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Conference Proceedings

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XII. International Conference on Logistics in Agriculture 2018

ANDREJ LISEC

Abstract The 12th International Conference on Logistics in Agriculture, which has been organized by the Municipality of Sevnica, Grm Novo mesto - Biotechnology and Tourism Center, Faculty of Logistics, University of Maribor and Landscape Governance College GRM has this year's central theme Global Challenges of Logistics in agriculture. The conference has become traditional and paves the way for a different view of logistics in connection with agriculture. That's why we have invited lecturers on the topic Digitalization in Agriculture: Digital Revolution in Agriculture - Industry 4.0. In addition to this topic, we will also discuss the topic of advanced food packaging, analyse local food production, circular economy, food supply chain, modern city logistics, processing industry, sustainable food concept, optimization of production stages and wine logistics in Slovenia, delivery of locally grown food in the local environment with electric and hybrid vehicles and creative solutions in the logistics of the care and staying of the elderly.

Keywords: • Logistics • agriculture • local food • packaging • electric vehicles •

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XII. mednarodna konferenca Logistika v kmetijstvu 2018

ANDREJ LISEC

Povzetek 12. mednarodna konferenca Logistika v kmetijstvu, ki jo organiziramo Občina Sevnica, Grm Novo mesto – center biotehnike in turizma, Fakulteta za logistiko Univerze v Mariboru in Visoka šola za upravljanje podeželja GRM Novo mesto ima letošnjo osrednjo temo Svetovni izzivi logistike v kmetijstvu. Konferenca je postala že tradicionalna in utira pot različnim pogledom logistike v povezavi s kmetijstvom. Ravno zato imamo vabljenega predavatelja na temo Digitalizacija v kmetijstvu: Digitalna revolucija v kmetijstvu - Industrija 4.0. Poleg te teme bomo na konferenci obravnavali še tematiko napredne embalaže za hrano, analizirali lokalno proizvodnjo hrane, krožno gospodarstvo, oskrbovalno verigo hrane, logistiko modernih mest, predelovalno industrijo, trajnostni koncept hrane, optimizacijo faz pridelave in logistike vina v Sloveniji, možnost dostave lokalno pridelane hrane v lokalno okolje z električnimi in hibridnimi vozili ter kreativne rešitve v logistiki bivanja in oskrbe starejših oseb.

Ključne besede: • Logistika • kmetijstvo • lokalna hrana • embalaža • električna vozila •

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Table of Contents/*Kazalo*

Conference Proceedings/*Konferenčni pripsevki*

Univerzitetna založba
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Spoštovani/*Wellcome.*

SREČKO OCVIRK
State Councilor of the Republic of Slovenia

Hrana je za obstoj naroda, države in lokalne skupnosti ključna dobrina. Kljub veliki popularnosti ekološke in alternativne pridelave se večina hrane še vedno pridela na konvencionalni način. Postopoma se dviguje delež hrane pridelan na ekološki način, prav tako pa tudi v popolnoma kontroliranih pogojih, na tako imenovanih farmah hrane. Pot hrane od pridelovalca do potrošnika predvsem konvencionalno pridelane hrane pa se podaljšuje. Z vidika države ni dopustno, da je pridelava dobrine, ki je primarna človekova potreba, v celoti prepuščena trgu. Zato se Komisija za kmetijstvo, gozdarstvo in prehrano ter Državni svet Republike Slovenije zavzemata za celovito in dolgoročno vzdržno kmetijsko politiko. Dejavnost, ki jo izvajajo gospodarske družbe v določenem sektorju in sektor v celoti se želi permanentno širiti, v tem razmerju sta logistika in kmetijska politika v nasprotju. Logistika predvsem podjetja ki se s to dejavnostjo ukvarjajo in velike trgovske verige s hrano ne vzpodbujajo neposredne povezave med proizvajalcem in potrošnikom, ali pa to izvajajo le iz reklamnim namenom. Cilj kmetijske politike pa so kratke prehranske verige, ki imajo pozitiven učinek na pridelovalca in potrošnika.

Izziv logistike v kmetijstvu je po moji oceni skrajšanje in posodobitev transportne poti med proizvajalcem in potrošnikom, logistično optimiziranje te

poti in hkratna vzpostavitev osebnega odnosa med proizvajalcem in potrošnikom. Del odgovorov na te izzive daje projekt Pametne vasi. Vendar brez osveščanja proizvajalcev in potrošnikov se verige trgovanja s hrano ne bodo skrajšale.

S svojim prispevkom želim usmeriti razmišljanje o organizaciji prometa s hrano na mikro raven, na individualni odnos kot protiutež velikim korporacijam, ki obvladujejo previsok delež trgovanja s hrano, kar pomeni tveganje za uravnotežen razvoj ruralnih območij.

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Advanced Packaging for Transport of Local Produced Food (Vegetables and Fruits)

Anesa Muminović, Norbert Timár, Blaž Šamec & Andrej Lisec

Abstract According to the production of a country, agriculture occupies the first place in terms of importance, so the maintenance and placement of agricultural products should be constantly present and the model of international transport should be constantly adapted to the contemporary market demands. This is especially true for fruits, vegetables, meat and live animals. In order to transport the goods safely, to store them and deliver them to the final consumer, they must be placed in a specific packaging. The packaging protects the load from scrapes, damage, external influences (moisture, light). In addition to its protective purpose, the packaging presents aesthetic appearance and allows a constant quantity and a safe declaration on the original packaging. In addition, the packaging plays a commercial role and improves product sale, which is why packaging design is one of its most important properties (often more important than content). The main task is to provide the customer or the consumer fresh, healthy, mature and preserved goods in the appropriate packaging that suits the taste and purchasing power of the consumer, whether it is a national or international sales market.

Keywords: • agriculture • vegetables and fruits • transport • packaging • production •

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1 Introduction

Fruit and vegetables play an important role in healthy nutrition and are high on the list of consumer priorities. However the major obstacle of purchasing ready-to-eat fresh-cut fruits and vegetables is their short shelf life, leading to quick degeneration and decomposition of the product and undesirable look and negative palatability (Ščetar 2010).

Quality and good packaging must protect the goods against the deterioration and damage. The final buyer (consumer) must be assured that the goods will get to it as goods were produced and that the environment could not have a negative impact on it.

Processing and packaging are the two important phases of operations in the food industry. The final phase is the packaging stage. A great deal of automation strategies are constantly being utilized in every phase of processing and packaging.

The correct packaging enables processors to pack fresh and fresh-cut fruit and vegetables and extend their shelf life. The important parameters for this shelf life extension are temperature, moisture and a modified atmosphere (oxygen, carbon dioxide and ethylene). If both temperature and packaging are optimal, ageing of fruit and vegetables can be slowed down significantly.

It is essential to minimise physical damage to fresh produce in order to obtain optimal shelf-life.

This study will explain the importance of packaging fruits and vegetables, show us types of packaging, and also conditions under which fruits and vegetables need to be transported and stored. Study will explain some of the advanced packaging technologies used to extend shelf life of vegetables and fruits and labeling of products.

2 Packaging functions

a) Function of protection

Good packaging must protect and guard against spoiling the contents stored in it. The end buyer (consumer, customer) must be assured that content will get to it as it was produced and that the environment could not have a negative impact on it.

b) Logistic function

The role of logistics is to ensure the storage of packaged goods in the required quantity and the prescribed durability without loss of value, while protecting the environment and saving costs. The packaging must ensure the storage of the packaged goods on the way to the final customer. Depending on the nature of the material, they are packed in suitable packaging, stored in silos, in an open storage space, in a covered, closed warehouse or in an air-conditioned warehouse. Therefore, the choice of packaging materials or packaging also depends on storage and transportation.

c) Marketing function

The end customer looks at the packaging as a part of the product. The packaging must attract the buyer and give him/her practical information. The commercial-selling function of the packaging consists in attracting the customer through its appearance, providing basic information about the product, providing consumers with easy identification of products on the market, creating an image of product, manufacturer, retailer, distributor and originality, and encouraging consumers to repurchase.

In addition, packaging can (Almenar 2016):

- Add value to produce,
- Strengthen brands,
- Monitor produce and environment changes during storage,
- Be a tracking tool,
- Provide anti-theft prevention,

- Allow unique identification and communication with consumers,
- Increase consumer satisfaction,
- Reduce food waste.

3 Deterioration

Deterioration includes any reduction in the quality of food, reducing their nutritional value, deteriorating their taste, smell, color, consistency and appearance, changing the chemical composition, physical characteristics and their contamination.

Figure 1: Defected pepper and strawberry;
(Source: http://www.fao.org/docrep/008/y4893e/y4893e06.htm)

The most common causes of food deterioration while in transport and in the store are:

- Defective product that has left the factory being defected,
- Improper transportation, handling and sale,
- Damaged packaging,
- Non-hygienic conditions of production, transport and handling of the product,
- Correct and defective (spoiled) products being mixed together,
- Keeping food in the vicinity of food or goods of strong odor,
- Exceeded the shelf life of the food.

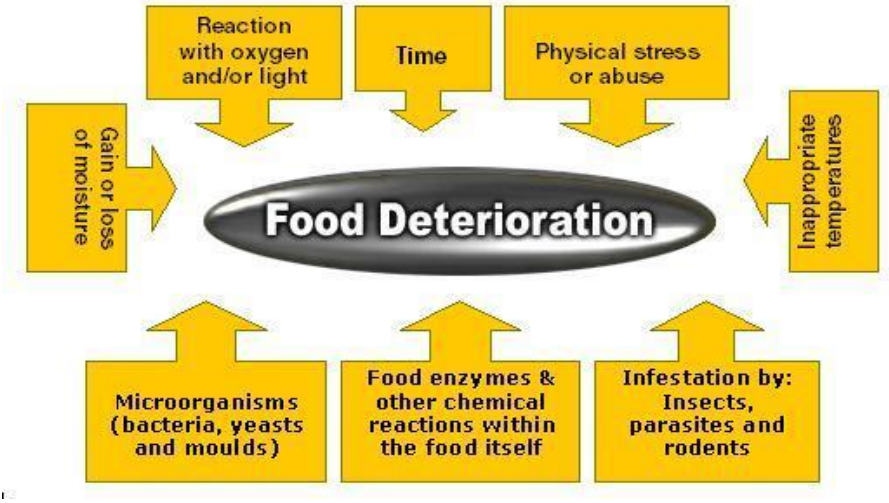

Figure 2: Illustration of causes of food deterioration.
(Source: http://ecoursesonline.iasri.res.in/mod/page/view.php?id=1706)

Depending on the type of food and the cause of the defect, deterioration of the food can be slow or very fast. Most common defects happen because of elevated temperatures, increased air humidity, elevated pressure, hitting, friction, irradiation, dust and other contaminants.

Beside outer causes, food can defect itself from inner causes, such as changing color, taste and consistency, physical and chemical reactions, reaction or contamination of packaging and microorganisms.

4 Transport, manipulation and storage of vegetables and fruits

The globalization of the market and the growth of the trade in vegetables and fruits are placing increasingly complex tasks on producers. The goal is to supply nutritional products as soon as possible to satisfy more demanding consumers, bearing in mind that it is only a satisfied customer a guarantee on market and winning the competition.

The production process management system, in most of the food-producing companies, is efficient due to the use of fully automated, modern production and control technologies and experienced and well-trained employees. On the other hand, distribution processes involving storage and transport of products are

often critical links in the food chain. One of the reasons is the dynamism of these processes; the product should be delivered from one location to another in the shortest possible time.

Vegetables and fruits are temperature-sensitive, ie they require a certain temperature regime. Therefore, special attention should be paid to this type of product in order to preserve their health and quality.

Each product in time loses on quality. However, the loss is much faster and higher if the product is exposed to unhealthy temperature. The highest number of bacteria that cause food poisoning grows best at a temperature of 37°C. Many microorganisms that cause food poisoning can not propagate at temperatures below 5°C. This means that in all parts of the cold chain the temperature should be below 5°C, and should not exceed 8°C.

Table 1: Recommended gas mixtures

Fruits	O_2 (%)	CO_2 (%)	N_2 (%)	Vegetables	O_2 (%)	CO_2 (%)	N_2 (%)
Apple	1–2	1–3	95–98	Artichoke	2–3	2–3	94–96
Apricot	2–3	2–3	94–96	Beans, snap	2–3	5–10	87–93
Avocado	2–5	3–10	85–95	Broccoli	1–2	5–10	88–94
Banana	2–5	2–5	90–96	Brussels sprouts	1–2	5–7	91–94
Grape	2–5	1–3	92–97	Cabbage	2–3	3–6	81–95
Grapefruit	3–10	5–10	80–92	Carrot	5	3–4	91–95
Kiwifruit	1–2	3–5	93–96	Cauliflower	2–5	2–5	90–96
Lemon	5–10	0–10	80–95	Chili peppers	3	5	92
Mango	3–7	5–8	85–92	Corn, sweet	2–4	10–20	76–88
Orange	5–10	0–5	85–95	Cucumber	3–5	0	95–97
Papaya	2–5	5–8	87–93	Lettuce (leaf)	1–3	0	97–99
Peach	1–2	3–5	93–96	Mushrooms	3–21	5–15	65–92
Pear	2–3	0–1	96–98	Spinach	Air	10–20	–
Pineapple	2–5	5–10	85–93	Tomatoes	3–5	0	95–97
Strawberry	5–10	15–20	70–80	Onion	1–2	0	98–99

Source: https://www.researchgate.net/publication/210280254

By increasing the temperature, all the processes within the plant's fruit/vegetable flow faster, and with the lowering of the temperature all processes in fruit/vegetable are slowed down. By cooling fruits and vegetables, it is achieved to slow down or stop the action of microorganisms and to isolate water as another cause of the defect. Today, in a cool and frozen state, almost all kinds of perishable goods (fruits, vegetables, meat, fish, ready meals, etc.) are transported and sold.

Cooling involves maintaining and storing fruits and vegetables at a temperature of 0 to +4 °C. Exceptions are some types of fruits and vegetables that can be stored and transported at slightly higher temperatures (eg. citrus fruit at 12°C and bananas up to 15°C).

The cooling process is essentially a way of storing fruit and vegetables that can not be changed for a shorter time. For some types of fruits and vegetables it is necessary to regulate the humidity of the space and the intensity of ventilation.

Apart from cooling, products can be frozen. Freezing is the process of cooling the product to the fading of the liquid content and is kept at very low temperatures for a long time, with a minimum change of basic natural and nutritional properties and product value.

To maintain transport and storage of food, it is necessary to have adequate storage and transport conditions related to the arrangement and equipment of the premises and vehicles, in accordance with the requirements of good storage practices.

Storage spaces must therefore be appropriately maintained and sufficient for the proper storage of various types of products. It is necessary to provide protection against dust accumulation and lifting, particle deposition on packed products, prevention of condensation or mildew development on walls and surfaces and good hygiene practices, including protection against various pollutants, and in particular pests

Storage atmosphere must be controlled by reference parameter control (CO_2, O_2, temperature, relative humidity), which are characteristic of each type of vegetables and fruits, including a variety of vegetables and fruits (Table 1).

4.1 Cold storage warehouses for vegetables and fruits

Warehouses are used for storage of goods, which are built as solid material objects with the required sewage and the ability to control the conditions. Warehouses can be universal - for storage of various types of food and specialized warehouses for storing certain types of foods.

Refrigerators are storage facilities for storing food at low temperatures (Figure 3). They are used to store both fresh and frozen foods. Cold rooms are mostly constructed as ground-based buildings. Specialized refrigerators are built around the food processing plants (slaughterhouses, frozen fruit and vegetable production plants, ready meals, fish, frozen bakery products, etc.) in which refrigeration or freezing is an integral part of the technological process.

The refrigerator walls must be as thick as possible and with as less openings as possible to achieve the best thermal isolation. The chambers are isolated by flocculant, glass wool or other insulators. Each chamber must be provided with a ventilation device that has natural or artificial air flow. Production and maintenance of the cold in warehouses for the storage of deteriorating goods is an essential part of the technology of work. It is achieved with compressors located in a special engine room, most commonly separated in their own building with a refrigerator.

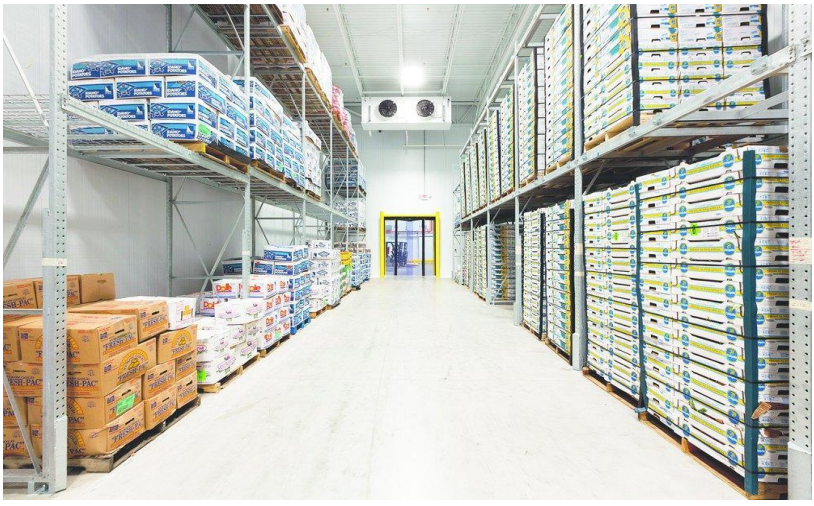

Figure 3: Cold storage warehouse.
(Source: https://www.reonomy.com/blog/post/the-rise-of-us-cold-storage-facilities)

By preserving fruits and vegetables in refrigerators, their use is extended for a certain, relatively short time. During that period, fruits and vegetables are in a lively condition. When storing fruits and vegetables, it is important to separate them because some types of products, due to their poor mutual influence, may cause the product to change the odor, to become inflammable, to transmit toxicity.

4.2 Transport of vegetables and fruits

For the transport of fruits and vegetables on longer distances, ships are used, and for shorter trucks and wagons. Some means of transportation differ in terms of protection, have a ventilation system, they are thermally insulated or cooled, kept out of the influence of outside temperatures, etc. In transport, cooling of fruits and vegetables is possible by means of a refrigerating machine, ice, dry ice or chilled air.

For the simplicity of manipulation and the entire transport process, most fruits and vegetables are palletised. Palletisation is the application of pallets in freight transport. The pallet is a wooden base or plastic base made out of panels of certain standardized dimensions to which the goods are placed.

The pallet is a kind of auxiliary equipment that allows the formation of a compact and solid package, complex of various types of piece goods (Figure 4). The loading and unloading of palletised goods is carried out by a forklift truck. If the goods are not palletised, loading and unloading requires additional workforce engagement and it takes more time to achieve the same amount of shredding as in palletised goods.

Figure 4: Plastic pallet with reusable plastic container.
(Source: https://nortpalet.com/en/info/fruit-and-vegetables-processing/)

Single use packaging generate a lot of unnecessary waste. Nowadays the consumers are demanding more recyclable packaging.

The Reusable Plastic Container is a returnable packaging without packaging waste because the containers are disinfected and cleaned after recollection. Damaged containers that can not be repaired are 100% recycled and used for the production of new plastic containers (Figure 5).

Reusable plastic containers' high levels of ventilation create the ability to more quickly cool products and control temperature in transit, prolonging shelf life. These containers can significantly reduce product damage. The design of containers make the handling process easier. The containers interlock exact and protect the foods from damaging.

Figure 5: The life cycle of plastic reusable containers at IFCO Company.
(Source: https://www.ifco.com/ee/en/food-safety/c3239543720887eb)

With the development of container transportation of fruit and vegetables is increasingly taking place in refrigerated-containers (reefers) transported by sea transport, and at the landing port of fruits and vegetables, it is directly loaded into trucks - refrigerators or wagons - refrigerators.

The benefits of transporting fruit and vegetables in containers are multiple, they protect products from external influences and allows simpler and more flexible application of temperature monitoring or regime. Frigo containers have a temperature control range of -35°C to + 12°C (Figure 6). Fruits and vegetables transported in fridges are packaged in boxes of various sizes and dimensions, weighing 10 to 50 kg. Container load was not palletised to make the container storage space as good as possible.

Figure 6: Inside and outside look of a reefer.
(Source: http://www.chassisking.com/images/products/regular/reefer-containers-20-hc-reefer-container-440v.jpg)

5 Packaging for vegetables and fruits

Consumption of food is one of the basic needs for human beings and its quality and safety is essential for leading a healthy life. Owing to the ever-increasing globalization of markets, foods being processed, distributed, and consumed in the same locality where they are produced are becoming less common. This worldwide integration of the food supply chain requires new approaches and systems for assuring food safety and quality since, during harvesting, handling, processing, and storage, food quality is compromised due to various biotic and abiotic factors. Therefore, it is important to monitor routinely the quality and safety of foods at different points in the supply chain. (Ashok 2018)

5.1 The Modified Atmosphere Packaging

The MA packaging technique (Figure 7) consists of the enclosure of respiring produce in polymeric films in which the gaseous environment is actively or passively altered to slow respiration, reduce moisture loss and decay and/or extend the shelf life of the products. (Ščetar 2010)

Figure 7: The Modified Atmosphere Packaging of fresh cut fruits.
(Source: https://www.chemarc.com/content/modified-atmospheric-packaging-map-technology-for-fruits-and-vegetables-an-overview/590196c484583c4676851674)

The Modified Atmosphere Packaging can be created in two ways, active and passive.

With active modification, the natural atmosphere in the sealed package is replaced with a modified atmosphere or gas mixture matched to the respective product. This modified atmosphere consists of **carbon dioxide**, **nitrogen** and **oxygen**.

Carbon dioxide is a natural gas that is low in the air. CO_2 prevents the growth of most aerobic bacteria and mold. The Carbon dioxide is the most important element in this packaging method. In general it can be said that the higher the CO_2 concentration, longer the shelf life of the perishable foods. It needs to be considered, fat and water are easily absorbed by carbon dioxide gas, but excessive

carbon dioxide concentration causes loss of quality in taste, moisture and concentration of packaging.

Nitrogen (N_2) is inert gas used to exclude air, especially to displace atmospheric oxygen in packaging. Oxygen's presence is precondition the growth of aerobic microorganisms. As a result, O_2 is usually excluded from modified atmosphere packaging. Vegetables and fruits need oxygen to stay alive and keep fresh in the packaging, thus require oxygen concentration, that prevents the spoilage.

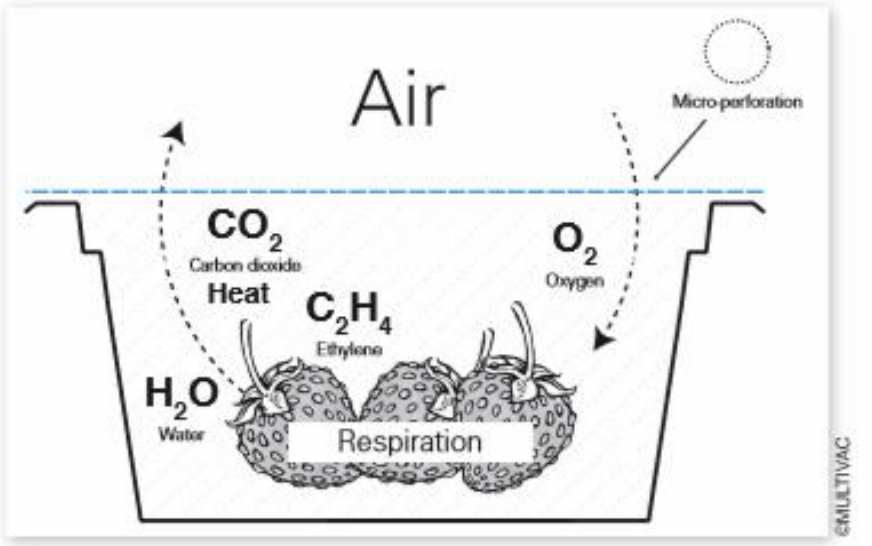

Figure 8: Passive Modified Atmosphere Packaging respiration diagram.
(Source: https://www.dlg.org/fileadmin/_processed_/1/f/csm_Packungsatmosphaere_Gleichgewichts-e_7f133437a5.jpg.)

The passive modified atmosphere packaging (Figure 8) has specific micro perforations that enables an exchange of the atmosphere between the package and the environment. The micro perforation, which is made by a special laser, are miniature holes that invisible for human eyes. In this packaging method, the carbon dioxide flows outward and the oxygen is inward. As a result in balanced air in the packaging takes the advantage of the natural respiration of fruits and vegetables for controlling the atmosphere in the packaging.

Figure 9: Testing the atmosphere in a plastic bag of carrots.
(Source: https://en.wikipedia.org/wiki/Modified_atmosphere)

The difference between the two methods is that active MAP use inert gases to form a static atmosphere, while in passive MAP the oxygen can entry and the carbon dioxide can exit. Figure 9 shows an atmosphere testing in a plastic bag of carrots.

5.2 The Intelligent Packaging as an innovation of the future

In Intelligent Packaging, the intelligent device or system is always part of the material that forms the package and is never placed inside the package along with the product. Examples of systems used currently to communicate produce quality and/or safety or to extend shelf life include indicators (time-temperature indicators, quality indicators, leak detectors), tracking devices (radio requency identification devices) and temperature-compensation membranes. (Almenar 2016)

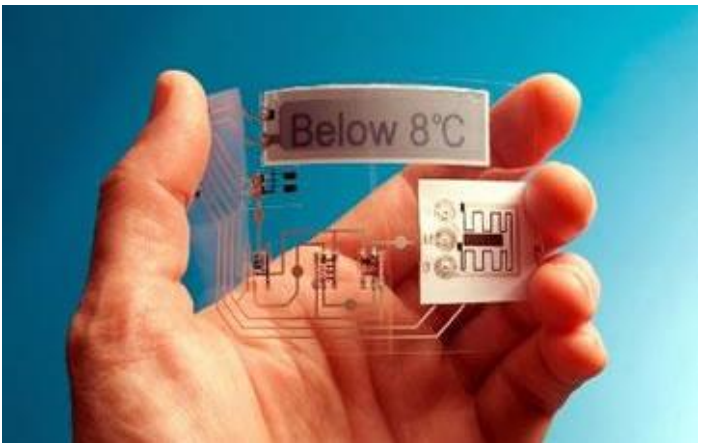

Figure 10: Thinfilm Electronics technology device for intelligent packaging.
(Source: http://www.fdbusiness.com/intelligent-packaging-sends-alerts-when-food-is-spoiled/)

Smart packaging can be categorised into two types, those which incorporate integrated circuits (IC's) (Figure 10) and does which do not incorporate IC's otherwise known as chipless smart packaging (Figure 11). Packaging that incorporate diagnostic indicators are also included in smart packaging. These can be used for such functions as monitoring vibration, acidity, tilt, shock, humidity, light, heat, time chemicals, virus or bacteria as they develop or as they are contacted. (Ščetar 2010)

Smart packaging uses features of high added value that enhance the functionality of the product, notably mechanical, electronic and responsive ink features, for example electronic and mechanical dispensers in which drugs are supplied and the prepared meal that automatically tells the microwave how it should be cooked. (Ščetar 2010)

Using intelligent packaging, it is possible to record a wide variety of time and temperature of product, products can be read by standard barcode readers and Android and Apple smartphones. Unique serial ID for each products can be used, enabling rich Track & Trace functionality.

Figure 11: BarCode being used for Intelligent Packaging of products.
(Source: https://www.smitherspira.com/industry-market-reports/packaging/active-intelligent-packaging-to-2023)

5.3 Biodegradable packaging

Prior to recent years, nearly all packaging for food, produce, and supplies were sold in plastics that were oil-based, made from petroleum. Because of the rising costs of oil, petroleum is a non-renewable resource and growing problem of waste disposal, there is growing attention to biodegradable packaging.

As a solution the consumer products industry is working on the development of biodegradable packaging (Figure 12). The materials of biodegradable packaging break down and return to the nature without causing harm. In order for packaging products or materials to qualify as biodegradable, they must completely break down and decompose into natural elements within a short time after disposal – typically a year or less.

Figure 12: Biodegradable packaging for fruits from palm.
(Source: http://www.sunpack.com/earthcycle-biodegradable-packaging-alternative/)

The compostable packaging consist of a group of polymers that derived from renewable raw materials like lactic acid, cellulose, soy protein, starch (e.g. corn, potato), it is not harmful to the environment and decompose back into carbon dioxide, water, biomass etc.

In the short term, bio based materials will most likely be applied to foods requiring short-term chill storage, such as fruits and vegetables, since bio based materials present opportunities for producing films with variable CO2/O2 selectivity and moisture permeability. (Ščetar 2010)

5.4 Labels on the packaging

One key area is the right labelling of the packaging. Labelling regulations also depend on packaging form. If we use the MAP methods for packaging – the primary packaging will be a closed pack. The text on the label must be written in one of the official languages of an EU member state and be comprehensible, in readable font size (minimum 1,2 mm) for the consumer.

Nowadays the conscious consumer would like to know more about the products, not just how fresh is the fruit or vegetables. He is interested in producing circumstance. The label is mandatory and include: the regulated product name and general description; the place of origin; the Trade's or Packer's full name and address; the quantity in the prepacked package is expressed as net weight (in grams or kilograms), production lot number and GTIN number (Figure 13).

The packaging have to be declare if the packaging contains gas, e.g. packed in protective atmosphere“ label. Additionally the trade's can declare information about the fruits' or vegetables' size, quality class, etc. The use of best-before-date is highly recommend, but is not mandatory for fresh unprocessed fruits and vegetables.

Figure 13: Label on the packaging.
(Source: http://www.freshplaza.com/2018/0117/tomatopack.jpg)

6 Conclusion

The average consumer rarely thinks about how their strawberries, asparagus, potatoes, apples and other fruits and vegetables got to the supermarket shelf. Customers simply decide what products they want and select them. But those strawberries, potatoes, apples and others, have been on a journey of many steps, considerations and challenges to arrive fresh and ripe on supermarket shelf.

Because of the many variables involved in packaging and shipping, getting perishables from point A to point B is one of the most challenging aspects of food manufacturing. Buyers – whether it's a grocery store or the end-consumer – expect a safe, attractive, fresh product.

Preservation of goods in a fresh and orderly condition from the place of production to the place of consumption is conditioned by the professional and proper preparation of the goods for transport. It is of utmost importance that each product is properly prepared, processed and preserved in a fresh and orderly state, up to the time the product is placed on the market.

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An Analysis of the Local Food Market: Sociological and Logistics Aspects

Vasja Omahne, Petra Vidergar, Lotka Uršnik, Andrej Lisec & Rebeka Kovačič Lukman

Abstract Transport is a key link between supply chain entities, while it has negative impacts on the environment. Shortening the supply chains in logistics is important, especially due to customer demands, cost and emissions reduction. The shortening of supply chains represents a complex problem, existing also in the field of a local food production. This paper addresses a supply chain problem of Spanish tomatoes, which are compared with locally "produced" and supplied tomatoes from Maribor. A comprehensive analysis of local food market in Maribor was performed from both logistical and sociological aspects. The supply chains were compared regarding the complexity, environmental impact and the quality of tomatoes. A comparison of the cost perspective of supply chains was also made. The large gap arises with the interests of supermarkets, as the Spanish supply chain can provide tomatoes throughout the year, while locally grown tomatoes are seasonal. Sociological aspect addressed information about shopping habits of inhabitants and their knowledge of domestic and locally produced foods.

Keywords: • Supply chain • shopping habits • Life-cycle assessment • local • domestic •

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1 Introduction

The promotion of locally produced food has a number of positive effects. These are the protection of the environment and the reduction of particular environmental impacts (e.g. CO_2 emissions), the shrinking of supply chains and shortening of logistical routes, the promotion of new jobs in rural areas and the improvement of the health of the population as a result of enjoying better quality food (Mundler *et al.*, 2016; Rothwell *et al.*, 2016). However, it can be perceived that locally produced food is devalued due to cheap imported food. Food multinationals also have large advertising budgets and very well succeed in hiding the huge gap that exists in the quality of their food and unprocessed or less processed local food. Due to the lack of information about the mode of food production and origin, consumers often have misconceptions about the value of the food they eat, although they are becoming more and more aware about the sustainability issues (Wognum *et al.*, 2010).

Logistic and sociological challenges of local food production should be also addressed, since freight transport has a strong impact both on environment, considering air, soil and water as well as living organisms (Canfora, 2015). The consequences of air pollution caused by freight transports are an increase in CO_2 emissions that generate a greenhouse effect, which results in atmospheric deposition, coastal areas and the extinction of animal species. Also, SO_2 emissions in transport affect acidity, therefore frequent occurrence of acid rain, which destroys nature and agricultural products. Emissions also affect soil (erosion, acidification) and water (acidification) (Novak, 2010).

Local food production and consumption is a challenge for sociological perspective as well. The purchase of local food stimulates local economy and local farmers. Consequently, money remains in the local community. Buying local food strengthens the links between the producers and consumers in the local community. This is reflected in three aspects; connecting people, promoting collective well-being and helping local farmers (Derkatch & Spoel, 2015). Food quality must also be considered in the sociological aspect. Foods of local origin have a higher nutritional value than imported food, which contains more chemicals. Chemicals are used for fruit and vegetables and those keep vegetables "fresh" for a longer period of time. Locally produced fruit and vegetables mostly

contain fewer additives than imported vegetables (Nacionalni inštitut za javno zdravje, 2016).

Due to the fact that consumer consciousness in the area of sustainable food supply is growing (Validi *et al.*, 2014) supply chain shortening is more than necessary.

2 Methods

The paper focuses on the logistic and environmental effects of a sustainable local food production, where 1 locally produced product (tomato) was evaluated from the supply chain point of view. Spanish and Slovenian tomato's supply chains were compared. Based on the obtained data from company Betafruit (German company that distributes fruit and vegetables through Europe), two simplified supply chain models were designed and a comparison of complexity, logistics routes and environmental impacts was performed. Mentioned supply chains can be seen in Figures 1 and 2, which are further discussed under the section 3.

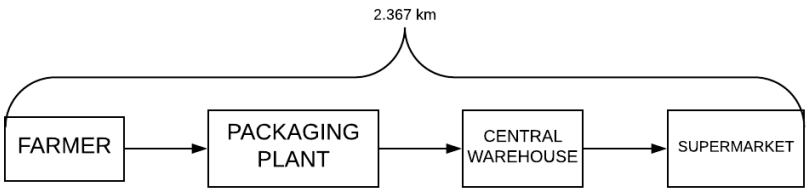

Figure 1: Spanish supply chain.

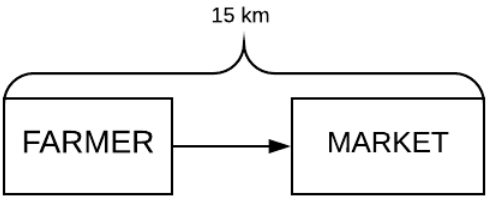

Figure 2: Slovenian supply chain.

Milà i Canals *et al.* (2008) are comparing the environmental impacts of domestic and imported vegetables (pulses, lettuce and broccoli) presented and important starting point. The survey showed differences of imported (vegetables from Uganda, Spain and Kenya) and home-grown vegetables (from the United Kingdom) in economic, environmental and sociological aspects. The research was carried out using the LCA (Life-cycle assessment), focusing on the study of the environmental impact of the product (in our case, vegetables) throughout the life cycle of the product. Therefore, all the effects on the environment of vegetables, such as energy consumption, pesticides, production and transport of oil, which are transporting vegetable transport vehicles, were taken into account in the analysis. The results were used as important findings of this research for our comparison of supply chains. The distance between the city of Maribor and the Spanish town of Almeria (famous for the production of tomatoes) and between Starše and Maribor was compared.

The second part of the research focused on the sociological aspect of local food market. Random participants were included in an online questionnaire. Questionnaire was solved by four age groups from 30 to 60 years. Respondents also had to define their place of residence and current employment status. The size of the sample is therefore 101 respondents, while the more precise structure of the sample according to the given criteria is shown below in Tables 1,2 and 3.

Table 1: Age groups of respondents

Age (years)	f	f%
30 – 39	16	16
40 – 49	35	35
50 – 59	33	33
60 or more	17	17
All respondents	101	100

The biggest age groups were people aged 40-49 and 50-59 years. Younger people were deliberately not included in the survey, as they usually eat food bought by their parents. Students also have subsidised food and do not buy the same amount of food as independent households.

Table 2: Employment status of respondents

Employment status	f	f%
Employed	70	69
Self-employed	8	8
Retired	19	19
Unemployed	4	4
Sum	101	100

Table 3: Place of residence of respondents

Place of residence	f	f%
Large city (more than 100.000 residents)	5	5
Small city (from 10.000 to 100.000 residents)	38	38
Village (to 10.000 residents)	58	57
Sum	101	100

3 Results

Results are divided in two parts - logistical aspect considering comparison of two supply chains and sociological aspect where the survey about buying local food was carried out.

3.1 Logistical aspect

The purchase of locally produced foods would be better, because it would consequently result in lower global warming potential due to lower CO_2 emissions, less acidification, less water consumption, lower human toxicity potential, lower ozone layer depletion potential etc. The implementation of locally grown food and delivery of it to the local food market in Maribor would consequently mean food with less pesticides, which is more nutritious and would mean less pollution. The problem is only a price, because the local agriculture would not be able to follow the requirements of customers, which in turn implies a higher price and a scarcity problem. Here, the benefits of vegetables from Spain appear, but Spanish vegetables are usually grown for mass consumption and are

full of special fertilizers. It must be mentioned that mass production also consumes huge amounts of drinking water. Also, transport from Spain represents a huge negative impact on the environment, and at the same time a longer supply chain. This can be solved by the implementation of the supply of locally grown Slovenian food, and consequently, the impact on the environment would be reduced; the biggest impact on this would be a shorter logistics path.

