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PROXIMITY AND SOCIAL CAPITAL IN THE CONTEXT OF ARTISAN FOOD PRODUCERS: TOWARDS LOCAL CONSTATATIONS OF KNOWLEDGE AND INNOVATION

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Abstract

Embeddedness of artisan food markets in local socio-economic settings is apparent and decisive in individual procedures, development and change. The paper argues that geography and location patterns affect artisan food producers in the context of knowledge availability. A sample of 704 Polish food producers are mapped using GIS, and in conjugation with current literature on tacit knowledge social capital, the implication for artisan food producers innovation capabilities is discussed. Results show that artisan food producers are different in their location patterns depending on the type of offered products. Apparent differences in location patterns strongly indicate that artisan food producers experience differences in tacit knowledge availability.

Key words

tacit knowledge • innovation • social capital • GIS • artisan food producers

Introduction

Artisan food producers reassert foods with local and regional identity (Parrott et al.,

2002). By bringing traditional foods to market, artisan food producers vitalize history and show how tradition can be a resource and value for regions (De Massis et al., 2016).

Also, as the markets and customer preferences change, artisan food producers must adapt, showcasing how their unique knowledge of tradition is a source of innovation (Messeni Petruzzelli & Savino, 2014). By illuminating the availability of knowledge for artisan food producers through their proximity to other artisan food producers, this article adds to the literature and this sector's opportunity to innovate.

Sharing knowledge between producers enhances the innovative force within the sector of artisan food producers. As a sector heavily relying on craftsmanship, tacit knowledge is a large part of the knowledge base of artisan food production (Jackson, 2013; Lingham et al., 2022). Tacit knowledge is something that one cannot communicate explicitly (Nonaka, 1994). This implies that for artisan food producers to increase their pool of knowledge, they depend on access to new and external tacit knowledge, and the exchange of this knowledge is crucial for their continued growth. To transfer tacit knowledge, trust between people, relationships and networks must be built. It takes time and effort from both parties to share knowledge that inherently cannot be communicated explicitly.

Networking is a source of resources, knowledge, collaboration, and innovation and development within industries (Huggins & Johnston, 2009). As for artisan food entrepreneurs, formal networks serve as a way for producers to develop ties with other producers, creating informal networks (McKitterick et al., 2016). These informal networks are built on trust, acting to garner social and professional support for a business. As similar industries strive to innovate and develop, employees from different and sometimes competing firms exchange knowledge and experiences. This exchange increases the prevalence of innovation as networks enhance the ability to solve problems and improve creativity to create new ideas and solutions (Desrochers, 2001).

An effective way of sharing knowledge and building networks is through social capital. Social capital is easiest to develop with geographical proximity, as proximity allows for

frequent interactions and trust building (Mäkelä, 2007; Kokthi et al., 2021). The effectiveness of social capital to distribute knowledge depend on the context of that region, making it difficult to measure the effectiveness of social capital in general (Malecki, 2012). There is, however, no doubt that social capital are recognized as an asset to a region's innovative capabilities and economic development through knowledge diffusion and building of networks. This implies that the proximity businesses have to neighboring businesses, and the knowledge neighboring businesses poses, is critical to the ability to acquire new knowledge used in innovative processes (Chumnangoon et al., 2023).

Mapping artisan food producers' locations will enlighten the types of knowledge available to these producers by looking at the different types of producers close to one another. Having a range of different types of producers available in the same area indicates the knowledge available to the producers. A geographical area with various types of producers means that knowledge exchanges through networking and cooperation are more likely to be novel and add to the ability of producers to innovate (Samarra & Biggiro, 2008).

The purpose of this study is to look at how businesses' innovation capabilities are affected by location. To answer this question this article will map how artisan food producers are located in relation to one another, and use current literature to point out the implication of knowledge availability as a result of spatial proximity. This paper adds to the body of knowledge on innovative opportunities for artisan food producers by finding location hubs of producers and the differences in location patterns between them. In particular, the paper extends the knowledge offered by McKitterick et al. (2016) by looking at knowledge availability in a geographical context, as social ties and networking affect opportunities for innovation for artisan food producers. Policy makers will benefit from this research by being made aware of the strengths and weaknesses of artisan food producers based on their location, thus policy towards regional innovation

and development can more accurately target the needs of artisan food producers.

With this background, the research looks at Poland as the region in question. The population of artisan food producers who are members of the EU-organized network Culinary Heritage Network located in Poland is studied using Geographic Information System (GIS). The article is structured as follows: First, the literature on tacit knowledge, social capital, and geographical proximity is reviewed to examine how geographical components affect social capital, knowledge transfer, and trust for artisan food producers and their opportunity to innovate. The second section presents the collection of data as well as the method and procedures used. The results are then presented, interpreted, and discussed in conjugation with relevant literature. Reflections on limitations of this research, as well as directions for future research is proposed at the end.

