POSSIBILITEIS OF SHORT SUPPLY CHAINS IN THE SUSTAINABLE LOGISTICS IN ZALA COUNTY

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Climate change has been a known problem for a long time, but nowadays its effects becoming more powerful and palpable in our everyday life. Therefore, one of the most important topics of the social sciences nowadays, the identification of the sustainable solutions. As the problem of the climate change is very complex, we have to examine it from different aspects/territories/industries. Logistics is one of these territories. Today logistics is more and more criticized as the average supply chains contribute in a highlighted way to the environmental pollution. In the past academic discussion, Short Supply Chains appeared as a potential solution but so far only in the field of agricultural sciences yet. One of our research aims is the definition of the basic shortened supply chain framework within a supply chain can be called 'shortened' in Zala County. For this, we will examine the implemented short supply chains on the ground of the literature review. We will seek the answer for the second important aim, which is the potential application of this technique, with qualitative methods among Zala County enterprises.

Keywords: Logistics; Environment; Pollution; Short Supply Chain.

INTRODUCTION

In the past few years climate change has had an increasing influence on our everyday life. In some domestic cities, the previously typical average temperature distribution was 9-10 degrees developed over the past thirty years, compared to which this indicator will rise to 11-12 degrees for the period 2021-2050 according to a certain model and further growth is to be expected by the end of the 21st century (Sáfián & Pej, 2017). Climate change can also be measured in terms of domestic precipitation, global radiation, and the number of heat-warning days. Based on the results so far, we can rightly assume that a significant change will take place in the domestic areas in terms of the general climate. Mezősi and colleagues (2017) summarized the changes as follows: "Global climate change and its effects have become more and more evident in the last century, which has clearly visible consequences in the Carpathian Basin as well. It can be partly explained by the

effects of climate change that many environmental dangers - e.g. drought, inland water, wind erosion - causes increasingly significant social, economic and environmental problems. The combined natural hazards (ice, fire, spring frosts, drought, inland water, heavy rains, wind erosion) caused losses of approximately EUR 300 million in the last decade." (Mezősi et al., 2017., p. 60).

In addition to the emissions generated during production, everyday logistics also contribute very strongly to climate change. Among the modes of transport, both air transport and water transport have a very harmful effect on the environment. From an environmental point of view, rail and road transport could perhaps be labelled more environmentally friendly under certain circumstances.

From economic side, companies strive for the largest possible shipment size, therefore water transport, with the possible addition of rail or road,

is a particularly well-established way of everyday logistics, which in this form places a great strain on the global climate (Szabó, 2014). In recent years, recognizing this segment of the problem as well, the European Union has increasingly supported the creation of shortened supply chains (Olajos & Szilágyi, 2015). The establishment of the shortened supply chains is not only supported by the community based on environmental aspects, but its important socio-economic impact is the strengthening of the local economy and the multiplier effect on SMEs. Sustainable supply chains are important for sustainable growth (Bakator et al., 2022), and short supply chains can be an alternative. At this point of the research, the question was formulated as to what do we consider an accepted short supply chain? What definition can we find for its spatial and functional delimitation? What actors make up a short supply chain? If these questions are clarified based on the literature, another important question is how sector-specific their creation is, and how much they represent a real solution to climate change. Accordingly, within the framework of this research, we are looking for answers to these main questions, for which we would like to find results with the help of a systematic literature search and qualitative methods in the mirror of Zala County enterprises.

THEORY AND RESEARCH QUESTIONS

If we talk about shortened supply chains, it would be really important to describe their exact meanings. As we are thinking of the potential implementation of a shortened supply chain (instead of our classic supply chain), we have to make it clear what is the radius and other criteria within it is worth the implementation of a new supply chain from environmental view. For this problem, the possible solution can be the definition of a theoretical framework which covers the basic criteria in front of a supply chain to be called shortened. (On long term, this theoretical framework can be used by the local government to make the concrete regulation.) Within the current study, our second goal is to get know the implementation possibilities of shortened supply chains in other industrial fields. Where are even possible? As this is only the first step of a long-term research topic, firstly, we will examine the introduction opportunities among Zala County enterprises and industries. For the examination of these goals, we had the following research questions:

Q1: What is the basic radius within a supply chain has to work to be named shorted supply chain in Zala County? Are there any other criteria that must be met?

