Competencies of Western Balkan farmers for participating in short food supply chains: Honey case study

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Abstract

The paper aims to examine the impact of different beekeepers' characteristics on their perceptions of two personal competencies required for successful participation in short food supply chains (abbr. SFSCs): (1) Communication and marketing knowledge and skills, and (2) Available time to cultivate communication with customers and sell honey. Data was collected using survey research, and the total sample included 1,081 beekeepers in the region of the Western Balkans. Multinomial logistic regression was used for data processing. According to the Nagelkerke R² the model explained a high percentage of the variance of both analysed dependent variables. The results indicate that beekeepers perceive both competencies as strong to medium strong. The first competency is more likely to be evaluated as strong to very strong by young beekeepers and those who perceive distance to consumers as a small or no barrier to honey sale. The strongest predictor for the second competency is family labour. The value Exp(B) shows that beekeepers with abundant family labour are 19.1 times more likely to perceive available time as a strong to very strong competency in direct sales.

Keywords: *Beekeepers, Short food supply chain, Competency, Knowledge and skills, Available time.*

1. Introduction

Whether they are represented by direct sales by farmers, or collective direct sales (local festivals, sales through cooperatives owned by farmers), or partnerships ("community supported agriculture"), short food supply chains (abbr. SFSCs) stand as a counterpart to long (commercial or global) supply chains, representing an alternative and reducing the reliance of farmers, consumers and society on global chains.

They decrease or eliminate the number of intermediaries in trade and create close and confidence-based relationships between farmers and consumers in which farmers transfer information about the product quality, origin and safety to the market, its production method, as well as other information related to their production (Bayir *et al.*, 2022; Cruz *et al.*, 2021; Kneafsey *et al.*, 2013; Renting *et al.*, 2003). If consumers consider this information to be valuable and significant in the purchase process, this type of sales relationship

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will further result in the creation of a new, higher product value and provide conditions for achieving price premiums (Clark *et al.*, 2021; Kneafsey *et al.*, 2013; Renting *et al.*, 2003).

According to the regulation of the European Union on the support for rural development, SFSCs include "a limited number of economic operators, committed to co-operation, local economic development, and close geographical and social relations between producers, processors and consumers" (European Union, 2013, p. 499). The Delegated Regulation (European Union, 2014, p. 9), Article 11, also specifies that "support for the establishment and development of short supply chains, as referred to in Article 35(2)(d) of Regulation (EU) No 1305/2013 shall cover only supply chains involving no more than one intermediary between farmer and consumer."

SFSCs are recognized as a useful way for the economic empowerment of small-scale family farms (through effects of achieved farmgate, price premium, value-added chain, diversification of activities and income, better negotiating positions) and their better integration into agri-food supply and value chains (Brumă *et al.*, 2021; Clark *et al.*, 2021; Kneafsey *et al.*, 2013; Malak-Rawlikowska *et al.*, 2019; Renting *et al.*, 2003; Rucabado-Palomar and Cuéllar-Padilla, 2020). They have an indisputable role in promoting and stimulating the sustainable development of local communities in rural areas. As a resource of the endogenous development, they contribute to the concept of multifunctional agriculture (Jarzębowski *et al.*, 2020; Kiss *et al.*, 2019; Mastronardi *et al.*, 2015; Renting *et al.*, 2003). Also, the European Commission shows clear intentions to continue providing support to shorter supply chains in the new CAP 2023-27, in order to improve the competitiveness and position of small-scale farmers in food supply and value chains, while contributing to environmental goals by building fair, strong and sustainable food systems (European Commission, 2020; European Union, 2021).

SFSCs are considered increasingly useful for strengthening small-scale family farms and sustainable development of rural areas in Central and Eastern Europe, and Western Balkan countries (abbr. WBCs), along with farm consolidation and greater market integration of farmers into global food supply chains (Borychowski *et al.*, 2020; Brumă *et al.*, 2021; Djordjević Milošević *et al.*, 2021; FAO, 2020; Goszczyński and Knieć 2011; Stępień *et al.*, 2022). In this region, farmers' markets (or local green market), on-farm sales, roadside sales, etc. have been traditionally highly represented in food systems since the Communist period and they reflect strong consumers' preferences for local food and direct purchase from producers (Brumă *et al.*, 2021; Djordjević Milošević *et al.*, 2021; Haas *et al.*, 2021; Pilař *et al.*, 2019).

Here it is important to notice differences between SFSCs in WBCs and those in developed countries. Namely, in developed countries SFSCs are part of value-added agriculture. In these chains, certain categories of consumers, concerned about food safety issues, buy fresh, high-quality and safe products from well-known producers and show a willingness to pay price premiums (Clark *et al.*, 2021; Cruz *et al.*, 2021; Kneafsey *et al.*, 2013; Malak-Rawlikowska *et al.*, 2019; Renting *et al.*, 2003).

However, in WBCs SFSCs are mainly a reflection of the inefficient and unorganized global (commercial) food supply chain which is characterized by: a) low integration of small and medium-scale farms (farmers with low productivity and small-scale production, and not implementing food safety standards); (b) lack of contractual relationships; (c) high price volatility; and (d) insufficiently developed farmers' associations and lack of acknowledged producer organizations, which results in the low negotiation power of farmers (Ciaian *et al.*, 2018; Djordjević Milošević *et al.*, 2021; Erjavec *et al.*, 2014; FAO, 2020; Hanf and Gagalyuk, 2018; Horvat *et al.*, 2020; Kotevska *et al.*, 2015; Stępień *et al.*, 2022). At the same time, the market of products placed through SFSCs is still not mature or institutionally arranged in most countries. Market organization and food safety laws are not applied efficiently, so products (mainly the unprocessed and low-value products) are sold through (semi)informal channels of direct selling, while farmers involved in these channels face various constraints to further development (Brumă *et al.*, 2021; Djordjević Milošević *et al.*, 2021; Erjavec *et al.*, 2014; FAO, 2020; Kotevska *et al.*, 2015; Mihailović *et al.*, 2020).