The diffusion of tacit knowledge

Tacit knowledge is knowledge that is not or cannot be written and communicated explicitly, being highly contextual and personal (Polanyi, 1966; Nonaka, 1994). Hau and Evangelista (2007: 1154) define tacit knowledge as "(...) knowledge which is intuitive, unarticulated, non-verbalized or even non-verbalizable". This is opposed to explicit knowledge, which is codified with universal acceptability. Therefore, explicit knowledge can more easily be transferred between people, e.g. through manuals or documents. Kikoski and Kikoski (2004) claim that all knowledge is either tacit knowledge or builds on tacit knowledge, which implies that explicit knowledge has been through a process of tacit knowledge being made explicit. Nonaka et al. (2000) present a circular model of the evolution of knowledge. As tacit knowledge can be explicit, so can explicit knowledge become tacit through internalization. Knowledge internalization leads to procedural power and mastery and increases the intention to share knowledge (Wipawayangkool & Teng, 2016).

A comparative study of the IT sector in Poland and the USA finds that internalization of knowledge increases tacit knowledge sharing, impacting incremental innovation amongst workers in non-R&D positions (Kucharska & Erickson, 2023). Using the examples of companies in the leather, glass, and furniture industries, Temeltas and Kaya (2021) reveal that artisans use tacit knowledge in collaboration with designers to develop new products. This development is also part of the companies making explicit knowledge from the tacit form that the craftsmen possess.

Considering the qualities of tacit knowledge, especially the difficulty in coding or structuring it, a justified question arises regarding the possibilities of sharing and diffusing this type of knowledge. In general, knowledge and innovation diffusion are encouraged by several factors that relate to society, institutions, businesses, and the knowledge sector (Janczewska, 2013). The exchange of tacit knowledge is more complex than the exchange of explicit knowledge. Moreover, while economies and businesses grow, the importance of tacit knowledge (often referred to as know-how and acting as the selling point for many products and services) is also increasing. Present or future tacit knowledge forms the basis of the competitive advantage creation of a company. Parolin and Lucia (2014) illustrate how the interaction between two craftsmen leads to new knowledge creation and innovation through the example of the Brianza wood and furniture district, showing the complexity of tacit knowledge exchange.

Haldin-Herrgard (2000) indicates some methods suitable for tacit knowledge sharing: apprenticeship, direct interaction, networking, and action learning, thus underlying the face-to-face element in those activities. While place and distance are essential in knowledge diffusion because the closeness to the source of knowledge makes it easier to acquire it, it is also true for the social space (Cowan, 2005). Personal contacts such as face-to-face meetings and social networks facilitate knowledge flow regarding time effectiveness and knowledge

quality. The quality of tacit knowledge diffusion is based on existing network ties among companies (Singh, 2005). The stronger the relationship between two firms, the greater the extent of tacit knowledge transfer between them (Tamer Cavusgi et al., 2003). Additionally, close relations between business partners will act as stimulants for detecting knowledge gaps and help fill them with new solutions or inventions.

As craft industries heavily rely on tacit knowledge, developing the knowledge base depends on collaboration and interaction. Collaboration must be properly facilitated, as interaction and knowledge transfer barriers can hinder development. According to Szulanski (2003), barriers to transferring knowledge include the sender of knowledge being afraid of losing their ownership of knowledge, the receiver not being able to absorb the knowledge being shared, and difficulty in the relationship between the sender and receiver. These barriers can be overcome by a supportive culture and structure, facilitating space and opportunity for verbal transfer of knowledge (Hall & Sapsed, 2005).

Among several ways geography affects knowledge, Howells (2002: 873) underlined that the knowledge set of an individual is influenced by human interactions, which in turn are shaped by place and distance. This can be perceived as a two-way process in which the transfer of knowledge and the presence of social interactions, together with the consequences that unfold from them, are a reciprocal phenomenon that benefits both the giver and the recipient. According to a study performed by Ganguly, Talukdar, and Chatterjee (2019), among Indian industry representatives, different forms of social capital positively affect tacit knowledge sharing, leading to a superb quality of knowledge and innovation capability. Although tacit knowledge is noticed in organizations as an asset, past studies also point out that this knowledge is difficult to code and, thus, more challenging to manage and transfer (Haldin-Herrgard, 2000). This difficulty stems from the fact that tacit knowledge is accumulated

mainly through experience, reflection, internalization, and personal talents. Furthermore, while explicit knowledge can be stored throughout different media (i.e., printed and electronic), tacit knowledge is bonded with the individual.