Q2: What are the industrial limitations of the implementation of shortened suply chains in Zala County? Is it possible to implement SSCs in other sectors out of the food industry?

RESEARCH METHOD

The research aims to identify the possible impacts of shortened supply chains on the general environment. As research method, we chose systematic literature review to present the wider context. On the ground of the existing literature, we will try to create a theoretical framework which is able to regulate the establishment of short chains. Within the review, we will try to identify those terminologies which can be used also in Zala County for our long-term legal framework. During this segment of the research, we use the search engine of Google Scholar, where we search for the terms "short supply chains", "climate change logistics" and "effects of shortened supply chains". We narrow down the searches to the most relevant 10-10 results, which will form the basis of this study.

Afterwards, we will make a qualitative sampling to examine the possibilities of SSC use in the county. As mentioned earlier, relationship between the sources of the problems explored by the literature and the problems of Zala County (the relationship between the model level and the reality level) was not known before the research as previous papers only have had results in the agricultural industry (Gubán & Hua, 2014., pp. 61-74). Because of this, we decided using quantitative basis to justify H2 as this approach gives space to learn about more complex processes (Babbie, 2008). We did all this with an understanding and adaptive review of qualitative and quantitative methodologies (Horváth & Mitev, 2015; Lewin, 1946, pp. 201-216). With the accepted methodology, our first task was to determine the details of the qualitative sampling (structure, research framework, query location & method etc.). In terms of the structure of the interview, it contains questions that helps the cognition of the potential sector-free introduction of shortened chains. The questionnaire is structured in the following form:

– Leading questions which can add some important information also

- Industrial sector of the given company
- Potential introduction of shortened supply chain
- Technical limitation (in the field of raw material purchase and sales)
- Further possible barriers of the implementation
- Willingness for the future introduction

In the framework of the qualitative research, we aimed to minimum 8 interviews at least. The research framework was given by Zala County Foundation for Enterprise database from which we choose companies with the following characteristics (filtration): minimum 10 employees, significant material flow (min. weekly order) and willingness to participate in research. After the filtration, we chose 50 companies and sent invitations to them. From the potential answers, we planned to make the interviews with the first feedback giving ones. The planned timeframe was 3 months, from 1 February, 2023 – 30 April, 2023. The planned location of research was the site of the given company (Király & Géring, 2016, pp. 5-16; Saunders et al., 2009). Since the purpose of the research is to examine the use of SSCs in Zala County, the sampling will be conducted among Zala County enterprises. Since our research is not descriptive (i.e. we do not want to paint a picture of the situation in Hungary), but rather we aimed to explore the possibilities in the use of SSCs in the county, so we did not strive for representativeness during the sampling, as a random sampling with a higher number of elements would be best suited for this purpose. According to this, the number of completed interviews will be treated as sample for the exploration of the research questions as well as the possibilities in local SSCs use and for the definition of the long-term research goals.

RESULTS

As we previously mentioned, we used the Google Scholar search engine for our literature review. Firstly, we tried the "shortened supply chain" phase but this search - even after filtering- caused too many results, so basically we continued with the terms "climate change logistics" and "effects of shortened supply chains", the search results of which generated a manageable number of articles.

The mentioned searches still yielded a significant number of irrelevant results, which e.g. they were more related to socioeconomic impacts than climate change. We narrowed down the searches to the most relevant 10-10 results, which form the basis of this study. We received the following results for the searched terms *(see the table below)*.

Table 1: Searching results of the literature review

Searched terms	Number of results
Shortened supply chain	4 590
Climate change logistics	936
Effects of shortened supply chains	799

(Source: Authors)

During the qualitative research, we conducted interviews with a total of 10 company leaders with which we achieved our previously described research aim. All in all, we had more than 14 positive answers for the interview invitation overall but due to date appointment questions and strategic time management we ended with 10 interviews. The location of the research was the meeting room of given company and only we were present as a researcher. In the field of qualitative interviews, we conducted interviews with the same structure with the managers. As we described in the methodology, we worked with semi-structured interviews that had the same basic questions, but the interviewees were able to answer according to their own responsibilities and experiences. The interview questions were not received by the company leaders before the interview, the questions were only known during the interview. The main elements of the interviews are summarized in Table 1. The timeframe of each interview was different, but was typically between 30 and 60 minutes. We interviewed only one expert at a time. During the interview, we asked the questions in order, after which we recorded the interviewee's answers in writing and sound recorder for each question. Due to the time factor, handwritten materials were created from which we made a transcript. Before scheduling the interview, we asked basic data from the companies which is summarized in the following table.