It was found that the route between Almeria and Maribor is 2.337 km long and the route between Starše (we used it as an average of the distance farmers who would sell tomatoes from the city of Maribor) and Maribor is about 15 km long. If the length of these routes is compared, a difference of over 2.000 km in the distance exists. This also implies, in terms of supply chains, the overcoming of a larger distance and greater pollution of the environment. Also, due to the distance, there is a need for several intermediate supply chain links. The model of the Spanish supply chain (Almeria – Maribor) is presented in Figure 1, which was designed on the basis of a conversation with the leading staff of the German company Betafruit, which deals with the distribution of fruits and vegetables from Spain across Europe.

The model of the system above applies to the proximity of the supply chain and is not divided into the supply chain microelements. This model can be compared with a simplified Slovenian supply chain, where the transport distance is only 15 km, Figure.

When comparing the presented supply chains, there is more than an obvious difference in the distance that the company or farmer has to make so that the tomato can be provided to consumers. However, tomatoes that come from Slovenia are more nutritious and fresh, since the supply chain is much shorter. Tomatoes from Spain must travel a huge distance, which also means a longer period of time and the inability to provide crop quickly. The great advantage of the Spanish supply chain is that it can provide tomatoes throughout the year.

3.2 Sociological aspect – analysis of the survey

Analysis of this part is divided into smaller analyses of responses to questions asked in questionnaire.

Question 1: Are you buying locally produced food?

Depending on age, the highest fraction of those, who answered yes, were aged 50-59 years (38%). Depending on employment, the majority of those buying local food is employed (69%), followed by retired people (18%). It is also interesting, that out of 4 unemployed people, 3 are buying local food, which is usually more expensive. Survey showed that people, who live on the village, are buying less local food, than those living in the city.

Question 2: Why do you decide not to buy local produced food?

The results showed that respondents doubt about food selling as locally is really locally produced. Unemployed also mentioned higher prices. There were also a lot of answers where people said that they grow their own food and that is the reason, that they do not buy it.

Question 3: Why is it important to you to buy local produced food?

The majority responded to the higher quality of food, following by support of local producers, other said there is less chemicals used while growing food and it is always fresh. For the age group 50 – 59 years health is the bigger benefit of eating local produced food.

Question 4: Which locally produced foods are most commonly purchased?

81% of people buys locally produced eggs. 65% are buying meat and vegetables. There were also answers to buy as much local food, as possible, including honey, flour and cereals.

Question 5: Are you willing to pay higher price for locally produced food?

84% are willing to pay more. Interestingly, those who answered, that do not buy local food often, were willing to pay higher price for local food, while those, who already buy local food, still want lower and competitive prices.

Question 6: Where do you most often buy locally produced food?

Figure 3: Where do people most often buy locally produced food?

59% of those, who buy locally produced food buy, it from a local producer alone, 45% in the local market and 21% buy it in the store.

Question 7: Respondents had to indicate, how often they buy local foods

42% are buying local food several times a week. Some people who answered, that they do not buy locally produced food often answered, that they buy it once a month or at least once a year.

Question 8: Are you aware of the negative impact on the environment caused by food imports?

93% of people are aware of mentioned problem. Interestingly, 25% of those, who do not buy locally produced food are also aware of negative impact, meanwhile 5% of those who buy local food, do not care about this. As we have shown before, the main reason for buying local food is quality of food.

4 Discussion

4.1 Logistic aspect

Considering results of logistic part, it can be perceived that local produced food has greater benefits for environment. Transport cause less environmental damage, food has higher quality, supply chain is more transparent and the paths are obviously much shorter. The main problem is price. Also considering the survey, prices of imported food are usually much lower and that way more consumers are able to afford it. Due to results of comparison incentives for the farmers could bring an added value, so they will be competitive on the food market.

It is also necessary to discuss about massive production of local food. When buying and selling smaller amounts, the supply chain can truly be simplified in just two steps - farmer and consumer. However, if larger amounts of locally produced vegetables, fruit and other goods would be sold, some sort of logistics centre should be established. Better organisation, higher traceability and short supply chains can be provided. Considering establishing logistics centre for local food in Slovenia the following services must be included:

- collection of fruits and vegetables and other food (by farms)
- storage of food
- processing of food (such as cooking, freezing)
- labelling, packaging
- consolidation
- food safety and standards activities (HACCP)
- administration, information technology

It is also important to locate logistic centre properly and logistically most efficient. Different parameters influent decision about location such as accessibility (motorway and rail accessibility, road network, restrictions for trucks), characteristics of location (possibility of expansion, social environment, construction restrictions, price, water supply, sewage, electricity) and economic environment (surrounding companies, competition, financial stimulations).

It also can be perceived that unfortunately self-sufficiency with local food in Slovenia is not possible due to capacities, and the weather conditions, which are not suitable for growing fruits and vegetables during the whole year. Considering the research, the main realistic goal is to educate consumers about buying local food and to increase awareness about positive effects of changing people habits in buying food. It is also reasonable to expect, that Slovenia will encourage local produced food more with financial and organisational support such as establishing logistics centre.

4.2 Sociological aspect

Due to sociological part and survey which was carried out, it can be perceived that mostly older generations are buying local. This may be the consequence of different lifestyles, if we consider younger survey participants. Their life pace is faster, and they may not have time to visit local markets, which are also usually open only in the morning. It is logical, that people living in the village are buying less local food, because they grow it themselves.

There is also some doubt about locally produced food really being local, which is the consequence of latest findings that some local food sellers were buying imported food and were selling it as home grown. Most consumers, that buy local, are aware of quality of local food and that is the main reason they buy it. It is interesting that most consumers buy local eggs and most are willing to pay more for local food.

The important result was regarding the place of buying local food. Most are buying it directly from the farmer, and can be argued that consumers do not trust local markets. Due to results, higher traceability and transparency of farmers when selling on local market can be suggested, but it is almost impossible to know, if fruits and vegetables are really home grown.

Most consumers are aware of environmental contribution when buying local food, but still a lot of young-age groups are not buying it. Considering this, it is important to raise awareness about all positive effects of buying locally produced food.

This can be made with organising events on local markets, marketing of locally produced food, giving information about environmental impacts and interesting positive facts, when buying local food, educating about quality and nutritional value of local food and also organising local food markets in the afternoon hours.

5 Conclusion and further research

Our research was divided in two parts - logistic and sociological. A comparison of Spanish supply chain and local supply chain was carried out and survey about buying local food was made.

To summarise all the results, Slovenia has a great potential to be more self-sufficient in producing and buying locally produced food, however, some obstacles emerge but can be overcome via awareness raising and regulations.

Thus most important step is so educate consumers, so the market would grow faster and a system for local food market would be established. Considering the market growth, logistical centre for local food would have to be established and for the optimal location of this centre, decision making programs (Dexi) could be used. Buying local food could improve the environmental pressures as well as health of consumers.

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An Introduction of Social Impacts to the Production Processes from Life-Cycle Perspective: A Case Study of a Toy

Vasja Omahne, Miha Vogel, Petra Vidergar, Andrej Lisec & Rebeka Kovačič Lukman

Abstract The sustainability aspects are becoming more and more important and individuals are becoming aware about environmental and social problems, although they are not included in the research and practice. This paper introduces an evaluation of social aspects via the whole life-cycle of the product (S-LCA), based on a case study of a toy from secondary materials, produced in Slovenia. The life-cycle perspective was used to evaluate the social impacts of a toy, which was observed through its three life-cycle phases.

Keywords: • Social Life-cycle assessment • sustainability • social responsibility • toy • case study •

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1 Introduction

Many countries, including in European Union are adopting sustainability oriented laws and also consumers are becoming more aware about social and environmental problems, which lead to the growth of the sustainability evaluation of processes, products and services. This encourages industries and companies to assess their products through the perspective of a life-cycle and carrying out a sustainability evaluation. In the sustainability evaluation a gap exists, which is a lack of the social aspect as identified by Ma *et al.* (2018), and can be addressed via the social life-cycle assessment (S-LCA), introduced by the United Nations Environment Program (UNEP). UNEP developed several indicators that can be used in S-LCA (Benoît Norris *et al.,* 2011) to better evaluate the social impacts of products, processes and services.

Also, Ekener-Petersen and Finnveden (2012) claim that considering social aspects in the sustainability assessment, more precisely in implementation of the S-LCA, can provide new insights to stakeholders about social impacts of a product system. This approach can identify important aspects that might otherwise be neglected. S-LCA can also help companies to conduct business in a socially responsible manner by providing information about potential social impacts caused by the activities in the life-cycle of their product (Dreyer *et al.*, 2006). Benoît Norris *et al.* (2010) state that S-LCA is best used for increasing knowledge, informing choices, and promoting improvement of social conditions in a product's life-cycles.

The major concern of S-LCA is that the methodology is not standardised, as for example the life-cycle assessment (LCA). The guidelines, published by UNEP, identify the following five main categories, that effect S-LCA. Those are workers/employees, local community, society, consumers and value chain factors (Upananda *et al,* 2009). The value chains are also closely interlinked with the logistics. In our research a focus was been given to the selected product - a toy for children that is made by the company Avantus zaposlitveni center, d.o.o. and for which S-LCA was carried out. In order to avoid the vagueness of the methodology, numerical indicators were developed to evaluate social aspects.

2 Methods

A framework for an evaluation of the social aspects within the life-cycle of a product is a methodology called S-LCA. A methodology enables studying the direct and indirect positive or negative impacts of the product on the social aspect through its life-cycle. It also integrates traditional life cycle assessment by having social aspects as focus (Sala, *et al.*, 2015). When conducting the S-LCA for our study, first a life-cycle model that consists out of three phases was designed, including all the processes. The three phases are production, usage and end of life. S-LCA indicators were selected, based on the UNEP methodology as well as other relevant numerical indicators were added, to comprehensively assess the impact of the company's product on the society. The most demanding was a definition of indicators, since it is often challenging to design social indicators in a way that they are not subjective and are at the same time measurable. Therefore, the following social indicators were used for the first phase (production):

- fraction (in %) of local suppliers in terms of the national average and a share of local suppliers in the company
- fraction (in %) of employees from a vulnerable environment
- fraction (in %) of psychologists in the company
- fraction (in %) of men/women in the company
- number of work hours per week
- employee satisfaction at the workplace
- satisfaction with an employer or manager.

In order to obtain the information about the satisfaction at the workplace in the company, an anonymous questionnaire was carried out. This questionnaire was spread out to all the employees and analysed.

It was also challenging to determine the indicators for the usage phase, since we did not have contacts with the users of the product. Thus, our results are based on previous research studies about how similar toys influence users (usually children). For the last phase, end of life, other options, excluding disposal were considered, especially to define the possibility of further re-usage and re-manufacturing of the product. The total structure of S-LCA and its steps are shown on Figure 1.

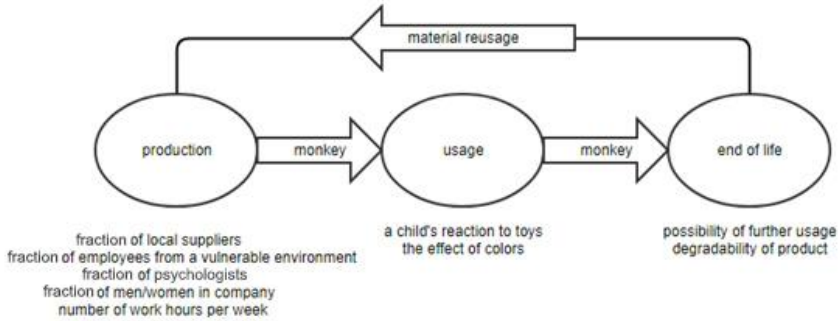

Figure 1: A product life cycle.

3 Results

Results emphasize the social aspects of the product throughout its entire life cycle (production, usage and end of life phase) by each indicator as explained in previous section.

3.1 A fraction of local suppliers

The aim of this indicator was to introduce a relation between the studied company and suppliers. The higher the number the keener the company is on cooperating with local suppliers.

The company Avantus has 5 suppliers for this product, 3 of which are located in Maribor, therefore 60 % of their suppliers are regarded as local. Taking into at a statistical report the area's average is only 27.2 %, for this reason our studied company is above the average (SURS, 2017).

3.2 A fraction of employees from vulnerable environment

First, it was defined a category of a worker from a vulnerable environment. The law defines these as handicapped workers in a way that it keeps them from finding and performing a regular job (Zakon o urejanju trga dela (Ur. l. RS, št. 80/10, 40/12 – ZUJF, 21/13, 63/13, 100/13, 32/14 – ZPDZC-1, 47/15 – ZZSDT in 55/17)). Second, our studied company is classified as a social company, therefore it needs to employ a certain number of people from a vulnerable environment in order to receive state funding.

In this case the company has in total 16 employees, 10 of them fall under the social category. This result (62.5%), proves they are socially responsible, according to the indicator.

3.3 A fraction of psychologists and social workers

The psychologists and social workers represent the availability of support for work related or personal issues of such nature. It shows a care from the side of the company as the higher the number of such workers the more comprehensive their support is. Out of the 16 employees 5 are available of offering psychosocial and social related support, which means that their coverage is quite attentive.

3.4 A fraction of men/women in the company

A gender equity raises a high level of concern with an intention to fairly allocate the resources (e.g. decision-making, salaries, imbalances in benefits, etc.) without any discrimination on the basis of gender. The studied company employs 13 women and only 3 men, which represents an imbalance in a favour of women. But in this case the higher number of women is because of the distinct line of work that the company offers.

3.5 Number of work hours per week

The amount of work hours that the average worker needs to perform in a week can show if workers are being overworked and made advantage off. The standard in Slovenia is 40 hours per week so anything above could be problematic, whereas anything below can show the company's willingness to accept flexible schedules. In this case it was found that the average working hours per week are 36.25. It was expected for a company that employs people from vulnerable environments to allow their staff more down time.

3.6 Satisfaction survey

To find out about the satisfaction of the workers regarding the company an anonymous survey was conducted. It consisted of 7 statements that were split into two groups. One was focusing on the workplace satisfaction and the other on satisfaction with the employer and management. The first group had the

maximum number of points set to 12, while the second had 9. After analysing a survey, the averages were 10.67 and 8.53, respectively. Thus, it can be concluded that that the employees are very satisfied with their work and employer.

3.7 Effects of the toy on children

Toys have an influence on children mental and emotional perspectives, which are both important. The three main pillars of a quality toy are the looks, the shape and the feel of it. The toy in the case study was in majority colourful, of a neutral shape and soft to touch. Bright colors intrigue children and appear more interesting to them. The neutral shape is important as it is not predefined and it encourages them to use their imaginations to fill in the blanks. Also, the soft feeling reinforces a feeling of comfort and security (Sončeve punčke, 2017; Bibaleze, 2017). In conclusion it was realized that the stuffed monkey checks all the boxes and should be a quality toy for children to play with.

3.8 Possibility of further usage

This indicator is for finding out the possibility of re-using and re-manufacturing the toy. In itself the toy already represents the concept of a circular economy as it is made out of recycled materials (socks). The other components are polyester, rice and threads. While the amount of thread is negligible, the other materials are possible to reuse. Rice is biodegradable, so it can be used as a fertilizer or re-used for filling up new toy. Also, socks can be shredded and used as filling instead of polyester, which is not biodegradable. This would make the components of the next generation of toys completely biodegradable and of natural origin.

4 Discussion

Observing the results of S-LCA and reasons for why S-LCA is a good tool, it can clearly be seen that the social aspects should be emphasized, when assessing the sustainability of a particular products. With the S-LCA stakeholders can get new insights about the social impacts of a observed product, which was in our case study a toy. Following the results it can be concluded that the company's social responsibility above the average, considering several indicators. Furthermore, this can be argued because 62.5% of the employees are from a vulnerable environment.

Conducting the S-LCA increased the knowledge and information about the effects of the toy on the local environment, since the results show the production process of a product supports local companies by using their services. The studied company is also very employees friendly, because they have a high number of psychologists and social workers, which provide help to employees when needed. Assessing the social impacts, it was found out that the company is willing to offer flexible schedules to their employees, and it is not discriminatory towards both genders.

The usage phase was assessed with subjective indicators, which were used to analyse the impact of the toy on children, and are based on the previous studies. The results indicate that the toy has a positive impact on children, mainly because of the bright colours and patterns. Another advantage is that toy does not comprehend any hard parts, but it is soft to the touch.

The results of our study support the outcomes of Benoît Norris *et al.* (2010), arguing that the S-LCA analysis promotes improvements of social conditions in a products life cycle. It is also supported by the fact that the toy can be reused. This makes the product environmentally friendly.

5 Conclusion

The S-LCA has been carried out according to the selected social indicators, using questionnaires and information provided by the company. It was found out that the company cooperates with local suppliers, employs people from vulnerable groups, and that the vast majority of employees is very satisfied with management. It can be also concluded that the product has a positive impact on the users, during the usage phase. It was found that the toys are made of socks in attractive and warm colours that stimulate the development of imagination in children. Furthermore, the toy is soft and made of natural materials, and thus reflects gentleness.

The results of our case study have shown a usefulness of the UNEP framework for assessing the social aspect of the toy, and bringing additional insigths to all the stakeholders Also, a flexibility of UNEP's framework has to be emphasized allowing the users to include attional case related indicators (e.g. local suppliers) in the methodology, increasing the comprehnsivness of the study. The challenge

that can be identified in the S-LCA are not clearly defined indicators, without which the assessment the social aspect of particular product can be questionable.

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Profit Margin Inequality Within the Food Supply Chain

Nataša Prodanović & Matevž Obrecht

Abstract The purpose of this paper is to examine the significance and importance of the food supply chain. We will review supply chain theory and focus on food supply chain. A supply chain is a system with three or more organizations that follow a flow of product, services, finances and information in both directions. It's important that all the activities in processes are repeated and aimed at meeting the needs of end consumers. All flows (information flow, financial flow, services and the flow of product) must be interconnected and related to the processes – this is the key for the supply chain to be efficient. We will in general introduce simple and complex supply chain and examine examples of food supply chain in Slovenia and elsewhere in the world. It was proved that Slovenian food supply chain is different than food supply chain in other countries so it is important to know where the supply chain itself is located and how it relates to other supply chain participants especially in terms of financial flow and profit margins that are unequally distributed within the supply chain.

Keywords: • Food supply chain, • supply chain management • Slovenia • supply chain profit • supply chain theory •

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1 Introduction

A supply chain is a system of three or more organizations that follow a flow of products, services, finances and information in both direction. All services in processes are repeated and aimed at meeting the need of end consumers. The supply chain includes information flow, financial flow, material flows, services and the flow of product services (MSC 2017; Chopra and Meindl 2013). It is important that all these flows are interconnected and related to the processes and have good integration – this is the key for supply chain to be effective. We know simple and complex supply chain, where simple supply chain has a linear connection and there is one actor in a particular process, while complex supply chain has many suppliers, processors, warehouses, wholesale customers etc. (Chopra and Meindl 2013). The development of the supply chain itself is carried out in four phases; the first phase relate to internal optimization, the second one relate to the correct informatization, the third to the mutual cooperation and the fourth phase relate to the external optimization (MSC 2017). The classical supply chain has the management of individual functions with almost zero cooperation between processes, so it is isolated. And this bring some disadvantages with large cost, large inventories, product damages, administrative costs are also very high and demand side response is poor. Therefore it does not make sense to have such a supply chain. On this basis, has been created a new form of supply chain, which has more effective approach, because the entire supply chain is accept as one organization (Opara 2003). All this contributes better traceability and transparency of information to all members of the supply chain. The goal of managing the supply chain is to increase the profitability and efficiency of the organization with optimized speed, security and optimization of added value (Opara 2003). In order to optimize the management of supply chain, it needs very good information technology and logistics, so we can say that the concept of 4P is joined by the flexibility, reliability of suppliers and their delivery and the level of inventory. We can save from 40 % to 80 % of total savings, the shipping time can be reduced from 30 % to 50 % and human resources can be reduced from 20% to 30% with proper or efficient management of supply chain (MSC 2017). When talking about agricultural supply chain the conceptualization of consumer products and services as supply chains is now a common practice in most industries. From the farming of basic raw materials to delivery of final products to the consumer, each different step in the entire production process is viewed as link in the chain (Opara 2003).

2 Food supply in Slovenia and in the EU

Food supply chain is specific however same rules apply for the food supply situation. It is very complex, where a lot of producers, suppliers, processors, carriers, warehouses, wholesalers and retailers are present. In the Figure 1 it is seen how complex food supply chains are. In such a complex system, it is difficult to handle all the processes and that the system is synchronized from all sides. The agricultural economy presents two features. The first one is based on greater concentration of farms into smaller numbers with large sizes and rising influence of contact farming and the second one is based on evolution of integrated supply chains linking consumers and producers.

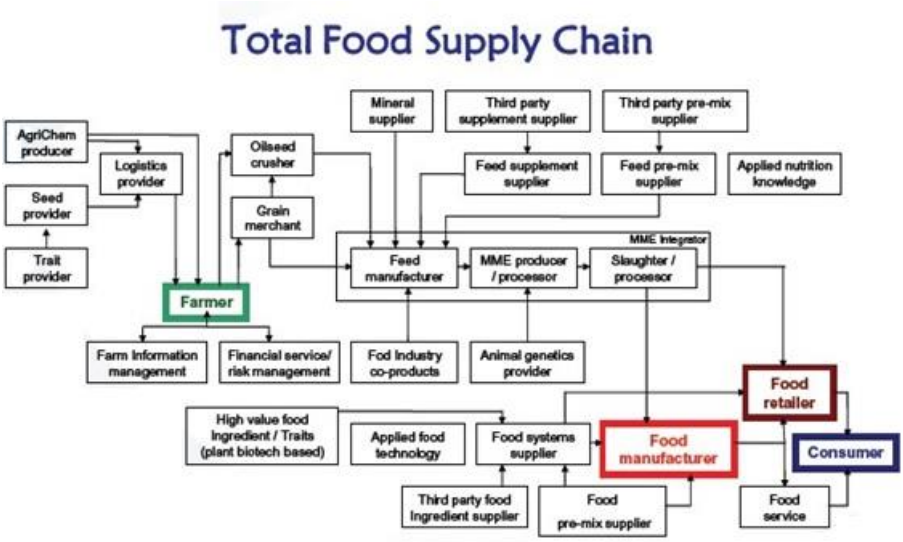

Figure 1: Total food supply chain.
(Source: MoniQA, 2010)

Intensive farming like this create new challenges for sustainable production, which is promoted of a balance approach for food quality, safety etc. and is contrary with genetically modified organisms which might impact human health on a long run. On the other hand food supply chains show increasing number of consumers who demand fresh, palatable, nutritious and safe as well as organic and local domestic food. Due to changing lifestyles and rising income around the world, there is also increasing proportion of meals eaten in restaurants and bars. These factor have major implications on the future of agriculture (Opara, 2003) as well as on the food supply in general.

3 Case studies

Research made by Koman (2011) suggests that relations in the food supply chain are poor in Slovenia and that they reduce competitiveness of Slovenian food supply actors. Therefore, Slovenian traders have only few possibilities compared to other global competitors. Relations are beginning to be fragmented by farmers, as they are in a "misunderstanding" with traders and their high margins. Because of all these misunderstandings, the Ministry of Agriculture decided to use codecs, which are variable for farmers, processors and traders. It is important to know, that food always was and still is one of the strategic human goods and its prices will increase not only in Slovenia, but over the world due to population growth, increasing standard of living and environmental impacts reducing yield and agricultural land. The strongest actor in food supply chain belongs to the retailers having power to set prices and effect on (or even exploit) food producers and food processors. President of the Slovenian Trade Union of Agriculture and Food Industry believes that farmers are not equal members in the supply chain. In principle, food supply chain in Slovenia should have been optimized. It is not optimal that Slovenia only have a very small percentage of Slovenian products in its food supply since the most of the food is imported in Slovenia. In 1992 Slovenian self-sufficiency was almost 90 %, while it felt to 38 % by 2009 (Koman 2011) and is currently app. 40-45 %. This is worrying, because Slovenia has more than 60 % of green areas which are many times unused and sometimes Slovenian food is exported to other countries. Slovenia has great opportunity to increase local produced food for domestic and foreign consumption. The second problem is profit in the supply chain which is unequally distributed. It should be regulated to give more to producers instead of retailers and to offer subsidies for the star-ups dealing with local food.

Study explored the Slovenian market and compared some food items and distribution of profit within their supply chains. In the Figure 2 the proportion of distribution of profit on bread, milk and yogurt in Slovenia is presented. Even if the producers are seen as the most important part of food supply chain, they receive the smallest share when talking about the financial flow. Because of these conditions disagreements between the individuals in the supply chain are common and food quality can be decreased substantially. Consequently, there are less and less local food producers and food processors. It is also known that Slovenia has a very high percentage of imported fruits and vegetables. However,

there are quite a few good practices where the food chain is short. One such example is the vegetable produced in Slovenia. This is consequently not comparable to imported from the quality perspective since the imported one loses a lot of nutrients, minerals and vitamins already at the transport itself. Short supply chain such as at "green box" initiative, where the trader buy goods from twenty major ecological farmers from all over Slovenia are much better for the food quality as well as for the equal distribution of profit margins.

Food item	Yoghurt	Milk	Bread
Total retail price	0,61 EUR	0,8 EUR	1,2 EUR/kg
Price (delivered in warehouse)	0,24 EUR	0,38 EUR	0,44 EUR
Retailer	0,37 EUR or 60,7%	0,42 EUR or 52,5%	0,76 EUR or 63,3%
Manufacturer / Processing facility	0,19 EUR or 31,14 % (dairy)	0,11 EUR or 13,75% (dairy)	0,26 EUR or 21,7% (miller& bakery)
Producer / farmer	0,05 EUR or 8,21%	0,27 EUR or 33,75%	0,18 EUR or 15%

Figure 2: Price cuts for individual supply chain partners for yoghurt, milk and bread (adapted from Koman, 2011).

Interestingly, according to their data, the sale price in "green boxes" is lower than in stores. In this case, the vegetables are not stored, the waste vegetables are almost at a zero level. A good example is also the Agrarie Koper, where farmers joined together and deliver fruit to schools and hospitals. The responsibly ministry also plays an important role in this case since it prepares a list of schools (final customers) and suppliers. This is how the short supply chain is taken care of and encourages the connection between schools, kindergartens and local producers (Šajina 2014).

The term "local food" means food production near its place of consumption, and production is based on local resources. In 2001, Britain carried out a study by the New Economics Foundation, which found that the money spent on locally produced foods generates 2,5 times higher revenue for the local economy than the same amount of money consumed in a typical supermarket. For

example, spent £ 10 on locally produced foods is actually worth £ 25 for the local area, and for the used £ 10 at the supermarket is only £ 14. When money is spent on locally produced food, it remains in a local district where its value is increasing. Consequently, there are also more investments there, which brings new jobs. It can therefore be concluded that the localization of food production is key to the local economy and to achieving social growth (Koman 2011 and Šajina 2014).

Logistics is a key factor between food manufacturers and traders. The research of Zhong et al. (2016) says that out of 24 million people employed in the food supply chain, 21 % are employed by logistics companies. In order for the supply chain to be sustainable, the supply chain itself has to concentrate on the economic, environmental and social perspective simultaneously.

A good example from Europe is the logistic center Limburg, located in the south of the Netherlands. There is a very high productivity in the logistics itself, and their infrastructure enables them to lower the cost of the supply chain and reduce the impact on the environment. North America is the second-largest food industry in the world, with a turnover of 650 billion € in 2013 (Šajina, 2014). Their care is multifaceted, which means that the process itself is large and complex, but it nevertheless tries to keep up with economic growth of around 3 % with various innovations. Food companies aggressively spin on the market, which brings a variety of risks. The use of biotechnology is also increasing in order to satisfy a sufficient amount of food. China is the third largest food producer with a turnover of around EUR 767 billion. In the Chinese and other Asian food supply chains, low prices (and sometime questionable quality) based on labor exploitation and inhumane working conditions, etc. can be present therefore it is disputable from social and environmental perspective.

Conditions of food supply chains, food quality and principles of organic farming and locally produced food is very different from the geographical location of producers, processors and retailers as well as how it relates with other global supply chain actors. The general problem is to provide food that has some quality standards for the entire global population. Giants of the global food industry, which can many times not be regulated, controlled and counteracted have a great influence on global food supply. According to the data on food supply chains there are many multinationals that have annual income above Slovenian annual budged therefore their impact as lobbies is severe. It should be necessary to begin

to shrink profit at the very top and redistribute a part of it to farmers and producers however this mission is almost impossible.

4 Conclusion

Supply chain in food industry is very important and production, processing and their operations to provide a smooth flow of food is crucial. It is important to know where the supply chain is located in the world, because every country has its own special features. We cannot expect same supply chain styles in country which have totally different mentality, GDP and standard of living as from the countries which do not have opportunity to raise local food. In case of profit margin redistribution authors would recoment that the producers should be protected by the Ministry of Agriculture, to have guaranteed purchased price especially for organic farming since it is unfair that the most important part of the supply chain have minimal financial gains. Slovenia should also advertise local food consumption more effectively and offer education of local food, negative impacts of imported food (e.g. food miles) and organic farming. The good idea is also to include local (and if possible organic) food in kindergartens and schools and to promote that every school should find local food producers and offer children only local vegetables and fruits at breakfast, snacks and lunch. What we eat is what our future is based on. Slovenia as a small country with a lot of green areas has high potential to become a pioneer in local food production and consumption to avoid food miles, lower nutritional values, create added value at home and to keep the profit at the level of local food producers.

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Digitalization in Agriculture: Digital Revolution in Agriculture – Industry 4.0

Slobodan Antić

Abstract This paper describes the high-tech solutions presented in the use of innovative Industry 4.0 technologies such as cloud-based software, Drones, IoT, Blockchain and Big Data. Paper explains the magnitude of global problems caused by agricultural expansion and the benefits of integrating modern technologies into the agricultural system. Research and personal experience and expertise in the industry by the authors are included, along with the latest trends in agriculture. Paper will indicate the importance of ICT in modern Agriculture. Unlike the traditional approach to doing aiculture, which was based on an optimal combination of resources and a strategy of cost advantage, open IT innovation has become the main driver of agriculture growth and productivity, and innovativeness is one of the strategic factors that can help agriculture to change in the existing market limitations

Keywords: • agriculture • IoT • drone • ICT • industry 4.0 • agremo •

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1 Introduction

Information and communication technology (ICT) is the basis of digital industrial revolution that today defines how modern companies operate and the global market functions. These technologies have essentially changed the way companies operate and create a competitive position for themselves in the market and have brought numerous advantages in terms of saving energy, space, money and time. ICTs have also facilitated management and improved flexibility of business systems, and provided for more reliable and secure operations. The main question is: "What will the fourth industrial revolution change in the way companies do business"? The main effect of the Industrial revolution 4.0 is a creation of digital economy that combines the use of Internet with other advanced technologies that support companies' businesses and cause significant disruption in the business environment.

According to Schwab (2016), global businesses in Industrial revolution 4.0 will change not only the way companies operate, but also the way people live and communicate. Industrial revolution 4.0 according to Smokvina (2016), brings advanced industrial production, which relies partly on modern technologies for production automation, data processing and data exchange.

This new industrial production framework merges two areas that used to be separate – robotics and e-business. In the core of the fourth industrial revolution lies the power of three technological innovations: Automatization, Internet of Things and Artificial intelligence, Berger (2016).

Industrial, economic and business models are changing fundamentally and humans are being removed from immediate production and monitoring of manufacturing processes. In this way production can be accelerated and the number of halts and problems minimized.

According to Smokvina (2016), the fourth industrial revolution is based on six principles, which define the characteristics of the modern business environment:

1. Interoperability – the ability of companies and people to connect and communicate in a cyber-physical system;
2. Virtualization – entails creation of a virtual copy of the physical world within a cyber-physical system in order to monitor and connect the system;
3. Decentralization – moving decision-making away from a few core people in a company. Product-related decisions have been transferred to consumers, who increasingly demand individualized products;
4. Capacity to operate in real time – the data are collected and processed immediately. Production and conditions in manufacturing facilities are monitored constantly, and production is automatically shifted elsewhere in case of a disruption;
5. Service-orientation – service architecture of companies is comprehensive and takes place via interconnected web services and Internet of Things;
6. Modularity – thanks to standardized hardware and software systems, production can be flexibly adjusted to meet the manufacturer's requirements.

The five digital technologies which are presented the basic concept for digital transformation are (EC, 2014, Digital transformation of European Industry):

1. Mobility and mobile applications (Technologies that enable voice and data connections between people, and objects;
2. Social media (social networks – Facebook, LinkedIn, blogs, and other.
3. Cloud – Cloud computing is a model for enabling convenient, on-demand network access to a shared computer resources (e.g. networks, servers, storage, softvare and other;
4. Big Data Analytics – process of collecting, organizing and analyzing large sets of data ("big data") from variety of different sources to discover patterns and other information;
5. The Internet Of Things (IoT) – Describes the network of physical objects that feature an IP address for internet connectivity.

Today, in agriculture production, many farmers are already using digital technologies such as smart phones, tablets, in-field sensors, drones and satellites. These technologies provide a range of farming solutions such as remote measurement of soil conditions, better water management and livestock and crop monitoring. By analysing the data collected, farmers can gain insight into likely future crop patterns or animal health and welfare. This enables them to plan more effectively and be more efficient. Potential benefits of the use of digital technologies may include improved crop yields and animal performance, optimisation of process inputs and labour reduction, all of which increase profitability. Digitalization can also improve working conditions for farmers and reduce the environmental impacts of agriculture.

The EIP-AGRI Focus Group (2016) for Precision Farming identified a range of measures that promote the use of technologies by farmers, including the following:

1. The introduction and uptake of technologies requires new skills and knowledge for farmers and advisers. Raising awareness and organising training on a regional/local level is essential, especially to reach small and medium-sized farms, where the use of digital technologies is not always thought of as profitable.
2. The development of specific data analysis tools, with a special focus on costs-benefits, can help farm advisers to play a critical role in informing farmers on digital technologies.

Figure 1: Digital transformation in agriculture.
(Source: EIP-AGRI Brochure Operational Groups Update 2016)

Digitalization of soil should include merging various technologies which would allow us to gather more information, create historical records and intelligent forecasts based on collected data. This kind of system would bring the intelligent decision making in farming. Some of the benefits of proposed system are:

- Better quality of crops and higher yields per square meter;
- The decrease of negative environmental impact & prevention of soil erosion;
- Reduction of water & pesticide usage.

Back in 2015, more than 30 % t of all value created with agricultural machinery worldwide came from software, electronics and sensors, surpassing the value created in the automotive industry three times over. It is essential for farmers and for the environment that processes are adapted to a digital technology concept because innovative processes can potentially lead to efficient and resource-

friendly sustainable farming. Two terms crop up at regular intervals: "precision farming" and "smart farming".

“Precision farming” is the targeted management of agricultural land using smart electronics. Examples include electronic devices for sensor-assisted soil assessment, the automated monitoring of free-ranging animals on pastures and the targeted control of agricultural machinery. Modern differentiated farming methods enable the management of spatial and temporal variability within plots of land. Precision farming is an agricultural concept involving new production and management methods that make intensive use of data about a specific location and crop. Sensor technologies and application methods are used to optimise production processes and growth conditions. In contrast to conventional agricultural methods, using digital data can increase resource and cost efficiency as well as reduce environmental impact. Aerial images taken using drones provide valuable information about fields, including for example soil quality, unwanted plants and plant diseases. Data is available relatively quickly and appropriate measures can be taken.

Smart farming (also known as Farming 4.0 and digital farming) is the application of information and data technologies for optimizing complex farming systems. The integration of smart agricultural technologies and modern data technologies enables seed planting to be adapted to a specific field to ensure an efficient production process. The application of information and data technologies supports farmers in making informed decisions based on concrete data. Smart farming is also based on precise control electronics. This paves the way for enabling agricultural machines to communicate among themselves as they can all access electronic field record files.

But the main question is. “ How does a farmer process all this information?”. There are farm management systems, agricultural apps and online platforms to support farmers. "Smart farming", often also referred to as "Farming 4.0", involves not just individual machines but all farm operations. Farmers can access real-time data on mobile devices (mobile phones or tablets). Data about, for example, the condition of soil and plants, terrain, climate, weather, resource usage, manpower, funding applications is collected, processed and evaluated. An agricultural business rarely purchases modern machinery and equipment from a single manufacturer. So choosing equipment providers not only depends on how

efficient the equipment is, but also whether devices can be flexibly connected with each other.

2 Digital technology in process of digital transformation

2.1 Blockchain technology

In theory, the goal would be to treat 1 square meter (sqm) of soil as a Soil Basic Unit (SBU) – congruent, square shape with sides of 1m by 1m. SBU cannot be divided into smaller units, similar to the pixel. Every SBU has 4 vertices. Each vertex is defined by geo-referenced data – point's longitude and latitude. Every SBU inherits its name from its 4 vertices, (vertex 1 lat/lon; v2 lat/lon; v3 lat/lon; v4 lat/lon;), e.g. (44.966069, 19.856436 ; 44.966070, 19.856436; 44.966069, 19.856437 ; 44.966070, 19.856437). Here we would like to introduce Blockchain, as a centerpiece of the system, as we will treat every SBU as a distributed ledger. SBU will work as a database updated independently by each node included in the network. Nodes will be data collecting platforms such as a cadastral database; drone analytics platform; IoT communication platform; farm management software, etc. Every single node on the network processes every transaction, coming to its own conclusions and then voting on those conclusions to make certain that the majority of network agrees with the conclusions. This will allow the agriculture system to manage a historical diary of records for every square meter – SBU. By doing this we are learning towards efficiency and maximizing yields of SBU. It is in line with the agricultural strategy of vertical growth. Depending on how we want to present the data, it can be stored on blockchain in one of three ways:

- Unencrypted data - can be read by every node in the network, and is fully transparent.
- Encrypted data - can be accessed only by participants with a decryption token. The token allows access to the data on the blockchain and can proove who added the data and when it was added.
- Hashed data - can be presented together with the function that created it, to show the data wasn't tampered with. Blockchain technology will create a continuously growing historical list of records – blocks, for each SBU

Every input collected by platforms (nodes) in the network is realized as a transaction and is stored in a block. That means that when a tractor's GPS or a seeder control unit, which is also an IoT device, sends some data such as variable seeding rate back to its mother platform, every seeding rate per SBU will be stored on SBU's blocks. This means that we want to create a historical record for every square meter of soil, and every action (transaction) of every agricultural operation that took place on that SBU and information extracted from it. Some of the information stored on a block could be:

- Type of a crop;
- Sowing rate;
- Yield;
- Weed pressure;
- Stresses occurring – diseases, irrigation, pest;
- Fertilizer rates;
- Applied herbicides;
- Moisture and
- Minerals.

