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Assessment of the relationship between business network and geographical indication

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Abstract: The adoption of geographical indication (GI) in emerging countries, such as Brazil is growing over the last few years, pursuing the success obtained by global collective. A GI is related to the network of actors in its region of coverage. This paper aims to develop a business network maturity model (BNMM) to support networks to understand the factors influencing its development in order to evaluate the benefits obtained by cooperation and GI. The proposed framework consists of key factors: management, relationships, knowledge, process and services, that trigger 15 constructs of an assessment instrument. In order to provide an initial verification of the developed framework, the questionnaire was applied with three selected networks of wineries and brewers. Findings show that having a GI does not necessarily result in a deep use of it, and a process of collective learning and joint actions would improve the potential benefits obtained with it.

Keywords: geographical indication; business networks; maturity model.

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1 Introduction

Parmigiano Reggiano Cheese and Parma Ham are among the most renowned geographical indication (GI) products globally, produced by companies within two of the world's most prestigious business networks: the Consorzio del Parmigiano Reggiano and the Consorzio del Prosciutto di Parma (Arfini, 1999; Giacomini et al., 2013). While cheese and ham are made in other countries and even in other regions of Italy, none achieve the same level of reputation and acclaim as these two PDO examples. This distinction is due to their strategies of quality assurance, the use of a collective brand, and coordinated efforts within their respective business networks.

Among the forms of business arrangements, business networks are those defined by formal and long-term collaborative agreements, whereby companies establish a joint purpose and form of relationship governance to achieve common goals and generate competitive advantages (Mandell et al., 2017; Verschoore et al., 2016).

GI is a strategy to differentiate and add value to products in national and international markets by guaranteeing the collective intellectual property of names linked to their territories of origin. Since 2012, Brazil has experienced significant growth in this area, reaching 66 GIs by 2021 and submitting a record 18 proposals to the National Agency of Intellectual Property (INPI) in 2020 (INPI, 2022). In contrast, the European continent and other developed countries have been engaging in this practice for decades (Vieira and Lourenzani, 2015), accounting for 90% of the nearly 10,000 GIs recognised worldwide (Portal da Industria, 2020).

According to Török et al. (2020) around 60% of the producers of a GI protected product belong to a cooperative. They argue that building a network of producers and external actors, as governmental and research institutions, is crucial to regional development. The characteristics and accomplishments of a network are potentially related to the success and benefits obtained with a GI, raising the need to analyse and measure its evolution process to maximise the results of joint action (Roth et al., 2012). This includes investigating how activities, objectives, skills, and management change over time (Mandell et al., 2017; Verschoore et al., 2016).

The aim of this paper is to present the business network maturity model (BNMM), applied in three networks with GI or in process of obtaining. The identification of the maturity level can be used for measuring performance, recognising the current stage of the network and defining how to achieve higher levels of maturity (Lacerda and Von Wangenheim, 2018).

2 Literature review

Giacomini et al. (2013) identify the Parma Ham Consortium as one of Italy's most significant protected designation of origin (PDO) products. The consortium comprises small and medium enterprises that benefit from external economies derived from a common market, where relationships among firms are based on both competition and cooperation. The authors highlight that this inter-firm environment, coupled with a shared socio-cultural system, has fostered endogenous innovation, which has spread informally within the district, enhancing the overall level of technology. Undoubtedly, the Parma

Ham Consortium stands as one of the world's leading examples of successful business networks.

Although GI has a legal character, it is part of a larger universe called collective labels, which can be related to the product itself, a raw material, a production process or a quality pattern (Arfini, 1999). It also can be a symbol of an association label, which indicates that the product has been produced or marketed in compliance with the rules established and by the members of this association (Arfini, 1999).

GI is an old and established practice in European countries, as *Consorzio del Prosciutto di Parma* began the process of recognition of origin in 1963 (Giacomini et al., 2013). In Brazil the regulation came with the Industrial Property Law in 1996 (LPI – Law No. 9.279 of 14 May 1996) and the first Brazilian GI was granted to *Vale dos Vinhedos Wines* in 2002, required by the local association *APROVALE*.