Transfer of tacit knowledge is highly dependent on social capital stocks. Social capital is an asset based on individuals' relations and interactions with surrounding communities (Putnam, 1995). Coleman (1988) describes how close relations create trust, facilitating mutual benefits between members of networks. Trust is a core mechanism for building social capital and is required for future reciprocation, as the sender needs to exert efforts into transferring tacit knowledge. Close and frequent interactions between firms benefit more significantly from sharing tacit knowledge (Tamer Cavusgil et al., 2003). As Anderson and Jack (2002) describes social capital, it is a process of bonding, creating conditions for the exchange of knowledge between people. Social capital cannot be understood as an individual possession, but something shared between people, in communities, and in networks. These communities and networks all benefit from the process of producing social capital, increasing economic performance and development (Svendson & Sorensen, 2007; Giaccaria, 2009). This ties regional innovation with communities and networks that are able to facilitate collective learning through social capital, networking and cooperation (Asheim et al., 2007).

The exceptionality of artisan entrepreneurship

Artisan entrepreneurship is a growing phenomenon (Ratten et al., 2022). As interest in handcrafts and the "roots" of culture increase, more and more people are turning towards artisan crafts, which include physical objects and intangible cultural heritage. Artisan food producers are carriers of tradition and heritage and developers with business growth and commercial interests. They articulate strong bonds to tradition, heritage, and

place, as shown by their produce (Brulotte & Di Giovine, 2014). The uniqueness of artisan production refers to the inherent use of traditional methods, ingredients, and knowledge attached to a place in time within the context of business activities (Ratten et al., 2022). The combination of heritage and business adventures demands artisan producers to balance their lifestyle, tradition, and community while pursuing commercial goals (Tregear, 2005). This balance between lifestyle and commercial motivations distinguishes artisan producers as unique economic actors. Enhanced understanding of the nature of artisan producers is thus required to recognize their function within society.

While commercial goals and ventures can co-exist and, to some extent, enhance, the pursuits of artisan food producers' independent, community, and lifestyle-based goals are a challenge. In the face of growing competition and stagnating consumer demand, these different goals can potentially lead to opposing considerations within the decision-making process. These considerations, unique to artisan production, enhance the general view of business ventures and entrepreneurship.

The exceptional character of artisan entrepreneurship results partly from the practical experience and "know-how" being significant elements of the total knowledge pool required in this type of activity. Artisan and craft activities permanently require the use of a combination of explicit and tacit knowledge. Artisan production widely depends on tacit knowledge (Shils, 1981; Venkitachalam & Busch, 2012). The knowledge of handcraft and the creative combination of methods and ingredients make the knowledge inherently expensive to acquire, reproduce, and transmit to others (Nonaka et al., 2000; Harlow, 2008). This is seen, e.g. in how apprentices spend time and recourses learning from a master before they can say they have adequately mastered the artisan craft. Another example is how food producers adapt knowledge of production to their local environment (Beckford & Barker, 2007). Soil and climate is different across areas, and food producers

are required to accommodate the conditions in which they are located. This implies that knowledge of production are unique to each local area, and cannot be transferred from location to location without producers changing and adapting new knowledge to their own circumstances.

The difficulty of transferring this specialized knowledge is a source of challenges as well as rewards. Tacit knowledge is required to produce exclusive products within crafts, allowing firms to exploit financial gain from this knowledge and benefit from the investment into training (Messeni Petruzzelli & Savino, 2014). The difficulty combined with financial gains makes tacit knowledge extremely important for the industry. This implies that the effort, time, and cost of transferring tacit knowledge are valuable and required for businesses to thrive and grow (Goffin & Koners 2011).

The benefits makes it worthwhile for entrepreneurs to invest the time and effort to build social capital. Social capital does not travel well, as the process depends on long term interaction, local culture, and context (Malmberg et al., 1996). This means that social capital is easier to achieve with spatial proximity. Entrepreneurs therefore has an opportunity to benefit from participating in meeting and network building with their neighbors. Yet, social capital are not dependent on spatial proximity to facilitate learning. As firms internationalize they extend their network and inter-firm collaboration beyond their location (Cappellin, 2004). Bridging social capital is the type where people have access to distant colleagues and associates, and is the type of social capital that brings in diverse knowledge (Woolcock, 2004). Bonding social capital, on the other hand, have less chance of bringing in new knowledge. It's easier to develop and maintain relations with close family, colleagues, and neighbors, but this type of contact seldom bring about new knowledge that can be used in innovations. These networks reinforce old knowledge, creating a lock-in effect (Ben Letaifa & Rabeau, 2013). In fact, too much bonding social capital can prevent newcomers accessing a network,

stifling opportunities for knowledge diffusion (Florida et. al., 2002). The conclusion is that while special proximity can work as a conduit for social capital in a region, it can also foster social capital that is harmful for innovation processes. Regions are most served by having active processes of building social capital, while at the same time preventing the "glue" between actors becoming too strong, thereby hindering development.