2.2 IOT technology

Internet of things (IoT) is all devices connected to the Internet, which communicate and exchange date with each other or with cloud-based data-collecting platforms. IoT can be a sensor, vehicle, home appliance or any other piece of electronics, and is used to improve processes by collecting data, analyzing it and performing an adequate action. Communication and exchange of data through a network is crucial for IoT functionality. The IoT network consists of a device or a sensor with a communication module, communication protocol, edge device or a router and a cloud data center. In agriculture IoT devices are used as sensors on the field measuring climate conditions – moisture of ground, air humidity, temperature; detecting pests – pest traps, improving pest control and saving the yield by monitoring insect activities.

Some agricultural hardware producers, such as John Deere, are incorporating specialized IoT devices into their products. One of the examples is a piece of their planting equipment – row unit. In this example, John Deere's seeder has a

sensor which communicates with a driver, by showing pressure applied to each seed as it's planted. Sensors will send the pressure information, but it will also provide data about the softness of the soil. The farmer then can adjust the pressure, in order to plant the seed on the right depth, and on the right distance. John Deere's sensors can also communicate with its mother cloud platform where all data are processed and stored. E.g. variable seeding rate for each sqm – seeding distance, and seeding depth. The same principle works with sprayers, where a device will communicate the herbicide prescriptions and spraying maps. Automatic sensor communication with cloud-based mother platforms are allowing us to automatize and improve processes – such as irrigation, spraying, seeding, harvesting etc.

Besides improving processes, this technology is making them Intelligent, as processes are based on sensor-collected data. Storing valuable information such as spraying maps, yield maps, soil moisture, seeding rates, as individual transactions on blockchain blocks for each SBU, will provide us with historical overview and conditions for intelligent decision making based on historical data.

2.3 Drone analytics

One of the main challenges for farming is large cultivated areas and inefficient crop monitoring. Until recently, the most advanced form of monitoring was satellite imagery. The main limitation of such practice was a high price, fixed interval of taking images, and cloud interference which could lower the quality and precision of the output. Drone technology solves that problems and offers a variety of crop monitoring possibilities at a lower cost. It can be utilized for any of the vegetative or reproductive growth stages in the crop life cycle. Unlike satellites, drones have a versatile function in precision agriculture operations. Besides collecting data they could be used for aerial spreading of seeds and spraying. One of the advantages of drone tech is an integration of various sensors which could be used for data collecting:

- RGB sensor;
- Multispectral & Hyperspectral sensor;
- Thermal sensor;
- Gyroscope Collected data is transferred into orthomosaic maps, which are eligible for analysis and extracting the drone analytics.

Today, digital solutions can provide valuable data and evaluate sources of stress for every sqm based on the compiled orthomosaic (Agremo, 2018). Data could show population and number of plants on the field or different types of stress that are affecting the field and the plants. As all of the drone data is georeferenced with a timestamp, storing such information on an SBU block as a new transaction is pretty straightforward. A good example of the transaction would be the measured plant density for the SBU. E.g. 10 plants/ sqm, which we could compare with the seeding map created by an IoT device.

2.4 Big Data Analytics

Accumulation of data from various sources improves the agricultural knowledge base. Storing all data in blocks will allow us to have a historical overview of all the actions performed on each SBU. Imagine what we could do if we know historical data for every square meter of agricultural land, ranging 50 years back. We could know all the crop cycles, yields, problems, stresses; each agricultural take measure, with every tool used in the process, following the weather conditions. Huge amounts of data would be a challenge to process, but by introducing AI and machine learning, historical data could get its bright future. All transactions from the past would be used for intelligent decision making, analyzing trends, the anticipation of the agricultural needs, potential threats and creating forecasts as shown in Figure 2.

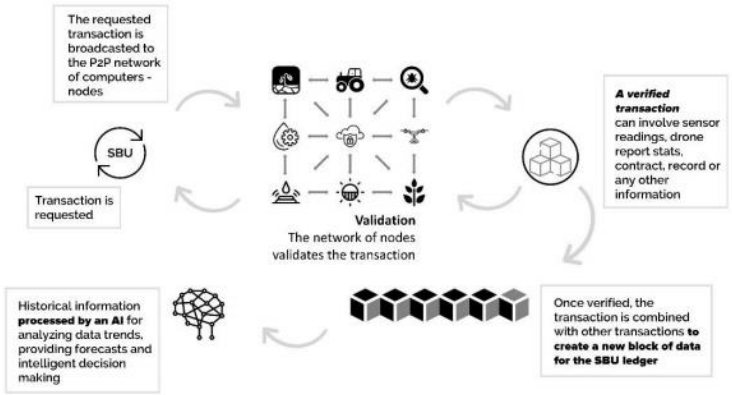

Figure 2: The inteligent agricultural decision making system.
(Source: Gibbs, 2004)

3 Agremo agribusiness platform

Agremo is a software platform for agribusinesses, crop growers and anyone interested in crop and land status and health. Agremo performs analytics from aerial imagery, leveraging computer vision and machine learning to provide "brains" for better crop management (Agremo, 2018).

Agremo platform is used in order to solve next agriculture issues:

- Solving lack of accurate and early insights into crops being grown.;
- Solving lack of accurate data based on which to plan the future. Accurate results that allow proper crop management decisions;
- Fast & proactive crop management as opposed to slow and reactive loss prevention;
- Less legwork – enormous time savings;
- Up to 65% financial savings in terms of pesticide application;
- Timely risk detection;
- Significantly higher crop performance ratio.

Figure 3: Agremo softvare platform.
(Source: Agremo. (2018))

Agremo platform could be used for monitoring, management and reporting issues:

1. PLANT COUNT MONITORING - Employing innovative technology plant counter accurately counts plants and determine stand establishment from aerial images, including different angle orientation plant rows;
2. PLANT HEALTH MONITORING - Range of analyses and reports developed to monitor plant health levels, detect stress and assess damage from different factors throughout the season. Plant health insights helps control weeds, insects and diseases, so crop threats can be identified in early stages and localized measures applied.
3. SEEDING DENSITY - In case of low quality of seeding, plants can be reseeded before it's to late, or other crucial decisions can be made timely. It also includes knowing in early stage yield to expect.
4. ANALYSIS MANAGEMENT - Simple, intuitive way to manage fields and analyses, fully equipped with tools, developed for accessing all your scans, reports and data, allowing you to monitor your fields over time.
5. FERTILIZATION PLANNING - Insights helps cut the cost by localized and precise application of fertilizer which will directly affect both yield and soil quality.
6. IRRIGATION MANAGEMENT - Water stress insights enhances water efficiency, gaining an economic advantage while also reducing environmental burdens.
7. REPORTING MANAGEMENT:
    - 7.1. STAND COUNT - Determines the number of plants in a specific area and compares it to the expected number. Stand counts are particularly suitable for seasonable crops.
    - 7.2. PLANT POPULATION - Provides information about the number of plants and is ideal for perennial plantations and orchards.
    - 7.3. PLANT STRESS ANALYSIS - Find out how healthy your crop is at key times during the growing season to intervene in a timely manner.
    - 7.4. WEED ANALYSIS - Identify weeds in time to optimize herbicide usage and prevent crop damage.
    - 7.5. FLOWERING ESTIMATOR - Assess flowering levels to determine the exact growth stage of your plants, choose a proper harvesting date and other.

7.6. PLANT DISEASE ANALYSIS - Analyze crops at all growth stages to obtain valuable insights into your plant's current condition.

7.7. WATER STRESS ANALYSIS - Spot areas with potential water stress and standing water to adjust your irrigation system before it affects your crop's health.

7.8. PEST ANALYSIS - Pinpoint infested areas and apply pesticide only where and if needed.

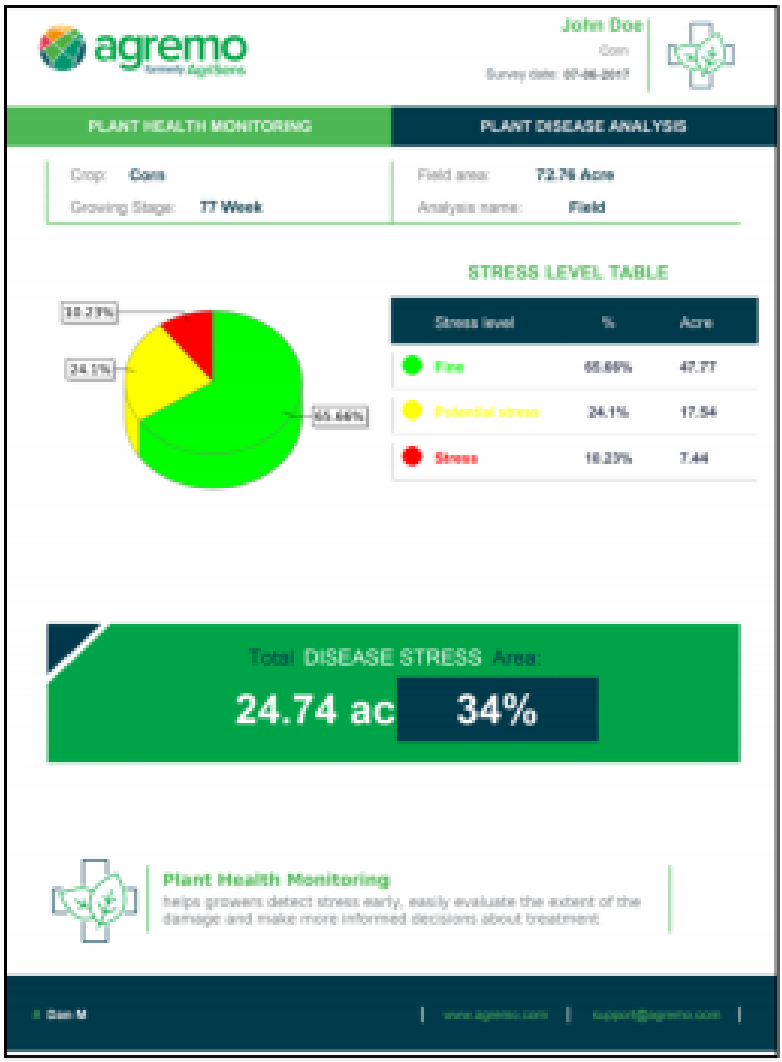

Figure 4: Plant disease analysis

The basics steps in Agremo process are: collect the data, generate maps, analyze images, and manage fields (see Figure 5.)

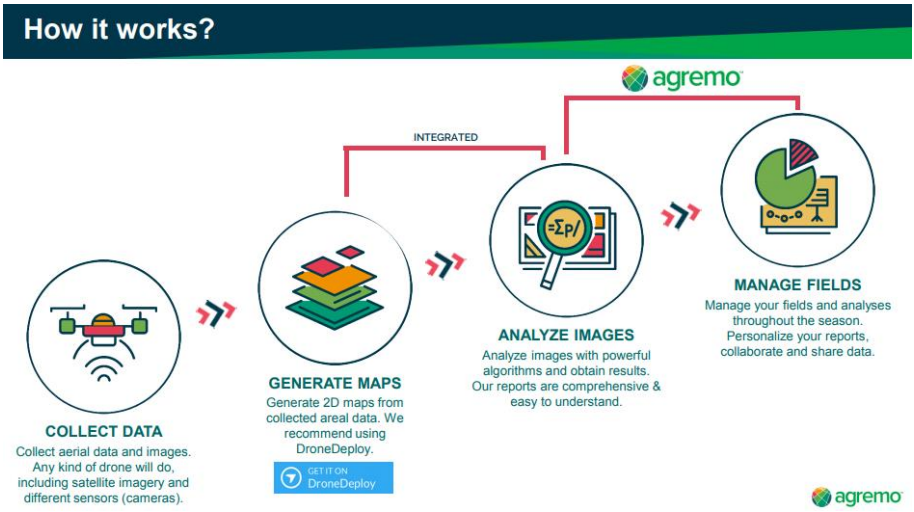

Figure 5: Agremo implementation steps

The main values created by Agremo Tool for better crop management are:

- Maximize profit by maximizing crop performance ratio;
- Reduce the costs of production by localized measures;
- Optimize your crop monitoring processes and save time;
- React proactively to stress problems and reduce risks Increase productivity throughout the season;
- Remove uncertainty in the results of your production;
- Platform to digitalize agriculture;
- Obtain data, data, and more data …;
- Use it as the marketing and sales channel;
- Collaborate and exchange data and outputs with others;
- Make effective strategic decisions based on facts.

6 Conclusion

Innovation is essential for a competitive and sustainable European farming and forestry sector. Today, many farmers are already using digital technologies such as smart phones, tablets, in-field sensors, drones and satellites. These technologies provide a range of farming solutions such as remote measurement of soil conditions, better water management and livestock and crop monitoring. By analysing the data collected, farmers can gain insight into likely future crop patterns or animal health and welfare. This enables them to plan more effectively and be more efficient. Potential benefits of the use of digital technologies may include improved crop yields and animal performance, optimisation of process inputs and labour reduction, all of which increase profitability. Digitisation can also improve working conditions for farmers and reduce the environmental impacts of agriculture. Another gain relates to agricultural data flows. Improving information flows up and downstream in agri-food chains could result in a wide range of benefits for those involved, including farmers and stakeholders in distribution and retail.

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Life Cycle Assesment of Distribution

Anesa Muminović, Blaž Šamec & Andrej Lisec

Abstract Through the years, companies have been faced with a problem of demanded goods from the customers. Some demanded goods were undoubtedly at abroad location or the goods would not be available for the customer in the moment they wanted it. As a consequence, and in the meaning of keeping up with the competition, factories and manufacturers had to make it possible that their products are at any time and at any place available for the customers to buy. Distribution is the system that takes the task upon itself to carry the products from factories and manufacturers and break the barrier between global time and distance in hope of keeping up with customers interests. Distribution is the key for providing a connection between distant markets and demanding customers.

Keywords: • customers • distribution • demand • system • life cycle assesment •

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1 Introduction

Distribution presents the stage of production of a product, from the time this product was made, up to the time of delivery of the product to the final consumer or buyer. Distribution covers all product activities to deliver the product in the safest, best, and most accessible way available to customers.

The purpose of the distribution is to increase the value of goods through distribution activities, i.e. the selling price of the delivered goods to customers is higher than the total costs incurred in production and distribution activities.

This study will get you briefly through history of distribution, it's definition from various points of view and get you know with main participants in distribution. Later, study will present the main distribution tasks, explain different distribution channels and physical distribution. Following that, study will explain term of Life Cycle Assessment and it's main tasks, and connection between distribution and Life Cycle Assessment (LCA). Last part consists of conclusion and references I used to help with writing this study.

2 Distribution

2.1 History

In history, local factories supplied local markets either directly or through local merchants. At the begin of mass production, companies had to make an innovative solution on how to full fill the needs of customers and how to put their product (or services) on a competitive market. The solution was "inventing" wholesalers.

A traditional supply chain consisted of a manufacturer that produced the goods, a wholesaler that bought in bulk from the manufacturer, and retailers who bought small quantities from the wholesaler and offered the products to their customers. The savings from mass production were so great that wholesalers could often sell to retailers at double the price they paid to manufacturers and the retailers in turn doubled the price again.

As we know, globalization and trade, in the surrounding world, change on a daily basis. Companies are on daily basis dealing with more and more demanding and strict customers and with new technologies. Companies are confronted to use sophisticated technology, marketing strategies and innovative approaches to keep up with the competition otherwise they would get left behind.

2.2 Definition

According to the International Chamber of Commerce, proposed in 1957, the distribution is: "the stage that follows the production of goods from the moment when they are commercialized to their delivery to consumers. It includes early activities and operations, which ensure that the goods are made available to customers, whether they are processors or consumers, facilitating the choice, purchase and use of goods." (Segetlija, 2006)

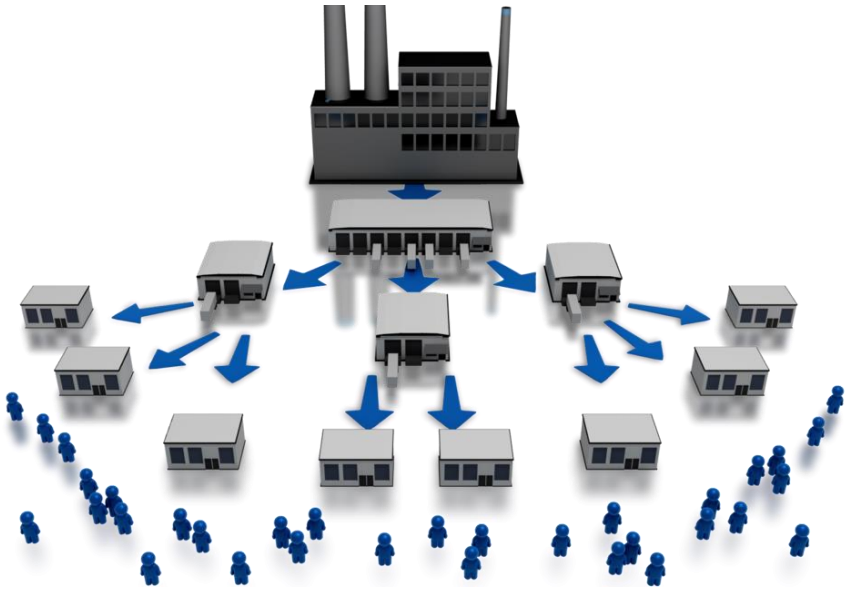

Figure 1: Scheme of distribution.
(Source: http://www.rg-group.com/blogs/distributor-service-model-evolution-revolution/)

For customers matter, about a product or service, distribution is the most important supply chain phase because it represents a link to customers, through which they perceive and evaluate functioning of the supply chain as a whole (Figure 1). Except of providing goods to customers, distribution also covers the flows of returned goods, as well as the flows of waste material.

The distribution is a system composed of a series of different, but intertwined elements such as order, delivery, storage, inventory management, manipulation, transportation, information system that has its own structure within which different activities take place, processes and actions that allow the availability of goods or services to customers, whether it is further processing or end-use.

National Council of Physical Distribution Management defines the concept of distribution as an efficient moving of finished products from the production line to the consumer, and in some cases includes moving the raw material from the supply point to the start of production. In accordance with, the distribution includes many activities, such as: case-related operations distribution, packing, signing, weighing, counting, sorting, storing, controlling inventory, choice of warehouse locations, terminals, market research, order processing, consumer service activities.

If we try to define distribution from science point of view, it is defined as a set of knowledge and activities that functionally and effectively connect all the partial processes of comprehending (understanding) spatial and temporal transformations of materials, goods, (semi) products, raw materials, live animals, capital, knowledge and information.

2.3 Participants in the distribution

Manufacturers can only produce the goods, but it is the intermediary who supplies these goods to the people who need it. To reach end customers, businesses need a well knitted network.

The network includes manufacturers, retailers, wholesalers, agents and brokers, commonly known as channel participants. These participants play a vital role in success and failure of any business. They connect the gap between suppliers and end consumers (Agarwal R. (a)). In the "New Age", Internet also became one intermediary between manufacturers and consumers (Amazon, eBay, Bolha, Njuskalo etc.).

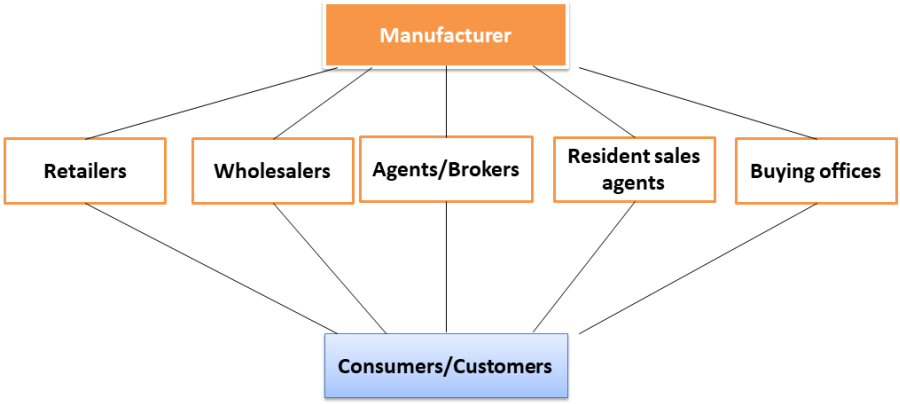

Figure 2: Basic scheme of participants in distribution.

Participants in distribution are (Figure 2):

Retailers are the gate keepers to the market for all other members of the sales distribution process. The retailer is the person who ultimately sells the goods to its end consumers.

Wholesalers are intermediaries who buy products from manufacturers and resell them to the retailers. They take the same types of financial risks as retailers, since they purchase the products, keep them in inventory until they are resold to retailers, and may arrange for shipment to those retailers. Wholesalers can gather product from around a country or region, or can buy foreign product lines by becoming importers.

Agents (occasionally called *brokers*) are also intermediaries who work between suppliers and retailers, but their agreements are different, in that they do not take ownership of the products they sell. They are independent sales representatives who typically work on commission based on sales volume, and they can sell to wholesalers as well as retailers.

Resident sales agents reside in the country to which they sell products, but the products come from a variety of foreign manufacturers. The resident sales agents represent those manufacturers, who pay the agent on commission.

Buying offices are also considered a type of commission agent or broker, since they make their money pairing up retailers with product lines from various manufacturers.

3 Main distribution tasks

The main distribution tasks generally consist of the following:

- shortening the time and time needed to get the goods (or services) from the place of production to places of consumption,
- increase the competitiveness of goods,
- programming production according to consumer requirements (needs),
- placement of new products (or services) on the market,
- creating and changing habits of consumers.

4 Distribution channels and physical distribution

The distribution system structure is structured from a distribution channel and physical distribution.

Physical distribution represents *physical flows or processes* of delivery, storage, handling and storage of goods. Distribution channels are the *routes* through which the goods are going, in other words, flowing from manufacturer to customer (consumer).

Distribution channels (marketing channel distribution) are functional paths, forms and methods of delivering goods from the manufacturer to the consumer. Distribution channels can be direct (no intermediaries) and indirect (with an intermediary). Distributors of distribution channels are economic entities who perform the functions of the goods and services market (classic shippers, logistic operators, carriers, warehouse keepers, distributors, insurers, financial institutions, etc.).

Figure 3 shows us difference between distribution channels and physical distribution.

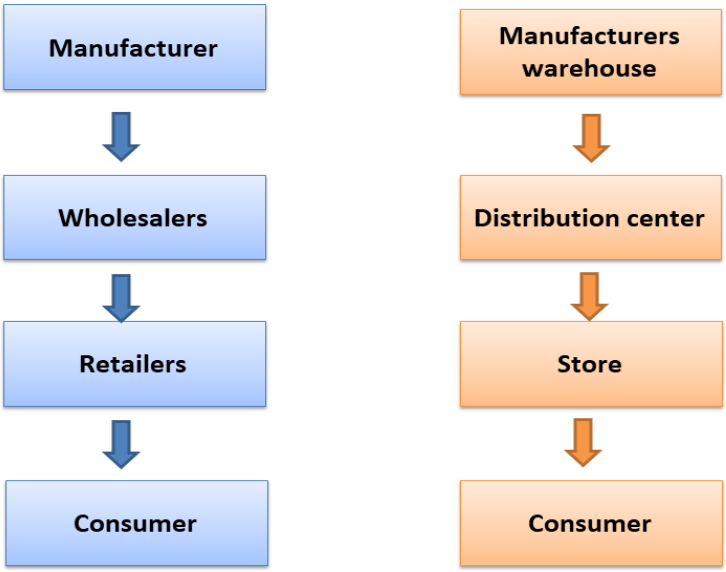

Figure 3: Display of distribution channel and physical distribution.

4.1 Distribution channels

Distribution channels are well organized arrangements that perform all the necessary tasks to assist exchange transactions. The basic function of a distribution channel is to provide a link between production and consumption and to create time, place and possession utilities which constitute the added value of distribution. (Agarwal R. (b))

While a distribution channel can sometimes seem endless, there are three main types of channels, all of which include a combination of a producer, wholesaler, retailer and end consumer. (Investopedia)

The first channel is a direct-to-consumer model where the producer sells its product directly to the end consumer. Amazon using its own platform to sell Kindles to its customers, is an example of a direct model. This is the shortest distribution channel possible.

The second channel is one where the producer sells directly to a retailer who sells the producer's product to the end consumer. This means the second channel

contains only one intermediary. Dell, for example, is large to sell its products directly to reputable retailers such as Best Buy.

The third and final channel is the longest because it includes all four: producer, wholesaler, retailer and consumer. The wine and adult beverage industry is a perfect example of this long distribution channel. In this industry, thanks to laws born out of prohibition, a winery cannot sell directly to a retailer. It operates in the three-tier system, meaning law requires the winery to first sell its product to a wholesaler who then sells to a retailer. The retailer sells the product to the end consumer.

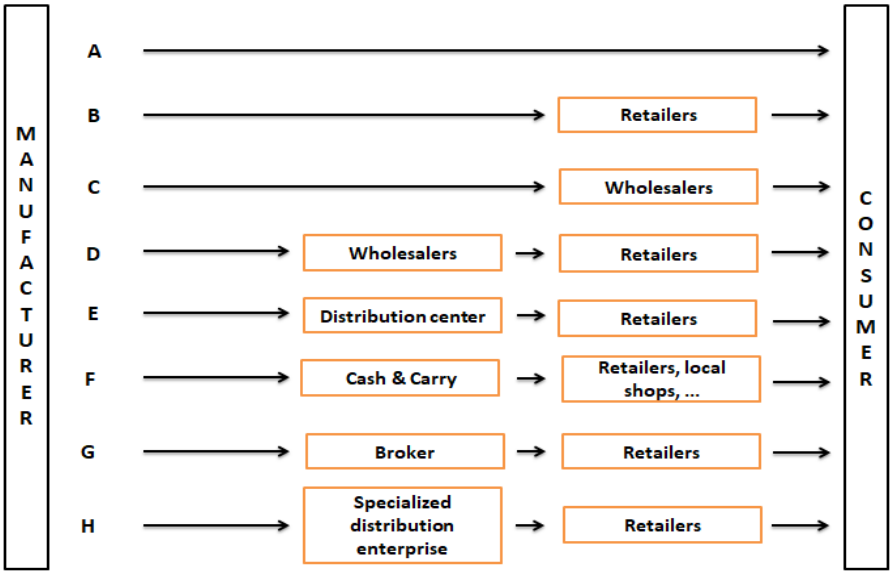

Figure 4: Alternative distribution channels for end-consumer goods.

Alternative distribution channels for end-consumer goods as shown on Figure 4: Channel "**A**" has the characteristic of a direct distribution channel. The manufacturer can sell the goods directly to the consumer via the factory retail network, catalog, newspaper, ads. Recently, through television and internet. Delivery of goods is done via mail, carrier or delivery service of the manufacturer.

Channel "**B**" has the characteristics of a short, indirect channel in which, apart from the manufacturer, there is an intermediary and a retail company.

Channel "**C**" also has the characteristics of a short marketing channel distribution. That's it mostly used by large consumers, such as hospitals, hotels, schools, etc.

In Channel "**D**", goods are delivered to consumers via wholesale and retail businesses of retail trade companies, whereby wholesale companies generally use theirs' own warehouses and a fleet. This channel is most widely distributed in consumer goods.

The "**E**" channel is most often used in the supply of regional markets for consumer goods.

Channel "**F**" is characterized by the sale of goods for cash. Wholesale grocery store uses this model to sell goods to craftsmen and small business owners under the cash and carry system. The goods are paid in cash when picking up.

Channel "**G**" is characterized by a broker as an intermediary in the distribution channel. The broker is an *independent trader* who without any persistent contractual relationship, based on specific orders, mediates between the buyer and the seller concluding a sales contract. This is an expert who knows the goods and market conditions very well. In addition to intermediary roles, brokers they can still run jobs on the market, sorting, packaging, promoting, and selling, all the way to providing the necessary documents necessary for the sale of the goods. Broker mediates between manufacturers and retailers, where they can use their own warehouses and fleet, but can also use the services of specialized distribution companies, which is not characteristic of the wholesale companies.

The "**H**" channel has been increasingly used in developed industrial countries lately. It is characterized by specialized distribution companies, as intermediaries in distribution of goods.

4.2 Physical distribution

Physical distribution covers all operations related to shipping, storage, shipment and delivery of goods, which take place in the warehouses of finished products from the manufacturer, logistics and distribution centers (LDCs), transport and retail (Figure 5).

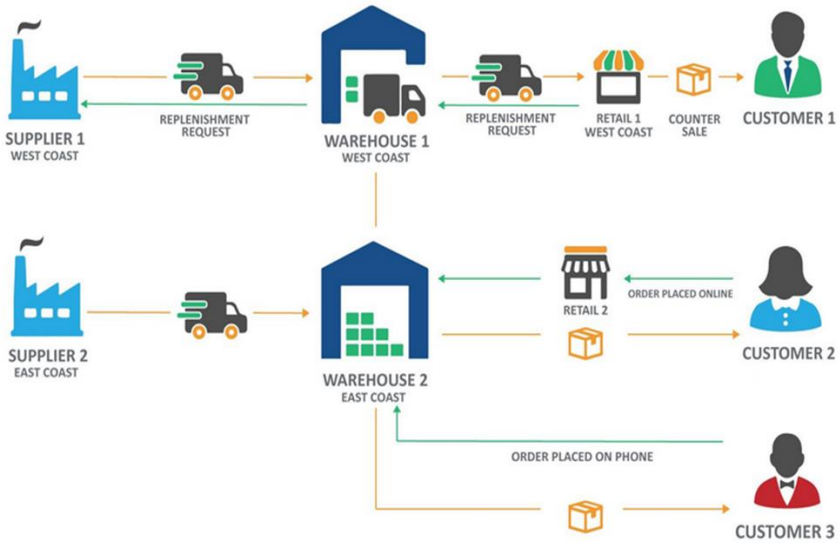

Figure 5: Distribution flow.
(Source: https://www.aboutitgroup.co.za/distribution-management-2/)

In a broader sense, physical distribution includes the movement of raw materials and raw material from the source to the beginning production phase. Physical distribution, therefore, involves planning, applying and controlling physical streams of raw materials and final products from the point of origin to the place of use in order to profit, also met customers' needs.

The illustration shows us how the goods are moving from the source (factory, manufacturer, supplier) through a distribution channel to the final user (customer, consumer) and in the opposite direction, the movement of payment to the original source. This illustration might as well show us, in the most basic way, the movement of goods, without flow of returned goods and the flow of waste material.

5 Life cycle assesment of distribution

5.1 Definition of Life Cycle Assesment

Society of Environmental Toxicology and Chemistry define Life Cycle Asessment (LCA) as an objective process to evaluate the environmental burdens associated with a product, process, or activity by identifying energy and materials used and wastes released to the environment, and to evaluate and implement opportunities to affect environmental improvements. The LCA methodology is standardized in ISO 14040 and 14044 (Figure 6).

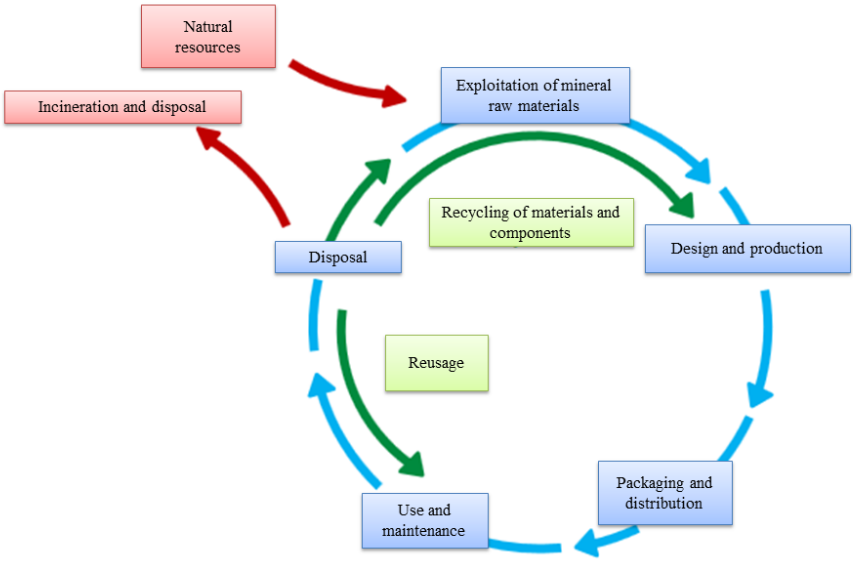

Figure 6: Illustration of life cycle assesment.

According to Ingaldi (2016) Analysis based on environmental life cycle of the product, has become one of the most important methods of assessing the effects of products on the environment. His complex method of analysis we try to gain insight into the entire product life cycle, which includes:

- extraction of raw materials,
- the acquisition of energy resources,
- production and distribution of energy required,
- production of semi-finished products and by-products,
- transportation and distribution,
- effects during use and
- alternatives handling of the product after use.

LCA provides information to manufacturers, suppliers, customers, and other stakeholders, it can be used for general information purposes, but also for specific production and consumption-oriented improvements e.g. process optimization, product comparison, product policies and ecolabelling.

5.2 Main phases of LCA

No matter of the LCA study range, it is carried out in four phases outlined in the Standard: Environmental Management - Life Cycle Assessment - Requirements and guidelines of ISO 14044 (Figure 7) (ISO 14040:2009; ISO 14044:2009).

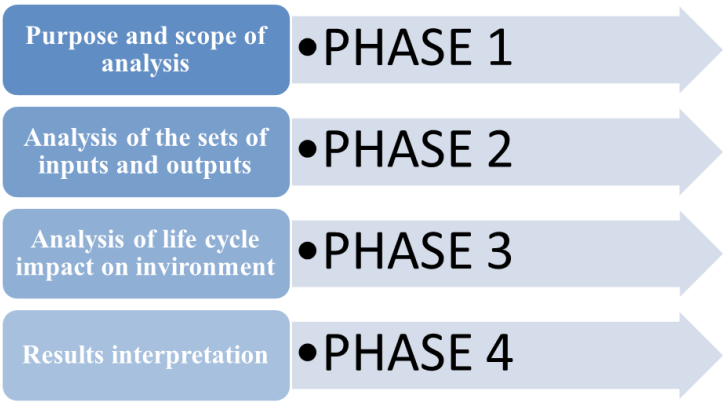

Figure 7: Main phases of LCA (based on SO 14040:2009 & ISO 14044:2009).

Phase 1: to determine the purpose and scope of the analysis,

Phase 2: analysis of the sets of inputs and outputs (analysis of the technological process, material and energy required for the process and emissions and waste, as well as the identification of potential sources of their formation, take into account issues of intangible assets, such as noise and odor.

Phase 3: life cycle impact assessment on the environment (transformation of the data collected in the impact category indicators or categories of damage),

Phase 4: results interpretation (application and verification of results)

Life cycle assessment can be useful to different actors:

- to raise awareness of decision makers on more sustainable phases of the life cycle,
- to support stakeholders seeking approaches that will provide a holistic assessment of the impact of the life cycle on the environment and society,
- offer guidelines to companies and people trying to reduce environmental degradation and use of natural resources in their production practices and to increase environmental, economic and social benefits for society and local communities.

5.3 Life cycle assesment of distribution

The LCA method is becoming an important contribution for long-lasting and stable sustainable development, as it combines economic and ecological effects in the overall understanding of the entire production, user and waste systems.

Manufacturers that uses the basics of the LCA method must take into account not only the choice of input materials, but also whether the material will be at some stage of the product life due to a negative impact on the environment, but also whether the production of this material results in a negative ecological effect.

Except of flows of goods to customers, distribution also covers the flows of returned goods, as well as the flows of waste material and is called reverse distribution.

Reverse distribution is a process of constant return of product or packaging in order to avoid additional environmental pollution or achieve another goal such as savings. Reverse distribution is a part of distribution channels and physical distribution.

The segment of "health" and "ecologically" oriented customers presents in the last ten to fifteen years the segments that have attracted the attention of a large number of manufacturers. Everything related to healthy life and environmental protection was the basis of the change in this new type of distribution flow.

The Life Cycle Assessment approach applied to distribution will provide a detailed account of the impacts of each aspect of the process. Such an analysis is particularly useful in the determination of a set of indicators that can be used to monitor changes in the environmental load of an evolving territorial distribution system and while producing products or services.

The results of LCA analysis could provide useful information in particular environmental areas, therefore such analysis can provide specific information which can be combined with the available information on the state of the environment to elaborate integrated programmes to improve quality, in particular regarding:

- Production of waste,
- Land use impacts,
- Resource use management,
- Air quality and noise related impacts and
- Landscape management and conservation.

6 Conclusion

The Life Cycle Assessment analysis approach is based on the analysis of all the resources consumed and material (wastes) generated in a particular process or product, considering its entire life cycle. The results of the analysis are a series of environmental indicators that consider both the local as well as global environmental impacts of the studied process. (Principi 3003)

When applied to distribution, LCA leads to determinating the impacts of the material, energy and information flows that that are related to all aspects of the local production, local transport system, inventory, warehouse systems and administration. These impacts may be dominated by production related emissions in some cases, while in others, significant emissions may be related to warehousing and administration activities.