Fronzaglia (2019) addresses the institutional environment as central to the GI process, as it is the one that enables the creation of arrangements, principles, roadmaps and resources. In this sense, obtaining a GI is related to the interaction between companies, institutions and culture of a region.

Török et al. (2020) state that GI has as potential benefits expanding market size, price and value aggregation due to the label of a premium product and local development. However, accordingly to their research there is a heterogeneity between GI outcomes for different products and also for similar products in different regions (Török et al., 2020). This finding is in line with the research of Vieira and Lourenzani (2015) that even though a group of producers have a GI established, most of them have difficulties for reaching market as controlled and labelled product.

Regarding networks, literature presents various cases of failure and dissolution, mainly generated by the lack of benefit or competitive advantages perceived by its members. These arrangements are in many cases constituted in order to solve specific problems and thus do not have the strength to structure and sustain themselves (Assens, 2003).

The identification of the maturity level can be used as an instrument for measuring performance, recognising the current stage of the network and defining how to achieve higher levels of maturity (Lacerda and Von Wangenheim, 2018). Through maturity models, it is possible to assess whether or not the organisation has the necessary competencies to achieve the desired results and objectives and to observe opportunities for improving business processes (Manuel, 2014).

As a structural basis for the present study, the capability maturity model (CMM) is used. This model is a precursor in the analysis of maturity and is widely recognised in academic literature. The original publication by Paulk et al. (1993) has garnered 2,900 citations, and their subsequent publication in 1997 has 1,850 citations, underscoring its significant impact and acceptance in the field.

Models developed based on the capability maturity model (CMM) should possess two main characteristics. First, they must have a defined set of disciplines and processes that can be used as measurement elements for assessing maturity levels. Second, they should focus on the continuous improvement of an organisation's processes, progressing from immature and random processes to those that are disciplined, mature, and effective (CMMI Product Team, 2006).

Braga (2019) proposed a multi-dimensional model to measure business network maturity, identifying five key factors crucial for evaluating network evolution:

knowledge, management, services, processes, and relationships. These factors significantly influence the dynamics and development of the network.

The management of a network comprises the organisational and managerial activities related to its development and operation (Agostini et al., 2015). Also, the establishment of an organisational structure to support its activities, protect members and the institution of external pressures, and explore more external and internal opportunities (Macciò and Cristofoli, 2017).

Between managerial activities there is also the formalisation of regulation, rights and duties of each member, the definition of the collective objectives and the procedures to be adopted, and the formal contract of the network with general rules (Verschoore, 2006).

Literature indicates that different levels and types of relationships reflect on different levels of network and firms' performance (Lin and Lin, 2016). In a network are underlined internal, between members and leadership, and external relationships, those with government, research institutions, support entities and other companies of the supply chain.

There are a number of potential joint activities to be developed in business networks, and especially when dealing with goods-producing networks, shared storage, the existence of internal standards, product quality certification and benchmarking can be developed (Ghisi and Martinelli, 2006).

Many agro industrial products become unique commodities that can be associated with the quality attributes of the product and the producing region, such as wines, cheeses, sausages or coffee (Jena and Grote, 2010). These products are produced in business networks that share a unique brand and in which quality is a main element (O'Reilly et al., 2003).

In a network of companies, knowledge sharing is one of the main elements that generate benefits through network action and that would not be generated in companies working alone (Dyer and Hatch, 2006). It is understood that the higher the level of knowledge sharing is, the better is the company's performance and the more innovative it is (Easterby-Smith et al., 2008).

Also, sharing knowledge in a network has the advantage that when a firm is exchanging and sharing its knowledge and resources with them, it is more able to recognise its capability, needs and store the acquired knowledge (Wang et al., 2018). Networks are also important in the process of enterprise innovation by facilitating the flow and sharing of knowledge and resources between them and between regions (Huggins and Thompson, 2015).

Business networks have first emerged as a defence strategy for small businesses against market oscillations and their low competitiveness. Recently they have evolved from a defensive profile to a proactive profile (Wegner and Padula, 2010), and the most notable feature of this evolution is the offer of services to members. The provision of services becomes one of the responsibilities of network management and aims to increase the competitiveness of companies and facilitate their adaptation to market changes (Wegner and Padula, 2010). Among the services offered stand out those of employees' capacitation and marketing, financial and technological consulting.