Access to knowledge is imperative for innovative performances. Several aspects surrounding the flow and availability of tacit knowledge for artisan food producers have been identified, where local conditions are central for building social capital and networks. However, research is needed on what type of tacit knowledge is available to artisan food producers through these avenues of knowledge flow. This paper contributes to this gap by looking at the locations of artisan food producers and their production types relative to one another. The answer to this question contributes to the current literature on tacit knowledge and innovation for artisan food producers by looking at the availability of these knowledge producers that can contribute to innovation through social capital.

Benefits of proximity

Previous studies showed that geographical, institutional, cognitive, social, and organizational proximity foster the availability and diffusion of knowledge (Boschma, 2005). Geographical proximity refers to the spatial and physical distance between actors. A shorter distance between economic actors brings people together, fostering the exchange of knowledge between these actors. Other proximity dimensions, such as organizational, cognitive, social, and institutional, foster knowledge diffusion. Organizational proximity refers to relations shared between actors in an organizational arrangement. This includes networks not dependent on physical proximity, facilitating knowledge diffusion between members. Cognitive proximity looks at the type of knowledge actors possess and

the accessibility of that knowledge to other actors. Standard references like technical language, understanding, and shared expertise facilitate the absorption capacity of knowledge between entities. Trust between actors is defined in social proximity, as friendship, kinship, and shared experience that facilitate the diffusion of knowledge (Molina-Morales & Martínez-Fernández, 2010).

Additional elements facilitating cooperation and knowledge exchange between organizations are shared habits, routines, established practices, rules, laws, and norms, commonly determined as institutional proximity (Knoben & Oerlemans, 2006). Institutional proximity creates predictability of interactions between actors, enabling stable conditions for knowledge exchange.

In research on patents as innovation measurements, Marrocu et al. (2013) concluded that cognitive proximity plays a more vital role than geographical proximity, even outperforming social and organizational proximity in knowledge sharing. This result aligns with the idea that access to external information about technology increases a firm's ability to produce innovations. The authors pointed out that they haven't looked at the possible mediating effect of geographical proximity on cognitive proximity, meaning that it could play a significant indirect role in knowledge diffusion (Marrocu et al., 2013). This approach has been studied by Liu et al. (2021), who showed that geographical proximity positively increases the effect of non-geographical dimensions. Silicon Valley and Shenzhen City exemplify knowledge diffusion between companies with short geographical distances (Carlino & Kerr, 2014). The growth of competencies in the oil and gas industries in Campos Basin, Brazil, is another example of companies reaping benefits in innovation activities due to geographical proximity (Silvestre & Dalco, 2009). Spillover effects of knowledge are not connected directly to geographical location but to the ease of knowledge transfer between workers in different companies. These effects are not seen in firms located away from these knowledge hubs.

Regarding artisan food producers, the studies cited above show some limitations. For example, the use of patents as the measurement of innovative activity is not possible in the case of companies based on tacit knowledge, as they do not rely on patenting for their innovations (González-Álvarez & Nieto-Antolín, 2007). When looking at incremental innovation activity and tacit knowledge acquisition in the fish farming industry in South Banin, Houessou et al. (2023) found that social and organizational proximity affected company performance positively. Geographical and cognitive proximity had no significant effects. The lack of effects related to geographical proximity supports the notion that geographical proximity is not sufficient for knowledge diffusion. However, it does not mean that geographical proximity does not have a mediating effect on other measurements of proximity. The lack of cognitive proximity effects is contrary to other studies (Marrocu et al., 2013; Zhang & Wang, 2021) but could be explained by homogeneous knowledge shared between the group studied or conflicts surrounding space usage. This phenomenon resembles the lock-in effect, where the geographical proximity is at a level where the knowledge is shared and has little potential to promote innovation (Ben Letaifa & Rabeau, 2013). Access to new and exclusive knowledge through other proximities enhances knowledge diffusion and innovation activities (Molina-Morales et al., 2014).

Geographical proximity has a dichotomous significance as it is insufficient to promote knowledge diffusion (and can even hinder innovation activities). However, at the same time, it can play a promoting role in knowledge spreading (Chumnangoon et al., 2023). Through social proximity, geographical proximity enhances social capital available to companies. Further, by being localized in an area with higher levels of social capital, companies benefit from higher innovation abilities (Laursen et al., 2012). Geographical proximity, therefore, can play a significant role in innovative performance among artisan food producers. Available knowledge is crucial to whether geographical proximity promotes

an increase in tacit knowledge, networking, and social capital or hinders development.

Literature analysis raises the question of whether artisan food producers are located close to similar businesses or are located close to relevant businesses but with a different knowledge base. The former suggests that geographical proximity mediates social capital and knowledge diffusion, while the latter indicates that location can hinder it.