Table 2: Qualitative interviews among enterprises of Zala County

Number	Industry	Employees	Position	Date
1.	Meat processing	128	Owner	07/02/23
2.	Game cooler (Deer, wild boar etc.)	24	Technical director	08/02/23
3.	Wood and furniture cluster	na	Cluster director	17/03/23
4.	Wood industry	25	Logistics Manager	17/03/23
5.	Clothing	12	Site Manager	18/03/23
6.	Electronic assembly	cca. 90	Logistics Manager	18/03/23
7.	Hospitality	14	Owner	14/04/23
8.	Automotive industry	12	Sales Manager	14/04/23
9.	Tool manufacturing	51	Managing director	26/04/23
10.	Clothing	13	Production leader	28/04/23

(Source: Authors)

SHORTENED SUPPLY CHAIN FRAMEWORK

Shortened supply chains can be approached from several points of view. Since the subject area itself was created recently and received more attention only nowadays, it does not currently have a generally accepted definition. Among the definitions, some authors define SSCs (shortened supply chains) according to the actors of the supply chain. According to their definition, those chains can be called SSC, whose actors are directly involved in the process of production, processing, distribution and consumption of products. More evident is the approach based on geographical distance (Juhász, 2012).

Small geographical distance is often an important aspect, despite the fact that the definition of locality is relative, and cultural differences, social and geographical characteristics are important in its assessment. According to 38 percent of American consumers, local food comes from within 25 miles (40 km), 28 percent drew the border at 100 miles, 26 percent said the given state, and 7 percent said the wider region was the authority (Pirog–Rasmussen, 2008). The relevant legislation of the USA (The US Food..., 2008) allows a transport distance of 400 miles (644 km) and sales within the borders of the producing state (Benedek & Balázs, 2014, p. 2).

Based on the literature, it is important to point out that the studies so far only approach SSC from the perspective of the food industry. The data collected during the studies comes largely from production cooperatives/unions, local producers and local farmers. From this point of view, the results so far mostly treat the applicability of SSC as a "local

product". Accordingly, SSC's industry-independent approach was included in our long-term research goals as we previously mentioned (Kujáni, 2017).

Despite the food industry-based results, of course the existing literature brought aspects that should be highlighted. One of these is the "food mile" or "food kilometer" concept. The point is that certain store chains already inform consumers how many kilometers the given goods traveled before being sold, thus encouraging customers to consume local products (Németh, 2015).

Another interesting aspect of the topic is what destructive factors have developed due to the constant and increased transport needs: In addition to the harmful environmental impact, increased transport also results in negative externalities that can be interpreted from a social point of view (traffic jams, accidents, noise). *"A study prepared for the UK Department for Environment, Food and Rural Development (DEFRA) estimates the resulting costs also. According to this, the direct costs of food transport in the UK alone exceed £9 billion per year (at 2002 prices, Smith et al., 2005). Of this, about 5 billion pounds per year is the social cost generated by traffic jams, 2 billion pounds is the cost of transport-related accidents, while the remaining 2 billion pounds is the cost of emitted greenhouse gases, air pollution, noise, and the cost of amortizing the infrastructure."* (Benedek, 2014, p. 994).

From this logically follows that there are important arguments in favor of examining the applicability of SSC, even in addition to reducing the carbon footprint. However, based on the literature, there are also arguments that shade the environmental

protection effects of SSC. Certain authors have come to the conclusion that REL in the food industry has a much more ecological footprint than classical chains, since, for example, the infrastructure of non-wild crops can have higher emissions than the imports of the same vegetable. Another interesting figure is that, according to the data for the USA, from the production of food to its consumption, 83% of the total amount of Co2 emitted is generated during production, while transportation accounts for a total of about 11% (of which only 4% comes from the last step of the delivery – in terms of the entire life cycle, the penultimate –, when the product goes from the manufacturer to the retailer (Benedek et al., 2014; Inzsöl, 2022).

However, this calculation does not take into account the multiplier effect caused by traffic jams. It is possible that only a small proportion of the total amount of greenhouse gases is formed during final part of transport, but the road load caused by transport can result many times of this amount, for which we currently do not have measured data.