3 Research methodology

The guideline proposed by Bruin et al. (2005) is applied for the development of the framework for business network maturity model. The option to use it as a reference responds to three main reasons:

- it is a clearly systematised model that allows great repeatability;
- it can be generalised to any research domain;
- it generates distinguished models based on the defined application focus (Magdaleno et al., 2011).

The method consists in 3 phases. The first one consists in a literature review about the two topics under study: business network and maturity model. The exploratory research was carried out in the Scopus, Web of Science, ScienceDirect and Scielo databases, using as filters only articles published in English in Portuguese from 2000. The keywords ‘collaborative network’ or ‘enterprises network’ OR ‘business arrangement’ OR ‘business network’ OR ‘cooperation networks’ OR ‘interorganisational networks’ OR ‘business networks’ were used.

The second phase of the method is dedicated to the development of the model, beginning with the definition of five evolutive maturity levels, as advocated by the standard of CMM (Paulk et al., 1993), as presented in Table 1. The nomenclature and features of the maturity levels were established based on the five key factors that influence a network evolution (Braga, 2019).

At the first level of maturity (level 1) companies establish relationships between them, but there is no organisation or formalisation, showing itself as an agglomeration of companies together. Yet, at level 2 companies begin to really integrate and interact in a structured way, they are incorporated into a joint structure and the first evidence of a business network begins to emerge. At level 3 the companies, having already formed the network, begin to engage to develop the network and their joint activities. Level 4 consolidates collaboration within the network among member companies and good external relationships. Finally, in level 5 there is a network where there is collaboration between the members and its structure, already developed and mature, is sustainable, and so the network is concerned with continuing a process of continuous improvement.

Table 1 Maturity levels

<i>Level</i>	<i>Network features</i>	
1	Agglomeration	Companies establish relationships between them, but there is no organisation or formalisation
2	Incorporation	Companies begin to really integrate and interact in a structured way
3	Engagement	The companies, having already formed the network with joint activities
4	Collaboration	Collaboration consolidated between the companies and community
5	Optimisation	Sustainable network with continuous collaboration and improvement

Source: Prepared by the authors

Maturity can be considered as a latent trait, since it is an attribute that cannot be measured by empirical methods, and therefore, to become an object of study with a

scientific method, it needs to be expressed through other measurable attributes, constructs, that qualify it (Pasquali, 2009).

Also based on them and on the literature review, 15 constructs were established as measurable attributes for the latent trait of maturity, shown in Table 2. From these constructs a questionnaire was developed as a research instrument. It consists of 15 questions, and for each construct is presented the corresponding typical expected characteristics for each of the 5 maturity levels. The respondent must then choose, for each question, which of the 5 options is most appropriate for the network under study. The questionnaire is presented in the Appendix.

Table 2 Theoretical axes and measuring elements of the business network maturity model

<i>Key factor</i>	<i>Construct</i>
Management	Governance
	Formalisation
	Leadership
Relationships	Internal
	External
	Trust
	Commitment
Process	Sharing
	Standardisation
Knowledge	Collective learning
	Innovation
Services	Services
	Joint brand
	Territorial valorisation
	Human resources

Source: Prepared by the authors

For the calculation of the maturity level of a network, firstly it is estimated for each respondent j the average of the answers for the 15 items of the questionnaire. After is calculated the average response from the j respondents of a same network resulting in the estimation of its maturity level.

In the third phase the model validity is verified. The first evidence of validity is carried out with academic experts from the field who will judge if the model is compatible with the investigated reality and if there is some other pertinent element that was not highlighted in the research. This step was conducted with five Brazilian researchers among those with a major number of publications in the area of business networks according to the bibliometric data obtained in the bibliographic review.

Finally, the model was tested with three business networks of agro agro-industrial sector of Brazil to measure its applicability, i.e., if what has been proposed is actually measured, and repeatability (Bruin et al., 2005). In this step one semi structured interview with the presidents of each network was conducted and the questionnaire was applied with the associate members, in order to analyse possible differences between the perceptions of leadership and members.