The product which is most commonly sold

through SFSCs in all WBCs is honey. It is placed solely through traditional SFSC types, such as: farmers' (green) markets, local food festivals (fairs), direct on-farm sales, roadside selling, etc. (Cela *et al.*, 2019; Cane *et al.*, 2014; Djordjević Milošević *et al.*, 2021; FAO, 2020). By establishing direct contact with consumers and by building trust, beekeepers "upgrade" their products with the information on honey quality, origin and safety. The consumers who consider this information valuable will buy these products and pay price premiums for them (Cela *et al.*, 2019; Cruz *et al.*, 2021; Kallas *et al.*, 2021; Ritten *et al.*, 2019; Vapa-Tankosić *et al.*, 2020). Placing honey through SFSCs leads to differentiating products on the market, achieving price premiums, adding value to honey in the value chain, while strengthening the beekeepers' market position and consumers' total positive experience (Andrieu *et al.*, 2021; Cane *et al.*, 2014; Cela *et al.*, 2019; Djordjević Milošević *et al.*, 2021; Kallas *et al.*, 2021; Kneafsey *et al.*, 2013; Ritten *et al.*, 2019; Virgil and Simona, 2020). Providing numerous benefits for all participants, these placement channels represent both an efficient distribution channel and a marketing instrument, particularly for small-scale farmers with limited resources who are dominant in the sector of agriculture of all WBCs.

Yet, we should be aware of numerous weaknesses of these marketing channels, which is why they can hardly compete with long channels in terms of prices, availability and diversity of products. These weaknesses are related to: (a) weak farmers' competencies and low production/logistics/finance resources of the involved small producers (which is an even greater limitation in undeveloped rural regions), and (b) possibilities of reaching effects of economies of scale (Bayir *et al.*, 2022; Charatsari *et al.*, 2020; Djordjević Milošević *et al.*, 2021; Jarzębowski *et al.*, 2020; Kneafsey *et al.*, 2013; Malak-Rawlikowska *et al.*, 2019; Rucabado-Palomar and Cuéllar-Padilla 2020). Only if a number of prerequisites for success are met, including those under the authority of farmers themselves and those within the competence of national and local authorities, SFSCs could be successful and economically and socially sustainable at the farm level and also at the level of local communities.

Bearing in mind the above mentioned, the authors believe that in order to shorten supply chains in all WBCs successfully, farmers must possess high competencies for participating in these marketing channels. Consequently, an empirical study was conducted in order to examine two types of beekeepers' competencies for participation in SFSCs: (1) communication and marketing knowledge and skills for direct sales, and (2) available time to cultivate communication with consumers and sell honey. By using descriptive statistics and multinomial logistic regression, the authors try to answer two research questions: (a) how beekeepers in WBCs perceive these competencies for participating in SFSCs and (b) whether the perception of strong competencies can be predicted based on different beekeepers' spatial, demographic and socio-economic characteristics.

The aim of this research is to provide policymakers with pragmatic knowledge which would help them to adapt development measures to beekeepers' needs and potentially establish support to beekeepers and their organizations for participating in SFSCs. In addition, the results will contribute to the further acknowledgement of this concept in WBCs and complement the scarce scientific literature.

2. Role of SFSCs in marketing beekeeping products

In all countries of the WB region, beekeeping represents a traditional and family business, a type of craft entrepreneurship, which is mainly present on small and medium-scale family farms as an additional activity (Bislimi, 2022; Cane *et al.*, 2014; Čavlin *et al.*, 2023; Djordjević Milošević *et al.*, 2021; FAO, 2020; Ramadani *et al.*, 2019).

Development of the beekeeping sector is limited by numerous factors, the most common being: (a) climate change and bee diseases; (b) lack of labour for commercializing business activities (both family and hired labour), as well as expensive hired labour; (c) insecure product sale (lack of contracts and regular buyers), small beekeepers' influence on the purchase price of honey and poor organization within the sector; (d) beekeepers' inadequate techniques and knowledge on the product marketing (packing, labelling, promoting) and undeveloped joint marketing strategies; (e) low total knowledge and skills of beekeepers (which are based on prac-

tical experience and insufficient use of advisory and educational services); (f) atomization of production and beekeepers' limited access to affordable capital (Bislimi, 2022; Brumă *et al.*, 2021; Ciaian *et al.*, 2018; Čavlin *et al.*, 2023; Djordjević Milošević *et al.*, 2021; FAO, 2020; Cane *et al.*, 2014; Ramadani *et al.*, 2019).

However, this sector generates additional household income, supplies national (local) markets with beekeeping products and makes important contribution to strengthening endogenous sources of rural development (Bislimi, 2022; Cane *et al.*, 2014; Čavlin *et al.*, 2023; Djordjević Milošević *et al.*, 2021; FAO, 2020; Ramadani *et al.*, 2019; Virgil and Simona, 2020). There is a high demand for honey, while the price of honey ensures sustainable income for beekeepers (Bislimi, 2022; Cane *et al.*, 2014; Ramadani *et al.*, 2019). In addition, certain categories of consumers perceive honey as significant for their health. Consequently, they are willing to pay price premiums for the locally produced honey placed through SFSCs, and they pay particular attention to its geographic origin and apiary landscape (Cela *et al.*, 2019; Kallas *et al.*, 2021; Ritten *et al.*, 2019; Vapa-Tankosić *et al.*, 2020). Due to frequent frauds and due to importing honey of low or suspicious quality, consumers in WBCs mainly prefer SFSCs to supermarkets when purchasing honey (Djordjević Milošević *et al.*, 2021).

Local markets and SFSCs represent valuable and accessible tools for valorizing these positive market impulses and improving selling and marketing of all bee products. By participating in SFSCs and using social media marketing, beekeepers gain a transparent channel of communication, information and sale with relatively low marketing costs. They can transfer information about their products to consumers in an efficient and easy way, as well as communicate with their customers (Andrieu *et al.*, 2021; Brumă *et al.*, 2021; Elghannam and Mesias, 2019; Kallas *et al.*, 2021; Mihailović *et al.*, 2020; Ritten *et al.*, 2019; Rucabado-Palomar and Cuéllar-Padilla 2020).