Methodology

The analysis was built on inventory surveys conducted by the authors, based on data downloaded from the European Culinary Heritage database and regional and local sources of information containing records on artisan food producers. The obtained results were summarized in tabular form using MS Excel - N-704. Next, initial data segregation and conversion were carried out, enabling the data to be implemented into GIS tools for final processing. The initial data processing revealed many errors when determining the coordinates, i.e., latitude and longitude. Due to the above, in some voivodeships, there was a clear need to identify the manufacturer by its detailed location, namely the postal code. This approach brought much better results and confirmed the position's accuracy on map of Poland.

In the second part of the analysis, initial processing of spatial data was carried out, where geostatistical interpolation of data related to producers and their products was used. The interpolation used to create heat maps based on GIS implemented Kernel Density function. The intensity map used here was created by assigning weights to individual points representing producers. The map was made using inverse distance weighting interpolation methods. The analysis also used the SPLINE tool with barriers, in which areas that were inactive in terms of non-functioning producers were additionally excluded from interpolation. This tool uses a mathematical function to estimate a value that minimizes the overall curvature of the surface, resulting

in a smooth surface that passes through the starting points. The density of food producers was determined by generating the center of gravity of their operations in each area. Based on the resulting layer, a heatmap-type interpolation was performed based on the proximity and density. For comparative purposes, an additional check was made on the results obtained using the inverse distance weighting method, which takes as the basis for interpolation the weighted average values measured at points that will be in the vicinity of the high-intensity point.

Results

This section shows combinations of concentration maps regarding three different types

of artisan food producers. The first type offers meat and fish products, the second offers dairy products, and the last offers vegetables, fruits, and wine products.

The map on top left of Figure 1 shows the concentration of artisan food producers offering meat and fish products. These types of producers are concentrated around certain areas, most notably north and south-east of Poland. There are also smaller concentrations of these producers in the north-east of the country. Noticeably, there are vast areas on the map with few or no producers of this type, indicated by the large white areas. This suggests that artisan food producers offering meat and fish products are located close to one another.

The map to the top right of Figure 1 shows artisan food producers offering dairy products.

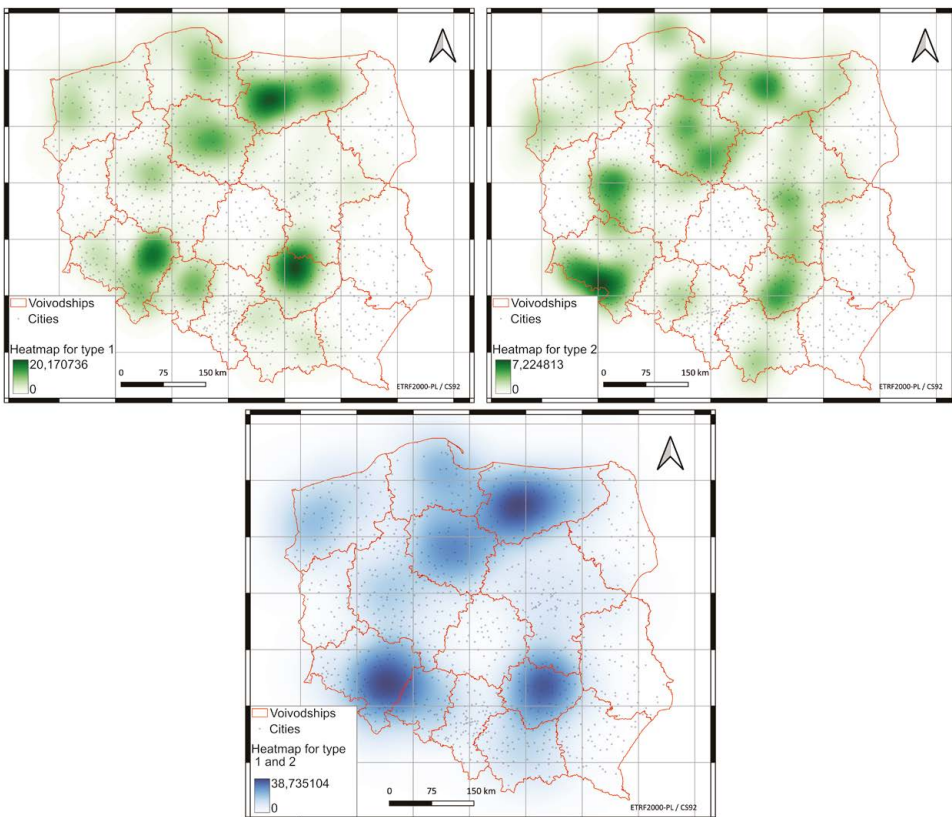


Figure 1. Concentration map of artisan food producers
Top left: meat & fish. Top right: dairy, bottom: combined.