These steps were conducted in loco at two winemakers' association headquarters and one micro brewer association: PROGOETHE, APROMONTES and ACASC. The choice of these networks for study is a non-probabilistic convenience sampling, selected for being more accessible to researchers (Oliveira, 2011).

4 Results and findings

The first application of the developed maturity model was carried out with the association of producers of the Goethe Grape Valleys (PROGOETHE), during the meeting of PROGOETHE members and counted on seven respondents.

PROGOETHE is based in the city of Urussanga, Santa Catarina state, Brazil, was founded in 2005 with the main objective of promoting the union between Goethe grape growers and winemakers in order to create the image of a noble and unique product, recognised both nationally and internationally (Vieira and Pellin, 2015).

Since its establishment, the members began the process of recognition of the quality, typicality, traditionalism and exclusivity of the Goethe grape wines with the request of a GI (Vieira and Pellin, 2015), granted to the group in 2012 with the support of entities of the government and institutions of research.

Currently the PROGOETHE association has seven associated wineries, as well as members of tourism, gastronomic and grape producers' sectors, totalling 20 members. Members of the Agricultural Research Company of Santa Catarina state (EPAGRI) and Urussanga City Hall also belong to the association, composing the triple helix (Etzkowitz, 2008).

The second application of the developed maturity model was carried out during the meeting of APROMONTES members and counted on ten respondents. The Altos Montes Wine Producers Association (Apromontes) was founded in 2002 and is headquartered in the municipality of Flores da Cunha, Rio Grande do Sul, and also includes producers in the neighbouring municipality of Nova Pádua, Rio Grande do Sul. Altos Montes refers to the region's topography, which has points with altitudes greater than 800m (Tonietto and Falcade, 2013).

The group obtained the Indication of Origin of High Wines (IPAM – Indicação de Procedência dos Altos Montes) in 2012, with the support of Embrapa (Brazilian Enterprise of Agrícola Research) and the University of Caxias do Sul (UCS). The seal is granted only to members of the association after the approval of the Regulatory Council of Apromontes.

The association also sought to develop wine tourism in the region combining wine tasting and service infrastructure and Italian traditions and modernity. Regarding external relationships there are partnerships with support entities as the municipal government of Flores da Cunha and Nova Padua, University of Caxias do Sul (UCS) and Embrapa, but none of these entities have management positions in the association.

The third application of the developed maturity model was carried out with ACASC – Associação de Cervejarias Artesanais de Santa Catarina, a micro brewers association created in 2008 and that brings together 31 members in the German colonisation region of Santa Catarina, centered in the city of Blumenau (Ristow et al., 2020). The group doesn't have a GI but have actions to implement a collective brand, as the creation of the Brewery Routes of the State of SC in conjunction with the State Secretariat of Tourism

and the production and dissemination of the first originally Brazilian style of beer, ‘Catharina Sour’ (Ristow et al., 2020).

In Table 3 is presented the results obtained with the application of the questionnaire with the three business networks.

Table 3 Results obtained with questionnaire application

<i>Key factor</i>	<i>Construct</i>	<i>ProGoethe</i>	<i>Apromontes</i>	<i>Acasc</i>
Management	Governance	5	3	3
	Leadership	3	5	3
	Formalisation	4	4	4
Relationship	Internal	3	4	2
	External	5	4	4
	Trust	4	5	2
	Commitment	4	5	2
Process	Sharing	3	4	1
	Standardisation	5	5	1
Knowledge	Collective learning	1	1	3
	Innovation	1	1	2
Services	Services	1	2	1
	Human resources	1	1	1
	Joint brand	5	3	2
	Territorial valorisation	5	5	3
<i>Maturity level</i>		<i>3.2</i>	<i>3.4</i>	<i>2.2</i>

The level of maturity reached by APROMONTES and PROGOETHE is 3 – engagement. At this level, according to the theoretical hypotheses developed, the network is well structured and formalised, and members become engaged in its development, with greater commitment to joint activities and collective goals. The leadership stimulates and makes movements with the goal of creating an environment of trust and commitment, necessary for collaboration. As for ACASC level of incorporation (2) was obtained, in which companies begin to really integrate and interact in a structured way.