SFSCs can successfully contribute to the marketing of bee products and be beneficial for beekeepers and consumers. This can be achieved by applying innovative approaches to product distribution and by fulfilling numerous prerequisites for success, which are primarily under the authority of the beekeepers themselves. Some of the most significant prerequisites for success are: (a) digital transformation of short chains, by using social networks and social media marketing tools more frequently; (b) networking of beekeepers and other participants in rural development (horizontal and vertical associations, strengthening beekeepers' cooperatives or production organizations; partnerships of beekeepers and tourist sector workers); (c) development of a joint marketing strategy (based on local/regional branding of products or branding through production organizations); (d) improvement of communication and marketing knowledge and skills of beekeepers and cultivation of the continuous contact with consumers; (e) greater investment in promoting, packaging and labelling of honey; (f) adjustment of beekeepers to the institutional framework related to food safety and marketing; (g) logistic improvement of the total product distribution process (Andrieu *et al.*, 2021, Brumă *et al.*, 2021; Cane *et al.*, 2014; Čavlin *et al.*, 2023; Cela *et al.*, 2019; Corvo *et al.*, 2021; Djordjević Milošević *et al.*, 2021; Jarzębowski *et al.*, 2020; Mihailović *et al.*, 2020; Paciarotti and Torregiani, 2021; Ramadani *et al.*, 2019; Renting *et al.*, 2003; Rucabado-Palomar and Cuéllar-Padilla, 2020; Virgil and Simona, 2020).

In WBCs, it is very important to satisfy these preconditions, having in mind numerous constraints to the development of the agriculture sector and food value chains, as well as the total low competencies of farmers and beekeepers in all the countries (Borychowski *et al.*, 2020; Cane *et al.*, 2014; Ciaian *et al.*, 2018; Čavlin *et al.*, 2023; Djordjević Milošević *et al.*, 2021; Erjavec *et al.*, 2014; FAO, 2020; Guri *et al.*, 2014; Hanf and Gagalyuk, 2018; Haas *et al.*, 2021; Horvat *et al.*, 2020; Kotevska *et al.*, 2015; Mihailović *et al.*, 2020; Volk *et al.*, 2019). For example, in several WBCs, Djordjević Milošević *et al.* (2021, p. 34) identified the most significant limitations for farmers' access to SFSCs, like "a lack of financing, inaccessible or insufficient government support, low product prices, large price fluctuations, a lack of affordable hired labour and a lack of marketing skills."

We should be aware of numerous weaknesses of SFSCs, which are particularly noticeable in developing countries and transition economies. Due to their weaknesses, these placement

channels can hardly compete with long channels in terms of prices, availability and diversity of products. Namely, throughout the literature the SFSC weaknesses are mainly connected to: (a) low competencies of farmers involved in SFSCs, i.e. their modest knowledge and skills in the field of management, marketing, communication, and entrepreneurship; (b) small market power of farmers and lack of cooperation and synergy with other actors; (c) inefficient and expensive distribution of products (due to the underdeveloped rural infrastructure and/or long delivery distances and/or large number of small periodical orders); (d) problems related to labour hire (a high need of family labour, or inexistent or expensive hired labour); (e) farmers lacking financial resources for investing in product development, marketing and sale; (f) farmers lacking time to cultivate communication and personal contacts with consumers (which is the basis of consumer loyalty); (g) problems of adjusting small-scale and traditional production with tax rules and regulations related to food hygiene and safety (Bayir *et al.*, 2022; Charatsari *et al.*, 2020; Jarzębowski *et al.*, 2020; Kneafsey *et al.*, 2013; Malak-Rawlikowska *et al.*, 2019; Rucabado-Palomar and Cuéllar-Padilla, 2020).

It should also be underlined that not all consumers are interested in buying through SFSCs; that most of them make decisions regarding the purchase on the basis of the price; and that producers from short chains compete with cheaper, industrial products from global chains (Kneafsey *et al.*, 2013; Jarzębowski *et al.*, 2020). A consumer-oriented study conducted in Spain indicated that a large number of producers were interested in using SFSCs based on social networks, particularly if producers maintained to ensure a competitive price, i.e. lower selling prices of food in comparison to conventional channels (Elghannam and Mesias, 2019).

Bearing in mind the above mentioned, as well as the attitudes of a number of authors which are either highly critical (Born and Purcell 2006; DuPuis and Goodman, 2005) or cautious regarding local markets and SFSCs (Kiss *et al.*, 2019), we believe that SFSCs should not be excessively glorified. A useful solution for most farmers and beekeepers would be a combination (diversification) of different distribution channels (short and long ones). It is frequently applied in practice and ensures sustainable income on the farm (Hanf and Gagalyuk, 2018; Malak-Rawlikowska *et al.*, 2019; Rucabado-Palomar and Cuéllar-Padilla, 2020).

3. Material and methods

The survey research method was used for collecting data, along with quota sampling. The target population included the owners of beekeeping farms dealing with beekeeping in the WBC region. The survey research was realized in the period from December 2021 to March 2022. A structured questionnaire was distributed to the respondents online using the Google Forms software. The total sample with valid responses involved 1,081 beekeepers.

Table 1 - Beehives and beekeeping farms in WBCs – the authors' assessment.

	Beehives, thousand, 2020	Beekeeping farms, no	Beehives per farm, no	Share of beekeeping farms in total number, %
Serbia	980	29,495 (2018)	33	45.8
Bosnia and Herzegovina	447	7,875 (2021)*	57	12.2
North Macedonia	310	6,681 (2020)**	46	10.4
Montenegro	69 (2019)	2,500 (2020)***	27	3.9
Albania	358	11,769 (2012)	30	18.3
Kosovo*	263	6,018 (2014)	44	9.4
Total	2,427	64,338	38	100.0

*Source: National statistics by country. *Ministry of Agriculture, Forestry and Water Management of the Republic of Srpska, the Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, and Brčko District Beekeeping Centre. **Ministry of Agriculture, Forestry and Water Economy and Food and Veterinary Agency of the Republic of North Macedonia. *** Association of Beekeeping Organizations of Montenegro.*

Table 2 - Structure of the sample.