The most tangible data refer to the product's delivery distances: "*if the consumer travels more than 6.7 km in his own car to shop (means, if the store visited is slightly more than 3 km from the consumer's residence), then the emissions will be likely larger than at the classic, efficient box system (during which it is necessary to cool, pack and transport the products to the local distribution center and finally to the consumer's door)* (Benedek, 2014, p 995).

On the basis of the whole context of the literature, the demarcation according to the state border was chosen (or maximum 600km). The criterion is that, the raw material, the supplier, production and the sales– the whole SSC - have to be located within this radius**.** By the obtained results it was confirmed at the local use of the SSCs, a potential legal framework can be set up.

ZALA COUNTY AS THE EXAMINED REGION

Based on logistical considerations and available data, we chose Zala County for the territory of the qualitative research. As 5 capital cities are located within a radius of 250 kilometers, and compared to Hungarian conditions, short-distance transport is usual so logistics became more valuable in the

economic life of the county, it was an ideal place to implement the study. In addition to this, we should also mention that the current development directions (ZalaZone Automotive Test Track, Metrans container terminal) have strong logistics output so it was a logical choice to implement the current research in the area (Szabó et al., 2019, p. 6). With the existing conditions, current development trends and data availability, we have every opportunity to achieve precise and accurate results (Szabó et al., 2020, pp. 66-77). From climate change side, Zala County is also affected by this global problem as many databases and models predicts significant changes in the local climate.
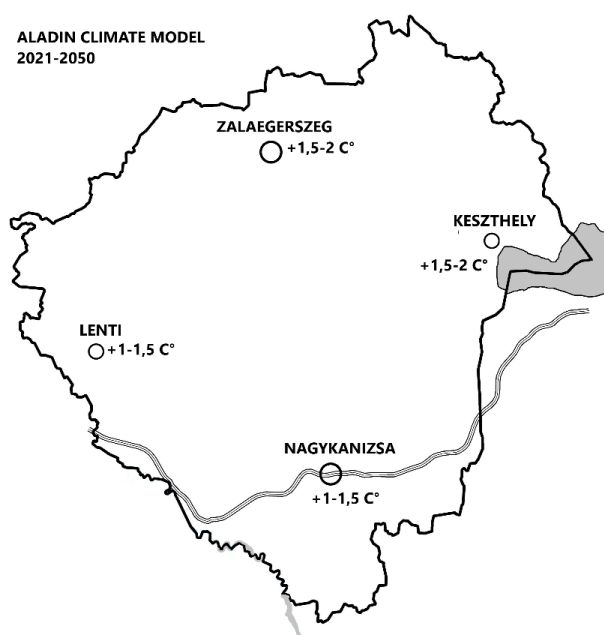

Figure 1: Avg. temperature increase in Zala County between 2021-2050 (Source: Authors)

As we can see on the Figure 1, a serious temperature increase is expected in the whole county. Unfortunately, this trend doesn't stop at the temperature increase but it includes the decrease of the annual rainfall amount, the increase of the heat alarm days, the erosion of the green surface and other climatic negative effects (via Climate strategies of Zalaegerszeg, Keszthely, Nagykanizsa and Lenti). These effects also give a strong reason to focus on the topic in the area and find several solutions for CO^2 reduction as well as the establishment a sustainable economic environment (IMRO-DDKK, 2020; IMRO-DDKK, 2022; NKM, 2020; Vibrocomp Kft. 2020).

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INDUSTRIAL LIMITATIONS AND INTRODUCTION POSSIBILITIES

As we previously mentioned, we successfully interviewed 10 local company leaders. Within the sampling, our main goal was the examination of the shortened supply chain introduction in other industries. On the basis of the results, 5 of the leaders answered that the introduction would be possible at their company, while 3 of them answered a limited implementation would be feasible and 3 of them told us that they can operate only with classic supply chains. The answers are summarized in the table below.