Services and process key factors are those in which there is a higher difference between the results obtained within the studied networks. In fact, there is a consolidation of two distinct clusters, based on the average level obtained, one with APROMONTES and PROGOETHE and the other one with ACASC. These results are aligned with the realities presented by the groups, ACASC has as main differences regarding APROMONTES and PROGOETHE, an earlier establishment and the absence of a GI.

GI is a major determinant in process key factor, as standardisation of process is what leads to a quality pattern as seen in many protected products (Arfini, 1999), as for example many wines that have as shared feature its process of production. It also influences the services that are offered for the members, as collective brand and territorial valorisation. In this sense, having a GI influences positively in process and services maturity levels.

There is a significant difference between management key factors, which can be related to the age of the three networks, as the older ones are better developed in management aspects when compared with the younger one.

Particularly for ACASC, it can be seen how trust and commitment influences internal relationships, constructs badly graded for this network. Literature indicates that commitment and trust are among the main factors for sustaining an interorganisational relationship (Castro et al., 2011). However, they are not an element of natural presence in networks, so must be cultivated by the leadership (Agranoff and McGuire, 2001; Klijn et al., 2016).

The weak point for all networks in this study is knowledge. Although knowledge and collective learning are highlighted in the literature as the main contribution of networks for the enterprises (Pekkola et al., 2013), empirical results show that this aspect is not well developed or pursued by networks.

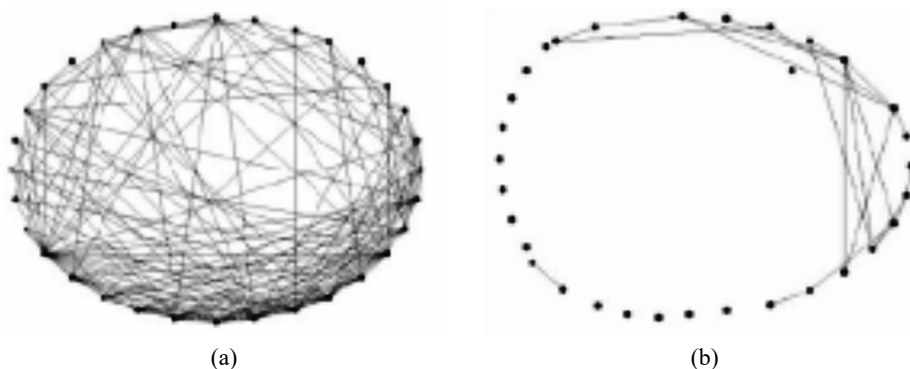
At PROGOETHE, the members reported that until they had a partnership with a local university, they conducted training courses and participated in scientific and academic events. However, after the end of the partnership these initiatives were interrupted, although they were important for the development of the companies and the association.

Unlikely, at APROMONTES knowledge was never promoted by the network's leadership, despite being one of its formalised missions. Informally there is constant exchange of information between members regarding sales, new technologies for the sector and the investments they are making in each company. The network's president explained that knowledge promotion is not prioritised because each winery employs highly specialised and professional staff, making it an issue handled individually.

ACASC demonstrates better results in the knowledge key factor compared to other networks, although it still presents a low grade in this area. Despite never having had a partnership with research institutions or universities, the association has motivated and supported initiatives for product innovation and facilitated exchanges for collective learning. These efforts have primarily focused on productive processes and quality controls among the members (Ristow et al., 2020).

Giuliani (2007) carried out empirical research in three winery clusters (Colline Pisane, Bolgheri and Colchagua) and obtained as a result that the links of knowledge exchange are smaller in number and intensity than the business links for the three cases studied, as shown in Figure 1.

Figure 1 (a) Networks of business and (b) knowledge *conhecimento* at Colline Pisane



Source: Giuliani (2007)

The discussion on knowledge within business networks leads to three hypotheses:

- H1 Knowledge is not collectively addressed within networks but is perceived as an individual concern for companies.
- H2 Knowledge sharing is an informal process that actually happens in networks, but it was not captured by BNMM.
- H3 There is a positive relationship between external relationships with research and high education institutions and knowledge sharing in business networks.