Sample characteristics	Structure (%)
Country, N=1,081	
- Serbia	52.5
- Bosnia and Herzegovina	5.3
- North Macedonia	11.0
- Montenegro	4.7
- Albania	24.3
- Kosovo*	2.2
Gender, N=1,081	
- Male	88.0
- Female	12.0
Beekeepers' age, N=1,081	
- Young (<40)	29.6
- Middle-aged (40-65)	57.2
- Older (>65)	13.2
Beekeepers' experience, N=1,081	
- Beginners and less experienced (<10)	43.8
- Mid-level experience (10-20)	24.6
- Highly experienced (>20)	31.6
Capacity size (number of hives per beekeeping farm), N=1,081	
- Small-scale ≤30 hives	30.1
- Medium-scale 31-150 hives	56.9
- Large-scale > 150 hives	13.0
Honey production region, N=1,081	
- Lowland area	35.3
- Hilly area	38.2
- Mountain area	26.5
Honey sales channels, N=1,081	
- Wholesale (sales to cooperatives, associations, wholesale buyers, in buckets or barrels)	3.6
- Retail (direct sales to consumers, in jars or smaller packages)	59.9
- Combination of retail and wholesale	36.5
Product range, N=1,071	
- Honey, only	23.8
- Honey and other bee products, like royal jelly, pollen, propolis and wax	76.2
Adding value to honey, N=1,067	
- No value added	56.0
- Added value (adding different products, processing, certification, original packaging…)	44.0
Availability of family labour to sell honey, N=990	
- Abundant	65.7
- Moderate	21.0
- Labour shortage	13.3
Distance to consumer/urban centres, N=983	
- Not a barrier or a small barrier to sale	72.7
- Medium to large barrier to sale	27.3

Source: Authors' presentation based on the survey.

The quotas were defined for the beekeepers' country of origin based on statistical data on the number of beekeeping farms in WBCs (Table 1). Due to the unstable political situation in Kosovo[1] and a low response rate in Bosnia and Herzegovina, the quotas for these two countries were not completely fulfilled. The structure of the sample is shown in Table 2.

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[1] This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.

Table 3 - Predictor variables used in the multinomial logistic regression.

Description	Categories
Beekeepers' age=1 Beekeepers' age=2 Beekeepers' age=3	Young (<40) Middle-aged (40-65) Older (>65)
Beekeepers' experience=1 Beekeepers' experience=2 Beekeepers' experience=3	Beginners and less experienced (<10) Mid-level experience (10-20) Highly experienced (>20)
Honey production region =1 Honey production region =2 Honey production region =3	Lowland area Hilly area Mountain area
Capacity size =1 Capacity size=2 Capacity size=3	Small-scale ≤30 Medium-scale 31-150 Large-scale > 150
Availability of family labour =1 Availability of family labour =2 Availability of family labour =3	Abundant Moderate Shortage
Distance to urban and consumer centres=1 Distance to urban and consumer centres =2	Not a barrier or a small barrier to sale Medium to large barrier to sale
Product range=1 Product range=2	Honey, only Honey and other bee products
Adding value to honey=1 Adding value to honey=2	No value added Added value

Source: Authors' presentation.

Bearing in mind that the respondents were probably not familiar with the phrase of SFSCs, the authors explained this concept by using the term "retail" or direct honey sale to consumers (farmers' markets, on-farm sales, roadside sales, home delivery, etc.), local restaurants, shops and/or hotels, in jars or smaller packages.

In the questionnaire the beekeepers were asked whether they possessed the following two types of personal competencies required for successful marketing of honey through SFSCs:

- Communication and marketing knowledge and skills (abbr. Knowledge and skills) required for direct sales. These competencies were explained to the respondents using the following concepts: cultivating contacts with consumers, mutual trust, understanding and responding to consumers' needs, transferring valuable information about the product and production process to consumers, designing and investing in packaging, attending fairs and manifestations, using social networks for placing products and alike;
- Available time needed for cultivating communication with consumers and selling honey (abbr. Available time).

The respondents rated these competencies using an ordinal 6-step Likert scale, where 1=very strong, 2= strong, 3=medium to strong, 4=medium, 5=weak, 6= very weak. In the multinomial logistic regression model, these competencies were dependent variables grouped into three categories: strong to very strong (answers 1, 2 and 3 on the Likert scale); medium (answer 4 on the Likert scale), and weak to very weak (answers 5 and 6 on the Likert scale).

Based on the results of semi-structured interviews with five beekeepers, which preceded the final structured questionnaire, and other studies directly or indirectly related to this paper's subject (Ciaian *et al.*, 2018; Guri *et al.*, 2014; Horvat *et al.*, 2020; Kotevska *et al.*, 2015; FAO, 2020; Djordjević Milošević *et al.*, 2021), the authors selected eight predictor variables (Table 3). These variables were believed to have an impact on beekeepers' competencies required for participating in SFSCs: age, experience, capacity size, product range, honey production region, availability of family labour for selling honey, distance to urban and consumer centres, and adding value to honey.

The authors did not include beekeepers' formal education as a predictor variable. The semi-struc-

tured interviews with beekeepers and studies by FAO (2020) and other authors (Erjavec *et al.*, 2014; Horvat *et al.*, 2020; Kotevska *et al.*, 2015; Djordjević Milošević *et al.*, 2021) have shown that formal education of beekeepers (and farmers) in WBCs has no significant impact on their knowledge and skills regarding production and sale and that the transfer of knowledge from agricultural advisors is not sufficiently developed and efficient. Therefore, the experience-based knowledge has the greatest importance.

The multinomial logistic regression was used to model the influence of spatial, demographic and socio-economic characteristics of beekeepers on their perceptions of the personal competencies required for successful honey sale through SFSCs. Since the dependent variables have three categories each, the two sets of logistic regression coefficients (two logits) were formed, while level 3 was the reference category (weak to very weak competencies). The last categories of the predictor variables (Table 3) were used as reference categories in the discussion of the results. The Exp(B) (odds ratios for the predictors) column was considered for significant predictors ($p<0.05$).