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Mobility, Transport and Logistics in Modern Cities Program in Hungary

Gergő Gajzágó, Sándor Remsei & Attila Kurucz

Abstract With the centralization of Hungarian development policy new type of national development actions have appeared. Such an action is Modern Cities Program, which affects the Hungarian cities with county rights. Thanks to this program these cities will be the winners of the current EU budget cycle in Hungary. The essence of the program is to secure the development of cities with county rights, which is confirmed in a form of a cooperation agreement between the cities and the central government. Though the program does not have any official conceptual documentation, ex ante evaluation or any public project list, we have tried to determine the goals of the program and to gather all of its projects. We found 258 projects, but the costs are estimated only in 28 cases and in 9 cases the content of the projects is really not clear. The government talked about a €10.960 million budget of the program, but we could calculate only €8.944 million. This paper is about the mobility, transport and logistics dimensions of Modern Cities Program, and we would like to give a detailed description of the affected development projects and their impact on cities.

Keywords: • city logistics • city transport • modern city • mobility • Hungary •

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1 Introduction

After 2010 Hungary saw an increase in big national projects as the tools of new centralisation affecting regional governance. The projects also helped the central government organise and coordinate local development projects and distribute most of the resources set aside for them. They are big in terms of significance and effect, and they are national because they have an impact on the whole country. The common features of the projects are:

- they are targeted at local development,
- they shape regional policy,
- the final decisions are made centrally,
- local policymakers are involved to some extent,
- local communities are not involved in decision-making,
- they form an important part of government communication,
- none of the initiatives has a unified documentation, a previous research or an explained concept,
- the efficiency and effect of the programs are not examined,
- implementation is not transparent,
- clear definition and quantification of the programs are insufficient or difficult because of the lack of documentation.

Since 2010, besides smaller actions, some of the significant initiatives have been the following:

- Modern Cities Program,
- stadium building program,
- strategic agreements with large enterprises.

The present study will discuss the results of a research in connection with Modern Cities Program (hereinafter referred to as MCP) focusing on mobility, logistics and transport. MCP with its HUF 3,400-3,500 billion investment (as stated by the government) will definitely have a huge impact on the development of cities with county rights thus indirectly on the Hungarian urban network. A significant amount of the projects is aimed at transport development as all cities are planning such types of improvements. After a short historical introduction,

the paper will examine the budget of MCP and the projects themselves, then finally the mobility, logistics and transport plans of the cities in question.

2 Hungarian urban network and central development efforts

From the point of view of the Hungarian urban network, three main features are worth mentioning. First, Budapest is predominant both economically and institutionally. Second, there is a huge gap between the capital city and the cities belonging to the next category: according to the UN settlement hierarchy, there are no big cities in the countryside and only smaller middle-sized cities exist with a population of 100-200 thousand. Finally, the Hungarian urban network is fragmented: 28% of the Hungarian settlements having a city status cannot be considered cities according to domestic population classification, while according to the UN classification it is true for 83% of them.

Table 1: Classification of Hungarian settlements

Type	Population (in thousands)	Number of cities
Metropolis	1000 –	1
UN big city	500 – 1000	0
UN middle-sized city / Hungarian big city	100 – 500	8
UN town / Hungarian middle-sized city	20 – 100	50
Hungarian town	5 – 20	189
Hungarian village	– 5	98
Total		**346**

(Source: chart made by the authors based on KSH data)

The unified development of domestic urban network was first introduced after World War II by socialist settlement developers. They claimed that until 1949 the development had been unplanned and spontaneous. Then in the 1950s, the socialist ideology proclaimed that „villages were exploited and in a subordinated situation during capitalism", that is why the prerequisite of building a socialist society was to abolish the differences between the city and the village (Hajdú 1989).

The most important tool used for settlement network development was socialist industrialisation, and to do so the 609/31/1950 regulation of the Peoples' Economy Council put the settlements into categories. One of the first and most important research tasks of the Territorial Planning Institution was to define which settlements would be improved, and as a result, 75 settlements were put on the list. The population of these places was 1.9 million apart from Budapest (Hajdú 1989), which is almost the same number of residents (1.98 million) involved in MCP now. The Country Settlement Network Development Study Plan was published in 1963 which stated that the focus of development was still the so-called socialist cities (Rechnitzer 2018). Based on this plan in 1971 a new Country Settlement Network Development Concept was developed which gave priority to the development of regional centres, a fact being important from the point of view of MCP. It also selected 23 advanced centres which almost match with the cities of MCP (excluding Baja and including Érd).

The difficulty of urban network and regional public administration was also studied by Bibó (1975): "it goes without saying that the regional division of public administration and urban network development are parallel, mostly the former aligning with the later". This idea of Bibó backs up the concept of MCP which says that urban network development comes first and the regional system is in life with it, where cities are the centres or frames of development. An important element of the regional system is the intermediate level, the county, about which Bibó says that "it easily confronts cities wanting to make them subordinated". It can especially true for cities with county rights as their relation to the counties is still not clear. One only needs to consider that MCP will partly be financed by county Regional Operational Programs.

After the change of the regime (1989) urban network development was again „haphazard and spontaneous" (Szepesi 2008; Pirisi 2008; Szabó 2016). Local administrations were independent to a great extent and city rights were granted in large numbers resulting in the numbers already shown in Table 1. We presume that there were three key elements contributing to the development and success of cities for two decades after 1989. The first one was the attitude and professionalism of city leaders and the institutional system in a broader sense, the second one was the advantages resulting from the location and accessibility of the city, and the last one was a clever choice of developmental path (for how the developmental paths of transition evolved see Lux 2017). While the large

investments of MCP do not affect the first element (though in case of Érd the development of the institutional system is of significant importance), the second element is a priority as each city with county rights must be reached on a highway. Regarding the development path, the picture is mixed: there are places where they strongly rely on the existing traditions (dependency on roads), while in other places they are trying to establish new industries (creation of roads).

A new phase of urban development started in the first decade of the new century due to a reorganised and strengthening regional development. One of the first and most important documents of this new institutional system managing territorial planning was the National Territorial Development Concept (NTDC) in 2005. One of its main principles was the development of cities and villages (OTK, 2005), and the first overall aim was to boost regional competitiveness based on strengthening central regions, so-called development hubs. Among medium-term objectives the second one was again "to support the development hubs energizing the regions and to improve urban networking". EU accession meant not only the localization of the planning system but the adoption of approaches and specific policy documents as well. For example, the Leipzig Charter (2007) states that urban development should be dealt with at the national level and countries take responsibility for the implementation of sustainability principles and integrated developmental tools, ensuring balanced territorial development. Several MCP projects promote the principle of sustainability (i.e. electric buses), and balanced territorial development is underpinned by unified government requirements which "modern" cities have to satisfy.

EU accession had an impact not only on planning but on financing as well: urban development gained momentum due to EU, or to be more precise, co-financed resources. From this point of view one of the most important elements of the first complete EU budgetary cycle (2007-2013) was the formulation and implementation of Integrated Urban Development Strategies (IUDS) by more than 100 settlements in 2007 (Kukely 2015). According to Barta (2009) "the public opinion about these strategies is that the renewal of urban development has not been started yet because of different reasons". One of them is that "the fundamentally new urban development approach" had to be applied within half a year: the Hungarian handbook came out in October 2007, and if applicants wanted to submit IUDS tenders next summer, which was the deadline, they had to develop their strategy in such a short time. This kind of hurry and quick implementation is also characteristic of MCP. The other reason for failure might

be that a basic idea of IUDS is the promotion of grassroots initiatives. This approach is present in MCP, too, as there were wish lists compiled by local leaders who later discussed them with the Prime Minister.

Tenders or programs aimed directly at city or urban network development are strongly connected to the EU accession. One of the first initiatives was the Regional Operational Program (ROP) in 2004-2006 giving almost €80 million to city rehabilitation (Baráth-Szépvölgyi 2006). In the period of 2007-2013 there were seven ROPs prioritizing regional and sub-regional development and city rehabilitation. These programs were targeted at cities and realised €1.4 billion investment (ÁSZ 2015). For the 2014-2020 period the main resource of urban development is Territorial and Settlement Development Program (TSDP), in which priority 2 (Business-friendly settlement development, maintaining the population), 6 (Sustainable development of cities with county rights) and 7 (Local developments managed at community level) have a direct impact on cities with their €1.87 billion budget (TOP 2018).

Finally having a look at the neighbouring countries it can be said that the picture is also mixed if we look for unified national urban policies. Out of 35 OECD members only 15 have an explicit national urban policy, and 5 of them are only in the program planning phase (OECD 2017). Poland accepted a document called National Urban Policy 2023 at the end of 2015. It gives a framework and sets directions at all developmental levels defining five priorities and ten thematic fields (i.e. community involvement, transport and mobility, investment policy) which must be present in local initiatives and development programs. The Check Republic in 2010 also adopted a document called Basic Principles of Urban Policy. It sets six principles (i.e. close involvement of stakeholders or regional approach to urban policy, namely the improvement of city countryside relations), and serves as a guidance on coordinating urban development actions of different sectors and regional governance levels (OECD 2017). In Slovakia, they were planning an urban development policy in 2017 involving a wide range of stakeholders into the preparation. Slovenia doesn't have an explicit urban development document, but the topic is present in and forms an important part of the Slovene Territorial Development Strategy. Out of the eight priorities three of them specifically apply to cities. Finally, Austria also doesn't have an independent urban policy, but the development of urban areas and

agglomeration policy are included in the Austrian Regional Development Concept (OREK 2011; OECD 2017).

3 Modern cities program

MCP has started another chapter in Hungarian urban policy and its effects on mobility are worth studying. MCP is targeted at cities with county rights which form a special group within the Hungarian settlement network. These cities are the most important hubs in the countryside – most of them are county centres as well – and have comparable rights with counties. All Hungarian rural cities having a population over 50,000 are cities with county rights, and the 21 biggest rural cities are also cities with count rights, only Salgótarján and Szekszárd do not belong to the biggest cities.

The program was launched on 15 March 2015 by Prime Minister Viktor Orbán in Sopron (Merényi 2017), and after that, he visited all the cities concerned, the last one on 26 May 2017. According to the government communication, the essence of the program is to determine the development priorities for cities with county rights for the next 4-7 years, sanctioned by a cooperation agreement between the Hungarian Government and the cities. Neither the starting, nor the finishing dates have been published, but participants mention the years 2019-2022 concerning the implementation of MCP projects.

But what does a modern city look like according to the central government? "For us, Hungarians the modern city means that it is Hungarian, formulated by Hungarian temper and way of thinking. It means a cosy, homey community and a safe environment offering employment opportunities and improving living standards. It means a place where people can find everything locally and feel themselves valued, where the streets, squares and buildings are becoming nicer and full of life" (Orbán 2015). There is no more detailed explanation available, but press briefings might offer some more specifics about modern cities:

- they are included in the highway system,
- they represent a high standard in all regional operational functions, and these functions are complete (transport, industrial and trade infrastructure, public utility and public functions, education, health care, recreation, tourism),

- they have developed public transport (i.e. electric buses, intermodal public transport centres where train and bus stations are in one place),
- they have a suitable area for investors,
- they have a special, local feature (i.e. cultural, natural heritage)

It is obvious that out of the five specifics two of them are closely related to transport. Although MCP does not have precise objectives the projects which have been chosen are based on the development ideas of the cities which are parts of their evolving development concepts (i.e. New Phoenix Plan of Debrecen). From 2014 the development concepts of cities are laid down in the Integrated Urban Development Strategies (IUDS), and there are approximately 180 of them (Kukely 2015). IUDSs give an analysis of the situation and set middle-term objectives as well as declare action fields accompanied by an itemised list of development projects. These projects strongly build on previous development ideas, mainly on Integrated Urban Development Strategies from 2007, and usually, after a very basic social debate (including a local public forum and downloadability of documents), they are accepted by the local administration assembly. The projects of MCP are also present in previous plans and we will discuss them under the heading about the projects.

3.1 Budget

There are 258 projects in MCP. The costs have been estimated in 28 cases and there are 9 cases when even the contents of the projects are not clear. So the data are only partly suitable for analysis. Besides, the sources of the budget are not published, thus we do not know if the money comes from the EU, or the central or local government. Table 2 shows that we identified €8,944 million; however, the government communicated €10,960 million as the budget of the program (Csepreghy 2017). The reason for the difference is that the data are not public.

However, as Undersecretary Mr Csepreghy stated 60% of MCP budget comes from EU sources (Weinhardt 2017). It is clear that the EU-based support per capita of the cities with county rights will be prominent. It is also obvious that in the current period the winners of the Hungarian settlement network will be these cities. However, there is no assessment study on the impacts of these developments on the Hungarian urban network.

Table 2 Modern Cities Program: Distribution of the investments by settlements

City	Population (in thousands, 2015)	Budget (M €)	Narrow budget* (M €)	Investment per capita* (€/capita)
Békéscsaba	60334	1332.0	242.0	806.7
Debrecen	203506	154.3	154.3	514.4
Dunaújváros	46052	125.3	125.3	417.8
Eger	54609	138,7	69.3	231.1
Érd	63993	136,7	136.7	455.6
Győr	129372	305,0	221.7	738.9
Hódmezővásárhely	44795	142,7	69.3	231.1
Kaposvár	63742	508,0	158.7	528.9
Kecskemét	111836	534,7	191.0	636.7
Miskolc	159554	633,0	133.0	443.3
Nagykanizsa	48241	185,3	114.3	381.1
Nyíregyháza	118125	183,0	123.0	410.0
Pécs	145985	880,7	118.3	394.4
Sajgótarján	35811	357.0	190.3	634.4
Sopron	61780	396.3	29.7	98.9
Szeged	162593	355.3	187.3	624.4
Szekszárd	33032	121.3	121.3	404.4
Székesfehérvár	98673	244.0	244.0	813.3
Szolnok	72786	437.3	37.3	124.4
Szombathely	77866	439.3	106.0	353.3
Tatabánya	66791	186.7	186.7	622.2
Veszprém	60761	192.7	192.7	642.2
Zalaegerszeg	58959	954.7	114.7	382.2
Total	**1979196**	**8944.0**	**3 267.0**	**473.5**

Source: made by the authors
(*without highways and railroads)

The overweight of transport projects is significant not only in quantity (30.2%) but more in the budget (73.5%), which is due to highway and railroad developments of the program. €5.68 billion will be spent on highways and railroads from the total transportation development budget (€6.57 billion). Even if we do not calculate these investments, €890 million remains on transportation development, which is yet the highest amount among the sectors. What is interesting is that the healthcare budget is very small (only 1.2%). The first reason for it is the former significant hospital development investments, which affected

typically the cities with county rights. The second reason is that the government pushed healthcare into the background.

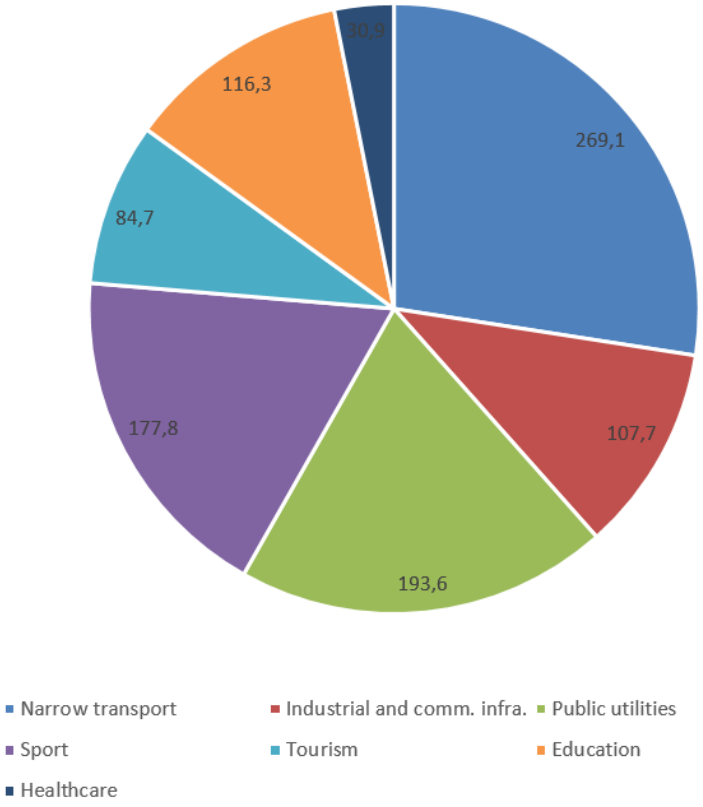

Figure 1: Planned MCP budget by sectors; Source: made by the authors.

Due to the big differences, the distribution of the total budget between the cities and regions cannot be interpreted. In the case of the narrow budget, we can see that Békéscsaba and Győr got the highest amount of money per capita, and Sopron got the least. The latter was the first visited city so in that time they did not know they could ask for more grants. The biggest sum exceeds the lowest one 8.2 times. In Figure 2 the size of the circles shows how big the budget is and the darkening colours show how the budget per capita is growing.

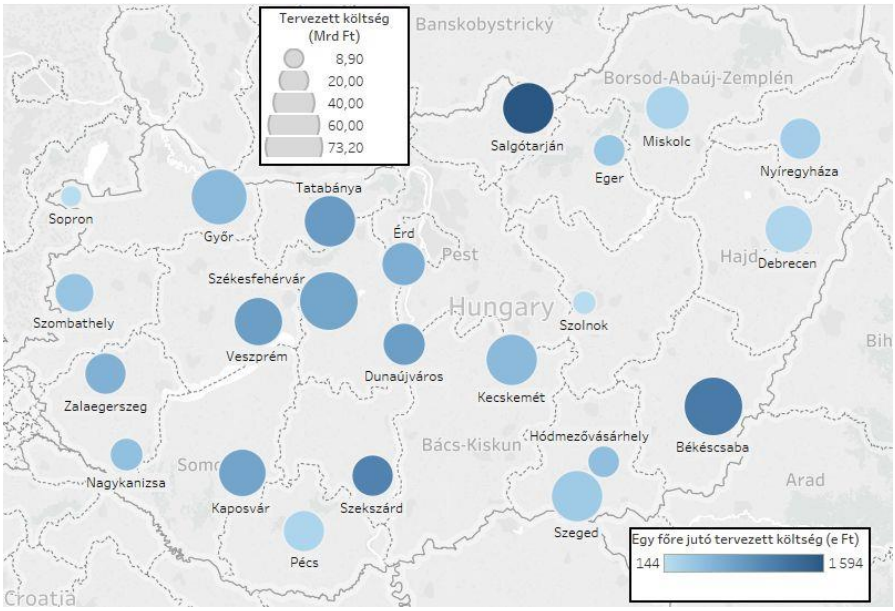

Figure 2: Territorial distribution of the planned MCP budget; Source: made by the authors.

3.2 Projects

We can get more information from examining the development projects. We could identify 258 projects from different sources. Typical projects are the development of – often intermodal - transport centres, formation of industrial areas, refurbishment of theatres, building sports centres and hotels, as well as expansion or renewal of secondary, typically vocational schools.

The city of Békéscsaba focuses on the food and printing industry but the most significant development will be the new highway to the city, which project covers 12 per cent of the whole MCP budget. In addition, the city would like to build a new railway station, which is a great investment, too (over €100 million), and the city wants to upgrade the extant airport to an intermodal centre. Still from the transport sector, there is the expansion of bicycle routes, which affects the whole city.

The city of Debrecen wants to spend a lot of money on innovation (€17 M, details are not clear), but the largest project is, of course, a transport project: there are plans to build a new railway station (€70 M). The development of the existing

and well-used airport, which is the second biggest airport in Hungary, is also on the list here.

The biggest investment in the city of Dunaújváros is the logistics centre, which has been planned for decades, and it has appeared in every development plan since 1999. This plan consists of an intermodal logistics centre and a large storage base. In addition, the city wants to procure electric buses, which would contribute to the decrease of the significant air pollution of the city. There are two further mobility projects here: the development of traffic nodes and a large-scale road rehabilitation.

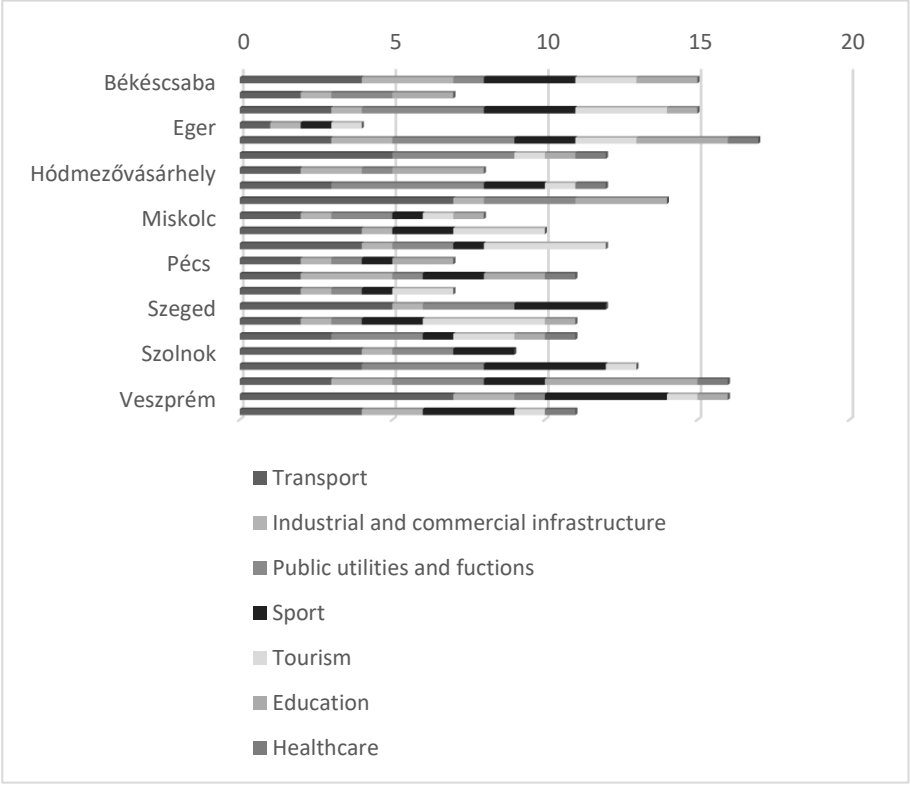

Figure 3: MCP projects by sectors; Source: made by the authors.

The city of Eger focuses firstly on the historical castle, which is the base of the remarkable tourism of the settlement. Only one project concerns mobility (it has to be noted that Eger has the fewest projects: only four), which is exactly as big

as the other three projects. This project is the building a four-lane priority road from the M3 highway (€70 M).

The city of Érd wants to compensate for its missing functions as a regional centre (e.g. police-office, prosecutor-office, and courthouse). There are mobility projects, too: a 14km-long bicycle road, a road rehabilitation package and procurement of buses. In this city, transport projects are small in size and significance, too.

The city of Győr wants to develop further their cultural capacities connected to the European Capital of Culture application, but out of its 12 projects five of them are mobility projects. They want to construct the western bypass road and connected to this, a new Danube bridge is being planned. The third project is the Hungarian part of the Győr-Dunaszerdahely priority road, connecting the two settlements. The last two projects belong to urban development: extension of the bicycle road network and formation of an intermodal public transport centre, which means the modernisation and transformation of the railway station of this city.

The city of Hódmezővásárhely – besides the tramtrain – would like to invest in bicycle roads and a solar power plant. The tramtrain would go to the county centre, Szeged, and the bicycle roads would be 117 km long.

In the case of the city of Kaposvár the main priorities are sport and healthcare, but the fifth largest project of MCP can be found here: the transformation of road 67 into a four-lane highway reaching to highway M7, costing €350 M. Besides this project, the construction of the city's public transport centre and of a new bus premise with purchasing electric buses are also on the list.

In the city of Kecskemét there is a €83 M development fund (details are not clear), and a railroad development project as the most significant items. 7 out of the 14 projects are connected to mobility. As it can be seen in the case of Győr, Kecskemét also emphasizes the bypass routes and the two four-lane roads to highway M5. The largest project is the development of the suburban railroad which helps to reach Budapest more easily. The building of a new P+R parking system and the renovation of the railway station are connected to the previous project. Finally, the city wants to transform the former military airport, mainly to satisfy the transit demand of Mercedes factory.

The projects of Miskolc are very diverse, but the Hungarian part of the Miskolc-Kassa highway far overtops as regards the budget (€500 M). In addition, there is a project titled "Public Transport Development" (€30 M), the details of which are not known but it may concern bus transport.

The city of Nagykanizsa focuses more on sport and tourism, because there is only a 38-km long bicycle road relates to mobility within the city. But outside the city all of the three projects relate to mobility: the construction of a four-lane road from highway M7, and two bypass roads.

The city of Nyíregyháza has significant projects within public transport, industrial infrastructure, sport and tourism sectors, too but the largest project is a bypass road again. Besides this project, the development of the bus fleet, the building of the Nyíregyháza-Tokaj bicycle route, and the establishing of the intermodal transport centre concern mobility.

The city of Pécs spends the essential part of its narrow budget (80%, €95 M) on the development of the university – the investments will affect all faculties of the university (PTE, 2017). On the full list, however, there is the second largest project of the whole MCP, the western arm of highway M6 from Pécs to Barcs (€600 M) and the extension of highway M6 to the southern border.

In Salgótarján the second largest item (€73 M) is a so-called Regional Development Plan (details are unknown), and the largest item is, of course, a transport project: connecting the city to the highway network (€167 M). In addition, there is one more mobility project: the renovation of the bus station.

The high priority in Sopron is tourism (e.g. building a new hotel), but the largest project relates to transport: the extension of the highway to the border (€333 M) and another four-lane road (€33 M).

The city of Szeged particularly wants to develop its public transport and sports institutions. The tramtrain represents public transport development, which is the continuation of tramtrain of Hódmezővásárhely to the direction of Makó. In addition, the city wants to build a new vehicular, a new railroad, and a new pedestrian bridge in the next years. And finally, the development of the airport could not be left out of the list.

In Szekszárd the largest investment will be the new district-heating system, which is a unique project in MCP. Transport is represented by three smaller projects: the development of the road network of the wine region, the expansion of the port, and the expansion of the dinkey line with an 8 km long part.

The program of Székesfehérvár is balanced: they want to implement a significant project in the field of transport, tourism, education, and culture, too. The city has a smaller airport and they want to develop it. In addition, a new parking house will be built, but its location is still unknown.

In Szolnok besides transport investments we should emphasize the development of the beach and swimming pool. Transport investments include the development of the port, the construction of a four-lane road connecting to the highway network (€200 M), the building of the northern bypass road (€200 M), and a sidewalk and road renovation package, which affects the whole city.

In the city of Szombathely sport and tourism are top priorities after transportation. The city wants to broaden the highway road (€200 M), establish a four-lane road (€133 M), and rehouse the bus station.

In Tatabánya three projects represent mobility. They want to connect the bus and the railroad station, so the plan is to establish an intermodal public transport centre. The second project is to renovate the city's road network, and the third project is to modernize the bus fleet.

The city of Veszprém has made a balanced list with a lot of projects: 7 out of the 16 projects concern mobility. It includes clarification of the ownership of the airport and then its development, construction of a new viaduct, road buildings all over the city, building new bicycle roads (30 km) and a new bypass road, and the establishment of a new intermodal transport centre, which is the largest mobility project in Veszprém (€20 M).

Finally, Zalaegerszeg focuses on sport, healthcare and tourism, but, of course, it has two huge and two smaller mobility projects as well: building a new highway (€500 M) and a four-lane road (€370 M), establishing a new intermodal transport centre, and building a new 4-km long railway to the industrial park.

In the field of establishing industrial parks there is a new element in Hungarian economic development: a group of companies called National Industrial Park Management and Development Ltd. This government-owned company establishes industrial parks mainly in cities with county rights under the brand Inpark. The company was founded in December 2015, and in June 2016 the central government decided about the implementation of the national industrial park conception. The total value of the investments connected to the development of the industrial park network is about €500-650 M, which is the largest real estate project in Europe in this field (Inpark, 2017). According to the Government resolution (1268/2016.VI.7.), the tasks of the new company are the planning and implementation of industrial parks of MCP and the planning, implementation and management of intermodal centres.

4 Conclusion

One of the questions is whether the developments of MCP are a new development path for the cities concerned. Because the coherence of the projects is fairly weak, a characteristic development path cannot be determined in every case. Generally speaking, the cities are going into the already successful direction (e.g. cultural and university developments in Győr) or they are building on extant potentials (e.g. Munkácsy-district in Békéscsaba, Clerical Fields in Érd, Mindszenty place of pilgrimage in Zalaegerszeg). The latter are characteristically tourism projects. On the whole, we cannot speak about significantly new development paths, only about the correction of the former development paths, e.g. strengthening tourism or education.

Basically it is a good result to have such a program, which tries to develop the rural centres of Hungary. The (not clearly described) aims of MCP can be acceptable, too. But we have to notice some risks regarding the implementation of the program:

- a lot of projects do not have an accurate content,
- most of the projects are overpriced (mostly with 50-100%),
- the whole program is absolutely not transparent,
- the overall budget of the program reaches 9% of the Hungarian GDP (in 2017), so it is a huge expenditure,
- unbalanced development of the cities: smaller towns are pushed into the background.

Social acceptance of the projects is good: firstly, the members of a community are glad for new developments, secondly, many of the MCP projects are not without precedent, but they reflect some local demand. Among the projects concerning mobility, logistics and transport some of them are returning ones, like four-lane roads, intermodal public transport centres, bypass roads, or modernising bus fleets.

On the whole, it can be claimed that MCP is a new tool for city development but Hungary still does not have a unified urban policy, and urban network development is still not well-established or balanced. What is more, the implementation of MCP can have a positive effect on regional centres, especially if the government will be open for the proposals of professionals. It can also be seen that mobility, logistics and transport are the strongest parts of the program regarding both the budget and the number of projects. These transport investments will determine the image of the most significant Hungarian cities for the next decades.

Acknowledgements

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XII. INTERNATIONAL CONFERENCE ON LOGISTICS IN AGRICULTURE 2018: CONFERENCE PROCEEDINGS
A. Lisec (ed.)

University of Maribor Press

Mobility, Transport and Logistics in Modern Cities Program in Hungary

ISTVÁN PESTI - FARKAS

Abstract Historical background for the better understanding of the current labor market situation in Hungary, with the scope of processing industry, especially beer manufacturers.

Keywords: • beer • workforce • processing • vacant • Hungary • multinational • craft beer •

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1 Introduction

The paper is separated into 4 parts beside of the introduction and summary: the vacant positions, the gross income of workers, the income of the multinational beer manufacturers and the income of the craft beer producers. The overall goal of the analysis to make the related trends visible, in order to give a clear picture on the current labor market processes from the aspect of companies and workers too.

2 The vacant positions

In the past 4 years – after the global financial crisis- the manufacturing industry, including the processing part, especially the beer production had found their market drivers and started to restart their lucrative businesses.

As the yearly profit correlates to the sales volume, the sales volume correlates to the produced products, that is simple and well known. But the surprising fact is, that despite of the increasing volume of production, the need of the human workforce had increased too. (As you can see on the chart nr. 1.) Logically, it can be stated that the current technological development is matured, the production is on the most efficient way, because change in the production volume requests change in the related workforce too.

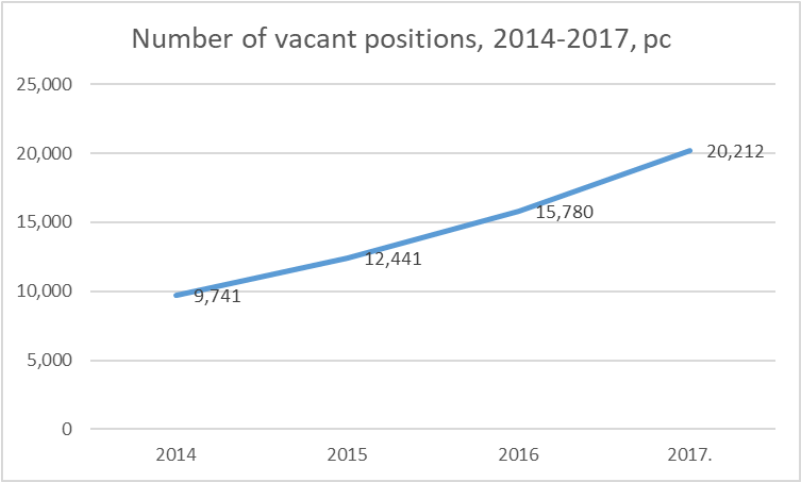

Figure 1: Number of vacant positions in the processing industry, between 2014-2017.
(Source: own creation on the data from Governmental Statistical Office)

As it is visible on the chart, the need of human workforce (or, from other point of view, the number of vacant positions) had been doubled in 3 years. The list is aggregated, therefore the blue collar and white collar positions are listed in the same category.

3 The gross income of workers

The vacant positions remain vacant if the companies does not fulfill them. The expectations against the workers can be measured on different ways, but one crucial factor is the salary expectation from the worker side.

As it is visible on the chart nr. 2. in the last three years, there was a huge increase in the average gross salaries in Hungary within this industry. For the better understanding of the situation, it have to declared that the current government had regulated the minimal wage for skilled workers, therefore complying with the law is a must from the companies' side.

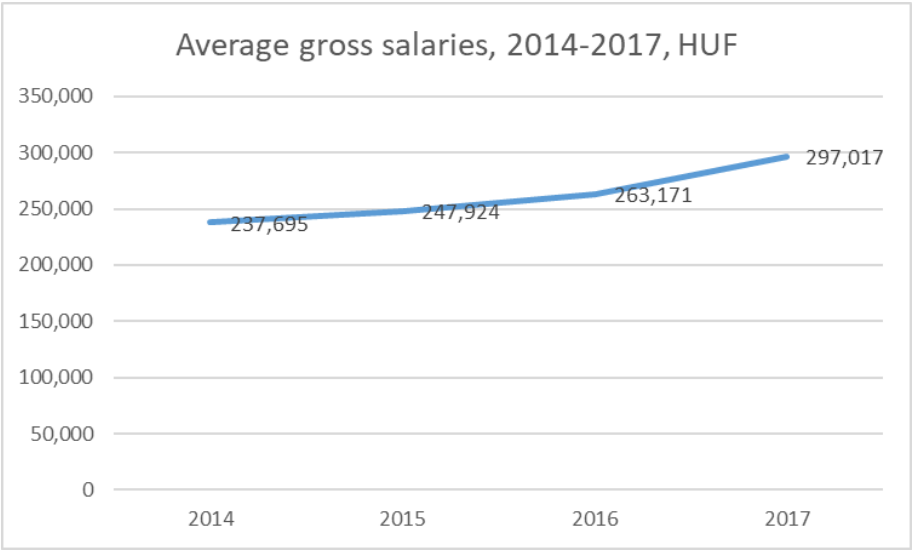

Figure 2: The average gross salaries in the processing industry, between 2014-2017.
(Source: own creation on the data from Governmental Statistical Office)

Because of the lack of professionals (reasoned by international movements, aging, etc.), the need of personnel is visible in the wages too: the companies are willing to give appr. 30% more than 3 years ago.

4 The income of the multinational beer manufacturers

There are three main companies on the Hungarian beer manufacturing market with global group background – Borsodi, Dreher and Heineken-, the market share is almost equal on yearly basis, but insignificantly vary month to month, but basically can be identified as stable.(Pesti-Farkas, 2017) Their breweries are located in Hungary, but I would like to hereby list the Pécsi Brewery, who manufactures locally, but has definitely low market share. The rest of the market players are importer (as Carlsberg), they had not been considered as subject of this paper. I had compared their reported incomes in the year of 2016 and 2017, as they are the latest closed ones. It is visible on the chart nr.3. that their market (or so called, the total income) had almost remained the same, only the ratio had been changed between the companies.

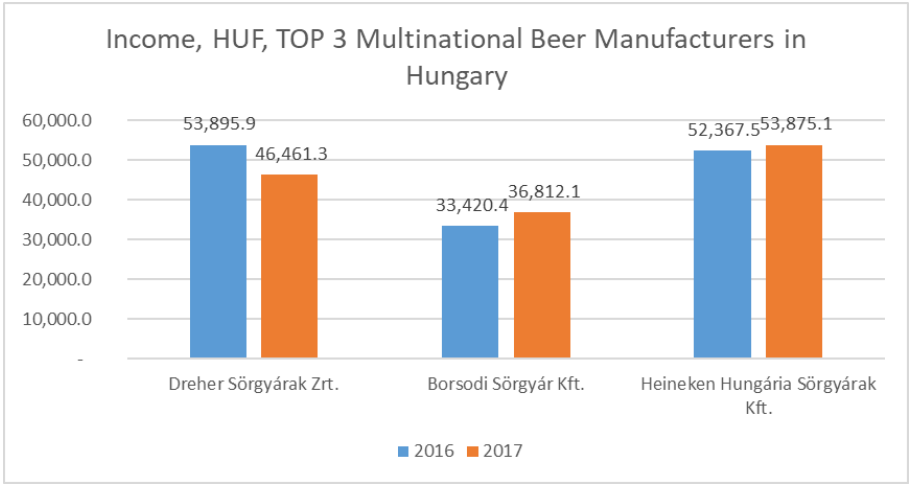

Figure 3: Income of the multinational beer manufacturers in Hungary, expressed in HUF.

(Source: own creation based on the governmental annual reports)

The mixed trend (one of theirs volume had been decreased, one of theirs had been increased and one of them seems stable) can not be compared to the trend of the lack of workforce, because based on the above, the missing personnel had not influenced all of the players.

It is interesting to note that at this moment, in 2018, there are lot of vacant positions on the career websites of the companies. (See Annex n.1.)

5 The income of the craft beer producers

There are plenty of companies on the Hungarian craft beer manufacturing market (Fertő et. al., 2018), I just listed the "biggest" ones, from the aspect of reported income in the last 2 years.