Table 3: Potential introduction of shortened supply chains among Zala County enterprises

Number	Industry	Yes, can be applied	Limited or questioned use	No, can't be applied
1.	Meat processing	x		
2.	Game cooler (Deer, wild boar etc.)	x		
3.	Wood and furniture cluster		x	
4.	Wood industry	x		
5.	Clothing		x	
6.	Electronic assembly			x
7.	Hospitality	x		
8.	Automotive industry			x
9.	Tool manufacturing			x
10.	Clothing		x	

(Source: Own Authors)

As previous studies have shown the introduction of shortened supply chains in the agriculture and food industry is absolute possible. Therefore it wasn't surprising that in industries close to these we had positive answers (like meat processing and game cooler). These were that industries where the daily logistics can operate in a closed chain in the territory of the county. The hospitality was quite more interesting as most of the raw materials can be purchased locally with some exceptions (e.g. coffee beans). Of course, hospitality is also quite close to the food industry but from research side this interview was very useful because we had the opportunity to see a concrete best practice in the field of shortened supply chains. Their operating method is the following: the restaurant is located in a rural area and every raw material is purchased from local farmers. The working logic is quite reverse compared with a classic restaurant as this hospitality enterprise adjusts the menu line to the locally available basic materials not just needed materials (and their purchase) to the menu line. As we mentioned only coffee beans is a hard task but despite of this more than 90% of the logistics system can be run with local purchases. As we mentioned hospitality is quite close to food industry but at same time it's different. In the existing literature, most of the papers focus on local farmer markets but restaurants can also be involved in this topic. Of course, hospitality doesn't include only restaurants but besides other types of companies also hotels. At this point of the sampling, we realized that the examination of hotels from short chain view would be really a demand so in our long-term research this can be the next step. Another useful sample was the wood industry: we made an interview with a local logistics leader and cluster manager. In these interviews we got a clear picture about the possible limitations of the introduction. At the hospitality, we had a conjecture about that one bottleneck can be the available raw materials but sales logistics was out of question as in this case the sales is done locally for implementation. On the ground of the answers, we had that result the shortened supply chain only can be called "short" if all the responsible actors and processes (raw material extraction, production and sales) are located within country border (or 600 km) at least. At the local wood industry, we had that answer it's absolute manageable as the raw material can purchased from local woods and the final outcomes will be sold to the local market (e.g. wooden products for construction works). From the cluster manager we had several feedbacks, from one side he mentioned that in **specialized companies** - e.g. companies producing wooden material for carpenter scaffolding -, and in those **furniture companies** which products high priced, unique needs, customized furniture, short chains are possible. At the same time on the other side, companies dealing

with mass furniture, the economic solutions are the operating of classic supply chains and **very important is that from customer view this is also the expectation (low-price product)**. About this topic we will explain more in detail in the later part of the paper.

In the clothing and textile industry, we received that feedback there are no obstacles in principle to introduce short supply chains in the industry but this kind change-over would be costly for the customers. The piece price would be so higher in this case that the customers with average incomes would hesitate about to choose a sustainable or a mass-product. This meant – if we see the complex picture -, the limitations are also the price of the product and **the customer behavior**. Despite these barriers, there is a sustainable development in the industry, as one of the asked companies tries to purchase the textile locally. We identified this as a limited shortness as the raw materials (e.g. cotton) are from long range. In complex enterprises like electronic assembly, tool manufacturing, automotive industry, there are no possibilities to change the classic supply chains to a shortened one due to infrastructural, technological and mainly from economic reasons. Another important question was the willingness for the basic changes itself. In this question the flowing table shows the summary of the answers.

Table 4: Willingness for introduction of shortened supply chains among Zala County enterprises