A similar pattern can be observed – producers are located in the north and south of Poland. In addition, there are more areas with a weak concentration of these producers, most notably in the northwest and along the north-south axis. This indicates a mixture among dairy producers; some are close to one another, but exceptions are frequent.

The bottom map shows the concentration of artisan food producers offering meat and fish products combined with artisan food producers offering dairy products. There are three areas where the concentration is prominent, namely north, southeast, and southwest. There are some areas to the west where the concentration is weak, but large white areas on the map indicate that the

co-location of these two types of producers is common.

Figure 2 shows meat and fish producers in the top left corners and vegetable, fruits, and wine producers in the top right corner. Artisan food producers offering vegetables, fruits, and wine are more scattered than meat and fish or dairy producers. The exceptions are to the south of Poland, where a more significant concentration of vegetables, fruits, and wine producers in one area occurs.

The bottom map in Figure 2 shows a combined concentration map of artisan food producers offering meat and fish and artisan food producers offering vegetables, fruits, and wine products. This map also shows three primary locations with a higher concentration

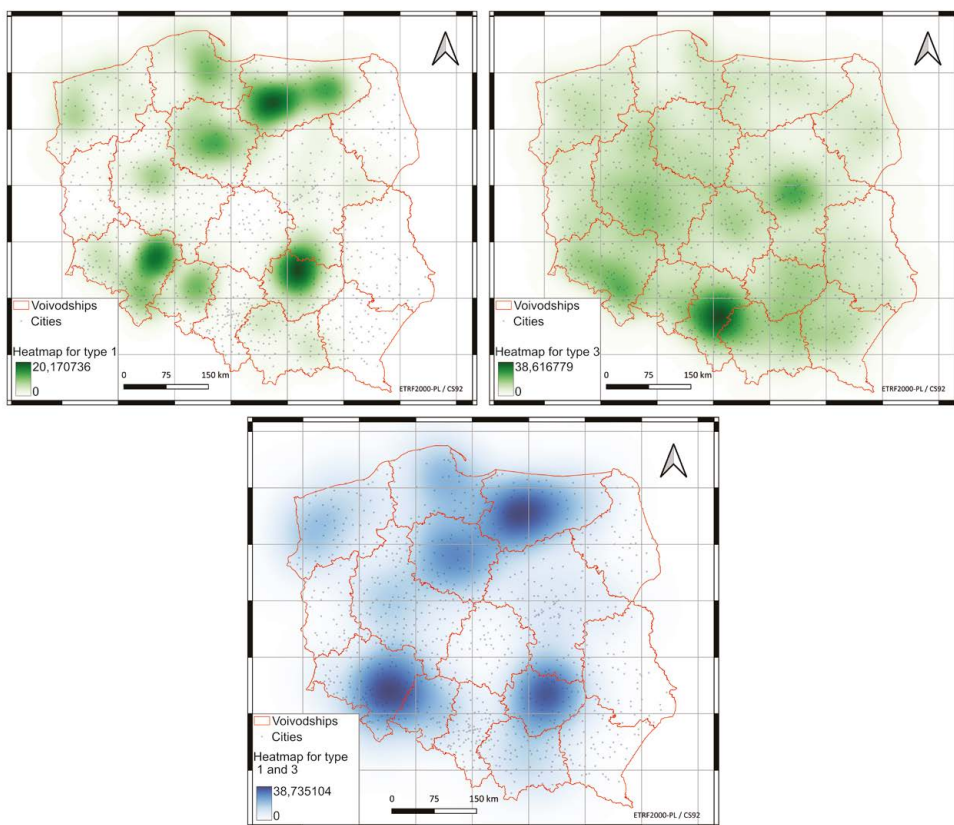


Figure 2. Concentration map of artisan food producers

Top left: meat & fish. Top right: Vegetables, fruits & wine, bottom: combined.

of producers. These locations are the same as shown in Figure 1.

Figure 3 looks at artisan food producers offering dairy products (top left) and producers offering vegetables, fruits, and wine (top right). The bottom map is a concentration map of these two types of producers. The bottom map shows a similar pattern to the previous figures, again indicating that for both dairy producers, as well as vegetables, fruits, and wine producers, these locations have a diversity of producers. The difference between the bottom concentration map and the map to the top right also highlights that vegetable, fruit, and wine producers are spread. Some are located in areas close to other types of producers, while others are

located away from similar as well as different types of producers.