The main advantage of multinomial logistic regression is that the analysis can be conducted across more than two categories. The quality of the model was determined by means of calculating, the Pearson Chi-square test, the Cox and Snell, Nagelkerke and McFadden pseudo R-squared and the percentage of correctly classified objects.

The likelihood ratio test in the multinomial regression showed that the logistic regression was significant and that the model predicted the results well for both dependent variables (Chi-Square (32)=680.387, $p<0.005$ for Knowledge and Skills, and Chi-Square (32)=573.843, $p<0.005$, for Available time). According to the Cox and Snell R^2, Nagelkerke R^2 and McFadden R^2, the model explained 74.1%, 83.3% and 62.0% of the variance of the variable Knowledge and Skills, respectively. On the other hand, the Cox and Snell R^2, Nagelkerke R^2 and McFadden R^2 explained 69.9%, 78.6% and 54.6% of the variance of the Available Time variable, respectively.

For the dependent variable Knowledge and Skills, the percentage of correctly classified objects was 94.6%, 42.6% and 57.4% for strong to very strong, medium and weak to very weak competencies, respectively, and the overall percentage of correctly classified objects was 80.3%. For the dependent variable Available time, the percentage of correctly classified objects was 94.6%, 51.3% and 59.4% for strong to very strong, medium and weak to very weak competencies, respectively, while the overall percentage of correctly classified objects was 77.1%.

All statistical analyses were performed using the SPSS 21.0 software (IBM, Chicago, USA), while applying the statistical significance level of $p \leq 0.05$ for making conclusions.

4. Results and discussion

Out of the total number of the surveyed beekeepers, 987 of them (91.3%) rated the competencies related to Knowledge and skills for participation in SFSCs and assigned them an average rating of 2.4 on the scale from 1 very strong to 6 very weak (Figure 1). At the same time, 1,024 beekeepers (94.7% of the total number) evaluated the competencies related to Available time for participation in SFSCs, giving them an average rating of 2.9 on the 1-6 scale (Figure 1).

Based on the score ranking, it can be concluded that beekeepers estimated both types of competencies as strong and medium to strong (Figure 1). These empirical results can confirm the views in the literature stating that farmers in WBCs are able to participate in SFSCs successfully (Borychowski *et al.*, 2020; Djordjević Milošević *et al.*, 2021; FAO, 2020; Goszczyński and Knieć, 2011).

The lower scores given to Available time can be explained by unfavourable demographic characteristics in rural areas, migrations and abandonment of agriculture, particularly by small-scale farmers, since it is impossible to reach high productivity and sustainable revenues in fragmented agriculture (Ciaian *et al.*, 2018; Djordjević Milošević *et al.*, 2021; FAO, 2020; Guri *et al.*, 2014; Horvat *et al.*, 2020; Kotevska *et al*., 2015).

When it comes to the countries involved in

the research, beekeepers in Albania assigned the poorest scores to their competencies (Figure 1). The unfavourable scores assigned to Available time can be explained by large-scale migrations of the inhabitants from rural areas, which results in large uncultivated land areas and lack of investments in agriculture (Guri *et al.*, 2014).

The multinomial logistic regression shows which predictor variables have a statistically significant influence on the dependent variables, i.e. beekeepers' competencies for participation in SFSCs. Accordingly, the results show that the following variables contribute significantly to the model ($p<0.05$):

- Beekeepers' age ($\chi^2(4)=33.52$ for Knowledge and skills, and $\chi^2(4)=18.45$ for Available time);
- Capacity size ($\chi^2(4)=10.01$ for Knowledge and skills, and $\chi^2(4)=15.08$ for Available time);
- Availability of family labour ($\chi^2(4)=217.57$ for Knowledge and skills, and $\chi^2(4)=89.58$ for Available time);
- Distance to consumers ($\chi^2(2)=32.39$ for Knowledge and skills, and $\chi^2(2)=38.05$ for Available time);
- Adding value to honey is statistically significant only for Available time ($\chi^2(2)=6.58$; $p=0.037$).

The following tables (Table 4 and Table 5) present the parameter estimates (i.e. coefficients of the model) for both dependent variables.

According to Table 4, the following groups of beekeepers have a larger odds ratio to perceive their competencies related to Knowledge and skills required for SFSCs as strong to very strong rather than weak to very weak, while the other variables in the models are kept constant:

- Young (Age=1, Exp(B)=4.07, $p=0.000$) and middle-aged beekeepers (Age=2, Exp(B)=2.34, $p=0.007$) as opposed to the older ones;
- Large-scale beekeepers as opposed to small-scale ones (Capacity size=1, Exp(B)=0.33, $p=0.006$);
- Beekeepers who do not perceive distance to consumers as a barrier or who perceive it as a small barrier to sale (Distance=1, Exp(B)=3.73, $p=0.000$);

Figure 1 - Average score of the beekeepers' competencies for participation in SFSCs on the scale from 1 (very strong) to 6 (very weak).
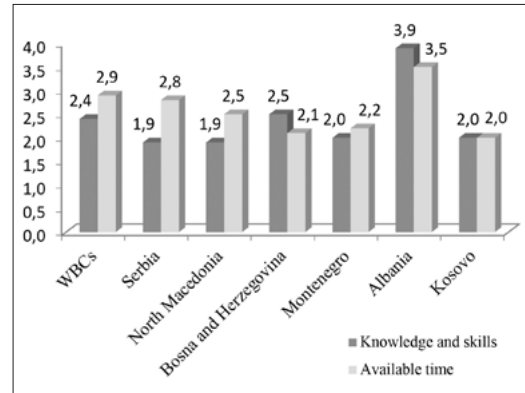
Source: Authors' calculation based on the survey data.

- Beekeepers who do not add value to honey (Added value=1, (Exp(B)=1.82, $p=0.011$).