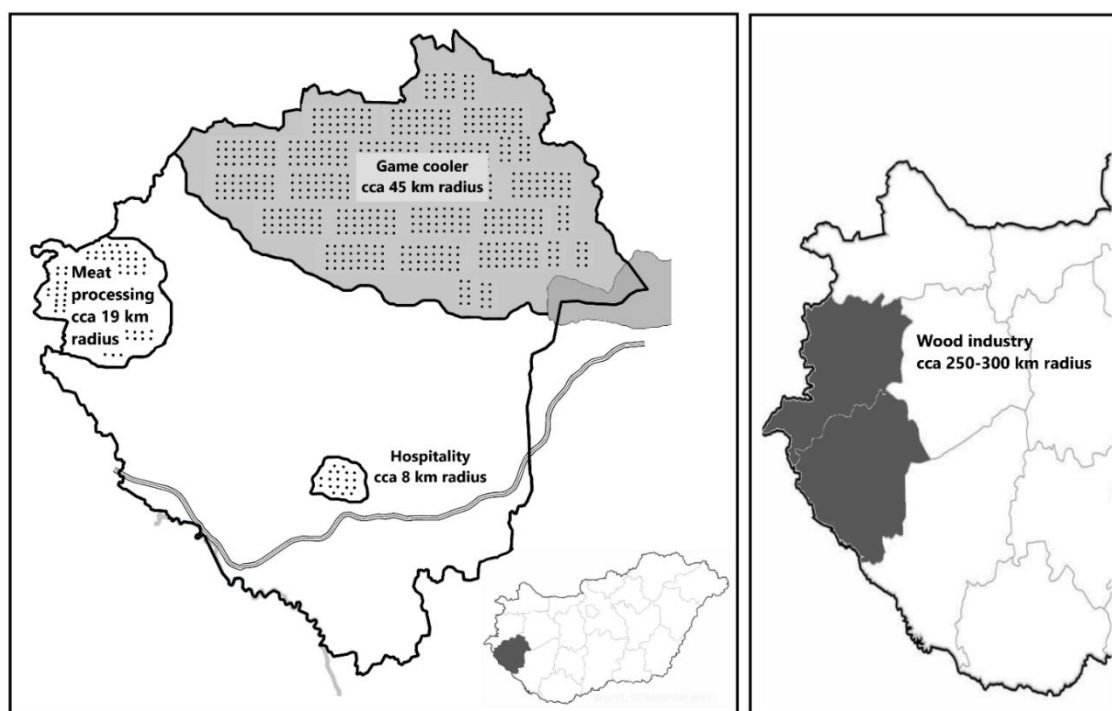| Number	Industry	Introduced or partly introduced	Interested in future introduction	Refuse short chain solutions
1.	Meat processing		x	
2.	Game cooler (Deer, wild boar etc.)	x		
3.	Wood and furniture cluster		x	
4.	Wood industry		x	
5.	Clothing		x	
6.	Electronic assembly			x
7.	Hospitality	x		
8.	Automotive industry			x
9.	Tool manufacturing			x
10.	Clothing			x

(Source: Authors)

Figure 2: Potential SSC operation radius among Zala County enterprises (Source: Authors)

All in all, we can say that there is a measurable willingness in the region for the sustainable operation and the introduction of SSCs but there is an aspect which appeared almost in every interview – the customer behavior. All of the companies noted that their customers need the low-priced and disposable solutions. This is especially true for the textile and clothing industry where fast fashion companies own the market. As the conclusion of this question, we can say that there are industries where SSC can be run without the major change of this behavior (e.g. hospitality) but there are others like wood & furniture and fashion industry where the introduction can be only successful when the general costumer behavior will be more conscious. At the sampling, one of the questions was the description of the potential SSC operation at the companies where the introduction is possible and the there is a willingness for it. On the basis of the answers, we made an SSC map about the operation circle.

The hospitality company currently works in SSC with 8 km radius. Other companies Game cooler and meat processing would be able to constraint their operation into a 45 km and a 19 km radius. In wood industry, this working circle would be 250-300 km while in the clothing industry we can't agreed a given data (we had to have more information about it). If we compare the result of the qualitative sampling and the literature review, we can see that given industry has other circumstances for the implementation of an SSC. For example, in hospitality smaller radius is reachable than in wooden industry so we add to our long-term aim the examination of the potential sector-specific SSC framework. This experience doesn't affect our main goal in the current paper and **by the obtained qualitative results it was confirmed that it is possible to implement SSCs in other sectors also as we identified two more industries (hospitality and wood industry) where the approach can be successfully implemented.** In connection with the other potential KPIs, it is important to highlight that the previous studies were conducted in the field of food industry, so in this case these KPIs are hard to use without transformation. Besides the former results are good basis for the development of the current theory, so we will use these KPIS at the long-term definition of the sectoral-free use of the SSCs (Malak-Rawlikowska et al. 2019; Luo et al., 2022; Rucabado-Palomar & Cuéllar-Padilla, 2020; Tundys & Wiśniewski, 2020).

CONCLUSIONS AND PROPOSALS

Based on the literature review, we can conclude that we have obtained a realistic picture of the current use and definitions of shortened supply chains but the results are still far from complete. Currently, the use of SSCs can encounter many obstacles (e.g. long-term cooling of a product due to its seasonality or the purchasing distance required by the consumer) but the methodology has only been studied more seriously for the food industry.