The research results presented above show that there are differences in location concentration between studied artisan food producers. While meat and fish producers tend to be located close to one another, we see a completely different pattern for vegetables, fruits, and wine producers whose locations are not concentrated in proximity to one another. At the same time, the concentration of combined maps shows that all studied artisan food producers are located in the same areas. This includes vegetables, fruits, and wine producers. In conclusion, artisan food producers of a wide range of products are located in proximity to one another. However,

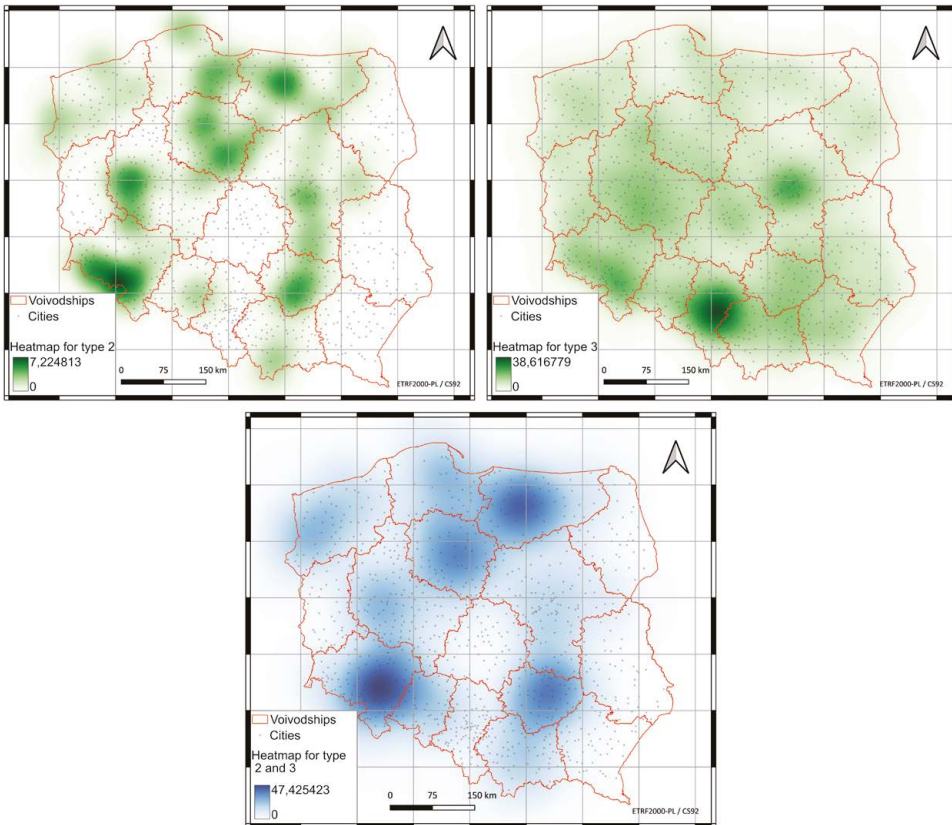


Figure 3. Concentration map of artisan food producers

Top left: dairy. Top right: vegetables, fruits & wine, bottom: combined.

there are significant differences in how these artisan food producers are located close to similar producers. In contrast, vegetables, fruits, and wine producers have vastly different location patterns than other artisan food producers.

Discussion

The difficulty of transferring tacit knowledge gives it high value (Messeni Petruzzelli & Savino, 2014). As craftsmen, artisan food producers depend on tacit knowledge (Lingham et al., 2022; Jackson, 2013), and the availability of such knowledge enhances their innovative capabilities (Ganguly et al., 2019). The transfer of tacit knowledge depends on, social capital, social relations and trust, which is easier to foster in person (Coleman, 1988; Tamer Cavusgil et al., 2003). Unique conditions like soil and climate makes knowledge not only tied to food producers production, but also to location. Hence, innovation activities for artisan food producers depend on relevant tacit knowledge available through social relations and proximity. Previous research shows how social capital and networking depend on geography, with informal and formal opportunities to form social relations depending on the distance between producers. The geography component works as a mediator for knowledge diffusion through social proximity. The relationship is not strictly positive for innovation performance, as there are examples of a lock-in effect and bonding social capital where producers form and maintain social relations with other producers who do not contribute to new knowledge. These relations actively prevent new connection from forming, preventing opportunities for knowledge diffusion. In these cases, geographic proximity to similar producers who do not possess new knowledge hinders the development of social relations that contribute positively to new knowledge and knowledge diffusion.

The aim of the undertaken research was to study the location relationships of the surveyed producers in relation to each other. This problem has been answered in two parts. The

first was to look at how artisan food producers are located in relation to similar producers, and the second was to look at how artisan food producers are located in relation to producers with different types of offerings. The answer to this question contributes to innovation literature by uncovering the geographical context for artisan food producers, thereby indicating their knowledge availability through social capital.

The results show that artisan food producers are different in their location patterns depending on the type of products that they produce. Producers of meat and fish products are to a large degree located close to one another. A different pattern occurs for vegetables, fruits, and wine producers. They are scattered throughout Poland, with the exception of a slightly more concentrated location to the south. As for dairy producers, their location pattern is between meat and fish on the one side, and vegetables, fruits, and wine producers on the other, with locations somewhat concentrated in certain areas.