To examine this hypothesis and further understand other aspects of BNMM, we used secondary data from the study by Giacomini et al. (2013) of the Parma Ham Association. The insights provided in their study were used to empirically observe the growth of the BNMM-based Parma Ham network. Although this approach can lead to an approximate analysis, it is a valuable method for gaining insights into how the network grows at different parameters

This assessment can highlight differences between the establishment and utilisation phases of a GI, as well as differences between Brazilian and European agroindustrial networks. By examining the key factors and constructs of the BNMM, as outlined in Table 2, authors extracted relevant aspects from the work of Giacomini et al. (2013). This extraction process allows for a comparative analysis that may provide insights into the maturity levels of the Parma Ham Consortium and potentially test the hypotheses related to the knowledge key factor.

- *Management*: the network was created in 1963 and has since its foundation “catalyzed relationships between firms, production strategies and initiatives to guarantee Parma Ham reputation on European and international markets”. At the moment of the study, it had a central governance played by the members, formalised by Law No. 526/99 which lays down its functions as tutelage, enhancement and consumer information. Its leadership “is very active in supervising sales and has no hesitation in taking legal action against counterfeiting and abuse”. In governance it holds regular meetings where members are informed of strategy.

Conclusion: these statements give excellent marks in terms of governance, formalisation and leadership.

- *Relationship*: there are a series of direct and indirect relationships in the network that “can be classified as economic, social, technical, logistic, administrative, informational, legal or organizational, etc.” (Håkansson and Snehota, 1995 apud Giacomini et al., 2013).

“At the same time, the close relationships between the different producers make up an informal network based on mutual trust and respect for guideline specifications. This mutual trust is very strong and enables a sort of social control which accompanies the formal supervision procedures of the consortium (as internal control) and the IPQ- Istituto Parma Qualità (as external control)” (O’Reilly et al., 2003; Mancini, 2003, apud Giacomini et al., 2013).

Regarding external relationships, “the new statutes take different roles into account; Article 1.1 allows for farmers, slaughterers, cutters and packers to join the consortium and contribute to its budget as well as themselves as the processors”.

Conclusion: internal and external relationships, trust and commitments are significantly attested by the researchers' claims

- *About process*: “the Parma Ham Consortium is closely linked to the IPQ, and although is independent operationally, it was set up by the consortium and other category associations. The IPQ has also capitalised the experience of the consortium in managing the supply chain and conformity with regulations dating from 1963. In a one-way link, the IPQ also carries out inspection and certification of supply chain firms. It checks firms. Compliance with the specification codes and is responsible for the marketing of identification labels guaranteeing authenticity and traceability, and checking documentation”.

Conclusion: standardisation is promoted by the network. There were no statements about process sharing.

- *About knowledge*: it is highlighted “an endogenous process of innovation which has led to a rapid spread and sedimentation of know-how and skills”. Numerous operators have sought solutions and remedies for problems in the production process and this has led to a widespread capacity for innovation (Mora and Mori, 1995, apud Giacomini et al., 2013).

Continuous technological growth is based on widespread processes of ‘learning by doing’ and ‘learning by using’ (Arfini and Mora, 1998, apud Giacomini et al., 2013) supported by research bodies such as the Stazione Sperimentale per Industria delle Conserve Alimentari.

The continuous interaction among producers, service companies, and research bodies has facilitated the rapid development of new solutions for the mechanisation of salting and refrigeration within the same area.

Conclusion: there is innovation promoted by the network and collective learning between members.

- *About services*: IPQ – Istituto Parma Qualità and with Stazione Sperimentale per l’Industria delle Conserve Alimentari render services to the consortium members.

In terms of territorial valorisation, “there is a direct link between product and area”. And for the collective brand, the author states that “they compete on the same market through big 30% price differentials” for similar products without the consortium mark.

Conclusion: services are offered by the network, there is a strong relationship with territorial valorisation and collective brand. There was no information about human resources.

Based on the aspects collected from Giacomini et al. (2013) it is estimated that the Parma Ham Consortium operates at a maturity level of 5, which is optimisation. The research conducted by Giacomini et al. (2013) provided detailed coverage of at least 13 of the 15 measurement elements.