In the current paper, our first aim was the definition of a theoretical framework with which we can make new regulations in the field of SSCs. On the basis of the literature, we suggest the national borders or 600 km as the frontiers of SSC (Within this radius can a supply chain called shortened). On the ground of the qualitative sampling, we saw that this framework should be specialized to sectors so we add this aim to our long-term research goals.

At the same time, we tried to make a clear picture about the potential limitations of the SSC introduction. With the help of the literature review and qualitative sampling, we could highlight two main bottlenecks: the available raw material and the consumer behavior in the industry. In the qualitative part, we clearly experienced that if there are insurmountable gaps between the consumer needs and the possibilities provided by SSC; and/or the raw material is available outside the radius in the given sector, the introduction can't be successful. These situations are quite typical in complex industries like electronic assembly, automotive or tool manufacturing where SSC can't be implemented (Another interesting question was the SSC use by hotels. The examination of this question was also added to our long-term goals.)

On the other hand, we successfully identified two more sectors where SSC can be absolutely a good solution: hospitality and wood industry. This way, we confirmed SSC is a sector-independent tool which we have to treat like that and we have to afford more resources to make our logistics processes more sustainable.

REFERENCES

Babbie, E. (2008). *A társadalomtudományi kutatás gyakorlata (6th ed.).* Budapest, Balassi Kiadó

Bakator, M., Đorđević, D., Terziovski, M., Ćoćkalo, D., & Bešić, C. (2022). Development of a youth entrepreneurship model for sustainable business growth, *Journal of Engineering Management and Competitiveness, 12(1)*, 3-19.

Benedek, Z. (2014). A rövid ellátási láncok környezeti hatásai. *Magyar Tudomány, 175(8)*, 993-999.

Benedek, Z., & Balázs, B. (2014). A rövid ellátási láncok szocioökonómiai hatásai. *Külgazdaság, 58(5-6)*, 100-120.

Benedek, Z., Fertő, I., Baráth, L., & Tóth, J. (2014). Termelői heterogenitás a rövid ellátási láncokban: a piacokon értékesítő gazdák jellemző különbségei. *GAZDÁLKODÁS: Scientific Journal on Agricultural Economics, 58(80-2016-973)*, 307-319. https://doi.org/10.22004/ag.econ.206089

Gubán, M., & Hua, N. S. (2014). A szolgáltatási fluidumáramlás matematikai modellezése. *Prosperitas, 1(2)*, 61-74. http://publikaciotar.uni-bge.hu/id/eprint/724

Horváth, D. & Mitev, A. (2015) *Alternatív kvalitatívkutatási kézikönyv.* Budapest, Alinea Kiadó

IMRO-DDKK Környezetvédelmi Nonprofit Kft. (2022) *Lenti város fenntartható energia- és klíma akcióterve.* https://www.menea.hr/wp-content/uploads/2022/03/SECAP_Lenti_vegleges_ZMVA-1.pdf

IMRO-DDKK Nonprofit Kft. & MEGÉRTI Kft. (2020) *Nagykanizsa Megyei Jogú Városklímastratégiája 2020-2030.* https://nagykanizsa.hu/letoltesek/2020-11/268_850_nk_klimastrategia_egyeztetesi_valtozat.pdf

Inzsöl, R. (2022). *A rövid ellátási lánc társadalmi-gazdasági és területi összefüggései termelői oldalról Vas megye példáján* (Doctoral dissertation, soe).

Juhász, A. (2012). *A közvetlen értékesítés szerepe és lehetőségei a hazai élelmiszerek piacra jutásában.* Agrárgazdasági Kutató Intézet, Budapest

Király, G. & Géring, Zs. (2016). Kvalitatív módszertani innovációk és a tudományos gyakorlat: szerkesztői előszó. *Prosperitas, 3(2)*, 5-16.

Kujáni, K. (2017). A rövid ellátási láncok tervezési feltételei a hazai kistérségekben - Organisational Conditions of Short Food Supply Chains in Hungarian Small Territories. *GRADUS, 4(2)*, 222-231. http://real.mtak.hu/id/eprint/109770

Lewin, K. (1946) Action Research and Minority Problems, *In: Resolving Social Conflicts*, New York, Harper And Row, pp. 201–216.