The "revolution" of the craft beers had started in 2017 (as you can see on the chart nr.4) and it is still ongoing: the big ones had changed their recipes and created new beers in order to compete with the smaller breweries on the field of flavor.

Depending on the used resources (eg. malt, water, flavours, etc.), the cost of a unit might vary in this separated category too, not even compared to the multinational ones.

Worth to note, that the visibility of the Csíki products might base on their legal battle with the Heineken Group regarding to the origin of a beer brand. They are listed here, because they do not belong to the multinational manufacturers, but hang out a little bit, as they have only commercial operation in Hungary, not manufacturing.

The companies are located in different areas of Hungary, so they are also affected by the above mentioned lack of professionals, as the job advertisements are showing in the annex. nr. 1.

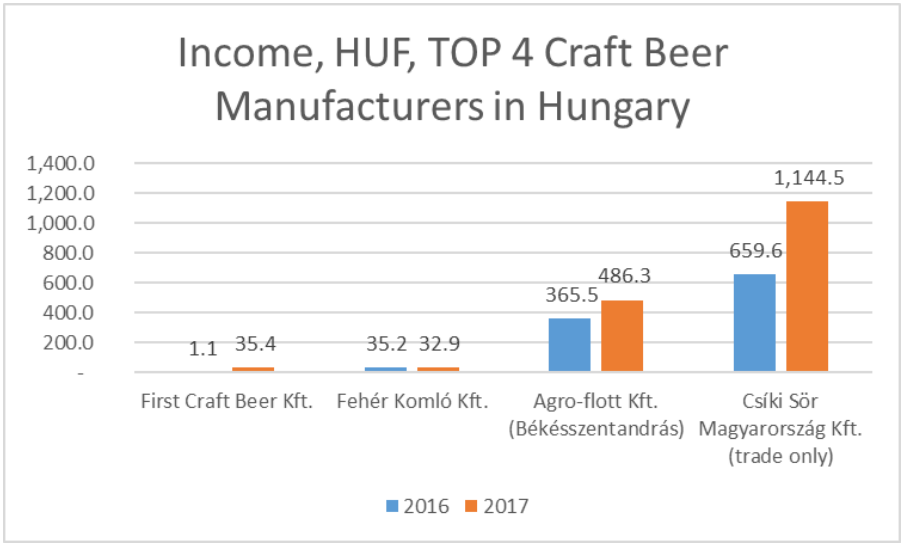

Figure 4: Income of the craft beer manufacturers in Hungary, expressed in HUF. Source: own creation based on the governmental annual reports.

6 Summary

The need of the human workforce is resulted higher wages in the last 3 years, as the demand meets with the supply. Based on the income data, we can say, that independently of the location or size of the factory, each and every processing industry operating companies are lack of well trained professional, independently whether the position is blue collar or white collar.

The income reports are showing an ambitious picture about the future, but –as it was the aim of the study- it is worth to consider the human workforce related questions.

In the light of the industry 4.0, there is a big question mark at each and every investment, which focuses on human capacity increase.

The workforce need, the increasing salaries are going to influence the further income of the companies –on local and global level-, therefore the topic needs further researches on the field of the effect of automation of human workforce.

Annex. nr. 1.
List of opened positions

Heineken, Source: https://heineken.karrierportal.hu/allasok
Summary: 3 of 10 are blue collar workers.

1. E-COMMERCE DATA EXPERT (BUDAPEST)
2. INTERN POSITIONS
3. KEY ACCOUNT MANAGER
4. KISKERESKEDELMI TERÜLETI KÉPVISELŐ (CENTRÁL RÉGIÓ)
5. PTP SPECIALIST (BUDAPEST)
6. **RAKTÁROS (SOPRON)**
7. REGIONÁLIS ÉRTÉKESÍTÉSI ASSZISZTENS (PÁPA)
8. TPM KOORDINÁTOR (SOPRON)
9. **ÜZEMI KARBANTARTÓ (SOPRON)**
10. **ÜZEMI TECHNIKUS (SOPRON)**

Borsodi, Source: http://borsodisorgyar.hu/hu/oldal/toborzasi-nap
Summary: 4 of 11 are blue collar workers.

1. **fejtőüzemi- és sörtermelési operátor**
2. **karbantartó műszerész**
3. **gépész karbantartó**
4. **raktáros**
5. végellenőr
6. fuvarelszámoltató
7. SAP-specialista
8. EHS-specialista
9. projektmenedzser
10. szállítmányozási vezető
11. gyakornoki pozíció az ellátási láncnál

Dreher, Source: https://karrier.dreherzrt.hu/allasok
Summary: 6 of 18 are blue collar workers.

1. Call Center munkatárs
2. Chief Legal Counsel
3. Elektrikus - Energiaellátási rendszergazda
4. Értékesítési képviselő - FOOD (Pest megye)
5. **Fejtési vonalvezető PET-KEG**
6. **Gépkezelő- Karbantartó (Fejtő-gépsor)**
7. **Gyártelepi vonatvezető**
8. National Warehouse Manager
9. **Operátor (csomagoló gépsoron)**
10. Personal Assistant (2 years fixed term)
11. Production Planner
12. SAP rendszerelemző (ABAP)
13. **Sörfőző**
14. **Sörtermelési technológus**
15. Számlázó pénztáros
16. Telefonos értékesítő - aktív értékesítés
17. Területi értékesítési vezető (független boltok – Nyíregyháza, Debrecen)
18. Ügyfélszolgálati ügyintéző (logisztikai terület)

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Borsodi Brewery Career site: http://borsodisorgyar.hu/hu/oldal/toborzasi-nap

Dreher Brewery Career site: https://karrier.dreherzrt.hu/allasok

Heineken Hungaria Breweries Plc Career site: https://heineken.karrierportal.hu/allasok

Hungarian Statistics Office vacancy report:
http://www.ksh.hu/docs/hun/xstadat/xstadat_evkozi/e_qli027a.html

Hungarian Statistics Office: income report:
http://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_qli042.html
Governmental annual reports: http://e-beszamolo.im.gov.hu/oldal/kezdolap

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The Sustainable Food Concept of Sopron's Region

Nikoletta Németh & Attila Kurucz

Abstract One of the main objectives of the latest rural development researches was to strengthen the local economy of Sopron and Sopron district. Previous analysis and studies have led to the recognition that it would be expedient to support local (regional) farmers and to create a market organization to increase the use of local food products. In the first step, the researchers concentrated on supplying raw materials and raw materials to so-called "big consumers" (restaurants, institutions, social care, etc.). On the other hand, it is very important to examine the existing sources of food supply and elaborate on the concept of an organization that enables market coordination. This paper is a milestone.In this paper, we undertook to develop the concept of the local food chain. It would also cover some modern aspects that were not included in previous agro-economic studies. According to our conception, it is very important to integrate and activate digital solutions as well. Thus, not only the co-operative model but the integration of local money and the development of a virtual market space can play an important role in developing an effective food chain and boots the regional economy.

Keywords: • food chain • local market • Sopron region • local food producers • local money •

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1 Introduction

The present study aims to describe the food supply concept of Sopron's region, one of Hungary's western border regions. Earlier projects have already looked at the agricultural enterprises in the region, particularly the famous viticulture. The intention here is to give a comprehensive, conceptual evaluation and introduction of a viable and sustainable food system that builds on local capabilities. Within this context, a summary will be given of the agrarian economic opportunities, market operations as well as economic specialties, such as the local currency, which is Sopron's unique facility. A strong focus will be given to local businesses and local producers, therefore to the local agricultural distribution processes. In addition to the existing opportunities, it is also important to show the directions of future developments in order to confirm the existence of sustainability. Therefore, in line with the elaborated concept, recommendations will be given on how to build it up and operate in the future.

2 The sustainability of the supply systems

The global increase in consumption affects all products, durable and perishable goods as well. The issue of sustainability will come to the fore from environmental and economic perspectives, but perhaps food consumption is the most vulnerable area in this regard. All the members of society can experience this when they do not get access to a certain type of food or when they can buy them at a much higher price.

One of the most common inferences of agricultural and agrarian economic studies is that the production, processing, distribution, and use of raw food materials have become strategically important due to the increased demand for food worldwide and the limited natural resources available. In addition to address the issues of food supply security, food manufacturers have to be more and more circumspect from healthcare aspects, too. This is mainly about food safety issues, controlled by central regulations.

As a result, it is necessary to create higher level co-operation between market players and state governance, and vertical and horizontal alignment of market players, as well as methods of co-operation with other food-chain related industries. (Kardeván, 2011).

One of the major requirements of sustainable food production systems is ensuring compliance to natural environmental and environmental protection standards, but economic and social aspects should also be considered due to increasing competition, rapidly changing consumer habits and labour market changes. On account of food security, the sustainable food concept needs to take into account a fourth dimension, i.e. consumer health. This is not only a matter of state coordination, rather people's own claim, which is a very important requirement for food manufacturing and distribution companies. With regard to the traditional approach to sustainability, four dimensions have to be considered and aligned here, as shown in the 1. figure below.

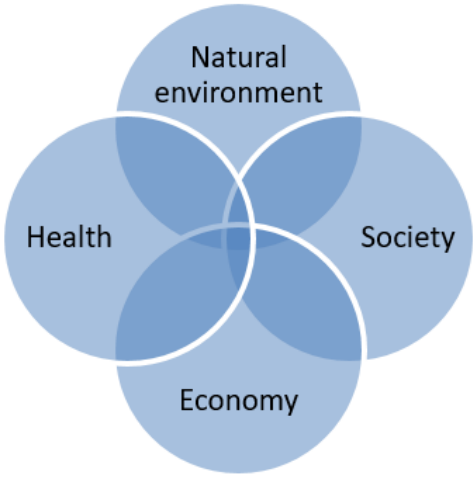

Figure 1: The four dimensions of sustainable food.
(Source: UMBESA, 2014)

The issue of healthy food, or food security, has been at the forefront of interest around the world and also became a priority for the European Union. Due to media news and possible bad experiences, a significant part of the population is concerned about the potential pathogens and chemicals in foodstuffs, including pesticides, veterinary residues, additives, and pollutants from the contaminated environment. Misconceptions and half-information may give rise to distorted prejudices against products and their producers. The well-known phenomenon that people are afraid of the results of new technologies is perhaps even more pervasive in this industry: a well-known example is the market launch of genetically modified foods (Nébih, 2015).

Ensuring access to quality food is a challenge in itself, although there is no shortage or significant quality concerns in the region under review. This study focuses on how to solve the food issue in the Sopron region in a sustainable manner, relying on local producers and other economic players involved in processing and transfer activities. Sustainability requirements can be met basically by regional co-operation and synchronising local needs and opportunities. In sustainable systems, due to the proximity of food production to the market, producers, processors, and consumers get closer together, and this will result in shorter supply chains, simpler, more transparent and cheaper distributions, and consequently cheaper food products. In addition, we can also assume that this way the opportunity increases to establish food security, to make healthier food more accessible and develop a food culture better suited to traditions. From an economic point of view, synergies can emerge if the formation of typical local and regional products and product groups creates a platform to shared marketing and tourism-aligned developments, and this can lead to an increased employment and more secure earning possibilities and livelihood for the families of the region.

2.1 The role of the local economy in sustainable food

In Western Europe there's been a tendency since the late 1980s with an increasing demand for region-specific food products produced with traditional methods passed on by former generations. Recognising this trend, France became to first to set up an inventory of specialty foods with high added value. Following the success of the French collecting work, in 1992 the European Commission's Directorate-General for Agriculture entrusted the project manager with the professional leadership of a European-wide comprehensive program, named Euroterroirs (Regions of Europe). The European collection comprises 4,000 products from the 129 regions of the EU.

The new approach and cultural attitude also influenced gastronomy; one of the most famous example is the slow food movement launched in 1989 in Italy, which emphasizes the relationship between meals and the environment and encourages, among other things, the consumption of local food. (Http://slowfood.com)

In 2005, the *"100-Mile diet"* movement was launched on Canadian initiative. The essence of the initiative was restricting food consumption, for one year, to include only foods grown within 100 miles. The authors have put forward several arguments for the consumption of local food:

- eating always fresh food,
- knowledge of the food's origin,
- building human relationships,
- proximity to nature, considering seasonal changes,
- the opportunity to try out new flavours,
- getting familiar with own environment and protecting it,
- helping small farmers, supporting the local economy,
- a healthier lifestyle,
- getting experiences, memories.

In the framework of the European Union FP7 Program, FAAN (*Facilitating Alternative Agro-Food Networks*) research was completed in 2010, in which NGOs and researchers collaborated to assess what local food systems can operate successfully in Europe. Five EU Member States: Austria, France, Poland, Hungary and the United Kingdom participated in the research, with a civil organization and an academic institute. The results of the research made it clear that the various European initiatives are driven by different motivations. Some of them simply want to sell their products on the nearest market, while others have defined alternative food systems as innovative food production and distribution initiatives that aim to preserve and develop the interests and values of producers, consumers, local communities and the natural environment and seek social, environmental, and economic sustainability.

At the beginning of the 2000s, a view was already developed holding that purchasing local products can favourably affect the local economy (Gareth, 2010, Hinrichs, 2000, Feenstra, 1997, Sims, 2009). The locally grown fruits and vegetables are fresher due to shorter transport distances and time. While vegetables sold in big supermarkets are usually harvested unripe and often transported for weeks, local vegetables can be collected just one day prior to the market sales. This also has a positive effect on the nutritional value of vegetables and fruits, and local food is considered by many people to have better taste as well.

The consumption of local products also reduces the impact on the environment. In addition, local food from familiar producers may contain less chemical residues. Due to the fact that local products have to be transported for considerably shorter distances, there is no need for significant logistical input and this fact lowers the level of pollutant emissions. Because of the shorter delivery time, the role of preservation decreases. Local food also encourage people to consume seasonal vegetables and fruits that has the best taste and quality when they are available in large quantities. In addition, this is the time when they are the cheapest as well. Effective economic and social processes also include local producers' faster accountability for food hygiene, warranty and quality complaints. So, the expectation is that they can react more quickly and flexibly and correct their mistakes. Naturally, it is in the interest of the producer to produce quality products, since their honour, reputation and, altogether, their livelihood may depend on it.

Selling local products contributes to sustaining ecological diversity. Since producers do not have to grow standardized, easy to store, easily transportable varieties, the indigenous domestic breeds can survive, whose cultivation otherwise would be forgotten.

Earlier, Sopron did not differ from similar Hungarian and other neighbouring cities in terms of food production. The food was mainly produced in the surrounding villages, but agricultural products were also produced in significant quantities in the town area. Viticulture has long been a major agricultural sector in the town. Besides vegetables, fruit, sugar beet, potatoes, cereals, fodder crops were grown and livestock was bred. Processing was largely done locally, the slaughterhouses and meat factories were well-known. After the Second World War, the production of food ingredients was mostly maintained in the city, but the former producers were replaced by large factories (since 1951, the Sopron State Farm and after the merger of smaller cooperatives, the Dózsa Agricultural Cooperative) beside the few sustaining small producers.

There are 39 settlements[1] in the Sopron district. It is bordered by Austria from the west and north, Vas County from the south, and Kapuvár District from the east (Figure 3). Its territory is 868 km², its population was 99,053 in 2010. There is practically no unemployment since 2.7 percent of the working-age population are registered jobseekers. This is mainly due to the industry relocation and the fact that many people from the villages work in Austria, in border areas. This, of course, hinders the development of labour-intensive agricultural sectors, which is also reflected in the altered production structure.

The natural conditions of the district are excellent for agriculture. Most of the area is flat or slightly hilly, with an average precipitation as well as average crop yields exceeding the national average. (Hungarian Central Statistical Office, 2013). The climate of the region is subalpine, and it is influenced by a favourable microclimate of Lake Fertő, which is a benefit especially in viticulture. The Fertő Hanság National Park with The Egret Castle of Sarród is a major natural asset even in European terms, providing conditions for breeding indigenous livestock. The best-known products are the Hungarian grey cattle salami and water buffalo salami, as well as honey, propolis, and beeswax (Murai, 2013).

Nevertheless, in several areas of the district intensive agricultural production has shrunk. The reasons for this are, on the one hand, labour market changes mentioned earlier, as well as some regime-change related tendencies that also adversely affected the agricultural production and food processing. In Sopron district, this culminated in the privatization and closure of the Petőháza Sugar Factory. Meat processing industry also suffered significant losses. In Sopron District, there are only a few smaller slaughterhouses suitable for processing poultry, pigs and sheep (Egyházasfalu, Völcsej, Iván, Nagylózs, etc.) Almost only the dairy and spirits production sector is present in the region.

[1] Settlements of the district: Ágfalva, Agyagosszergény, Csáfordjánosfa, Csapod, Csér, Ebergőc, Egyházasfalu, Fertőboz, Fertőd, Fertőendréd, Fertőhomok, Fertőrákos, Fertőszentmiklós, Fertőszéplak, Gyalóka, Harka, Hegykő, Hidegség, Iván, Kópháza, Lövő, Nagycenk, Nagylózs, Nemeskér, Pereszteg, Petőháza, Pinnye, Pusztacsalád, Répcevis, Röjtökmuzsaj, Sarród, Sopron, Sopronhorpács, Sopronkövesd, Szakony, Újkér, Und, Völcsej, Zsira.

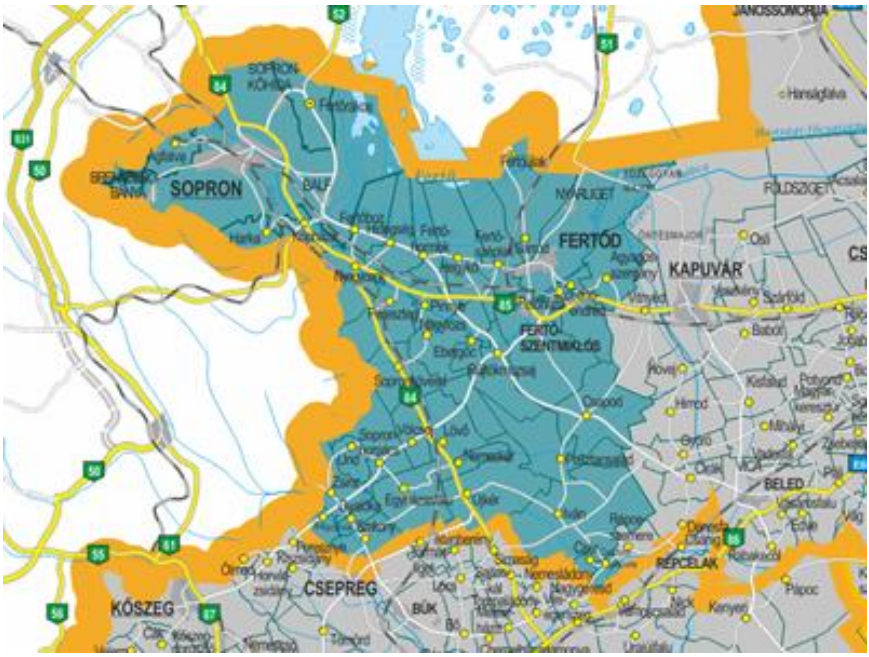

Figure 2: The map of Sopron district.
(Source: Districts (Járások) 2015)

3 Developing the local food concept of Sopron region

3.1 The theoretical background of the concept

The purpose of the research is to enable Sopron district's agricultural producers to reach consumer markets of the district with their products in ways that can reduce logistical costs, and also, local yields and profit remaining in the area the local economy can revitalise and develop. To meet this goal, it seems essential that local demand and supply should meet as well as demand-, and supply-management should be coordinated (Figure 3).

Figure 3 shows that well-organised co-operation is a prerequisite for boosting the local economy, which is the coordinated operation of local producers (possibly intermediaries) and consumers in order to achieve a superordinate common goal - cost reduction, profitable growth, and market revival.

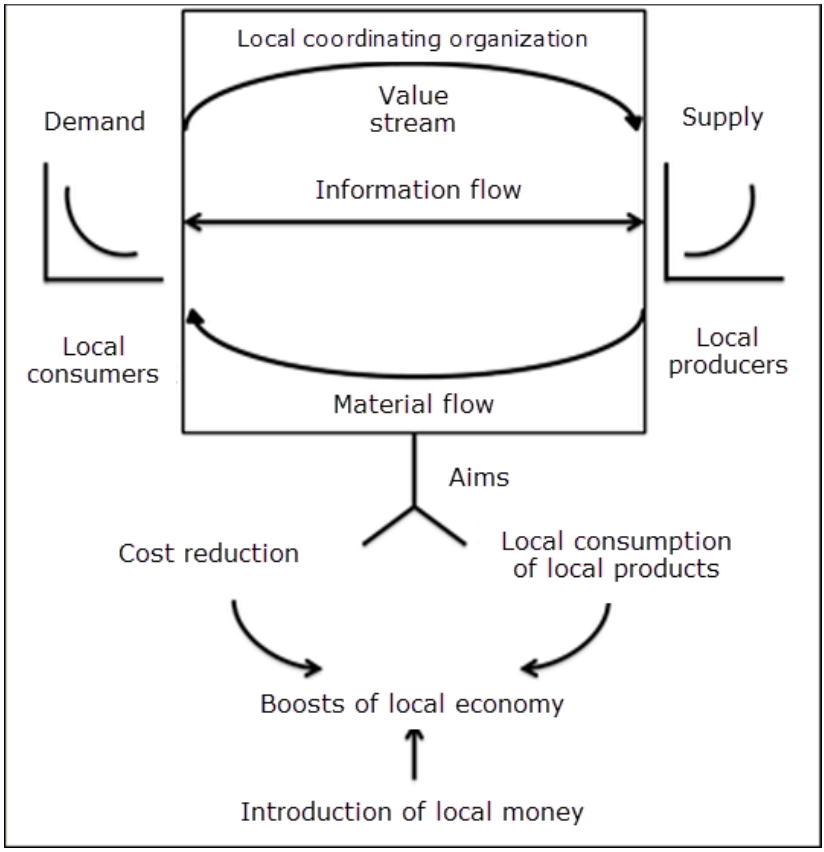

Figure 3: The principle of boosting the local economy.
(Source: made by the authors)

When designing the concept, the stakeholder theory and stakeholder strategic alliances play an important role, which is indispensable for setting up a well-functioning system. A local coordinating organisation is very important for this aim. This organisation should be able to ensure a seamless connection of the local market stakeholders. This is a prerequisite for the formation of an efficient local market and the concentration of sources enabling the invigoration of the local market. The coordinating body should work independently, but should also ensure local producers and consumers can find each other. The vital point is, therefore, the coordinating force functioning as a catalyst, because it facilitates the delivery of the raw material products to the field of use, helps the new value derived from the activity streaming to new places and ensures a continuous flow of information between local consumers and producers. The above role helps the local economy to boost and develop while hinders the added value to leave

the local economy. This process can be strengthened by the creation of local currency and its use on the local market.

3.1.1 Cooperation opportunities

According to noteworthy researchers' opinion, nowadays the success of the local economy is largely determined by the market players' position in the business network because the economic stability of a place depends on the common strategy and value chain integration strength. This has become the prerequisite of success in the 21st century. A peculiar situation can be noted when examining the local economy of Sopron district. On the supply side there are farmers with relative autonomy and who are profit-oriented, but at the same time, they are also interested in co-operation in order to achieve economies of scale and access markets as well as arranging more efficient business operation. (Figure 53).

On the demand side, there are local economy participants who require raw materials primarily for restaurant food processing. Since restaurant services including mass caterers are cost-sensitive areas, the players in the demand side are also interested in creating a form of co-operation.

Table 1: Characteristics of the supply and demand side of the local economy

Demand-side		Supply side
Flexibility	Co-operation	Autonomy
Low risk		Rigid production framework
Autonomy and self-interest		High risk
Meeting customer demands on a higher level		High industrial input prices
Service orientation		Yield orientation
Profit orientation		Relatively low output prices

Source: made by the authors

The high degree of environmental dependence and production orientation of the supply side is in contrast with the more flexible nature of the demand side and its service orientation. A common interest in boosting the local economy and reducing costs can create forms of co-operation that support common interests.

The comparison of the characteristics and goals of vertical and horizontal co-operation can give a clear picture of which form can be more useful to revitalise the local economy and enforce local interests. This relationship is illustrated in Table 2.

Table 2: Characteristics of vertical and horizontal integration

Vertical integration	Horizontal integration
Based on the supply chain	It can be among the companies of the same size
Extending the scope of operation to the buyer or suppliers.	The basis of cooperation are the similar product, sales and marketing.
The goals: make stronger controll though the whole value chain	The goals: good purchasing power, better bargaining power
Strengthening influence in the operation and quality, maintain the competitiveness.	Lower alternative and transaction costs, decreasing the cost rate

Source: made by the authors

Comparing the main features of vertical and horizontal co-operation, it can be concluded that the horizontal co-operation models are more suitable to the stimulation and efficient operation of the local economy in terms of the relationship between the producer and the intermediary (some tourism companies included as well). Thus, the concept is based on activities aimed at strengthening market presence and their long-term sustainability. Naturally, when examining the relationship of processing companies and producers, it is necessary to consider the possibility of vertical models operating effectively. When the relationship of buyer-supplier, so market supply-demand is examined, one can see that vertical relationships are more typical. It seems possible that they can be developed, either when the goal is to launch new crops to the market or to improve the efficiency of production technologies.

3.1.2 Levels of the producer side

On the supply side, not just nationwide but also in the examined region, there is still a significant share of farmers who produce their products as independent small farmers or in family businesses. These businesses are characterized by the fact that when selling their product, they have no co-operation form to support

their agricultural output to access markets. This, on the one hand, weakens the efficiency of cost-cutting measures that would reduce the time for the products to get to the local consumers, and increase delivery and transaction costs (distributing smaller quantities to several markets and organising it). On the other hand, it may result that local producers' products are not sold in the region, thus reducing the application of principles to boost local economies. The problem is further complicated by the fact that local micro and small businesses are acting against co-operation, primarily because of the fear of losing self-reliance and the lack of co-operation traditions. The additional expenses due to the widening agricultural price gap, high industrial input prices and fragmented sales procedure significantly increase the break-even yield and the return revenue. Ultimately, as a result of the high level of logistic and marketability costs, the loss-minimisation behaviour is gaining ground.

As mentioned earlier, co-operation allows rapid information flow between the producer and the user sides. Similarly, the lack of co-operation blocks or delays information transfer, which leads to growing market uncertainty and disorganisation in sales processes.

Foreign experiences show that the transport and transaction costs of the small-scale market can be significantly reduced by co-operation forms organized on a causal basis (Figure 4).

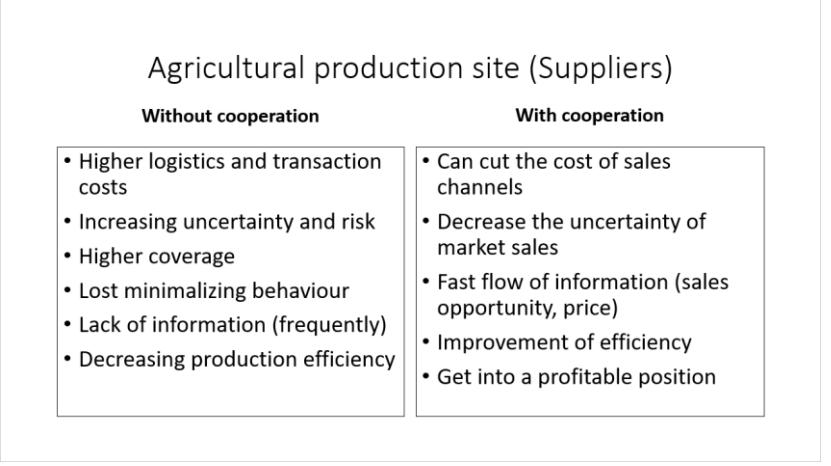

Figure 4: Anticipated effects of cooperation on the supply side.
(Source: made by the authors)

The above mentioned may point out that farmers can manage more efficiently if they arrange market access and sale of their products through cooperation.

The simplest form of co-operation between players of the fragmented agricultural market can be a horizontally organised partnership that is close to the producer phase, but its essential role is not production arrangement, rather conducting and organising sales activities. Its members are typically small farmers, sole traders, and family entrepreneurs, not excluding well-capitalised bigger businesses either. Beside organisation and sales, their scope of activity also includes logistics and other functions (marketing) as well.

3.1.3 Aligning sales channels

A well-organized supply chain including the appropriate distribution channels integrated into the system is the prerequisite for the efficient maintenance and long-term operation of a local economy. Short and direct sales channels are a network of producers and consumers that means the local economy's food production and sales system and a bottom-up collaboration, basically in contrast with the traditional "long-distance" sales channels. Although the change in consumer attitudes is apparent, establishing a link between locally produced products and end consumers is not easy. A place and platform need to be created where supply and demand can meet. It is not merely about reorganising small local markets, but it is also vitally important that producers can provide information for their customers in cyberspace. By informing customers about the products, their benefits, the time and location of the availability, producers can gain credibility as well.

Changes in the producer and consumer attitude, and also a marked change of mindset are the prerequisites of the system operation.

Direct sales, therefore, shorten sales routes because raw or processed materials are delivered directly to consumers and users by eliminating intermediate sales actors (wholesale, retail). These local producer markets can be organised in several ways. Focusing on a given location, several producers can offer their products. Where appropriate, producers can go to customers via mobile sale. They can also be combined with electronic web-based solutions. Sale can take place on the Internet, and the delivery and the receipt of goods can be much easier because of the geographical proximity.

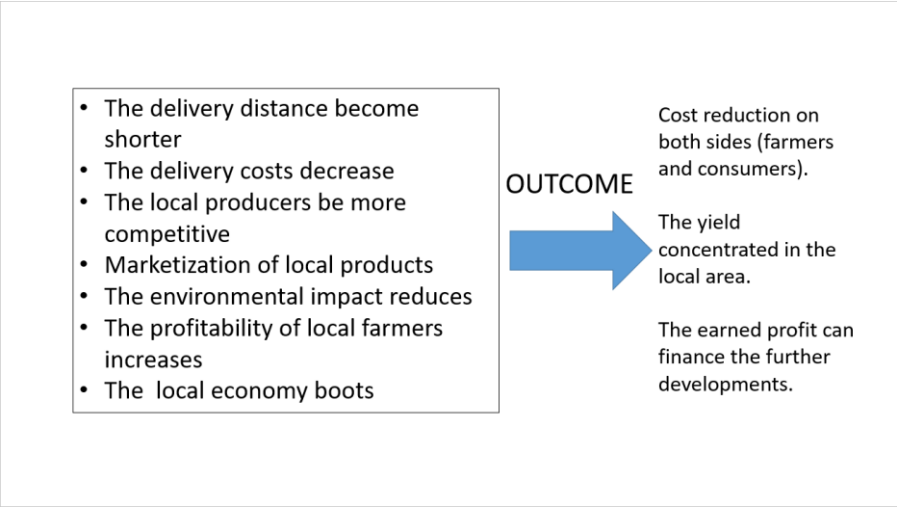

Figure 5: The effects of direct sales.
(Source: made by the authors)

Of course, the direct sales can benefit both the producer and user side and it can be made more intensive with virtual tools of business. Direct links of the supply and demand side of the local market significantly reduce transport distance, which also leads to a significant reduction in transaction and delivery costs for both producers and users. These cost-saving options reduce the cost-intensity of food producers and users, and thereby increase profits. It is not a negligible factor that the competitiveness of local agricultural producers can be improved by making better use of their natural capacities as it is possible to involve products that otherwise cannot withstand longer deliveries. Producers can appear at local events where their PR activity can strengthen their market position and promote their products.

The environmental impact of production can be reduced by stimulating the local markets since lower transportation and logistics costs may save resources that otherwise would play a central role in environmental pollution.

Finally, the introduction of a direct sales system would significantly improve the profit prospects of local producers, small farmers, and family businesses as a result of cost-reducing effects and efficiency improvement measures. Although the organisational and informational activities certainly involve a learning process, this price is worth being paid so that not only profitable, but

economically viable and thus strategically more successful businesses can develop.
The consequences of direct sales are therefore clearly beneficial as they enable the local market to operate more efficiently. Taking steps that result in cost reduction inversely increases income with surplus yield and also promotes the use of capital for development purposes.

There are several ways to directly sell the locally produced products. There is a possibility of a bottom-up collaboration that will establish the links between supply and demand, thus enabling rapid market sales of fresh fruits and vegetables, storable vegetables, meat, eggs, and dairy products. Product delivery from the producer to the consumer takes place directly via the integrator mediator. Because of the small territory of the local market and the small number of producers and consumers, information can spread quickly, making the market operation more efficient. This can only be enhanced with the electronic solutions and web support, as mentioned above. As in the case of enterprises, it can be anticipated that coordinating organisations will deploy new IT technologies so that their market organisation processes become up-to-date and effective and remain so in the future.

In the case of larger local markets, it is possible to establish a partnership that maintains a logistical center, with jointly supervised sales points or shop-networks that not only cater to the large customers of the region but also meet the needs of individual consumers. The latter form can be considered as a more structured, higher-level form of cooperation.

3.1.4 The use of local currency

Foreign and domestic literature and experience show that the introduction of a local currency can stimulate the local economy (Tóth, 2011).

Local money is an alternative currency with limited territorial use to support the local market. The issuer can tailor local money so that it can economically support the region. Local money ensures that local agriculture and food production will develop, as it functions as a medium of exchange, stimulates local demand and enhances competitiveness. This is achieved through the fact that it does not have a positive interest rate, it is not worth accumulating, but it is worth circulating quickly.

Official currency, however, due to its positive interest and the potential yield-generating capacity often migrates to more lucrative areas, restraining the deposit of local economy profits, thus hindering the economic development of the region. If local currency is introduced as scriptural money as well, that would create an increasing and inexpensive credit supply for the local economy participants.

In terms of money, there is a widespread practice that can be regarded very positive and promotes the spread of local currency: a deposit should be placed in the bank in a low-risk portfolio with the same value as the local currency. Then the accumulated yield can and must be used to stimulate the local economy.

It should also be remembered that cash substitutes will not only be able to leverage the region's long-term economic recovery but also by promoting the purchase of local products and services, the liquidity position of market participants can also be improved due to a cash-saving solution.

The leverage effect of local money can be further strengthened if, when paying with local funds, the user is rewarded with various discounts and the money substitute, for example, can be used as a meal voucher.

Lastly, it should be mentioned that the economy reinvigorating effect of local money can be enhanced when converting local money into official money has an additional cost, and when the local currency has a negative interest. In this case, there is little incentive to exchange local money back into official money.

As a summary, the following economy-stimulating effects can be expected:

- As it is territorially limited, it exerts its economic stimulus effect on local markets;
- It circulates fast as a means of exchange, so it can enhance competitiveness;
- It has a zero or a negative interest rate, so it means an inexpensive credit supply as account money;
- The yield on bank deposits also has an incentive effect on the economy, since the liquidity (by revolving credit) of the market players can be ensured from this return;
- It can be used as a voucher with a beneficial effect on trade processes;
- Although it can be exchanged back with extra cost, its volume in the economy can be quickly and flexibly influenced.

Sopron is in an advantageous position, first in the country to have introduced "local money", the Blue Frank (Perkovátz, 2010). Local money in Sopron appears as a transferable voucher and is currently available only in cash. It has proven its viability in many areas and has in many respects contributed to the cooperation of local economy players in the city and its surroundings.

3.2 Models of the local market revitalisation in Sopron district

Several methods of cooperation between the supply and the demand side can be outlined in the region. In the next section three progressively cascading models are presented. These are the following: the looser contractual relationship model, the cooperative model that organizes sales and the integrated local food-chain model.

3.2.1 The contractual relationship model

In view of the economic conditions described above and the circumstances of the region, the contractual relationship can be considered the most basic form of cooperation between the two parties. In a contractual relationship, the consumer commits himself to the purchase of the raw material and the producer usually sells the product at a price calculated on a predetermined basis. Naturally, the contract is already in place before the agricultural product is produced.

The contractual relationship is beneficial for both parties, reduces market uncertainty and promotes a better position for local market players. Farmers can sell their products very easily compared to open market production (sales without cooperation) and the risk of selling can be mitigated by the rapid sale of relatively easily perishable agricultural raw materials. In addition, it has a predictable sales revenue, which is a great advantage in the food producing markets, as the liquidity of the enterprise can be scheduled in advance. Here, too, we can turn to the beneficial effects of the usage of local money.

Both the producers of agricultural products and the consumers benefit from the contractual sales relationship. In the greater part of the year, the supply of raw materials in the local market is guaranteed not only for well-preserved products but also for seasonal, lower-demand raw materials.

The biggest problem with the contractual relationship is that the meeting of the fragmented supply and demand sides takes time and cannot be guaranteed. The establishment of contractual relations involves relatively high transaction costs and the success of transactions cannot be guaranteed without sufficient organising integrator force. The consequence will be that the contractual model is likely to operate with little efficiency and thus it is not able to ensure the expected level of invigoration for the local market.

3.2.2 A cooperative model organising sales activity

The conditions for a more efficient operation of the local market can be created by the cooperative model organizing *sales activity*. The cooperative models are characterised by the fact that they are essentially supply-side oriented, but their important task is to adequately represent the users' interests, in other words, the needs of the demand side are taken into account with due regard. However, efficiency gains can only be measured through the growth of the local market if a sufficient number of producers and users are cooperating. Otherwise, the benefits of the cooperation specializing in sales cannot be used properly.

The main advantage of the above cooperation is that, besides the coordination of production and the increase of added value, it does not only facilitate supply and demand encounters but - within certain limits - it is capable of aligning supply to demand and synchronise the two.

It is also important to note that the aforementioned coordinating and synchronising force facilitates the use of market information on production and user-side decision-making, and thereby reduces market uncertainty.

Of course, developing and maintaining the above cooperation form also involves costs and expenses. First of all, resources should be created that are necessary for the cooperation that was established as an economic player and for the completion of organisation and leadership tasks, human resources should be assigned. Although any member of the cooperative can assume these roles or entrust anyone, it will increase their expenses. Nevertheless, the benefits of a cooperative model focusing on sales seem to far outweigh its disadvantages and are capable of being the driving force of the local market's invigoration.