The difference in maturity levels between the proxy made for the Parma Ham Consortium and our empirical findings with Brazilian networks underscores the potential of cooperation in Brazil. Despite being younger in years of foundation, Brazilian

networks are already reaping the benefits of joint action. This suggests a promising outlook for collaboration and collective growth within Brazilian networks.

Indeed, the findings also clarify the weakness observed in the knowledge key factor obtained in the study, as well as the hypothesis raised from the research. The features of the Parma Ham Consortium support Hypothesis 3, indicating a positive relationship between external relationships with research and higher education institutions and knowledge sharing.

This insight suggests a valuable opportunity for development in Brazil, leveraging the continuous contact between producers, service companies, and research bodies observed in the Parma Ham Consortium as a benchmark for knowledge and innovation triggers. By fostering similar collaborative relationships within Brazilian networks, there is potential for significant advancements in knowledge sharing and innovation, leading to enhanced competitiveness and growth within the industry.

5 Conclusions

The academic literature on networks of companies indicates the lack of studies that analyse its process of evolution with the aim of maximising the results of the network action (Roth et al., 2012). There are still scarce models that investigate how activities, objectives, competencies and management change throughout this process of evolution (Agostini et al., 2015).

The literature also addresses the importance of GI for the development of small and medium enterprises and consequent regional development, and that Brazil is experiencing a boom of GI recognition solicitations.

The present work presents a maturity model with the proposal to complete this research gap. A maturity model can be understood as a tool for studying and directing the continuous improvement of an organisation's processes, and achieving higher levels of maturity is linked to achieving better results throughout the organisation (CMMI Product Team, 2006).

From the application of the model in three-network business, two with GI and a third with a common slogan, to verify its applicability it was possible to prove that the model responds to its objective being possible to obtain a value of maturity level of the networks. The characteristics highlighted theoretically were verified in the empirical reality studied.

Another proxy was made to a well-known Italian consortium in order to allow for a benchmarking against the relatively younger Brazilian networks – which was established in terms of a diametrically opposite ranking with regard to the evaluations expressed by Italian and Brazilian networks – as well as on how to re-compose knowledge production through producers, service companies and research bodies.

The present contribution achieves a first step by providing a maturity model grounded in the available body of research on business networks. Future research could build upon this by verifying and advancing the maturity model through further case studies and formal empirical investigation, as well as refining its constructs and measures for larger groups and contexts.

Moreover, designing cross-cultural comparative studies that mirror one another, like the proxy done with the Italian consortium for this study, could tell us something about

the differences and similarities in the maturity and performance of the network between different geographies and sectors. This could serve as a means of benchmarking and provide a valuable opportunity to highlight best practices in terms of knowledge-sharing, innovation and network governance.

The future directions for this research would be a valuable contribution to the study of business networks, GIs and their implications for regional development and economic growth. Moreover, research in these directions could also be of use for practitioners and policymakers who aim to support collaborative networks and to achieve the aims of the UN Sustainable Development Goal.

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Appendix

Example of questionnaire to the theoretical axe services

		<i>Maturity model</i>				
<i>Theoretical axis</i>		<i>1 – Agglomeration</i>	<i>2 – Incorporation</i>	<i>3 – Engagement</i>	<i>4 – Collaboration</i>	<i>5 – Optimisation</i>
Services						
E12	Services offered	The network does not offer services	The network offers services in a timely and sporadic way	The network offers some services on an ongoing basis	The network offers various services such as consultancies, training, fairs and events	The network offers an increasing number of services and satisfies
E13	Joint brand	There is no development regarding the use of a joint brand	A joint brand starts to develop and recognition is sought (for example, geographical indication)	There is already a joint brand, but little used by members.	The chain has a strong alternative joint brand, backed by the high quality of products	The network brand is used more importantly than individual brands
E14	Territorial enhancement	There is no kind of territorial enhancement	There are movements towards the valorisation of the products of the region	Joint events related to regional culture are promoted	There is a unique regional brand for products	In addition to level 4, there is regional leadership, attention to other economic activities in the region