Simultaneously, beekeepers with labour shortage have a higher odds ratio to estimate their competencies related to Knowledge and skills as weak to very weak rather than strong to very strong (Family labour=3, Exp(B)=0.31, $p=0.023$), while the other variables in the model are kept constant. The only variable that is statistically significant for the second set of coefficients is Capacity size=1 (Exp(B)=0.28, $p=0.005$). The strongest predictors in both logit models are beekeepers' age (Age=1) and distance to urban and consumer centres (Distance=1), both in the first logit. The odds ratios show that young beekeepers and those who perceive distance to consumers as a small or no barrier to honey sale are 4.1 times and 3.7 times more likely, respectively, to perceive their knowledge and skills for honey sale through SFSCs as strong to very strong competencies.

For the second dependent variable Available time (Table 5), the following groups of beekeepers have a greater odds ratio to perceive this competency as strong to very strong rather than as weak to very weak, when the other variables in the models are kept constant:

- Older beekeepers (>65), in contrast to young (Age=1, Exp(B)=0.19, $p=0.001$) and middle-aged beekeepers (Age=2, Exp(B)=0.14, $p=0.000$);

Table 4 - Results of the multinomial regression for modelling levels of beekeepers' knowledge and skills for SFSCs depending on different independent variables.

Parameter Estimates								
Knowledge for SFSCs a	B	Std. Error	Wald	df	p value	Exp(B)	95% Confidence Interval for Exp(B)	
							Lower Bound	Upper Bound
Strong to very strong competencies Age=1	1.402	0.365	14.795	1	0.000	4.065	1.989	8.306
Age=2	0.848	0.312	7.384	1	0.007	2.336	1.267	4.306
Age=3	0ᵇ	.	.	0	.	.	.	.
Experience=1	-0.166	0.283	0.345	1	0.557	0.847	0.487	1.474
Experience=2	-0.486	0.288	2.852	1	0.091	0.615	0.350	1.081
Experience=3	0ᵇ	.	.	0	.	.	.	.
Region=1	0.057	0.292	0.039	1	0.844	1.059	0.598	1.877
Region=2	-0.176	0.274	0.414	1	0.520	0.838	0.490	1.435
Region=3	0ᵇ	.	.	0	.	.	.	.
Capacity size=1	-1.112	0.406	7.502	1	0.006	0.329	0.148	0.729
Capacity size=2	-0.283	0.372	0.579	1	0.447	0.754	0.364	1.562
Capacity size=3	0ᵇ	.	.	0	.	.	.	.
Family labour force=1	1.010	0.532	3.607	1	0.058	2.746	0.968	7.788
Family labour force=2	-0.481	0.522	0.849	1	0.357	0.618	0.222	1.720
Family labour force=3	-1.186	0.520	5.196	1	0.023	0.305	0.110	0.847
Distance=1	1.317	0.233	31.860	1	0.000	3.731	2.362	5.894
Distance=2	0ᵇ	.	.	0	.	.	.	.
Product range=1	-0.347	0.269	1.662	1	0.197	0.707	0.417	1.198
Product range=2	0ᵇ	.	.	0	.	.	.	.
Added value=1	0.600	0.236	6.461	1	0.011	1.823	1.147	2.896
Added value=2	0ᵇ	.	.	0	.	.	.	.
Medium competencies Age=1	0.433	0.424	1.043	1	0.307	1.542	0.672	3.541
Age=2	0.362	0.356	1.037	1	0.309	1.436	0.715	2.885
Age=3	0ᵇ	.	.	0	.	.	.	.
Experience=1	-0.040	0.327	0.015	1	0.903	0.961	0.506	1.826
Experience=2	-0.277	0.335	0.686	1	0.408	0.758	0.393	1.461
Experience=3	0ᵇ	.	.	0	.	.	.	.
Region=1	-0.178	0.337	0.278	1	0.598	0.837	0.432	1.621
Region=2	-0.422	0.317	1.776	1	0.183	0.656	0.352	1.220
Region=3	0ᵇ	.	.	0	.	.	.	.
Capacity size=1	-1.285	0.458	7.881	1	0.005	0.277	0.113	0.679
Capacity size=2	-0.640	0.412	2.416	1	0.120	0.527	0.235	1.182
Capacity size=3	0ᵇ	.	.	0	.	.	.	.
Labour force=1	0.796	0.595	1.788	1	0.181	2.216	0.690	7.116
Labour force=2	0.615	0.563	1.191	1	0.275	1.849	0.613	5.578
Labour force=3	-0.998	0.600	2.762	1	0.097	0.369	0.114	1.196
Distance =1	0.396	0.274	2.098	1	0.148	1.486	0.869	2.541
Distance =2	0ᵇ	.	.	0	.	.	.	.
Product range=1	-0.238	0.326	0.534	1	0.465	0.788	0.416	1.492
Product range=2	0ᵇ	.	.	0	.	.	.	.
Added value=1	0.437	0.279	2.454	1	0.117	1.548	0.896	2.675
Added value=2	0ᵇ	.	.	0	.	.	.	.

a. The reference category is: Weak to very weak competencies. b. This parameter is set to zero because it is redundant. B-regression coefficient; df-degree of freedom: Exp(B)-exponentiated values of the regression coefficients

Source: Survey results. Authors' calculation.

Table 5 - Results of the multinomial regression for modelling levels of beekeepers' available time for SFSCs depending on different independent variables.