The cooperative model may also mean the creation of a *purchasing*-type cooperative if the interests of users become more vigorously expressed. This is already enough to help the whole food system, especially if, for example, producers do not want to create a cooperative for some reason. The interest enforcement and economic stimulus coordination can also be created on the demand side.

3.2.3 The integrated food chain model

Before outlining a market organisation that is most likely to help market coordination, let's recall the aspects of revitalizing the previously described local market and then the opportunities for cooperation and integration that can help farmers and agricultural products users in Sopron region to be more efficient. Subsequently, mention was made of the possibilities of cooperation between the supply and demand side. In the study, the conclusion is crystallized that the multifunctional cooperative model can provide the most favourable organisational framework for cooperation, and market participants need to focus on direct and short sales channels because they can best support the local market. Finally, it has been stated that the introduction of local money can also improve the region's more efficient operation by boosting local market turnover.

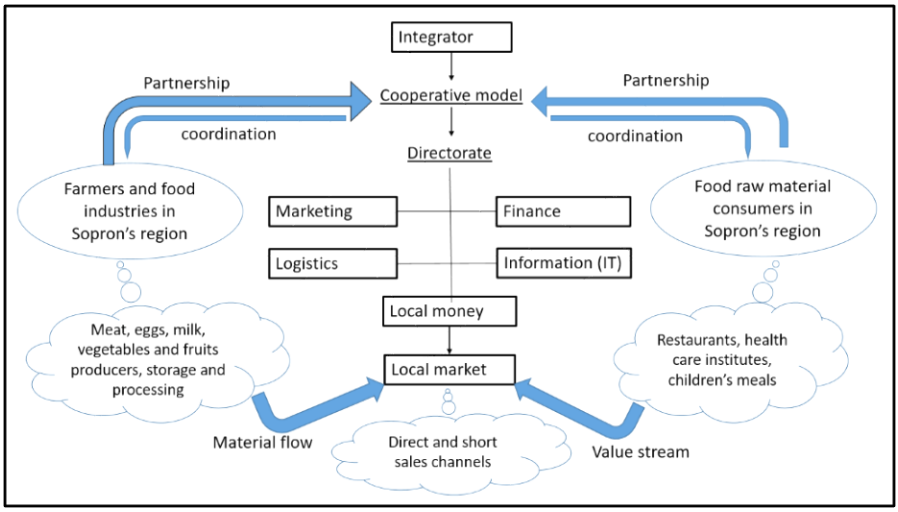

Figure 6: The integrated food chain model.
(Source: made by the authors)

Figure 6 illustrates the model of the local market supported by the present study, which may indeed be suitable for developing the local agricultural market in Sopron. This concept is believed to allow the region's resources to support innovation in the entire food chain and to prevent the migration of local resources.

In the district, the market supply side comprises the producers who produce good quality and sufficient quantities of agricultural products with the agricultural resources available in the region (farmland, meadow and pasture, skilled workforce, agricultural machinery, and equipment).

In the region, besides extensive livestock farming - for which it is a prerequisite to have good quality and sizable meadows and pasture areas - intensive, stable cattle breeding can be found as well. The latter is characteristic predominantly for primary producers and small producers, but there are also a bigger number of cattle fattening and dairy businesses. In addition to cattle, pork and poultry farming, and also egg production are rather intense, and sheep breeding is extensive. There is intensive vegetable growing in the district - in some companies already in large scale - while the fruit production volume is not significant.

Most of the agricultural raw materials are needed for primary processing (e.g. cutting, cooling) or storing (potatoes, root vegetables, fruits, etc.). These activities are part of the integrated system as well.

It is a problem that the supply side operators often sell their products far away from the region, in absence of a good market organising power.

The demand side means restaurants, canteens for children and youth or healthcare institutions and residents of the region, using different agricultural raw materials. Surveys show that players in the demand side primarily do not purchase raw material from local producers, but from wholesalers or from other parts of the country.

It can be seen, therefore, that basically neither the producers nor the users go to the local market to sell their product or purchase material and this clearly hinders the efficient operation of the region's local market.

It is a prerequisite for boosting and improving the local market, that selling and buying should mostly take place in the region's internal market. In order to fulfill this important condition, it is essential to *establish a cooperative operating as an integrator, whose role would cover the entire food chain, i.e. production, processing, and distribution as well as cooking preparation and service.* This integration can ensure cooperation between market players by establishing cooperative member status for business-related stakeholders. The co-operative thus basically acts as a catalyst - not as a bureaucratic oversized head, whose maintenance would require a high level of indirect expenses - ensuring the meeting of participants in the supply and demand side within the region. Naturally, the establishment and maintenance of the integrator role involve expenses that can be covered from membership fees.

When market players meet, actual business relationships and trades activities take place on the local market. The material flow from farmers to the local market ensure the satisfaction of needs of raw food material consumers users, while the value flow from the demand side conveys the sellers' satisfaction.

An essential element of the cost-effective operation of the model is that the sales channels on the local market should be direct and short. Otherwise, the maintenance cost of the long sales channel increases, and also, the profit outlooks will drop for both the producer and the user side.

The integrator's professional activity covers the four important functions that are most important to market revitalisation.

The role of marketing in the model is to collect and organise information about the local market and their stakeholders, thus supporting the more efficient operation of the local market.

The logistics function is to ensure the flow of material, value, and information by connecting supply management (agrarian producers and users) and demand management (material users) enabling market players to make relevant decisions.

Using the basic data that can be mapped from the broad and narrow economic environment, the integrator generates and transmits important information to the participants in the local market. This information is not only necessary when quantifying natural yields and needs, but also in financial and liquidity areas, because with its help it is possible to improve efficiency and enhance profit outlook.

Incorporating financial function into the co-operative model is also important because it is indispensable to monitor the financial activities of the integrator and follow the cost needs of maintaining the local market. This function also includes the maintenance of adequate liquidity and the search for favourable equity investment alternatives.

The financial function plays an important role in the creation and efficient management of local currency. The introduction of local currency on the local market requires great caution. If successful, its use as a means of exchange relieves local market from using the official money, improves the liquidity position of market participants, has a resource-boosting effect, and its coverage background produces yields.

The design and implementation of the outlined integrated food chain model are obviously complicated and time-consuming. Any mistakes in this area may even hinder the implementation of the concept and the successful operation of the integrated system. That is why, in the event of a positive decision by potential participants, a thorough preparatory work and a gradual introduction are needed. It is also possible that the cooperation of the narrower circle of participants and the two previous models will be introduced first and after effective and effective cooperation between stakeholders, the organisation will gradually be transformed into an integrated chain.

4 Conclusion

It seems possible to invigorate the agricultural market in the Sopron region since it already possesses good opportunities and operating agricultural enterprises. Their coordination can be achieved with integration through the establishment of an economic network based on horizontal relationships and the establishment of a flexible food chain. With a changed mindset of enterprises and the increase of their learning capacity, it seems certain that local food can found their market in the area. What is more, this can be linked to tourism later on as a major industry in border regions. One should not forget about digitization, which can provide platforms for businesses, and can significantly increase their operational efficiency and market sales processes. A noteworthy capability of Sopron is the presence of local currency, which, integrated into the model, has tangible financial benefits for both manufacturing and processing businesses. Setting up a coordinator body as early as possible can be seen as a key to development, which - when implemented in an appropriate structure - can create a successful incubation effect in the region.

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XII. MEDNARODNA KONFERENCA LOGISTIKA V KMETIJSTVU 2018
KONFERENČNI ZBORNIK
A. Lisec (ur.)

Univerzitetna založba
Univerze v Mariboru

Optimizacija faz pridelave in logistike vina v Sloveniji: odličnost od pridelave do ponudbe

JULIJ NEMANIČ IN LEA - MARIJA COLARIČ - JAKŠE

Povzetek Večina slovenskih vinogradov se nahaja na strmih legah, kar vinski trti, skromni rastlini, zelo ustreza. Takšni naravni pogoji otežujejo in podražijo obdelavo vinogradov, toda omogočajo pridelavo vin visoke kakovosti. Zaradi težav v panogi se posamezni vinarji na trgu pojavljajo z nizkimi cenami vin. To ni prava strategija za izjemne naravne danosti, ki jih ponujajo vinogradniške lege. Kako zastaviti pridelavo vin, da bo ekonomična? Višja kakovost vin omogoča višje prodajne cene. Po logičnem razmisleku je optimalna usmeritev v »odličnosti«, ki se mora striktno uveljavljati na vseh nivojih, od obnove vinogradov, načrtne obdelave za doseganje optimalne kakovosti grozdja, selektivnem določanju roka trgatve za posamezne sorte in vinske sloge, ves čas nege vin in v končni fazi - ponudbi in postrežbi vina po modelu odličnosti. Verižna povezanost vseh faz v nizu pridelave in trženja vina je logistični izziv za optimizacijo vinogradniško-vinarskih kmetij, podjetij, zadrug. Zadnja faza, ponudba, izbira in postrežba vina je v Sloveniji šibek člen (so tudi svetle izjeme), ki razvrednoti s trudom, znanjem, stroški in z ljubeznijo pridobljeno kakovost vin.

Ključne besede: • logistika • tradicija • obnova vinogradov • digitalizacija • zaščita vin PTP •

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1 Uvod

Izjemno vlogo vinske trte že v prazgodovini lahko razberemo iz Mojzesovega zakonika: »Edinec, če je imel doma vinograd, je bil oproščen vojaščine. Če bi v bitki padel, bi bil vinograd neobdelan. Kakovostni domet vina določa kakovost grozdja in na tem temelju se lahko nadgrajuje končna kakovost. Vino, žlahtna pijača, ki ni namenjena odžejanju, temveč je spremljevalec jedi (OIV 2018), pride do izraza le, če je vino k jedi pravilno izbrano, ustrezno ponujeno in postreženo. Postrežba vina je tipična logistična faza, ki zahteva senzorično poznavanje jedi in vin. Poznavanje vin v fazi postrežbe vključuje vzdrževanje vinske zaloge glede na značaj restavracije, gostilne, turistične kmetije ali zidanice, ohranjanje kakovosti, stalno zagotavljanje ustrezne temperature in spoštovanje pravil sožitja vin z jedmi. Naročnik vina je lahko eno-gastronomsko razgledan in se hoče sam odločiti za vino, ki bo spremljalo jed ali želi, da se mu v restavraciji svetuje pri izbiri jedi in vina. Poznavanje zakonitosti privlačnosti oziroma neskladja vin z jedmi je nujna veščina, potrebna za ustvarjanje enkratnega kulinaričnega užitka in doživetja. Ta zadnji korak je odločilen za želeni učinek in dobro ter poduhovljeno počutje, ko sedi za omizjem. Vedno se lahko predvideva nevarnost, da nepravilno izbrano, toda odlično vino, ne pride ob jedi do izraza. Samo mojstrsko načrtovanje gastronomskega dogodka, ki je sestavljen iz več jedi in vin, lahko z upoštevanjem horizontalnega in vertikalnega načela pri zaporedju jedi in vin zagotovi odlično razpoloženje družabnega omizja.

2 Vinogradništvo in vinarstvo

2.1 Ustrezna obnova in obdelava vinograda za kakovost vin

Vinograd je trajni nasad, zato je izbira vinorodne lege (kakovost terroirja) in kompatibilnih sort usodna za uspešno delo. Na slovenskih tleh se je trta gojila že tisočletja, kar pričajo odkritja o bivanju Rimljanov. Vinska trta in vino pomenita bogato kulturno in ekonomsko dediščino. V Sloveniji čislamo vinsko trto in ta žlahtna kultura se v naši lepi naravi (terroir) dobro počuti. Na trto smo navezani, ne samo ekonomsko, temveč tudi čustveno. Nimamo vinograd samo zaradi dohodka, pač pa tudi zato, ker je to način našega življenja. Veliko je dobre volje in veselja ob dobrih letinah, pripravljeni smo potrpeti ob vremenskih ujmah. Na osnovi stoletnih opazovanj so v Evropi ugotavljali, katere sorte grozdja in prakse obdelave omogočajo pridelati vina, ki zrcalijo okolje, kjer trta raste (Olszak 2011).

Naši predniki so spremljali razvoj panoge v Evropi. Eden od dokazov je prvo slovensko peneče vino, ki so ga v Gornji Radgoni pridelali že leta 1850. Vinar Kleinošek je svojo »štajersko penino« prvič prodajal že leta 1852. To je bil velik dogodek za Slovenijo in Bleiweisove novice so o tem pisale leta (Bleiweis, 1853). Drugi svetel primer, ki priča o logistični povezavi med našimi intelektualci in razvojem vinstva v Evropi je knjiga Vinoreja (Vrtovec, 1844). Avtor, duhovnik (vikar v Št. Vidu pri Vipavi), zgodovinar in vinogradnik je potoval po Evropi in poznal stanje panoge. Opisal je tudi maceracijo belega grozdja. Danes pišejo v Evropi in pri nas o revoluciji oranžnih (jantarnih) vin. Angleški pisec o vinu Simon Woolf začenja svojo knjigo (*Amber Revolution*) s poglavjem o slovensko-italijanski meji, od koder prihajajo pionirji tovrstnih vin in kjer je deloval Matija Vrtovec (Woolf, 2018).

Simon J. Woolf je britanski, večkrat nagrajeni novinar in pisec o vinu ter strokovnjak za oranžna in naravna vina. Redno piše za angleško vinsko revijo Decanter, v sklopu katere je leta 2017 organiziral prvo Decanterjevo degustacijo naravnih vin. Woolf je ustanovitelj spletne strani The Morning Claret, ki je v sedmih letih delovanja zrasla v enega najpomembnejših spletnih virov za vse ljubitelje naravnih in oranžnih vin. Trenutno ima Woolf sedež v Amsterdamu. V obsežni knjigi Jantarna revolucija (*Amber Revolution*) je Woolf predstavil zgodbo o najstarejšem vinskem stilu, ki v svetu doživlja vnovično rojstvo. Pisal je po pričevanjih vinarjev iz Gruzije, Italije, Hrvaške, Avstrije, Portugalske, Španije, Slovaške, BiH-a, Češke, Bolgarije, Kanade, Francije, Švice, ZDA, Južne Afrike in tudi Slovenije. Knjiga, za katero je podatke, primerjave in utemeljitve zbiral štiri leta po vsem svetu, se namreč odpre prav s poglavjem o slovensko-italijanski meji, od koder prihajajo pionirji tovrstnih vin. Namenil nam je naslednji nasvet: "Slovenija se trži s konvencionalnimi vini, ko bi morala izpostavljati oranžna (Woolf, 2018).

Naša tradicija nam je podarila znane vinske blagovne znamke. Doslej smo jih sedem zaščitili po romanskem modelu Priznano Tradicionalno Poimenovanje (PTP). Dediščina nas umešča med zgodovinske pridelovalce vin, a hkrati zavezuje, da vzdržujemo ugled vin slovenskega porekla in sledimo napredku. Napredek naj ne bo nekritično vnašanje novih tehnologij, ki jih tehnološki svet producira, temveč pridelava vin po čim bolj naravni poti, brez stresnih posegov. Navajamo misel znanega francoskega profesorja, ustanovitelja inštituta za okus,

J. Puisais-a: »Moj Bog, »prepad« med vinarjem, ki prideluje vina in tistim, ki jih proizvaja je ogromen, če se gre za isto »blagovno znamko« (Puisais *et al.,* 2007).

Pojem »pridelava« vin pomeni običajno, ne pretirano tehnološko vodenje postopkov od grozdja do steklenice. Besedna zveza »proizvodnja vina«, v skladu z Zakonom o vinu in drugih proizvodih iz grozdja in vina (Uradni list RS 70/97), naj ne bi obstajala v slovenskem jeziku, razen za peneča vina, ki so dodatno obravnavana z več tehničnimi postopki. Velja strokovno načelo, čim manj enoloških sredstev in čim manj tehničnih postopkov (pretakanje, filtriranje, bistrenje, žveplanje …), večjo integriteto ohrani vino.

Živimo v Evropski uniji in tržimo na skupnem evropskem trgu. Italija, ki je po površini vinogradov četrta na svetu (690.000 ha), veliko vlaga v obnovo vinogradov. V Nemčiji so zaprosili EU, da bi smeli povečati vinograde za 834 ha, dobili so dovoljenje samo za 308 ha (AgE 2018). Še več primerov bi lahko navedli kot dokaz, da znajo v drugih deželah boljše gospodariti z vinogradi kot v Sloveniji. V svetu se vinogradi povečujejo, leta 2016 so se površine povečale na 7,5 milijonov ha (OIV, 2018).

Po navedbah Ministrstva za kmetijstvo, gozdarstvo in prehrano je bilo v Sloveniji leta 2009 16.354 ha vinogradniških površin, leta 2015 pa samo 15.688 ha. Poraja se vprašanje, kakšno bo stanje v Sloveniji čez pet let, če se ne zaustavi opuščanje vinogradov? Vinogradniška kriza ne sme biti samo težava vinogradnikov - še dobro, da imamo vinogradnike, ki kultivirajo, ohranjajo in vzdržujejo krajino ter obdelujejo površine po strmih legah, ki za drugo pridelavo niso primerne.

Dolgoročno gledano je nujno potrebno ustvariti pogoje, da bodo vinogradniki, majhni in veliki, zainteresirani za obnovo vinogradov. Majhni vinogradniki so pravo zaledje za zadružne kleti, ki potrebujejo grozdje.

2.2 Napredne tehnologije – digitalizacija

Vino ubira nove poti in te so digitalne (Fleuchaus, 2018), napovedujejo organizatorji 63. Vinogradniško-vinarskega kongresa, ki bo letos potekal v Stuttgartu. Digitalna tehnika, integrirana v prakso, bi koristila v vseh fazah (Bect 2018). To zadeva: e-dokumentacijo, drone v vinogradih (delajo na avtomatskem prepoznavanju slik glivičnih bolezni trte), digitalno vodeno alkoholno vrenje,

avtomatizirane analize. S tem se obeta olajšano delo, več podatkov za odločitve, več sproščenega dela in prostega časa, s tem pa tudi bolj učinkovito logistiko med posameznimi fazami »od trte do mize«.

2.3 Zmanjševanje vsebnosti SO2 v vinu z bio-protekcijo

Kakšna je pot zmanjševanja vsebnosti SO2 v vinu z bio-protekcijo je vprašanje, na katerega odgovor z nestrpnostjo pričakujejo stroka in pivci vina. Vprašanje: »Ali je mogoče zaščititi vino pred oksido-redukcijo in mikrobiološkimi spremembami z mikro-organizmi (bio-protekcija) vrste kvasovk ne-Saccharomyces tako kot z SO2«? si je zastavila Lucie Biteau, enologinja, ki je prejela nagrado »Grand Prix 2018« Zveze enologov Francije (Simonin *et al.*, 2018).

Kvasovke nesacharomicesi se uporabljajo samo v fazi predfermentacije, kot cepljenje ali ko-inokulacija. Te mikroorganizme se doda v mošt v prvi minuti, torej na grozdje ali po pecljanju. Zasedejo mošt in ne dovolijo razvoja kvarljivim mikroorganizmom, npr. Brettanomicesom, avtohtonim bakterijam, ki proizvajajo biogene amine ali vonje po maslu in acetamidu. Delujejo tudi antioksidativno, ker porabijo (vežejo) kisik. So tudi odporne na nizke temperature, zato lepo prestanejo razsluzenje ali hladni postopek stabulacije. Ko pa se začne alkoholno vrenje, ne obstanejo, ker jih razgradi (uniči) že 5 do 6 % alkohola in postanejo hrana za Saharomicese (Mennesson *et al.,* 2018).

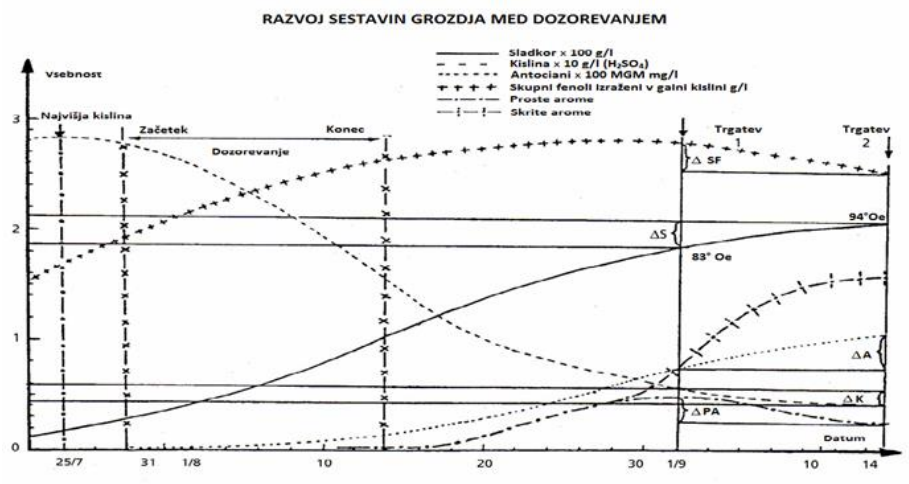
Ta postopek prispeva k razvoju tipike karakterja terroirja, kompleksnosti, mehkobe vina in nesacharomicesi ter so prijazne so dodanim selekcioniranim kvasovkam.

Rezultati raziskav kažejo, da je možno zaščititi vino proti oxiredukciji in mikrobiološkim spremembam z uporabo kvasovk ne-saharomices, pri čemer ni razlike v poteku alkoholnega vrenja (Mennesson *et al.,* 2018). Toda žveplano vino, ki kaže več sortnosti in svetlejšo barvo, je manj občutljivo na oksidacijo. Poskus se je nadaljeval v letošnji trgatvi (vinski letnik 2018) in pričakujejo se dobri rezultati za to prakso.

2.4 Organizacija optimalnega roka trgatve in obiranja grozdja

Ob besedi trgatev večina ljudi pomisli na veselo delo v jeseni, za katerega se čutijo vsi dovolj kvalificirani. Rdeča nit tega članka je kakovost vina, ki pa ji morajo biti podrejene vse organizacijske odločitve. Ker je za kakovost vin najpomembnejša kakovost in zdravje grozdja, je trgatev za vrhunsko kakovost strokovno zahtevno opravilo in odgovoren delovni dan. Tako kot niso užitna gnila jabolka, tudi iz gnilega grozdja (izjema je žlahtna gniloba za vina posebne kakovosti) ni mogoče pridelati kakovostno in odlično vino.

Vinarstvo je dolgoročna panoga, zato je uspešno le dolgoročno načrtovanje. Ko se opazi dozorevanje grozdja, je skrajni čas za načrtovanje vinskega izbora, ki ga omogoči letnik. Dva letnika nista enaka, zato je potrebno predvideti vinske sloge, čakati na tehnološko zrelost in načrtovanim vinom prilagoditi roke trgatev.



Graf 1: Razvoj sestavin grozdja med dozorevanjem (Foulonneau 2009).

Priloženi graf prikazuje, da je ocena stopnje dozorelosti grozdja ključna za rok trgatve posameznega vinskega sloga (Foulonneau, 2009).

2.5 Prijazna predelava grozdja in nega mošta

Grozdje je pestro sestavljeno in izjemno bogato sadje, toda zelo občutljivo, zato je potrebno predelavo grozdja čim bolj kakovostno organizirati. Jagodna kožica je pravi zaklad najfinejših sestavin, ki so pod skupnim imenovalcem polifenoli, kamor spadajo barve, arome, taninske snovi in drugo. Potrebna je skrbna, nežna

in prijazna predelava grozdja, da se jagodne kožice pred alkoholnim vrenjem čim manj poškodujejo. Imamo stroje, s katerimi odstranimo peclje in stiskalnice, s katerimi iztisnemo iz kožic dragocene sestavine za kakovost in sortni značaj vina. Najboljši stroji, ki so neustrezno upravljani, lahko grozdje poškodujejo. Pri tem pride do izraza občutek in posluh kletarja za dragocenost in žlahtnost grozdja.

2.6 Ukrepi za zagotavljanje obstojnega vina s poudarkom na minimalnem žveplanju

Pridelavo vina od grozdja do steklenice sestavlja veriga členov, od najšibkejšega člena je odvisen končni rezultat, to je kakovost in odličnost vina.

Zastaviti alkoholno vrenje je zahteven korak. Danes so na razpolago kvasovke, ki poleg osnovnega poslanstva, spreminjanja sladkorjev v alkohol in stranske produkte, vplivajo na značaj vina. Živa bitja, kot so kvasovke, imajo svoje zahteve, ki jih je znanost razjasnila. Prilagajanje okoljskih pogojev kvasovkam, predvsem ustrezne temperature in prehrana, omogočajo kakovosten metabolizem, ohranjanje naravne posebnosti letnika in sorte grozdja ter proizvodnjo želenih stranskih produktov.

Kamen spotike, ki nam je v panogi nastavljen in se težko opravičujemo, je konzervans - žveplo. Noben postopek ali poznano sredstvo ne more v popolnosti zamenjati žvepla, ki ima več stransko delovanje. Poleg vsega je še cenovno ugodno in enostavno za uporabo. Svetovna zdravstvena organizacija opozarja, da je dnevna, še sprejemljiva količina sulfita na kg telesne teže do 0,7 mg/l (Biteau, 2018). To je dober podatek, toda z znanjem, ki obstaja, je možno zavarovati vina še z manjšimi odmerki žvepla, kot je to v praksi.

Vino je »živo bitje«, ki se v steklenici še spreminja, lahko na boljše ali pa mu kakovost pada. Ali znamo ohranjati kakovost, dokler vina ne prodamo? Na tem področju je še veliko priložnosti za izboljšanje postopka. Brez težav ugotavljamo ob obiskih gostiln in nakupih stekleničenih vin v trgovinah, da nekatera vina prehitro zgubljajo kakovost in se postarajo. Turistična in enološka panoga ne bosta uspešni, če bodo gostje turističnih prostorov razočarani nad vini poleti, preden je novo vino v prodaji jeseni.

2.7 Prijazna in obzirna nega vina

Pri predstavljanju organoleptičnih lastnosti vina govorimo o telesu in strukturi, ki predstavlja bogastvo sestavin in gostoto vina. Toda vino ima tudi svojo »dušo« in kar čutimo kot dušo, je trenutek po požirku, ki pričara sorto, vinorodno lego, letnik, vinarja. Samo vino, ki je imelo »srečno mladost« zmore v polni meri nagovoriti vsa čutila in nuditi trenutek sprostitve. Vino, ki je šlo skozi hitre tehnične postopke (groba pretakanja in filtriranja, močna žveplanja idr.), je ožeto fines in ubito. Velja poudariti, da vino potrebuje mir in svobodo, da samo izloči, kar ne potrebuje. Ne trdimo, da si je mogoče privoščiti čas pri vsakem vinu, ker je treba letnik čim prej unovčiti. Toda kletar, ki dela z občutkom natanko prepozna, kdaj katero vino potrebuje njegovo pomoč in pozornost.

Pestra in raznolika narava Slovenije - slovenski vinski terroirji - omogoča vina vseh kakovostnih stopenj, od preprostega pitnega vina, do najvišjih kakovosti, ki jih omogočajo izjemne lege in odlični letniki. V odličnem kletarstvu ni šablonskih postopkov in protokolov, ki veljajo za vse kategorije vin. Kletarstvo ni samo tehnika, je tudi umetnost in samo iz odličnega grozdja kletar lahko ustvari odlično vino. Taki primerki niso možni vsako leto, toda odigrajo svojo vlogo pri ugledu vinarja in vinorodnega območja.

3 Inovativni ristopi za trženje in izvoz vin

3.1 Trženje vin

Kako zadovoljiti kupce vin od A do Ž? To vprašanje se nanaša na zadnjo fazo, ponudbo in postrežbo vina na vinogradniški kmetiji, turistični kmetiji, gostilni ali zidanici. Postrežba kupcev oziroma gostov na tržnih vinogradniških kmetijah je tako pomembna kot obdelava vinogradov ali nega vina. Toda prevečkrat se zaradi dnevne delovne ihte dober namen spreobrne, zato je potrebno razviti lasten pristop.

Pomemben segment trženja za razdrobljeno vinarstvo je prodaja na domu, na turističnih kmetijah (Göbel, 2018). Vtis, ki ga dobi obiskovalec, tako v kraju kot na kmetiji, določi v veliki meri kakovost vin. Gostje pričakujejo na kmetiji prijetno in nevsiljivo vzdušje. Nikjer ni lepše priložnosti pridobiti gosta kot pri osebni prodaji, ki je časovno zahtevna in draga, toda se vrača (izplača).

Kako spoznati kupce, njihove potrebe in izpolniti njihova pričakovanja? Zunanja in notranja podoba kmetije (vidni napisi na kleti, na dostavnem avtu, etiketi, dopisi, prospekti, internet, uniforme …) naj kažejo enotnost in prepoznavnost. Ni nujno, da imajo na vseh kmetijah oziroma pri vseh ponudnikih vin enak način strežbe, saj ima vsak svojo zgodbo. Ljudje se med seboj razlikujejo, npr.: »mlad in drzen slog« ali »tradicija in zanesljivost« ali »enostavnost in nizke cene«. Slaba kopija uspešnega soseda ne bo pritegnila. Naravnanost in podoba naj ne velja samo za vinsko klet, ampak naj bi vsa družina živela v tem slogu. Če se ta skladnost ne opazi, se to pogreša pri avtentičnosti, ki je v ponudbi vin nujna.

V vsaki družini se njeni člani razlikujejo po talentih in veselju do različnega dela. Nekdo je lahko odličen kletar, a mu ne leži pogovor s kupci ozirom gosti. Kako razdeliti delo v družini, da bo na vseh področjih doseženo največ? Velikokrat je v eni osebi vinogradnik, kletar in prodajalec vin, kar pa nekateri zmorejo, drugi ne.

V nemških turističnih vodnikih in marketinških navodilih celo priporočajo pravi besednjak v pogovoru s kupci, ki naj bi bil pozitivno naravnan. Primer: »Modra frankinja je že razprodana. Morate se odločiti za drugo vino«. Bolje je: »Namesto modre frankinje vam lahko ponudimo modri pinot, ki je odličen«. Ali: »Ne, tega vina že davno nimamo v ponudbi«. Bolje: »Tega vina nimamo več v ponudbi, imamo pa vino, ki mu je podobno«.

Kupci imajo ob nakupu vina določena pričakovanja. Če so njihova pričakovanja izpolnjena, so zadovoljni. Če so doživeli več kot so pričakovali, so navdušeni. Če so dobili manj, kot so pričakovali na osnovi oglaševanja gostinsko-turističnega obrata, so razočarani in se počutijo izdane, izigrane.

Gostinsko-turistični obrat naj bi se prilagajal svojim kupcem. Misel »kupec je kralj« se sliši večkrat. Ta misel se lahko obrne drugače, toda motivirajoče za vinarja. Kupec je lahko tudi »gost«, »partner«, pomaga ohranjati moje delovno mesto, srečanja s kupci so prijetna, skratka je zame pomemben, ne glede na to, koliko kupi.

Tudi osebna urejenost kontaktne osebe v gostinsko-turističnem obratu prispeva k odličnosti, še posebej, če je kupec najavljen. Kakovost in odličnost storitev na tržni kmetiji se meri preko dveh vidikov.

- Organizacijski vidik: točnost, uspešnost, enakomernost in pripravljenost pomagati.
- Osebnostni vidik: prijaznost, taktnost, zainteresiranost, ustrežljivost.

Prostor, ki je na kmetiji namenjen za pogovor s strankami oziroma gosti, je odločujoč. Dvorišče, degustacijski prostor in prodajni prostor, so osnovne posetnice (vizitke) kmetije. Kupcu pade v oči lepa zasaditev, urejenost, funkcionalnost parkirišča, dostop do kleti … Kaj se ne spregleda? Neurejeni kotički, embalaža, odpadne snovi, predmeti … Tudi druga čutila so na preži: uho - razni šumi (hladilnik), noge - (neravna tla), roke - (mize, prti, sedežne blazinice), nos- vonj v prostoru.

Preden pride kupec oziroma gost v gostinsko-turistični obrat, še posebej, če je prvič, ima na osnovi promocije in priporočil prav gotova določena pričakovanja. Kako mu bo vino ponujeno? Je dovolj osebne povezanosti vinogradnika z njegovimi vini ali je ponudba neosebna, tako kot v samopostrežni trgovini? Po nakupu preverja, če je račun razumljiv in pošten. Je slovo prijazno? Je razmerje kakovost - cena ustrezno? Na osnovi vseh teh vtisov se odloča, če bo gost še prišel.

Gost ima ob obisku lahko stik z več osebami. Ali se vsi obnašajo do kupca oziroma gosta na enak način? Ali vsi odobravajo enake popuste? Kako je z reklamacijami? Pregovor pravi: »Kupec, ki kritizira, je dober kupec«, saj vinarju daje priložnost, da ga prepriča in s tem ohrani kot stranko. V primeru reklamacij priporočajo obnašanja po vzgledu štiri P:

1. P = pohvaliti kupca, ker je bil odkrit in je povedal, da je bila ena steklenica v kartonu počena.
2. P = pokazati interes s vprašanjem, koliko steklenic je bilo poškodovanih.
3. P = pogumno sprejeti reklamacijo.
4. P = pripravljenost škodo poravnati.

Kupec se po takem odnosu prepriča, da ima poštenega dobavitelja vina.

Kupci radi pokušajo vina v prostoru (prodajalni), kjer je kotiček opremljen za pokušanje. Privlačne informacije za kupce so vidne cene ob razstavljenih

steklenicah, informacije o vinskih legah, postopkih nege. Tako se izognejo tudi najbolj neprijetnemu vprašanju o cenah vin. Kupec se lažje sam odloča o nakupu. Za njegovo dobro počutje je pomemben tudi občutek, da ne moti poteka dela na, na primer, kmetiji. Zato naj bo obratovalni čas prodajalne prilagojen krajevnim navadam. Med kupci steklenic na turistični kmetiji ali v zidanici se pojavijo, poleg preprostih ljubiteljev vin, tudi poznavalci, in postavljajo vprašanja. Zadrega ni potrebna, če prodajamo dobro vino, ki je tudi nam všeč in smo ga pridelali z znanjem in ljubeznijo. Velikokrat slišimo vodiča na kmetiji ali v vinski kleti, ki pove:

- »Naša vina so odlični spremljevalci jedi.« Ta stavek je brez pravega učinka, saj ne vzbudi nikakršne podobe.
- Povedano drugače, z enakim ciljem vzbuditi pri poslušalcih občutek, da si zaželijo piti njegovo vina ob jedi: »Naše letošnje mlado rdeče vino je čudovito v družbi pečenega kostanja, krvavic …« Takšen opis si poslušalec zapomni in večja verjetnost je, da bodo preverjali to zanimivo dvojico »portugalka : kostanj ali krvavice«.

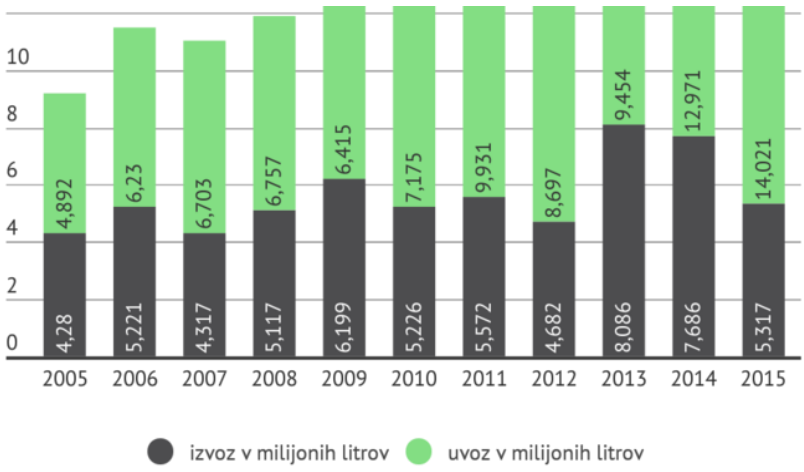
Vrhunsko vino ne more in ne sme biti poceni. Kupec je pripravljen več plačati, če ve, kaj kupuje. Drago vino ima svojo zgodbo, sicer ne more biti drago. Kako to zgodbo predstaviti, da bo pritegnila pozornost, da se bodo v glavah poslušalcev vrstile slike, ki bodo vzbudile čustva in željo po takem vinu? Kaj je ledeno vino danes v Sloveniji ve večina ljubiteljev vin. Toda ljudje radi poslušajo zanimive izkušnje o trgatvah grozdja za ledeno vino, ki so vsako leto in na vsaki kmetiji drugačna. Po taki privlačni zgodbi, ki doda ledenemu vinu dodaten čar, se kupci lažje odločijo za nakup vina z visoko ceno. Pri zgodbah se svetuje izogibati se osebnim problemom. Nikogar ne zanima, da smo ozebli med trgatvijo, se prehladili in z vročino kletarili. Končni cilj vsake vinske zgodbe je prodaja vina. Visoke številke se dajo z nekaj psihologije narediti prijaznejše. Primer, omemba odstotka popusta nima takega učinka, kakor če se sliši, koliko evrov bo kupec prihranil: »Polna cena za šest steklenic vina je sicer 30 evrov, toda danes je popust in plačate samo 24,5 evra«. Prihranek 5,5 evra je oprijemljiva številka, ki jo kupci slišijo in pomaga k odločitvi.