We find these differences in location patterns again when looking at producers' locations in relation to artisan food producers with differentiated offerings. The concentrated locations of meat and fish producers coincide with the locations of producers with different offerings, setting them apart from the scattered vegetables, fruits, and wine producers. The single location hub for vegetables, fruits, and wine producers to the south does not coincide with the location of other producers, indicating that this location hub is primarily homogenous. Again, dairy producers have location patterns somewhat in the middle of the other two producer types, with some locating close to other artisan food producers with different offerings and some locating in areas with few other producers.

The vast differences in location patterns between different producers indicate different degrees of knowledge availability and innovation opportunities between producers. At first glance, the locations of meat and fish producers suggest they have homogenous knowledge available through networking

since they have the highest concentration of locations close to one another. When looking at the combined maps, however, it is clear that these producers have a pattern of locating close to different types of producers, with a clear preference for location hubs of artisan food producers in general. These locations can be seen repeated through the combined maps, even those where meat and fish producers are absent. The implication is that meat and fish producers have available artisan food producers nearby that offer a knowledge base different from their own, given the difference in offerings. The closeness to other producers and tacit knowledge makes it easier to acquire new knowledge through networking and social relations (Cowan, 2005), and the geographical proximity to different types of knowledge base mediates social proximity and social capital for innovative performances (Chumnangoon et al., 2023). The locations offer the opportunity to build trust and facilitate meetings by transferring tacit knowledge (Haldin-Herrgard, 2000), increasing the availability of valuable knowledge for growth (Messeni Petruzzelli & Savino, 2014).

In order to take advantage of their location patterns, meat and fish producers have to be aware of the possible pitfalls to knowledge diffusion and innovation performance. By avoiding lock-in effects and the potential negative effects of social bonding, meat and fish producers can actively seek or bring in new sources of information in their networks and communities, increasing their innovative performances and their regions economic development. Producer diversification alone cannot guarantee that producers take advantage of their close proximity, though it does make the process of knowledge diffusion easier than otherwise.

The location pattern for vegetables, fruits, and wine producers indicates a lower diffusion of tacit knowledge than we see for producers with different offerings. By not locating in location hubs for artisan food producers, vegetables, fruits, and wine producers miss out on possible networking and

knowledge diffusion compared to meat and fish producers. Another point is that vegetables, fruits, and wine producers are not located close to one another, meaning that these producers have less chance of suffering from lock-in effects seen with other producers (Houessou et al., 2023). These producers have the opportunity to acquire new knowledge through bonding across space, though it is harder to create the trust necessary to make these bonds fruitful.

Conclusion

Heterogeneity in location patterns indicates that the diffusion of tacit knowledge is not something that can be studied universally. The opportunity for innovation for artisan food producers depends on the type of offerings they produce. As networking, trust, and social relations depend on context, the apparent differences in location patterns strongly indicate that artisan food producers experience vast differences in tacit knowledge availability.

Consequently, initiatives for innovation and development in the sector of artisan food producers should be sensitive to contextual differences between producers. For example, Culinary Heritage (an EU initiative for networking among artisan food producers) should provide services depending on whether artisan food producers can find tacit knowledge within close proximity or if they need more global networking channels to increase their knowledge. If producers are in need of more knowledge through global networking, organizers has to be aware that tacit knowledge is location dependent, and should help producers adapt the new knowledge to their own unique conditions. Networks should also be sensitive to pitfalls of social capital, such as lock-in effects. For this reason networks have to constantly work to bridge producers who are not already established together in networks, allowing for the positive effects of social capital. For researchers, these findings indicate that geographical proximity has different effects, whether

mediating or direct, depending on the local context and producer group studied. The same applies to tacit knowledge diffusion, where context and artisan food producers' offerings within a location affect what type of knowledge is available and relevant for innovation. Researches should also be sensitive to whether networks have properly addressed the danger of becoming complacent and cut off from opportunities for acquiring new knowledge.

This study only looks at artisan food producers in Poland. This means that the study is limited regarding location patterns of artisan food producers in general. Studies in other countries and regions looking at location patterns in sectors can, in future research, cover this knowledge gap. Another limitation is the population of artisan food producers studied. As these artisan food producers are all members of the Culinary Heritage Network, this study has not included artisan food producers who chose not to be members of this network initiative. This loss of observations could affect the results and skew the location patterns presented in the paper.

Lastly, the locations of artisan food producers depend on historical and traditional elements. Certain areas have a stronger connection to certain foods and drinks, affecting branding and the concentration of certain types of producers. Future research can illuminate how historical and traditional bonds affect location patterns of artisan food producers and how those bonds affect the availability and diffusion of tacit knowledge within these areas. These recognized shortcomings could inspire future research agendas.

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Unless otherwise stated, the sources of tables and figures are the author's, on the basis of their own research.

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