Available time for SFSCs a		B	Std. Error	Wald	df	p value	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Strong to very strong competencies	Age=1	-1.663	0.479	12.071	1	0.001	0.190	0.074	0.484
	Age=2	-1.987	0.453	19.234	1	0.000	0.137	0.056	0.333
	Age=3	0[b]	.	.	0	.	.	.	.
	Experience=1	-0.192	0.272	0.496	1	0.481	0.825	0.484	1.408
	Experience=2	-0.021	0.288	0.005	1	0.943	0.980	0.557	1.722
	Experience=3	0[b]	.	.	0	.	.	.	.
	Region=1	-0.420	0.277	2.288	1	0.130	0.657	0.382	1.132
	Region=2	-0.182	0.274	0.440	1	0.507	0.834	0.487	1.427
	Region=3	0[b]	.	.	0	.	.	.	.
	Capacity size=1	0.863	0.363	5.672	1	0.017	2.371	1.165	4.826
	Capacity size=2	0.784	0.311	6.375	1	0.012	2.191	1.192	4.028
	Capacity size=3	0[b]	.	.	0	.	.	.	.
	Family labour force=1	2.947	0.606	23.632	1	0.000	19.055	5.807	62.530
	Family labour force=2	1.030	0.594	3.006	1	0.083	2.801	0.874	8.975
	Family labour force=3	0.028	0.577	0.002	1	0.962	1.028	0.331	3.188
	Distance to consumers=1	0.579	0.247	5.515	1	0.019	1.785	1.101	2.895
	Distance to consumers=2	0[b]	.	.	0	.	.	.	.
	Product range=1	-0.108	0.270	0.161	1	0.688	0.897	0.529	1.523
	Product range=2	0[b]	.	.	0	.	.	.	.
	Added value=1	-0.001	0.228	0.000	1	0.996	0.999	0.639	1.562
	Added value=2	0[b]	.	.	0	.	.	.	.
Medium competencies	Age=1	-0.436	0.527	0.684	1	0.408	0.647	0.230	1.815
	Age=2	-0.857	0.499	2.949	1	0.086	0.424	0.159	1.129
	Age=3	0[b]	.	.	0	.	.	.	.
	Experience=1	0.083	0.292	0.080	1	0.777	1.086	0.613	1.924
	Experience=2	0.080	0.308	0.068	1	0.794	1.084	0.592	1.982
	Experience=3	0[b]	.	.	0	.	.	.	.
	Region=1	-0.375	0.299	1.577	1	0.209	0.687	0.383	1.234
	Region=2	-0.065	0.292	0.049	1	0.824	0.937	0.529	1.660
	Region=3	0[b]	.	.	0	.	.	.	.
	Capacity size=1	0.114	0.376	0.091	1	0.762	1.120	0.536	2.342
	Capacity size=2	0.223	0.322	0.479	1	0.489	1.250	0.665	2.349
	Capacity size=3	0[b]	.	.	0	.	.	.	.
	Family labour force=1	1.797	0.647	7.717	1	0.005	6.029	1.697	21.417
	Family labour force=2	1.894	0.618	9.405	1	0.002	6.649	1.981	22.312
	Family labour force=3	-0.905	0.643	1.986	1	0.159	0.404	0.115	1.425
	Distance to consumers=1	-0.621	0.249	6.204	1	0.013	0.538	0.330	0.876
	Distance to consumers=2	0[b]	.	.	0	.	.	.	.
	Product range=1	-0.026	0.292	0.008	1	0.929	0.974	0.550	1.727
	Product range=2	0[b]	.	.	0	.	.	.	.
	Added value=1	0.026	0.246	0.011	1	0.915	1.027	0.634	1.661
	Added value=2	0[b]	.	.	0	.	.	.	.

a. The reference category is: Weak to very weak competencies. b. This parameter is set to zero because it is redundant. B-regression coefficient; df-degree of freedom: Exp(B)-exponentiated values of the regression coefficients

Source: Survey results. Authors' calculation.

- Small-scale (Capacity size=1, Exp(B)=2.37, *p*=0.017) and medium-scale beekeepers (Capacity size=2, Exp(B)=2.19, *p*=0.012), in contrast to large-scale ones;
- Beekeepers with abundant labour (Family labour=1, Exp(B)=19.06, *p*=0.000);
- Beekeepers who do not perceive distance to consumers as a barrier or who perceive it as a small barrier to sale (Distance to urban and consumer centres=1, Exp(B)=1.79, *p*=0.019).

The strongest predictor in both logit models is Family labour in the first logit (Family labour=1 (Exp(B)=19.06, *p*=0.000). The Exp(B) value shows that beekeepers with abundant labour are 19.1 more likely to perceive Available time as a strong to very strong competency than as weak to very weak.

The presented results that show the significance of family labour force for obtaining high scores of both types of competencies correspond to the findings of Djordjević Milošević *et al.* (2021). Studying SFSCs in WBCs and Turkey, these authors found that, among other factors, lack of family labour for business commercialization and lack of affordable hired labour represented great barriers to a more successful participation of farmers in SFSCs (Djordjević Milošević *et al.*, 2021). At the same time, Malak-Rawlikowska *et al.* (2019) highlighted the significance of family labour in all supply chains, and stated that labour to production ratio was significantly higher in SFSCs than in other chains.

Economies of scale and large resource and production capacities of farms in Central and Eastern European countries are the key determinants of their sustainability and resilience, as well as integration in food supply chains (Borychowski *et al.*, 2020; Stępień *et al.*, 2022). Large production capacities also have an impact on the perception of Knowledge and skills for participation in SFSCs. Namely, our results showed that large-scale beekeepers were more likely to perceive Knowledge and skills required for SFSCs as strong to very strong competencies rather than as weak to very weak. Small production capacities of the respondents showed positive results only regarding Available time for direct sales.

According to our research, young beekeepers are more likely to estimate their knowledge and skills for SFSCs as strong to very strong competencies. Mastronardi *et al.* (2015) highlight that it is young entrepreneurs that are offered great possibilities by SFSCs when developing their activities. On the other hand, although our results state that older beekeepers are more likely to estimate Available time for SFSCs favourably, Mastronardi *et al.* (2015) doubt that these marketing channels might provide additional income to pensioners.

Rucabado-Palomar and Cuéllar-Padilla (2020) and Paciarotti and Torregiani (2021) state that, among other factors, logistic solutions are significant for farmers' success in SFSCs. Our results have just confirmed that distance to a consumer and urban centre which does not represent an obstacle or represents a small obstacle to honey sale through SFSCs significantly increases the likelihood for beekeepers to perceive both competencies as strong to very strong.