Informativen je intervju na štirih nemških turističnih kmetijah z vprašanjem: »Se je spremenilo obnašanje kupcev«? Povzemamo intervju vinarjev (Gries 2012):

1. Kupec nima več samo enega dobavitelja vin, ampak sodeluje z večimi kletmi. Zato so količine vin manjše in gre več časa za posameznega kupca. Mnogim kupcem veliko pomenijo dobre uvrstitve vin na ocenjevanjih in časopisni članki. To se opaža predvsem pri kupcih, ki naročajo vino po internetu. Zato se zelo posveča hišni spletni strani, kakor tudi ceniku vin.
2. Še pred 15 leti smo prodali večino vina stalnim kupcem. Mlajša generacija kupcev je zahtevna za kakovost in opremo steklenic. Starejši kupci so usmerjeni v kakovost in količino. Ne išče se več vina vseh sort, temveč sortna vina iz določenih leg.
3. V zadnjih letih je zelo naraslo znanje o vinu, tako stalnih kot tudi novih kupcev. Mlajša generacija je zelo radovedna in spremlja dogodke na vinskem trgu. Ogrevajo se za mlada, poudarjeno sadna, sveža vina.
4. Ugotavljamo bliskovito spreminjanje navad kupcev. Ne drži pa, da mlada generacija ne sledi starejši v znanju o uživanju vina. Zopet se iščejo lokalna vina, kar kaže na dolgoročnost.

3.2 Izvoz vin

Izvažati vina je cilj vsakega ambicioznega vinarja. V Slovenijo uvažamo veliko več vina kot izvažamo. Podatki za leto 2017 še niso poznani, spodnji graf se nanaša na leto 2015 in kaže trend naraščanje uvoza in padanje izvoza. Čeprav količinsko izvoz slovenskih vin že nekaj let stagnira, vrednost izvoza raste, poudarjajo na Ministrstvu za kmetijstvo, gozdarstvo in prehrano, saj se izvažajo predvsem srednje in višje cenovna vina (Alič, 2018).



Graf 2: Izvoz in uvoz vina (Alič 2018).

V Mainz-u (Nemčija) je sedež Vinskega inštituta (DWI), ki se ukvarja z izvozom vina (www.deutscheweine.de/weinwirtschaft). Ugotavljajo, da je med vinarji naraslo povpraševanje po svetovalcih za izvoz. Vsakemu, ki namerava izvažati svetujejo, da se osredotoči na eno ali dve državi, ki naj bi bili v bližini.

Kakšne predpostavke mora imeti vinar, ki želi izvažati?

- Izoblikovano paleto vin, ki je kakovostno in cenovno jasna, viden nastop (sejmi) in stalno zanesljivo kakovost.
- Spletno stran, ki ni nujno, da je v celoti v angleškem in/ali drugem tujem jeziku, zaželeno pa je, da je predstavitev kmetije v angleškem in/ali drugem tujem jeziku.
- Reference, da vinar ni nepoznan, časopisni članki v tujini, predstavitve v vinskih vodičih, medalje na mednarodnih ocenjevanjih, ki so dobra referenca za promocijo.
- Načelno velja: bolje 3-krat letno izvoziti v eno državo, kot enkrat v treh letih v različne države.
- Priporoča se izdelati tri-letni načrt oziroma strategijo, definirati cilje, vizijo in finančno konstrukcijo za projekte in promocijo ter delovati v skladu z zastavljenim načrtom in ga sproti evalvirati.
- Predhodno preverjati, s kakšnimi cenami bi se predstavili na zunanjem trgu, kakšna je konkurenca, možnost udeležbe na sejmih,

sodelovanje z mediji. V Veliki Britaniji so v modi lahka vina in s takšno informacijo se lahko vzpostavijo stiki in opravijo kompetentni razgovori s kupci. Zato je potrebno poznati smernice, kakšni vinski slogi so prisotni v določeni državi v danem času.

- Množična elektronska pošta za vinske trgovce praviloma ni učinkovita.
- Dobro je poiskati trgovskega partnerja in se z njim osebno seznaniti. Pošiljanje vzorcev za pokušnjo, če nismo naprošeni, se ne svetuje.
- Oprema steklenic mora biti ustrezna in usklajena z nastopom. Odražala naj bi filozofijo podjetja in zrcalila posestvo ter njegovo zgodbo.
- Etiketa ne sme biti prezahtevna - čim manj je na steklenici sporočil, tem več je izgledov, da bo osnovno sporočilo vinarja, sorta in blagovna znamka učinkovitejša.
- Neizkušen vinar veliko tvega, da bo na tujem trgu, ki je »sovražen«, uspešen, in da ne bo zgubil denarja.
- Ne svetuje nobeni nemški zadružni kleti, da se sama odpravi na tuji trg. Svetuje, da se vključi v DWI, kjer vedo, kako postopati.

Ocenjujemo, da imamo v Sloveniji malo vinarjev, ki se lahko na osnovi gornjih predpostavk uspešno uveljavijo v izvozu vin in da je domači trg bolj hvaležen. Menimo pa, da tudi na domačem trgu ne bo uspeha, če ne bomo dosegali večino gornjih predpostavk, zato je pomembna kakovost, ki zahteva optimalno logistiko od trte do steklenice.

4 Sožitje vin in kulinarike v gostinsko-turistični ponudbi

4.1 Vino ni pijača za odžejanje, je dopolnilo in spremljevalec jedi ali začimba

»Tudi najboljša hrana je slabša za znaten odtenek, če ji, siroti, ni dana pijača za žlahten pomenek« (Bogataj *et al.,* 2000). Vinu, žlahtni pijači simbolične vrednosti, umetnost od davnih časov posveča izjemno pozornost, kar se odraža v poslikavah, kipih, poeziji, filozofiji, prozi, čez 500 omemb v Bibliji. Skratka, postalo je brezčasno (Puisais *et al.,* 2007).

Kaj lahko današnja generacija naredi, da bi vino čim bolje odigravalo svoje poslanstvo: »Biti človeku v veselje?«

Vino nastaja s fermentacijo grozdja in alkohol je ena od več kot tisoč sestavin. Ohranja vse sadove procesa alkoholnega vrenja v obliki lepega videza, novih arom in več sto novih sestavin. Grozdje in vino ne doživljata v tehnološkem postopku višje temperature od 30° C. V njem ostajajo nepoškodovane naravne snovi grozdja (tudi vitamini). Vse pijače, ki so pasterizirane (sokovi, pivo …), zgubijo zaradi visokih temperatur v tehnološkem procesu, najfinejše naravne sestavine sadja in žita. Tudi to je eno od dejstev, da lahko verjamemo v »zdravilnost« vina.

Leta 1991 je francoski zdravnik Serge Renaud, ki je znanstveno raziskoval vpliv vina na zdravje ljudi, prišel do ugotovitve, da je pri Francozih za 3,5-krat manjša umrljivost zaradi kardio vaskularnih bolezni v primerjavi z ljudmi v ZDA. Vse je vodilo do sklepa, da je odpornost Francozov zaradi življenjskega sloga, ki ob jedi redno in zmerno uživajo rdeča vina, saj vsa vsebujejo antioksidante (Renaud 1998). Izkazalo se je, da lahko na osnovi rezultatov priporočajo dnevni odmerek do tri kozarce. Novica je postala pravi medijski hit po 60 minutni oddaji na ameriški televiziji CBS, povpraševanje po rdečih vinih je bliskovito naraslo.

Ta študija je vzpodbudila raziskovalce po celem svetu, predvsem zdravnike, in sledile so mnoge potrditve rezultatov prof. Serge Renaud-a. Potrdili so, da je molekula v vinu resvératrol, sedaj znana kot močan antioksidant. Raziskave vinskih sort po svetu so tudi pokazale, da vsebuje največ resvératrola Modra frankinja, ki je slovenska avtohtona sorta. Ali dovolj poudarjamo to odkritje pri promociji rdečih vin, PTP zaščitenih vin? Medicina razglaša, da je posameznik toliko zdrav, kot so zdrave njegove žile in srce. Že stara medicinska modrost uči, da vino čisti žile. Zavetnik slovenskih vin Anton Martin Slomšek je avtor reka: "Žalostna je miza na kateri ni vina«. Tudi ta trditev opozarja, da ima vino posebno mesto v slovenski kulturi. Izročilo nas zavezuje, da negujemo spoštljiv odnos do vina in najlažje to uresničujemo, ko ga ponujamo, predstavljamo in strežemo.

4.2 Bolj prijazna in spoštljiva ponudba vin v gostinstvu

»Vino je duša kosila. Meso in zelenjava predstavljata samo material«, je stavek, ki ga med gastronomi velikokrat slišimo. Študije ugotavljajo, da 69 % mladih (millenijcev) svoj krožnik fotografira preden začne jesti (Fleuchaus, 2018). Uveljavljata se pregovora: »Povej mi, kaj ješ in povem ti, kdo si« in »Povej mi, katero vino piješ, s kom in kdaj, pa ti povem, kdo si.«Torej mladina želi nekaj vedeti o jedi, ni jim cilj samo jesti. In v vinski stroki je več zgodb, kot kjerkoli drugje.

Zmerno uživanje vina je element zdravega načina življenja, toda informacije o tveganjih in zlorabi bi morale biti sestavni del trženja vina (Olszak, 2011).

4.3 Za napredek v gastronomiji je potrebno sommeliersko znanje

Glavna vloga vina je ob jedi. V dokumentu iz leta 2006 »Strategija gastronomije Slovenije«, so navedene obstoječe in možne slovenske dvojice: Vino – jed. Znanje vinarja o vlogi vina pri mizi je nujno za uspešno komunikacijo z gosti, posebno z zahtevnimi. Poštena in avtentična kratka vsebina ima pogosto več teže kot pa domnevno dobre besedne kreacije.

4.4 Ustvarjanje inovativnega sožitja med jedmi in vini

Vsaka jed ima svoj značaj, saj je osnovna sestavina nadgrajena z dodatki, začimbami in drugimi surovinami, kar pripelje do več ali manj okusnosti (slastnosti). Tudi vina so prepoznavna po značaju. Ni vina, ki bi ustrezalo vsem jedem. Možno pa je izbrati za vsako jed vino, ki bo ustvarilo harmonijo (Lebe *et al.,* 2006). Ob srečanju vina z jedjo se v ustih lahko razvijejo različne stopnje okusnosti:

- Jed lahko pretirano poudari gotovo značilnost vina, da se (paradižnikova omaka v družbi zrele Modre frankinje) dozdeva nepitno.
- Beljakovine ublažijo taninski okus vina, npr. močno tanično rdeče vino, ki pri čisti degustaciji ni prijetno, se lahko pokaže zelo okusno v družbi ustrezno pripravljenega rdečega mesa.
- Vino lahko doda jedi svojo aromo, npr. odlična sadna Modra frankinja lahko svojo sadnost prenese na jed, kakor to zmore tudi začimba.

Ponesrečena dvojica vina in jedi lahko razvije neprijetne arome, ki jih ne najdemo niti v jedi niti v vinu. Lahko opazujemo metalno aromo, če ob sirih značaja »Camembert« postrežemo rdeče tanično vino ali če belo barikirano vino ponudimo k ostrigam ali morskim sadežem z značajem po jodu.

Vino in jed lahko reagirata odlično in razvijeta boljše arome, kot jih imata samostojno oba. Taka dvojica je popoln uspeh. Ustvarjalni gostinec ima možnost preverjati svoje sposobnosti pri oblikovanju dvojic po načelu: klasična izbira, možna izbira, drzna izbira (Lebe *et al.,* 2006).

Analizirajmo jed in vino, preden ju ponudimo - čeprav sta vsak zase odlična, ni rečeno, da bosta harmonirala. Priporoča se predhodno raziskati oba partnerja, če se okusi enega in drugega ujamejo na treh pomembnih točkah: intenzivnost, narava in tekstura. Če okusi na teh treh točkah niso na enaki ravni, lahko eden od elementov premaga drugega in ga zasenči. Zato velja pravilo, da je bolje ocenjevati (uživati) ločeno oba, kot družiti okuse, ki si nasprotujejo.

Vedno se zgodijo reakcije med vini in jedmi, ki se jih lahko predvidi in z oblikovanjem menija usmerja. Glavna sestavina vina, ki dominira, odloči, ali je vino tanično, sladko, kislo ali bogato.

Preskušanje dveh klasičnih primerov, na primer sortna vina Syrah iz Slovenske Istre ali merlot iz Vipavske doline ali Cabernet sauvignon iz Goriških Brd se občutijo mehkejša, manj tanična (kosmata) v družbi beljakovinsko bogatega rdečega mesa. Ista vina delujejo bolj tanično postrežena k zelo slani prekajeni šunki in zelo kosmata ob močno zabeljenih jedeh.

Bela suha vina, znana po višji kislini (npr. Rumeni plavec, Belokranjec PTP), delujejo manj kisla ob slanih ali rahlo sladkih jedeh. S kislimi vini celo uspe uravnotežiti težke mastne jedi.

Pri sožitju vin z jedmi je potrebno upoštevati še mnoge druge dejavnike. Vrsta omake je včasih bolj vplivna kot osnovni material obroka. Na primer, zajec kuhan v omaki z rdečim vinom in s suhimi slivami se ne bo na enak način skladal kot zajec, pripravljen s paradižnikovo mezgo in gobami. V takšnem primeru je potrebno ponuditi lažje rdeče vino zaradi paradižnika ali barikirano zaradi gob. Pomembno je upoštevati, kakšna je osnovna priprava jedi, na primer v

kombinaciji z zelenjavo, krompirjem, rižem ali gobami. Zelenjava ubije kompleksno vino, gobe ga povzdignejo, riž in krompir pa sta bolj nevtralna. Velja splošno pravilo, enostavna jed - enostavno vino. Če jed ni pestra in ima na primer samo dva osnovna okusa, potem bi jo kompleksno vino zasenčilo. Boljše je izbrati enostavno vino, ki se z lahkoto pije, pri čemer vino in jed lepo harmonirata. Torej nič ni absolutnega in »definitivnega« pri sožitju med jedmi in vini. Včasih je vse odvisno od drobnih sprememb, na primer od dodatka začimbe, ki v receptu ni predvidena in da jedi povsem drug značaj, pri čemer je potrebno izbrati povsem drugo vino, ki se spaja z jedjo. Lahko se zgodi tudi ne pričakovani razvoj vina, ki je bilo dolgo v vinoteki in ima zaradi tega povsem drugačno telo in okus, zato ni primerno k jedi, kjer smo ga predvideli. Takšne in podobne spremembe lahko vplivajo na vzdušje za mizo in zadovoljstvo gostov, zato je potrebna posebna pozornost na vsakem koraku in pri vsakem procesu, nič ni rutinskega in samoumevnega. Gostinec naj bil na osnovi lastnih izkušenj in znanja sposoben ustvarjati svoje dvojice ter jih ustrezno in samozavestno prezentirati in argumentirati.

5 Sklepne ugotovitve - možni izhodi za dolgoročno uspešno in odlično vinarstvo

V Sloveniji bi lahko veliko storili za boljše ekonomsko stanje v vinogradništvu-vinarstvu (VV), če bi logično optimizirali verigo »od trte do mize«. Ob letošnji trgatvi (2018) se je čutilo med vinogradniki malodušje, posebno med tistimi, ki niso imeli kupcev za grozdje – vinski letnik je mnoge vinogradnike našel nepripravljene. Stanje v panogi ni rožnato, saj se vinogradi postopoma opuščajo, obnavlja pa se zelo malo površin. Slovenija uvozi več vina, kot izvozi (Alič 2018). Kar strinjamo se s trditvami, da že nekaj let ne pridelamo v državi vina niti za samooskrbo.

Vinska trta ni enoletna kultura. Samo z dolgoročnim načrtovanjem panoga uspeva in je lahko organizirana tako na ravni kmetije, kot države. Nismo logično razmišljali in se načrtno skozi leto pripravljali na trgatev – ali smo dobri gospodarji?

Konkurenčnost na ravni kmetije, vinorodnega okoliša in celo države je odvisna od naše svojevrstnosti, karakteristik vinske ponudbe in vinogradniških kmetij, ki kultivirajo pokrajino. V vinogradniških območjih so ljudje trmasti in si življenje

s trto predstavljajo kot neizbežno, a ljubo usodo. Toda brez pravil zavlada kaos, zato so potrebna zanesljiva pravila trženja. Vinogradniki med sabo niso konkurenti, saj ima vsak svojo tehnologijo pridelave grozdja, vina in svojo zgodbo, pa tudi vina primanjkuje. Konkurenti vinogradnikom so pivovarji in proizvajalci mešanic iz žganih pijač. Kako kolegialnost sprožiti v vinorodnih okoliših? Prevečkrat se išče krivda za stanje v panogi pri drugih, namesto na domačem pragu.

Ne moremo s pridelki tekmovati z nižinskimi vinorodnimi območji, kjer lahko ljudje pridelajo veliko grozdja na hektar površine in preživijo z nizkimi cenami. Ne potrebujemo visoko tehnoloških vin, ki vinom odvzamejo naravne značilnosti. Ponudimo lahko kakovostna vina, ki odražajo naravo, avtentičnost in tradicijo. Da bomo lahko govorili o slovenski »vinski oazi«, bo potrebno imeti v ponudbi tudi vina »terroirja«. Ta vina so prava vaba za vinske poznavalce, ki so pripravljeni kakovostno vino tudi ustrezno plačati. Predstavitve vin nadgradimo z lastno zgodbo, v kateri bo čutiti, da se zavedamo svojih korenin. Trdoživost in odločnost naših prednikov se je pokazala od turških vpadov do vonj preteklega stoletja. Vzdržali smo in si priborili »prepoznavno identiteto« ter sloves gostoljubnosti. Vse to se odraža v nas, v naši filozofiji in značaju naših vin, ki pa ne morejo biti pridelana po hitrih postopkih - za tak tržni pristop so dobrodošla tudi »macerirana« vina.

Vinar, ki trži vino, bi moral vedeti vse o svojem vinu: značilnosti tal v vinogradu, nagib parcele, količine in razporeditev padavin v letniku, sorte, pridelke, zrelost grozdja, postopke predelave, potek alkoholnega vrenja, nego vina, arome, harmonijo idr. in to vse razložiti na vprašanje kupca. Tudi gostinec mora poznati značilnosti vina: sorto, sortno strukturo zvrsti, letnik, ožje poreklo, kategorijo vina (mlado, zrelo, barikirano, ostanek sladkorja), sporočilo vinarja za posamezno vino, priporočeno jed. Ni dovolj zdrdrati: alkohol, letnik, sorto in na hitro natakati - brez znanja ne bo uspeha. Izobraževati je potrebno vinarje in turistično gostinske delavce in to vsakoletno, če hočemo biti uspešna vinska destinacija. Pregovor »Izobraževanje je kot plavanje proti toku, čim odnehaš, te odnese«, še kako velja za vinogradniško in vinarsko panogo.

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Zakon o vinu in drugih proizvodih iz grozdja in vina (Uradni list RS, št. 70/97, 16/01 in 105/06 – ZVin)

XII. MEDNARODNA KONFERENCA LOGISTIKA V KMETIJSTVU 2018
KONFERENČNI ZBORNIK
A. Lisec (ur.)

Univerzitetna založba
Univerze v Mariboru

Možnost dostave lokalno pridelane hrane v lokalno okolje z električnimi in hibridnimi vozili

KLEMEN LISEC, ZOLTAN SZEGEDI IN ANDREJ LISEC

Povzetek V članku raziskujemo smiselnost investicije lokalnega proizvajalca jabolčnega soka in ostalih izdelkov iz jabolk v nekonvencionalna vozila (električna, plug-in hibridna vozila) za distribucijo izdelkov do obstoječih strank v lokalnem okolju ter primerjamo okoljski, stroškovni in časovni vidik z konvencionalnimi vozili. Smiselnost investicije ni zgolj v stroškovnem vidiku, namreč tudi okoljskem, kar s podnebnimi težavami postaja vse bolj interes splošne javnosti. Republika Slovenija in Evropska unija namenjajo trajnostnem razvoju in krožnem gospodarstvu vse več sredstev. V članku smo analizirali distribucijo proizvajalca jabolčnega soka in ostalih izdelkov iz jabolk skozi dve poti - dnevno pot, pri čemer smo simulirali dostavo do gostinskih lokalov in ostalih odjemalcev v osmih mestih v okolici mesta Sevnica, in daljšo, tedensko pot, kjer smo simulirali distribucijo do obstoječih strank po krajih v celotni Sloveniji. Pri distribuciji smo upoštevali uporabo konvencionalnih vozil (ICE), baterijskih električnih vozil (BEV), hibridnih plug-in vozil (PHEV) in hibridnih vozil (HEV), ter kakšen vpliv ima uporaba posameznega tipa vozila na okolje, na stroške goriva in na čas dostave.

Ključne besede: • električna vozila • hibridna vozila • distribucija lokalne hrane • logistika • analiza poti •

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1 Uvod

Za lastnike električnih, hibridnih in priključnih hibridnih vozil je v letu 2018 na večini električnih polnilnih postaj v lasti podjetja Petrol d.d. polnjenje potekalo brezplačno (Petrol – Elektromobilnost paketi, 2018). Če smo partner v logistiki nam to lahko nudi konkurenčno prednost, v kolikor so izpolnjeni določeni pogoji (primerna napetost polnjenja, zmogljivost baterije, vračunana daljša časovna konstanta). V članku bomo ugotavljali ali je za lokalnega proizvajalca izdelkov iz jabolk (jabolčni sok, suha jabolka, sveža jabolka, marmelade in čežane) smiselno, da razmišlja o uporabi nekonvencionalnih vozil v svoji distribuciji do obstoječih strank.

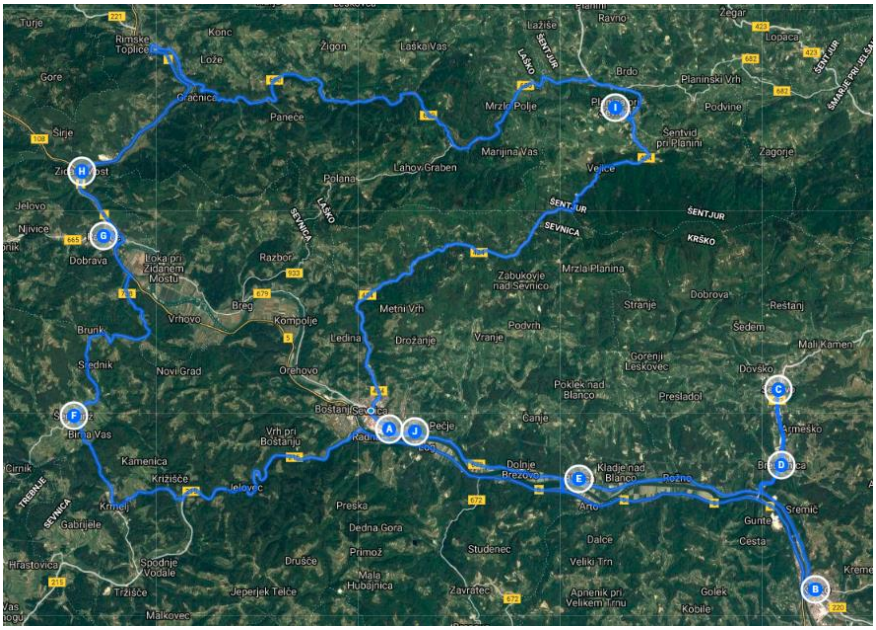
V tretjem poglavju bomo glede na poti, ki jih proizvajalec izvaja, ugotavljali kateri tip vozila (vozilo z motorjem na notranje izgorevanje, dve vrsti električnih vozil in priključno hibridno vozilo) ima najnižje mesečne stroške. V četrtem poglavju bomo izvedli okoljsko analizo, saj vemo, da so konvencionalna vozila ena izmed največjih onesnaževalcev okolja danes (Lampič, b.d. str. 4). Temperature našega planeta od leta 2013 do 2016 so najvišje, od kar jih merimo (Espinosa, 2017), kar je spodbudilo k razmišljanju tudi medije in splošno javnost, ne le strokovne javnosti, katere 55% meni, da sprejeti in izpeljani ukrepi ne bodo pravočasno zagotovili želenih učinkov ter da se bo storila nepopravljiva škoda (The GlobeScan SustainAbility Survey, The 2017 Climate Survey, 2017). Izračunali bomo izpust emisij CO2 v okolje glede na prevoženo pot posameznega tipa vozila.

V petem poglavju bomo izračunali ali je časovno učinkovito, da pri distribuciji lokalno pridelane hrane uporabimo nekonvencionalna vozila. Tako bomo upoštevali časovne zamude, ki se pojavijo pri polnjenju goriva z uporabo konvencionalnega vozila z motorjem na notranje izgorevanje (Renault Kangoo), ter polnjenje nekonvencionalnih vozil (električni vozili Renault Kangoo Z.E. in Nissan e-NV200) na električnih polnilnicah na distribucijskih poteh, ki smo jih definirali. Pri priključnem hibridnem vozilu Mitsubishi Outlander PHEV smo upoštevali, da je po izpraznitvi baterij prešel na uporabo motorja na notranje izgorevanje.

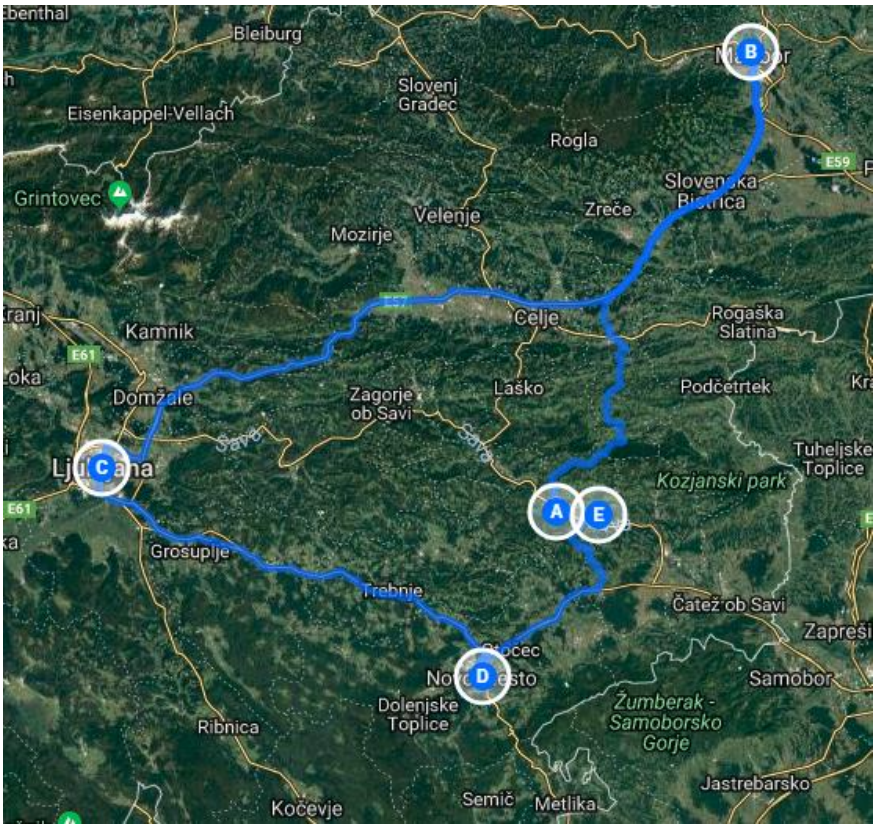
2 Metode

Za možnost dostave smo izbrali proizvajalca jabolčnega soka in ostalih izdelkov iz jabolk iz okolice mesta Sevnica. Proizvajalec ima stranke v lokalnem okolju, kjer se distribucija opravlja vsak dan enkrat, prav tako pa ima proizvajalec stranke v treh večjih mestih po Sloveniji, kjer se distribucija izvaja enkrat tedensko. Glede na distribucijske poti, ki jih mora opraviti, bomo izračunali ali je smiselna investicija v električno, hibridno ali priključno hibridno vozilo, pri čemer bomo upoštevali stroškovni, okoljski in časovni vidik.

S pomočjo spletnega orodja Google Maps bomo določili optimalno kratke poti za obe vrsti distribucije. Dnevna distribucija (Slika 1) poteka do mest Krško, Senovo, Brestanica, Blanca, Radeče, Zidani Most, Šentjanž in Planina pri Sevnici. Tedenska distribucija oziroma razvoz (Slika 2) pa poteka do strank v mestih Ljubljana, Maribor in Novo mesto. Distribucijska pot je zbrana na podlagi realnih, anonimiziranih podatkih proizvajalca lokalnih izdelkov.



Slika 1: Dnevna distribucijska pot (krajša).



Slika 2: Tedenska distribucijska pot (daljša).

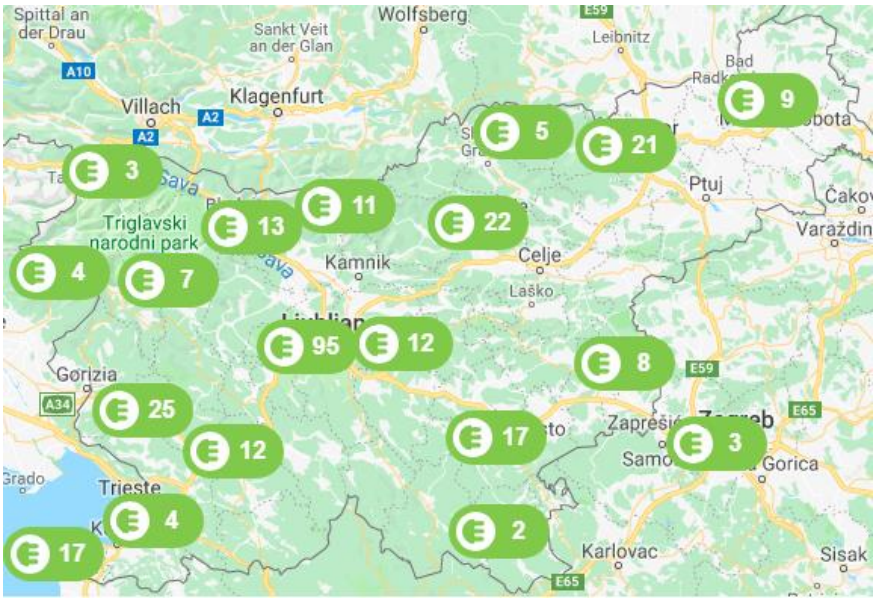
Pri distribuciji bomo izračunali stroškovno analizo, kjer bomo primerjali vse štiri vrste vozil in pri tem upoštevali strošek poti. V kolikor domet v nekonvencionalnih vozilih ne bo zadostoval za celotno pot, bomo v pot vključili polnilne postaje, ki so razporejene ob poti. Pri okoljski analizi bomo analizirali vpliv na okolje, ki ga imajo različni tipi vozil, in sicer skozi prevoženo razdaljo in porabo energentov. Opravili bomo tudi časovno analizo, kjer bomo upoštevali povečano časovno komponento pri nekonvencionalnih vozilih zaradi polnjenja med samim procesom distribucije.

3 Analiza stroškov

Po podatkih spletne aplikacije Chargemap in spletne aplikacije gremonaelektriko.si je v Sloveniji že skoraj 320 polnilnih postaj, od tega 27 hitrih polnilnih postaj na avtocestnem križu Slovenije (Sistemski operater distribucijskega omrežja z električno energijo (SODO), Hitre polnilnice, b.d.), ki

ji vzpostavil SODO v okviru evropskega projekta »Central European Green Corridors (CEGC)«. Hitre polnilne postaje so pomembne iz logističnega vidika, saj običajno polnjenje električnih vozil ni časovno učinkovito in ni primerno za logistične dejavnosti, kjer je časovna konstanta bistvenega pomena (Green Transportation, EV DC Fast Charging Standards, 2018).

Tabela 1 prikazuje mesečne stroške konvencionalnega vozila, dveh električnih vozil (Renault Kangoo Z.E. in Nissan e-NV200) in priključnega hibridnega vozila, pri čemer smo upoštevali, da se dnevna pot opravi štirikrat tedensko (16 poti mesečno), tedenska pa enkrat tedensko (4 poti mesečno). Glede na kataloške specifikacije dobavitelja električnih vozil smo upoštevali, da pri dnevni poti električnega vozila med distribucijo ni potrebno polniti nobenega od električnih vozil, medtem ko je pri tedenski poti električno vozilo zaradi dolžine poti potrebno polniti oba. Slika 3 prikazuje polnilnice, podprte za naši električni vozili, slika 4 pa prikazuje hitre polnilne postaje na avtocestnem križu Slovenije. Za naše izračune bomo uporabili hitre polnilne postaje pri vozilu Nissan e-NV200 in navadno polnilno postajo za električno vozilo Renault Kangoo Z.E. Polnjenje na navadnih polnilnih postajah je bilo glede na spletno aplikacijo gremonaelektriko.si brezplačno, medtem ko imamo za hitre polnilne postaje več možnosti : podpis pogodbe s podjetjem in upravljalcev hitrih polnilnic Petrol d.d., kar nam odpre možnosti do njihovih paketov za polnjenje, ali pa uporaba predplačniške kartice SODO. V našem primeru smo se odločili, da bomo uporabili predplačniško kartico SODO, kar nam omogoča uporabo hitre polnilnice za 30 min in ceno 5,00 € za vsakih porabljenih 30 min.



Slika 3: Podprte polnilnice
(Vir: Renault.si)

Pri električnem vozilu Renault Kangoo Z.E. smo predpostavljali moč motorja 44 kW (tehnične specifikacije proizvajalca), pri električnem vozilu Nissan e-NV200 smo predpostavljali moč motorja 40 kW (tehnične specifikacije proizvajalca), pri konvencionalnem vozilu Renault Kangoo smo predpostavljali, da je moč motorja 55 kW – dCi 75 E6, pri priključnem hibridnem vozilu Mitsubishi Outlander PHEV pa električna moč motorja znaša 70 kW, moč glavne baterije 13,8 kW/h, moč pomožne baterije 70 kW/h ter moč bencinskega motorja 99 kW. Izračuni so bili narejeni na podlagi proizvajalčevih navedb v tehnični specifikaciji vozila in spletne aplikacije Mitsubishi Fuel Calculator.

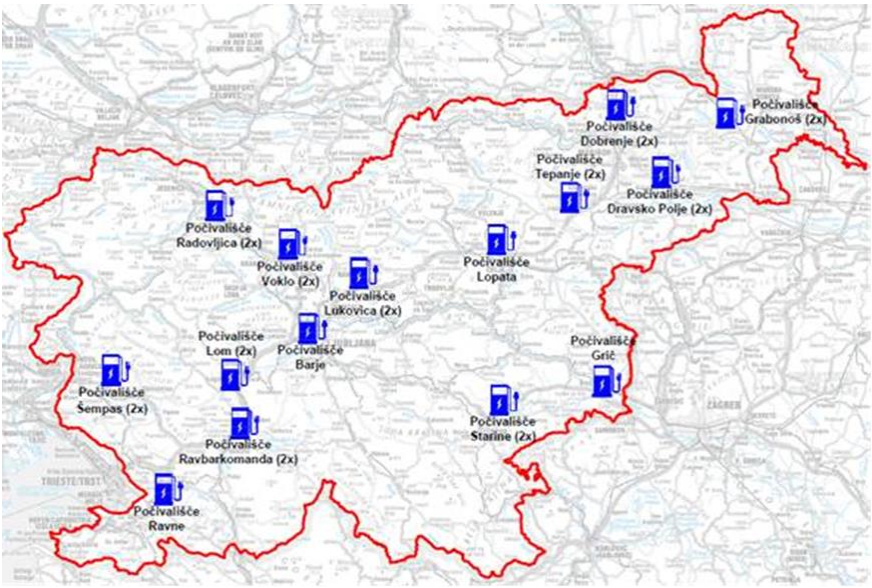
Pri električnih vozilih smo upoštevali domače polnjenje, kjer smo opravili izračun na podlagi povprečne cene električne energije za leto 2017, enotni tok (ET). Kjer le domače polnjenje zaradi dosega električnega vozila ni bilo mogoče, smo izračunali polnjenje na hitrih polnilnicah avtocestnega križa Slovenije.

Pri konvencionalnem vozilu (Renault Kangoo), ki ima motor z notranjim izgorevanjem smo upoštevali navedbe proizvajalca, ki navajajo porabo goriva 4,3 l/100 km pri kombinirani vožnji. Ministrstvo za gospodarski razvoj in tehnologijo (MGRT) na dan 31.10.2018 navaja drobnoprodajno ceno dizelskega goriva 1,364 € na liter (MGRT, Cene naftnih derivatov, 2018)

Kot je razvidno iz tabele 1, so stroški električnih vozil bistveno nižji, prednjači pa Nissan e-NV200. V primerjavi z konvencionalnim vozilom je mesečni strošek goriva manjši za 134,06 € ter 116,78 € manjši od priključnega hibridnega vozila Mitsubishi Outlander PHEV. Razlika med konvencionalnim in priključnim hibridnim vozilom bi bila višja, če bi na trgu obstajalo priključno hibridno dostavno vozilo in ne zgolj SUV gorivo z višjo porabo motorja na notranje izgorevanje.

Tabela 1: Stroškovna analiza

	Konvencionalno vozilo Renault Kangoo	**Električno vozilo Renault Kangoo Z.E.**	**Električno vozilo Nissan e-NV200**	**Priključno hibridno vozilo Mitsubishi Outlander PHEV**
Pot	Skupni strošek poti (€)	Skupni strošek poti (€)	Skupni strošek poti (€)	Skupni strošek poti (€)
Dnevna pot (Sevnica, Krško, Senovo, Brestanica, Blanca, Šentjanž, Radeče, Zidani Most, Planina pri Sevnici, Sevnica)	118,53€	53,21	48,45	106,90
Tedenska pot (Sevnica, Maribor, Ljubljana, Novo mesto, Sevnica)	98,39	25,65	24,25	88,74
SKUPAJ	**216,92**	**78,86**	**72,70**	**195,64**



Slika 4: Hitre polnilnice na avtocestne križu Slovenije (vir: sodo.si)

4 Okoljska analiza

Pri vplivu na okolje smo pri konvencionalnem vozilu Renault Kangoo vzeli nazivno vrednost izpustov CO2 na kilometer, ki smo jo pridobili v tehnični dokumentaciji vozila in znaša 112 g/km. Na ta način smo lahko izračunali izpust CO2, ki ga vozilo izpusti v okolje na celotni distribucijski poti (dnevni in tedenski). Rezultati so vidni v Tabela 2: Okoljska analiza. Priključno hibridno vozilo Mitsubishi Outlander PHEV ima nazivno vrednost 40 gramov izpuščenega CO2 plina na 100 kilometrov, kar je precej manj od konvencionalnega vozila. To je posledica dveh baterij in elektromotorja, ki asistira motorju na notranje izgorevanje, prav tako pa je možna vožnja brez emisij CO2 do 50 kilometrov glede na tehnično specifikacijo proizvajalca. Za vožnjo na baterijo smo dodali emisije, ki se izpustijo v okolje pri proizvodnji električne energije, za kar smo uporabili slovensko povprečje 0,5 kg CO2 ekv/kWh. Nazivno vrednost emisij CO2 in emisije za proizvodnjo električne energije smo pomnožili z dejanskimi kilometri obeh poti v distribuciji.