Luo, J., Liang, Y., & Bai, Y. (2022). Mapping the intellectual structure of short food supply chains research: A bibliometric analysis. *British Food Journal, 124(9)*, 2833-2856. https://doi.org/10.1108/BFJ-05-2021-0465

Malak-Rawlikowska, A., Majewski, E., Wąs, A., Borgen, S. O., Csillag, P., Donati, M., & Wavresky, P. (2019). Measuring the economic, environmental, and social sustainability of short food supply chains. *Sustainability, 11(15)*, 4004. https://doi.org/10.3390/su11154004

Mezősi, G., Bata, T., Blanka, V., & Ladányi, Z. (2017). A klímaváltozás hatása a környezeti veszélyekre az Alföldön. *Földrajzi Közlemények, 141(1)*, 60-70.

Németh, A. (2015). A mezőgazdaság relokalizációja a környezetterhelés csökkentése érdekében. *Economica (1585-6216), 8(3)*, 240-251.

NKM Optimum Zrt. (2020)., *Keszthely Város Klímastratégiája.* Retrieved 2023.03.16. from https://klimastrategia.keszthely.hu/images/Keszthely_Klimastrategia_20200828.pdf

Olajos, I., & Szilágyi, J. E. (2015). A rövid ellátási lánc-, mint a támogatott felzárkóztatás esélye Borsod-Abaúj-Zemplén megyei hátrányos helyzetű kistérségeiben. *Észak-magyarországi Stratégiai Füzetek, 12*, 71-82.

Rucabado-Palomar, T., & Cuéllar-Padilla, M. (2020). Short food supply chains for local food: A difficult path. *Renewable Agriculture and Food Systems, 35(2)*, 182-191. https://doi.org/10.1017/S174217051800039X

Sáfián, F., & Pej, Zs. (2017). *Sárvár SECAP.* https://sarvarvaros.hu/sarvar-varos-klimastrategiajanak-felulvizsgalata-0000-00-00

Saunders, M., Lewis, P. & Thornhill, A. (2009) *Research methods for business students.* Pearson education.

Szabó, D. (2014). A rövid ellátási láncban rejlő lehetőségek és veszélyek Magyarországon. *Acta Carolus Robertus, 4(1064-2016-86465)*, 109-118. https://doi.org/10.22004/ag.econ.206848

Szabó, L., Szabó, K., & Gubán, M. (2019) Logistics Processes of Enterprises in Zala County, *In: International Conference Sustainable Logistics 4.0*, pp. 20-25.

Szabó, L. - Szabó, K. - Gubán, M. (2020): Territorial examination of the logistics processes of enterprises. Prosperitas, 7(1), pp. 66-77.

Tundys, B., & Wiśniewski, T. (2020). Benefit optimization of short food supply chains for organic products: A simulation-based approach. *Applied Sciences, 10(8)*, 2783. https://doi.org/10.3390/app10082783

Vibrocomp Kft. (2020). *Zalaegerszeg Klímastratégiája.* https://zalaegerszeg.hu/dokumentum/34641/Zalaegerszeg_klimastrategiaja.pdf

MOGUĆNOSTI KRATKIH LANACA SNABDEVANJA U ODRŽIVOJ LOGISTICI U ZALSKOM OKRUGU

Klimatske promene su već dugo poznat problem, ali danas njihovi efekti postaju sve snažniji i opipljiviji u svakodnevnom životu ljudi. Jedna od najvažnijih tema društvenih nauka današnjice je identifikacija održivih rešenja. Kako je problem klimatskih promena veoma složen, mora se sagledati sa različitih aspekata/teritorija/industrija. Logistika je jedna od ovih aspekata. Danas se logistika sve više kritikuje jer prosečni lanci snabdevanja na naglašen način doprinose zagađenju životne sredine. U dosadašnjoj akademskoj literaturi, kratki lanci snabdevanja pojavili su se kao potencijalno rešenje, ali za sada samo u oblasti poljoprivrednih nauka. Jedan od ciljeva ovog istraživanja je definisanje osnovnog okvira tzv. "skraćenog" lanca snabdevanja u okviru Zalskog okruga. Ispitane se implementirani kratki lanci snabdevanja na osnovu pregleda literature. Za drugi važan cilj, a to je potencijalna primena ove tehnike, odgovor se tražio kvalitativnim metodama među preduzećima Zalskog okruga.

Ključne reči: Logistika; Životna sredina; Zagađenje; Kratak lanac snabdevanja.