In general, in all the countries of the observed region, SFSCs are developed in an environment which is not very stimulating. All of these countries have a similar environment, as well as similar competencies and resource capacities of the beekeepers and consumers involved in SFSCs. These similarities involve: (a) dominance of traditional types of marketing channels (underdeveloped collective direct sales and community supported agriculture); (b) a prevalence of producers who make low investment in production certification, marketing and adding value to products; (c) no producer organizations, unorganized and unprotected beekeepers at the market; (d) poor application of the laws (on beekeeping, trade, food safety); (e) underdeveloped rural infrastructure and local infrastructure for product sale (local sales booths, fairs); (f) unstable national support measures incompatible with the EU and lack of national support measures for strengthening farmers' competitiveness through local markets and SFSCs (Bislimi, 2020; Borychowski *et al.*, 2020; Cane *et al.*, 2014; Čavlin *et al.*, 2023; Djordjević Milošević *et al.*, 2021; FAO, 2020; Haas *et al.*, 2021; Kotevska *et al.*, 2015; Mihailović *et al.*, 2020; Volk *et al.*, 2019).

However, it can be noticed that Serbia shows the biggest improvement in the field, which can be seen in the following: (a) with the support of FAO appropriate regulations were introduced in terms of placing small quantities of plant and animal food products (see FAO, Serbia-Country Profiles); (b) the Law on regulation of the market of agricultural products (Official Gazette R.S. No. 67/21) was enacted in 2021, which represents a prerequisite for the establishment of producer organizations and development of their operational programmes; (c) there is a large number of local and regional associations, as well as the umbrella organization named the Association of Beekeeping Organizations; (d) the Association of Beekeeping Organizations makes efforts to use the joint purchasing and distributional centre and developed brand "Naš med (srb.)/Our honey (eng.)" to improve collective placement channels for honey (Association of Beekeeping Organizations of Serbia, https://spos.info/); (e) social media marketing and various online platforms (Facebook and Instagram, blog sites) are used successfully for promoting and marketing of small-scale farmers' and beekeepers' products.

The limitation of the research lies in the fact that the obtained results are the reflection of the respondents' subjective opinions. However, this is typical for all social studies where objectivity is difficult to confirm. On the other hand, bearing in mind the need of science-policy interface, our empirical results can contribute to expanding the knowledge of national and local authorities about SFSCs and adjusting agricultural policies in WBCs to the EU's Common Agricultural Policy (abbr. CAP).

Future research should be directed at studying these channels in other sectors of agricultural products. It would also be significant to investigate the impact of various factors and prerequisites on SFSC development in the future. Some of these are producer organizations (which are yet to be established and recognized) and integration of agricultural producers with other participants of rural development (e.g. connecting with participants in the non-food sector, such as rural tourism). This is especially significant bearing in mind that associating

and networking of producers is not sufficiently developed in WBCs (FAO, 2020; Goszczyński and Knieć, 2011; Paraušić *et al.*, 2017). Future research should also examine using the Internet and social networks for direct sale (Elghannam and Mesias, 2019), as well as the adoption of technological innovation and information communication technologies, which are becoming more topical in the agricultural sector (Li *et al.*, 2022; Mozas Moral *et al.*, 2020). Additionally, it would be interesting to examine the conceptual framework of the beekeepers' behaviour. Is the beekeepers' focus on improving the profitability of production, profitability of SFSCs or contributing to ecosystem services?

5. Conclusion

Based on the example of the beekeeping sector in WBCs, it can be concluded that farmers' competencies for participating in SFSCs, related to communication and marketing knowledge and skills, as well as the available time for cultivating communication with customers and selling honey, are not an obstacle to selling honey through this marketing channel.

Out of the eight analysed predictors which can affect beekeepers' communication and marketing knowledge and skills for participation in SFSCs, the strongest ones were beekeepers' age and distance to urban and consumer centres. The odds ratios show that young beekeepers and those who perceive distance to consumers as a small or no barrier to honey sale are 4.1 times and 3.7 times more likely, respectively, to perceive their knowledge and skills for honey sale through SFSCs as a strong to very strong competency.

On the other hand, the available time for participation in SFSCs is more likely to be estimated as a strong competency by older, small and medium-scale beekeepers, those with abundant family labour and those who do not perceive distance to consumers as a barrier to honey sale. The strongest predictor is family labour, and the value Exp(B) shows that beekeepers with abundant family labour are 19.1 times more likely to perceive available time as a strong to very strong competency in direct sales.

All countries of the observed region have a similar environment in which SFSCs are developed. Consequently, the involved producers have similar competencies. Only Serbia has made certain improvement regarding the market organization of the products placed through SFSCs in terms of enhancing legislation, developing collective direct sales, using social media marketing and increasing the degree of beekeepers' organization.

Nevertheless, national rural development measures in all countries are unstable and incompatible with the EU CAP. They do not provide any support to farmers' participation in SFSCs, and this needs to be changed in the future. The support of public policies and strategies in all WBCs should be directed towards relationship drivers model in SFSCs, with emphasis on: (a) building and strengthening trust between the participants; (b) supporting farmers participating in these channels; (c) encouraging the associations of all participants in the beekeeping sector and in other fields (providing support to producer organizations, cooperatives, and also for vertical coordination); (d) making institutional improvements and applying the law more efficiently in the sector of food production, marketing and safety; (e) building rural infrastructure and sales infrastructure. Naturally, all this asks for acquiring national (budget) sources of financing and IPARD funds, ensuring local community support and continuing the adjustment of agricultural and rural development policies to the new EU CAP aims (2023-2027).

The results of this study could be used by policy makers when programming support measures within rural development programmes (at the national, regional and local level) intended for farmers' participation in local markets and short supply circuits. Programming of these measures could be facilitated by national bodies understanding the importance and role of SFSCs in sustainable rural development and acknowledging farmers' competencies for participating in them. In addition, the results of such scientific research, as well as the implementation of European projects dealing with the promotion of farmers in the local markets and short food supply circuits, e.g., "Smart-chain Project" (Corvo *et al.*, 2021), can help national and local authorities in WBCs to recognize the concept of SFSCs and their importance for improving farmers' competitiveness.

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