Za obe električni vozili (Renault Kangoo Z.E. in Nissan e-NV200) smo uporabili isto metodo, kajti nazivne vrednosti neposrednih izpustov električnih vozil so ničnе, vendar se emisije izpuščajo v okolje skoz proizvodnjo električne energije. Za izračun porabljene energije obeh električnih avtomobilov (kwH na 100

kilometrov) na distribucijskih poteh smo uporabili aplikacijo Green Race, kar smo pomnožili z slovenskim povprečjem proizvodnje električne energije.

Tabela 2: Okoljska analiza.

	Konvencionalno vozilo Renault Kangoo	**Električno vozilo Renault Kangoo Z.E.**		**Električno vozilo Nissan e-NV200**		**Priključno hibridno vozilo Mitsubishi Outlander PHEV**
Pot	CO2 emisije (kg)	Povprečna poraba energije (kWh/100km)	CO2 emisije (kg)	Povprečna poraba energije (kWh/100km)	CO2 emisije (kg)	CO2 emisije (kg)
Dnevna pot (Sevnica, Krško, Senovo, Brestanica, Blanca, Šentjanž, Radeče, Zidani Most, Planina pri Sevnici, Sevnica)	229.38	17.25	173.11	16.48	165.38	105.16
Tedenska pot (Sevnica, Maribor, Ljubljana, Novo mesto, Sevnica)	190.40	19.11	191.80	18.27	183.34	88.46
SKUPAJ	**419.78**	**364.90**		**348.72**		**193.62**

Rezultati kažejo, da sta tako poraba kot izpusti večji na tedenski poti, predvidoma zaradi uporabe avtoceste, kjer so hitrosti višje. Prav tako vidimo, da je največ izpustov CO2 v okolje izpusti konvencionalno vozilo z motorjem na notranje izgorevanje, najmanj pa priključno hibridno vozilo. Priključno hibridno vozilo sicer uporablja motor na notranje izgorevanje, vendar mu baterije asistirajo, prav tako pa se med vožnjo regenerirajo skozi regenerativno zaviranje (Continental Mitsubishi, Mitsubishi Outlander PHEV regenarative breaking, 2017).

5 Časovna analiza

Časovna analiza je pomembna, saj je to odločilen faktor ali je investicija v nekonvencionalna vozila smiselna. Zaradi časa polnjenja, ki je odvisen od tehnologij, ki jih uporabljajo baterije ter pomanjkanja polnilnih postaj, v nekaterih primerih ni smiselna uporaba nekonvencionalnih vozil v logističnih procesih (tovorni promet).

V primeru dobavitelja, ki smo ga izbrali za ta članek, so razdalje enake ne glede na tip vozila. To je za to, ker so polnilnice na poti in ustavljanje ne vpliva na

prevoženo razdaljo, le na porabljen čas. Konvencionalno vozilo Renault Kangoo in priključno hibridno vozilo Mitsubishi Outlander PHEV sta imela podobne izgube na času, in sicer 7 minut za vsako polnjenje posode za gorivo. Ta izguba je vračunana v Tabeli 3 (čas potovanja) za posamezno vozilo.

Tabela 3: Časovna analiza.

	Konvencionalno vozilo Renault Kangoo		**Električno vozilo Renault Kangoo Z.E.**		**Električno vozilo Nissan e-NV200**		**Priključno hibridno vozilo Mitsubishi Outlander PHEV**	
Pot	Razdalja (km)	Čas potovanja (h)	Razdalja (km)	Čas potovanja (h)	Razdalja (km)	Čas potovanja (h)	Razdalja (km)	Čas potovanja (h)
Dnevna pot (Sevnica, Krško, Senovo, Brestanica, Blanca, Šentjanž, Radeče, Zidani Most, Planina pri Sevnici, Sevnica)	2048	38:19	2048	38:19	2048	38:19	2048	38:19
Tedenska pot (Sevnica, Maribor, Ljubljana, Novo mesto, Sevnica)	1700	21:41	1700	55:41	1700	26:41	1700	21:41
SKUPAJ	**3748**	**60**	**3748**	**94**	**3748**	**65**	**3748**	**60**

Pri časovni analizi obeh električnih vozil se je izkazalo, kako pomembna je tehnologija polnjenja posameznega vozila. Po navedbah proizvajalca se baterija Nissana e-NV200 napolni 80% v 30 minutah, če je izpolnjen pogoj, da je na voljo hitra polnilnica. V našem primeru je na voljo, saj tedenska pot poteka po avtocestnem križu Slovenije, kjer se nahaja 27 hitrih polnilnic. Polnjenja so vračunana v Tabeli 3 (čas potovanja). Pri drugem vozilu, Renault Kangoo Z.E., se baterija napolni do 80% v 4:05h, če polnjenje poteka na hitri polnilnici. Polnjenja so vračunana v Tabeli 3 (čas potovanja).

Iz izračunov smo ugotovili, da je izguba na času pri uporabi električnega vozila Nissan e-NV200 5 ur v primerjavi z konvencionalnim in priključnim vozilom. Če te dve vozili primerjamo z električnim vozilom Renault Kango Z.E., pa vidimo da je izguba kar 34 ur več na račun daljšega polnjenja. V praksi pomeni, da uporaba slednjega vozila za definirano distribucijsko pot ni smotrna.

6 Zaključek

Pri iskanju primernega hibridnega dostavnega vozila, smo ugotovili, da dostavnega hibridnega vozila v Sloveniji še ni na voljo, prav tako ni na voljo dovolj velikega osebnega hibridnega vozila, ki bi lahko opravljalo funkcijo distribucije. Ko smo iskali primerno priključno dostavno vozilo, smo ugotovili, da tudi tega tipa vozila ni na trgu v Sloveniji, je pa na voljo večje osebno vozilo Mitsubishi Outlander PHEV, ki ima zadosti prostora, da lahko z njim opravljamo manjše distribucije v lokalnem okolju. Z identificiranjem električnih in konvencionalnih dostavnih vozil nismo imeli težav, saj je ponudba že obstoječa.

Pri časovni analizi smo ugotovili, da uporaba električnega vozila Renault Kangoo Z.E. ni učinkovita, ker je zaradi daljšega časa polnjenja na definirani tedenski poti časovno neučinkovita, saj se vozilo po izpraznitvi polni kar 4:05h do 80%. Električno vozilo Nissan e-NV200 je za polnjenje na tedenski poti porabilo 5h več na mesec od konvencionalnega in hibridnega vozila, kar smatramo za dober kompromis med stroškom poti in časovno učinkovitostjo. Pri krajši, dnevni poti, teh razlik ni, saj oba električna vozila opravita celotno pot brez polnjenja. Pri izbiri električnega vozila za distribucijo torej velja previdnost glede na predvideno pot.

Iz okoljskega vidika smo ugotovili, da je v tem trenutku najbolj učinkovito priključno hibridno vozilo, najmanj pa konvencionalno vozilo z motorjem na notranje izgorevanje. Razlika emisij CO2 med njima je 226,16 kg na celotno definirano pot, kar znaša 53,87% manjši izpust hibridnega vozila glede na konvencionalno vozilo.

Stroški so v vseh primerih nižji pri obeh električnih vozilih, kjer je povprečni strošek obeh vozil vseh opravljenih mesečnih poti 65,06% stroška konvencionalnega vozila in 61,26% stroška priključnega hibridnega vozila.

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XII. MEDNARODNA KONFERENCA LOGISTIKA V KMETIJSTVU 2018
KONFERENČNI ZBORNIK
A. Lisec (ur.)

Univerzitetna založba
Univerze v Mariboru

Kreativne rešitve v logistiki bivanja in oskrbe starejših oseb

NINA POŽUN, LEA - MARIJA COLARIČ - JAKŠE IN ANDREJ LISEC

Povzetek Prispevek predstavlja različne oblike bivanja za starejše osebe, in sicer bivanje v domovih za starejše, v namenskih stanovanjih, oskrbovanih stanovanjih in stanovanjskih zadrugah ali stanovanjskih skupnostih. Ker so po svetu poleg tradicionalnih institucionalnih oblik stanovanjske oskrbe za starejše že uveljavili nove in inovativne rešitve, ozavesti tudi s trendi na področju bivanja starejših, ki v Sloveniji še niso dovolj razširjena. Pri tem seznani z obliko doma za celo življenje – »lifetime homes«, podprtega bivanja – »assisted living«, stanovanjske skupnosti – »cohousing community«, upokojenske skupnosti – »retirement community«, pametnimi domovi – »smart home« in dopolnilnimi dejavnostmi na kmetijah. Poseben poudarek namenja predlogom in izboljšavam za bivanje starejših oseb, kjer se osredotoča na aktivno bivanje starejših oseb – izmenjavo starejših in kapacitetami za starejše z demenco. Prispevek nagovarja k novim, inovativnim in cenovno ugodnim rešitvam bivanja za večjo kakovost življenja ljudi v tretjem življenjskem obdobju, tudi preko izobraževalnega programa s tematskim sklopom socialno varstvene storitve podeželja.

Ključne besede: • namestitve starejših oseb • bivanje in oskrba starejših oseb • dopolnilna dejavnost na kmetijah • aktivno bivanje starejših – izmenjave starejših • kapacitete za starejše z demenco •

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1 Uvod

Oblike bivanja za starejše so v Sloveniji slabše razvite. Poznamo domove za starejše, oskrbovana stanovanja ter najemna stanovanja za starejše osebe. Drugih možnosti bivanja starejših niti ne zasledimo. Do sedaj smo razvijali predvsem institucionalno obliko stanovanjske oskrbe za starejše, ki pa je tudi najdražja. Po svetu pa so medtem že lansirali nove in inovativne rešitve, kot so domovi za celo življenje, podprto bivanje, stanovanjske skupnosti, pametni domovi in drugo. Slovenija trenutno reševanje problematike zasedenosti mest v domovih za starejše poizkuša z novo obliko namestitve, in sicer z uvedbo bivanja in oskrbe starejših oseb kot dopolnilna dejavnost na kmetijah.

Zaradi povečevanja finančnih potreb za zagotavljanje ustrezne stanovanjske oskrbe in storitev za starejše težav kmalu ne bo mogoče reševati situacije le z dosedanjimi uporabljenimi modeli, ampak je potrebno razviti nove, kreativne in inovativne rešitve in vpeljati drugačne, alternativne oblike bivanja in oskrbe za starejše, ki bodo tudi učinkovitejše in manj finančno zahtevne kot obstoječe, hkrati pa bodo upoštevale želje in preference starejših ljudi.

2 Uporabniki storitev oskrbe starejših oseb

Starostna struktura uporabnikov institucionalnega varstva se z leti povečuje, kar kaže, da je povprečna starost ljudi iz dneva v dan večja. Uporabniki institucionalnega varstva potrebujejo več nege in zdravstvene obravnave, postajajo pa tudi zahtevnejši, saj kot samoplačniki pričakujejo celostno in individualno obravnavo.

Čakalna doba za sprejem v dom je lahko tudi do dve leti, daljše čakalne dobe pa posledično pomenijo sprejem čedalje starejših oseb, ki kažejo potrebo po zdravstveno najzahtevnejših storitvah. Poleg njih pa se pojavlja vse več oseb, ki bolehajo za demenco in potrebujejo ustrezno oskrbo. Da pa bi zagotovili prosta mesta potrebnim, nastajajo novi trendi na področju bivanja starejših. Ti omogočajo več svobode, različne animacijske dejavnosti in čim daljše samostojno bivanja osebam, ki so tega sposobne.

3 Namestitve starejših oseb

V Sloveniji je najbolj razširjena oblika namestitve starejših občanov zavod, ki obsega osnovno oskrbo - bivanje in prehrano ter socialno oskrbo - varstvo in zdravstvena oskrbo. Domovi za starejše so namenjeni posameznikom, ki so starejši od 65 let.

Iz podatkov (Poudarki iz analiz področja institucionalnega varstva starejših in odraslih s posebnimi potrebami 2015, 2016) Statističnega urada Republike Slovenije o stanju prebivalstva na dan 1. 1. 2017 in primerjava z letom 2015 kaže, da se je skupina prebivalcev, starih 65 let in več, povečala za 10.324 oseb oziroma za 2,7 %. Indeks staranja[1] za leto 2017 torej znaša 126,52 in se je v primerjavi z 2016 letom povečal za 2,46 indeksne točke.

Prebivalstvo se stara, zato so nastale in še nastajajo druge oblike namestitve in bivanja starejših oseb. Kerbler (2011) opredeljuje, da poleg domov za starejše poznamo še tri oblike na področju dodatnih možnosti bivalnih enot, in sicer namenska stanovanja, oskrbovana stanovanja in stanovanjske zadruge oziroma skupnosti.

3.1 Bivanje v namenskih stanovanjih

Za bivanje v namenskih stanovanjih se smatra, da lahko starejša oseba še vedno biva samostojno. Najemnik namenskega stanovanja mora dokazovati svoje zdravstveno stanje in plačilno sposobnost, najemodajalec pa mora omogočati samostojno bivanje v primerno arhitekturno prilagojenem stanovanju. Stanovanja najemodajalci podeljujejo na podlagi zbiranja vlog ali javnega razpisa ter oblikovanja prednostnih list, določijo tudi višino najemnine v skladu z veljavnimi pravilniki. Praviloma pa so cene nižje od tržnih.

3.2 Bivanje v oskrbovanih stanovanjih

Druga možnost bivanja so oskrbovana stanovanja. Ta so namenjena dolgoročnejši obliki varstva starejših. Starostnikom omogočajo, da ob občasni pomoči ohranijo samostojnost in neodvisnost bivanja. Starostniki, ki najemajo ta

[1] Indeks staranja se nanaša na razmerje med številom prebivalcev, starih do 15 let, in številom prebivalcev, starih nad 65 let. Vrednost indeksa staranja 100 nakazuje, da je število prebivalcev v obeh starostnih kategorijah enako.

stanovanja so aktivni in ne potrebujejo institucionalnega varstva. Hkrati pa jim občutek varnosti in brezskrbno preživljanje tretjega življenjskega obdobja omogoča, možnost izbire in oblike pomoči. Ravno zato so oskrbovana stanovanja v Sloveniji praviloma grajena ob domovih za ostarele, ki pomoč izvajajo kot dodatno storitev. Obseg in vrsta oskrbe se prilagodi potrebam in željam posameznega upravičenca.

3.3 Bivanje v stanovanjskih zadrugah ali stanovanjskih skupnostih

Tretja možnost za bivanje starejših oseb so stanovanjske zadruge ali stanovanjske skupnosti. To so družinske hiše, prilagojene za bivanje starejših, v njih stanuje nekaj starejših parov ali posameznikov. Bivanje starejših je organizirano v tako imenovanem »integriranem bivanju«. Starejši živijo v stanovanjih oziroma hišah, ki jim omogočajo visok nivo samostojnega bivanja, za podporo pa je vzpostavljena mreža struktur, ki zagotavlja zdravnika, lekarno, trgovino in upravljavca stanovanj. Cilj je, da oseba čim dlje ostane v lokalnem okolju in nato samostojno sprejme odločitev o drugih oblikah bivanja (Nagode, 2015).

Pokritost s kapacitetami[2] kaže na nenehno rast po letu 2003, saj so se takrat začele podeljevati koncesije zasebnikom, pa tudi povečevati kapacitete javnih zavodov preko dogradenj in najemov dodatnih enot. V letu 2008 je bila dosežena primerljiva evropska pokritost s kapacitetami v institucionalnem varstvu, v letu 2012 pa je pokritosti dosegla vrh (5,2 %), sedaj pa v zadnjih petih letih beležimo padanje odstotka pokritosti s kapacitetami. Zaradi staranja prebivalstva se število dejansko čakajočih na mesto v domu zvišuje, kar je statistično vidno v letu 2015, saj se je število prošenj in dejansko število aktualnih prošenj v primerjavi s preteklimi nekaj leti povišalo, nato pa se je v letu 2016 število prošenj spet znižalo, število dejansko čakajočih na sprejem pa v primerjavi s prejšnjim letom zvišalo. Indeks zasedenosti[3] se je torej po znižanju v letu 2015 v letu 2016 spet nekoliko zvišal.

[2] Pokritost potreb po kapacitetah odraža delež populacije 65+ (brez oseb s posebnimi potrebami), ki je vključena v institucionalno varstvo starejših.
[3] Indeks zasedenosti odraža razmerje med dejanskimi kapacitetami domov in številom realiziranih dni, popravljenih s številom dni v letu.

4 Trendi na področju bivanja starejših

V tujini so se razvili drugačen načini bivanja starejših, nekaterih v Sloveniji še ne poznamo ali pa še niso aktualni. V nadaljevanju predstavljamo nekatere oblike bivanja starejših oseb.

4.1 Dom za celo življenje ali *»lifetime homes«*

Oblika individualnega načrtovanja domov, ki je aktualna predvsem v tujini, je dom za celo življenje ali »lifetime homes«. To so zgradbe, ki so primerne za bivanje v vseh življenjskih obdobjih. Načrtovane so brez arhitekturnih ovir, so enostavne za uporabo in vzdrževanje. Aktualen je t. i. makropristop, ki deluje po načelu, da je vsak prostor dostopen vsem. Nasprotje t. i. makropristopa je mikropristop, pri čemer se gradi za določene skupine ljudi (npr. invalidi). Makropristop pa je namenjen vsem ciljnim skupinam in je zato ekonomsko učinkovitejši.

4.2 Podprto bivanje - *»assisted living«*

V ZDA se razvijajo t. i. *»assisted* living« ali podprto bivanje, ki predstavlja samostojne stanovanjske enote v bližini zdravstvene oskrbe. Te omogočajo bivanje starejših v enakem okolju tudi v kasnejših obdobjih, ko je potreba po oskrbi večja. V Veliki Britaniji razvijajo podobno zadevo t. i. »extra care grouped housing« ali skupinsko bivanje s posebno nego, ki pa ga predstavljajo samostojna stanovanja, pri čemer je ponujena tudi možnost skupnih storitev ter zdravstvene oskrbe in pomoči.

4.3 Stanovanjska skupnost - »cohousing community«

Novejša oblika bivanja je t. i. *»cohousing community«* ali stanovanjska skupnost, kjer ima vsako gospodinjstvo (posameznik ali par) svoje stanovanje. Ljudje, ki živijo na tak način, sami izberejo skupnost, v kateri bi radi bivali. Skupnost je lahko eno ali večgeneracijska. Ta model ni namenjen starostnikom, potrebnim pomoči, saj se zdravstveni center ne nahaja v bližini. Model je grajen po principu od spodaj navzgor, kar pomeni odvisno od uporabnikov, z upoštevanjem osebnih želja.

4.4 Upokojenska skupnost - *»retirement community«*

Naslednji skupinski način bivanja starejših ljudi je t. i. »retirement community« ali upokojenska skupnost. Model je zaradi odsotnosti zdravstvene oskrbe primernejši za vitalne in aktivne starejše ljudi in predstavlja samostojno bivanje v skupnosti in se nahaja v bližini storitvenih dejavnosti (Grdiša, 2010; Sendi et. al., 2002).

4.5 Pametni domovi - *»smart home«*

Čedalje več se pojavljajo pametni domovi oziroma »smart home«. V dom uporabnika so nameščeni senzorji, ki spremljajo fiziološke funkcije uporabnika, zaznavajo njegovo delovanje s spremljanjem njegovih življenjskih navad in sprememb, uporabniku prenašajo sporočila ter spremljajo socialno stanje uporabnika. Vse te informacije sistem sproti shranjuje in nam omogočajo, da lahko prepoznamo tudi bolezensko stanje v zgodnji fazi. V stanovanju so nameščene tudi naprave, kot so detektor gibanja, ognja, dima in izliva vode. Teleoskrba je v slovenskem prostoru omenjena že leta 1992, vendar je odstotek njenih uporabnikov nizek (0,1 %). Oktobra leta 2011 je postala na voljo vsem uporabnikom najenostavnejša oblika teleoskrbe, to je SOS gumb. Deluje tako, da uporabnika s klicem poveže z operaterjem (Kerbler, 2011).

4.6 Dopolnilne dejavnosti na kmetijah

Med drugim (Zore, 2018) se v Sloveniji razvija nova oblika socialnega varstva starejših oseb, dopolnilna dejavnost na kmetijah. V skupino dopolnilne dejavnosti na kmetijah sta trenutno uvrščeni dve obliki socialnega varstva, in sicer dnevno ali celodnevno bivanje odraslih in starejših oseb, ki niso odvisne od tuje pomoči. Razlika je, da ena kmetija lahko dnevno bivanje ponudi največ 12 osebam, celodnevno bivanje pa največ šestim, ki morajo imeti na razpolago ustrezno opremljene sobe. Kmetije morajo svojim varovancem zagotoviti primerno hrano, ki prihaja s slovenskih kmetij v vsaj 50 odstotkih, na svoji kmetiji pa mora pridelati 30 odstotkov živil. Osebam v celodnevnem bivanju na kmetiji je potrebno omogočiti bivanje, prehrano, pranje osebnega in posteljnega perila, čiščenje in vzdrževanje bivalnega prostora ter družabništvo.

Prve kmetije bodo socialno varstvo kot dopolnilno dejavnost na kmetijah vpeljale v okviru pilotnega projekta, ki ga Ministrstvo za kmetijstvo, gozdarstvo in prehrano napoveduje konec leta 2018. Po oceni bo v pilotni projekt vključenih od osem do deset kmetij, zainteresiranost pa kaže že vsaj 30 kmetij. Med trajanjem projekta in evalvacijo učinkov se bodo pokazale zahteve, ki jih bo treba normativno urediti tako z vidika varnosti uporabnika kot izvajalca.

4.6.1 Primer dobre prakse v Sloveniji: Grunt, zavod za socialno podjetništvo na podeželju

Primer dobre prakse v Sloveniji, ki je tudi primer dobre prakse na evropski ravni, je zgodba socialnega kmetijstva ali »*social farming*«, ki jo razvijata kmetija Zadrgal iz Komende in zavod Grunt z zaposlenimi petimi invalidi. Zavod Grunt od kmetije odkupi zlasti mleko in druge pridelke, na kmetiji jih predela in poskrbi za prodajo, z rastjo prodaje pa raste tudi obseg proizvodnje. Grunt, Zavod za socialno podjetništvo na podeželju, je neprofitni in samostojni zavod s statusom zaposlitvenega centra, ki deluje po podjetniških načelih. S sredstvi upravlja gospodarno, vse dohodke pa vrača v osnovno dejavnost. Na ta način omogoča lasten razvoj in ustvarjanje novih delovnih mest. Pod strokovnim vodstvom invalidom zagotavlja usposabljanje in delo na delovnih mestih primernih njihovim zmožnostim in skrbi za njihovo polnopravno integracijo v zaposlitveno življenje ter razvoj poklicne kariere. Delovanje zavoda je usmerjeno k ustvarjanju pozitivnih koristi za družbo preko izboljševanja kakovosti življenja posameznikov in skupnosti. Prodaja izdelkov poteka v prostorih zavoda, na tržnicah in stojnicah, pridelke in polizdelke pa odkupujejo tudi lokalni ponudniki hrane. Kupcem so na voljo vložena in predelana zelenjava in sadje, marmelade, džemi, jajca, testenine, mleko in mlečni izdelki ter drugo. Na voljo imajo tudi lastne recepture in razvijajo svojo blagovno znamko, v okviru katere bo zavod odkupoval in predeloval pridelke kmetije Zadrgal ter drugih zainteresiranih kmetovalcev iz Komende in okolice.

5 Predlogi izboljšav za bivanje starejših oseb

Aktivno bivanje starejših oseb - izmenjave starejših

Izmenjave starejših bi lahko delovale po principu mladinskih izmenjav, ki bi omogočale starejšim, da se srečajo, spoznajo ter krajši čas skupaj bivajo in sodelujejo pri skupnih projektih. Sprva bi potekale med domovi za starejše v Sloveniji, lahko pa bi se razširile tudi v druge države, mednarodno, vendar je potrebno pri tem upoštevati, da so priprave vsebin in logistika vse večje.

Dejavnosti bi potekale v sklopu domov za starejše, obsegale pa bi razne delavnice, ustvarjalnice, vaje, razprave, igranje vlog in druge aktivnosti po zmožnostih in sposobnostih posameznika. Udeleženec bi podal željo po izmenjavi in po dogovoru z oskrbovalci bi poiskali primeren dom za izmenjavo, ki bi bil zainteresiran sprejeti v oskrbo oskrbovanca (lahko pa tudi oskrbovanca, ki bi se želel zamenjati s prvotno zainteresiranim oskrbovancem). Zainteresirana ustanova bi nato nudila oskrbovancu vso potrebno infrastrukturo in storitve (sobo s posteljo, prehrano, animacijske vsebine idr.).

Izmenjave bi lahko bile posamezne ali skupinske, kot to prakticirajo mladinske organizacije. Izmenjave bi lahko trajale od tri do deset dni. Za prevoz bi lahko poskrbela prostovoljna društva, ki nudijo brezplačen prevoz starejšim (npr. Sopotniki). Udeležili bi se lahko tisti, za katere bi osebje doma upokojencev presodilo, da so primerni in sposobni udeleževanja, prednost pa bi imeli tisti, za katere bi osebje doma ocenilo, da oskrbovanec potrebuje spremembo in menjavo okolja, predvsem zaradi psihofizičnega stanja oskrbovanca.

Projekt bi vodile organizacije, npr. Zveza društev upokojencev Slovenije (ZDUS) v sodelovanju z drugimi organizacijami, in sicer z društvi, domovi za upokojence, s starejšimi, prostovoljnimi organizacijami in z drugimi neformalnimi skupinami ter organizacijami ne le nacionalnem, temveč tudi na mednarodnem nivoju (EURAG Europe - Evropska federacija starejših oseb, AGE Platform Europe - Glas starejših oseb na ravni Evropske Unije, EUROCARERS - Evropska mreža neformalnih oskrbovalcev, ADA - platformi mednarodne mreže Help Age International). Potrebne bi bile dotacije EU, ki bi bile namenjene kritju potnih stroškov, če ti ne bi bili organizirani s pomočjo prostovoljcev in pa s finančno podporo za kritje praktičnih stroškov izvedb dejavnosti in aktivnosti v času

izmenjave. Praktične naloge sodelujočih pri snovanju in načrtovanju aktivnosti ter kasneje skozi izvajanje samega projekta so priložnosti, preko katerih bodo starejši spoznavali drugo okolje, sklepali nova prijateljstva, aktivno preživljali svoj čas, pridobili nova znanja in veščine ter jih tudi delili z drugimi sodelujočimi. Ob zaključevanju projekta in razširjanju rezultatov pa bi bilo potrebno o izkušnjah spregovoriti tudi drugim. Vsak sodelujoči posameznik ali skupina bi v svojem primarnem domu morala spregovoriti tudi drugim in predstaviti svoje izkušnje in doživetja.

Kapacitete za starejše z demenco

Najbolj pogosta bolezen, o kateri se največ govori, čeprav hkrati včasih še vedno premalo, je zagotovo demenca. Mednarodna klasifikacija bolezni pravi, da je demenca sindrom, ki je posledica bolezni možganov, navadno kronične ali napredujoče, pri tem pa so okvarjene višje dejavnosti možganov, ki zajemajo spomin, razmišljanje, orientacijo, dojemanje, računanje, zmožnost učenja, govor in presojanje. Demenca najbolj prizadene bolnikovo sposobnost za opravljanje vsakodnevnih aktivnosti. Tak bolnik se izgublja v domačem okolju, ne zna slediti navodilom, nima občutka za čas, ne znajde se med ljudmi in v prostoru. Pogosto je tudi ponavljanje vprašanj, zanemarjanje lastne varnosti, higiene in prehrane. Kljub temu pa bolnik ohrani nekatere veščine, torej še vedno lahko vozi avto ipd.

V domovih za ostarele bolniki z zmerno in hudo demenco običajno bivajo v varovanih oddelkih. Če te možnosti nimajo oziroma, če ima bolnik blažjo obliko demence, je bolnik nameščen v stanovanjsko-negovalnem oddelku. Za te oddelke je priporočljivo, da so zračni in z velikimi hodniki. Sobe naj bi bile opremljene po okusu stanovalca, tako da je zagotovljena domačnost. Za stanovalce mora biti zagotovljen psihosocialni model bivanja, pri čemer morajo upoštevati strokovna načela individualizacije, celovitosti obravnave, aktivnosti in avtonomije posameznika ter možnost izbire.

Ritem dnevnih aktivnosti mora biti prilagojen in usklajen potrebam stanovalcev. Poudarek mora biti na aktivnostih, ki stanovalcem pomagajo pri njihovih motoričnih in ročnih spretnostih, ohranjanju in spodbujanju njihovih kognitivnih, psiholoških in socialnih spretnosti ter veščin. Poskrbeti je treba tudi za aktivnosti, ki pomagajo ohraniti in krepiti fizične moči posameznika ter osebna znanja in interese. Vse te aktivnosti upočasnijo upadanje kognitivnih funkcij,

povečujejo čustveno aktivnost in pomagajo pri vzpostavljanju in ohranjanju socialnih stikov ter vplivajo na boljšo samopodobo in zadovoljstvo stanovalcev.

Večjo kapaciteto bi domovi dosegli z zgraditvijo dodatnih poslopij, ki bi nudili dodaten prostor za bolnike z demenco, saj tudi večina njih potrebuje intenzivnejšo pomoč od ostalih starostnikov. Večja kapaciteta bo na voljo tudi, ko bodo nove oblike trendov v popolni uporabi.

Predlagamo več manjših stanovanjskih enot v pritličju. Prostori naj bodo svetli, z možnostjo zastora. Tla naj bodo barvita, vendar brez vzorcev in drugačne barve kot stene. Tla pa naj imajo tudi »barvne ceste« - oznake oziroma vodila, na katerih piše kam vodijo. Osebe z demenco se lahko nato držijo prave barve ceste, ki jih vodi v željen prostor. Ceste oziroma vodila so preprosta za uporabo, predvsem pa so na istem mestu vsak dan in pot do jedilnice, stranišča in delovne terapije je vedno enaka. Podobna vodila lahko uporabimo tudi na steni, kjer se lahko znajdejo navodila za uporabo različnih predmetov in aparatov, ki jih uporabljajo oskrbovanci. Vodila naj bodo na nasprotni strani postelje, da ko oseba z demenco počiva in se nato predrami, je prva zadeva, ki jo vidi in si osveži spomin. Takšna vodila bi osebam z demenco omogočala malo več samostojnosti in nudila več varnosti.

Sobe naj imajo tudi osebnostno noto, naj bodo opremljene s fotografijami svojcev, družin in z napisi imen oseb na fotografijah ter letnicami posnetkov. Okvirji slik naj bodo iz primernih materialov in na primernem mestu. Izbor fotografij naj se opravi s svojci. Tako bodo osebe z demenco vsak dan lahko obujale spomine in se spominjale družinskih članov ter jih povezale z osebami, ki bodo prišle na obisk. Sobo naj krasi tudi velika ura in velik koledar, ki prikazuje samo trenuten datum (za prejšnji dan strgamo listek) ali pa naj bo koledar analogni s samodejnim spreminjanjem datuma. Zaposleni naj vsak dan poskrbijo za pravočasno menjavo datuma. Oskrbovanci pa bodo vsak dan opomnjeni na dan in datum, v katerem so.

Novodobna preučevanja strokovnega tematskega področja

Do podobnih ugotovitev so prišli tudi na Visoki šoli za upravljanje podeželja GRM Novo mesto (2017-2018), kjer so na podlagi preučenih vsebin v slovenskem in mednarodnem prostoru v sklopu razvoja novega magistrskega študijskega programa Upravljanje podeželja razvili tudi poseben tematski sklop, poimenovan Socialno varstvene storitve podeželja. V okviru predmetov Menedžment in organizacija bivanja starejših ljudi, Alternativne oblike bivanja za starejše ljudi ter Oskrba starejših v različnih oblikah bivanja želijo izobraževati mlade in znanja željne posameznike za pridobitev strokovnih tematskih znanj, veščin, spretnosti in kompetenc na področju socialno varstvenih storitev podeželja, predvsem pa:

- Sposobnost uporabe organizacijskih rešitev in povezovanja različnih organizacijskih struktur v organizacijah za oskrbo starejših ljudi in v različnih organizacijskih omrežjih.
- Poznavanje alternativnih oblik stanovanjske oskrbe in storitev za starejše, ki so učinkovitejše kot obstoječe in finančno manj zahtevne, hkrati pa upoštevajo želje in preference starejših ljudi.
- Sposobnost načrtovanja oskrbe in zagotavljanja storitev za potrebe starejših v Sloveniji, zlasti na podeželskih območjih.
- Modeliranje odličnosti človeškega vedenja, na podlagi spoznavanja potrebnih prepričanj, fiziologije in posebnih miselnih procesov ter strategij, ki stojijo za njimi.

6 Zaključek

Slovenija in vse ostale države se morajo začeti pripravljati na čase, ko bo vedno več upokojenih in vedno manj aktivnih oziroma delavnih oseb. S tem bo domovanje v domovih postalo znatno dražje, brez pokojninskih reform pa še težje dostopno. Na spletu najdemo veliko gradiv in člankov glede izboljšanja domov, kot npr. razna izboljšanja s tehnologijami, ki bi pripomogle, da starejši ne bi bili tako osamljeni. Vendar se trendi spreminjajo in v ZDA je vedno več izseljevanj iz domov za ostarele. Vedno več starejših se odloča za zelo skromno življenje v mestih ali pa življenje v mirnem okolju v naravi ali pa za življenje pri družinah. Trend je razumljiv, saj stroški domov naraščajo, pokojnine pa se ne večajo sorazmerno. Na primer, pri povprečni pokojnini v Sloveniji, ki znaša

641,62 € in najnižjem znesku v domu za ostarele, ki se giblje med 750 in 850 €, si še vedno več kot 70 % upokojencev ni zmožna privoščiti bivanja v domu (Stevenson, 2015).

Možnosti, ki bi jih lahko upoštevali in implementirali v slovenskem okolju, je kar nekaj. Ena izmed teh so skupna stanovanja, kjer biva več oseb oziroma več upokojencev. S tem bi se znebili zajetne najemnine in stroškov, povezanih s stanovanjem. Ljudje bi skrbeli drug za drugega, občasno bi se v proces dela vključila oskrba iz doma upokojencev ali druge službe (npr. socialna služba, patronažna sestra idr.). S tem bi upokojencu omogočili samostojno upravljanje s pokojnino, ki jo prejemajo. Obenem bi imeli družbo in medsebojno pomoč ter po potrebi ustrezno oskrbo na domu. Urejali bi si okolico kot tudi stanovanje po želji, kar je gotovo dodatek k svobodi in načinu življenja, kot so ga bili prej vajeni.

Na drugi strani so kmetije, kjer bi lahko vzpostavili nastanitev za starejše. Kmetije predstavljajo veliko priložnost, ki bi jo v Sloveniji lahko izrabili. Z velikim številom turističnih kmetij ali posesti bi lahko izrabili prostor kot tudi okolje za nastanitev starejših. S tem bi prav tako zagotovili manjše stroške za starejše in večjo svobodo pri izbiri ter urejanju življenjskega prostora, povečala pa bi se kakovost življenja v tretjem življenjskem obdobju. Na kmetiji bi starejši pomagali pri manjših, lažjih opravilih, v zameno (ali z doplačilom) pa bi prejemali prehrano, namestitev in drugo. Ugotavljamo, da že obstajajo turistične kmetije, ki nimajo naslednikov in kjer razmišljajo o preureditvi turističnih kmetij v bivalne enote za starejše osebe, saj imajo pretežno že urejeno infrastrukturo za bivanje.

Aktivno preživljanje časa oskrbovancev bi lahko popestrili z izmenjavo starejših po domovih, kakor to prakticirajo študenti po Evropi s programom Erasmus+. Namreč oskrbovanci si želijo več družabnosti in aktivnosti, domovi pa zanj nimajo razpoložljivih sredstev. Vsaka delavnica, ki jo dom izvede, zahteva neka sredstva, kot npr. material za izvedbo delavnic. Ta material bi se lahko nabavil tudi s prodajo izdelkov, ki jih oskrbovanci ustvarijo med delovnimi terapijami.

Domovi bi z uvedbo izmenjav bili primorani k iskanju novih rešitev, predvsem logističnih, ki se nanašajo na izvedbe delavnic, transporta ter hitrih in začasnih nameščanj oseb. Z veliko preizkušanja bi lahko razvili nove oprijeme za ta problem. Kompleksnost tega problema se kaže v dejstvu, da mora biti vsak upokojenec obravnavan drugače in individualno, z osebnim pristopom in

čutnostjo. Vsak ima svojo zgodbo, težave, razmišljanje, sposobnosti in pričakovanja. Tukaj pa se moramo dotakniti tudi oskrbovancev, ki bolehajo za demenco in za katere v Sloveniji strmo primanjkuje ustreznih prostorov v domovih.

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