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Inter-organizational relationships involving SMEs: A bibliographic investigation into the state of the art

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ABSTRACT

The theme of inter-organizational relationships involving SMEs (SME IORs) has generated a relevant body of knowledge that has not been systematized yet. This article carries out a systematic literature review on SME IORs using bibliometric techniques, aiming to provide an overview of the main subfields of research and to identify promising paths for future research that can contribute to develop a more comprehensive body of knowledge around SME IORs.

Four factors of thematically connected research emerge, which represents the main subfields of inquiry within the field of SME IORs. Insights regarding the content of these topics, the different theoretical foundations of the literature on SME IORs, and potential paths for future research are discussed.

Introduction

It is widely recognized that small- and medium-sized enterprises (SMEs) play a fundamental role in the economy of many countries around the world. While showing high level of flexibility, informal communication and a flat organizational structure (Ngah and Ibrahim, 2009), SMEs also have some significant limits related to their dimension that restricts their ability to internationalize, innovate and cope with competitive and environmental pressures. To overcome these shortcomings, firms often complement their scarce resource base by engaging in different kinds of inter-organizational relationships (IORs) (Partanen et al., 2014). These efforts have been supported also by governments that have developed numerous policy actions targeted at promoting collaborations among SMEs worldwide (Lefebvre et al., 2014).

Alongside with the importance of the topic in the business world, the academic literature has registered an increasing amount of publications in management journals on the topic of SME IORs, resulting in an accumulation of knowledge spanning a wide range of organizational areas across different levels of analysis (Brass et al., 2004).

Even though some literature reviews have been conducted, they are focused either on the analysis of a specific IOR construct, as networks (Hoang and Antoncic, 2003), on particular organizational and managerial features, as leadership (Müller-Seitz, 2012), learning (Beeby and Booth, 2000), and proximity (Knoben and Oerlemans, 2006), or on a specific typology of IORs as IORs for research and development (R&D) (Büyüközkan and Arsenyan, 2012) and for logistics and transportation (Cruijssen et al., 2007). To the best of our knowledge, a comprehensive literature review dedicated to SME IORs has not been conducted yet. The rationale behind carrying out a literature review around the topic of SME IORs resides both on its practical implications, demonstrated by the increasing trend of IOR formation, and on the fact that SME IORs often have different peculiarities in comparison to IORs established among large firms. Indeed, SMEs and large firms have different networking patterns and this does not allow simply extending findings from studies of larger firms to the SME domain (Colombo et al., 2012). SMEs have in fact

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different abilities to in-source external knowledge in comparison to large companies, can allocate fewer resources for building and utilizing relationships, and often lack all the capabilities required to establish and manage their IORs. Furthermore, SME entrepreneurs may not possess all required network-related expertise and skills, which calls for the support of external entities compensating this lack (Agostini et al., 2015). Based on small firms facing numerous challenges in implementing collaborative strategy, different authors (e.g. Ariño et al., 2008) have focused their research specifically on the SME domain.

On such grounds, systematizing the often fragmented findings of the literature into a comprehensive body of organized knowledge that could both inspire practitioners and guide future research on the topic seems to be worth doing for both the academic and business worlds.

Accordingly, this article carries out a systematic literature review on SME IORs, aiming to provide an overview of the main subfields of research and, thus, unveil promising paths for future research that can contribute to develop a more comprehensive body of knowledge around SME IORs.

In this article, we use bibliometric techniques to provide a more objective alternative to qualitative reviews, because this method permits the aggregation of large amounts of bibliographic data. Bibliometric techniques introduce a systematic, transparent and reproducible review process, thus allowing researchers to map the research field without subjective bias.

This bibliometric analysis significantly contributes to the research on SME IORs by identifying and discussing the main subfields of research that have characterized the recent development of this quite fragmented literature and by providing interesting paths for future research.

In the remainder of the article, we first explain the details of the methodology we used to select and analyze the articles included in our sample. Subsequently, after briefly describing the selected data, we present the results of the factor analyses, as well as characterize the factors that represent the different subfields of research within the area of investigation. In particular, we outline their theoretical foundations and construct conceptualization, as well as summarize the main findings based on the specific topic of investigation. In the last section, based on factor discussion, we highlight opportunities and potential paths for future research for management and organization scholars.

Methodology

A bibliometric approach

A bibliometric analysis is performed with the aim to trace the state of the art of the field and identify its evolution. Bibliometrics can be defined as “the mathematical and statistical analysis of bibliographic records” (Pritchard, 1969) and are often performed with the aim of uncovering and articulating the underlying structure of a research field. The analysis of references and citations allows establishing intellectual linkages among documents, which lets scholars build structural images of a scientific field. The main advantage of bibliometric techniques, in comparison to narrative literature reviews which are subjected to bias by the researcher and often lack rigor (Tranfield et al., 2003), is related to the fact that they introduce quantitative accuracy into the subjective evaluation of literature. Indeed, they guide the researcher to the most influential works and to mapping the research field without subjective bias.

The first step of the research is the identification of the articles to be analyzed, namely the selection of the documents that can be truly considered as giving the contribution to the field of SME IORs (McCain, 1990). In the second step, bibliometric techniques are used to identify the main subfields of the theme. The following paragraphs describe these two steps in details.

Sample selection

A critical first step in discovering the underlying structure of a field is the identification of its intellectual core (McCain, 1990), which includes the articles that belong to the theme under investigation. To this purpose, we start the analysis with a wide dataset that is gradually reduced at subsequent stages. We initially identify the keywords to be used for the search in double-blind peer reviewed articles in Journals from the scientific database ISI Web of Knowledge. The keywords are selected taking into consideration the fact that a varied terminology[1] has been employed by the authors in order to refer to the topic under investigation. Consequently, following the work by Agostini and Nosella (2017), we combine the terms alliance, network, inter-organizational relationship,[2] partnership, collaborat* and cooperat* that are searched in the title in combination with the term SME[3] that is searched in the topic (i.e. abstract, title and keywords). These queries were performed in March 2015. This allows us to capture many forms of IORs involving SMEs.

Considering the scope of the analysis, we search for those terms in the articles published in academic journals in the Web of Science Research Areas named “business economics” and “operations research management science”, and written in

[1] In this area of research, there is not a shared and straightforward terminology identifying different types of IORs; as a consequence different terms are used to make reference to the same phenomenon (e.g., network or alliance) or the same term is used with different meanings.

[2] We search for every possible variation, i.e. inter-organizational/inter organizational/inter-organizational/inter organizational/interfirm/inter-firm/inter firm relationship.

[3] We search for every possible variation, i.e. SME OR “small company” OR “small companies” OR “small firm” OR “small firms” OR “small business” OR “small businesses” OR “small enterprise” OR “small enterprises” OR “small- and medium-sized” OR “small and medium-sized” OR “small and medium sized” OR “small- and medium-size” OR “small and medium-size” OR “small and medium size”.

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English, without temporal limitation. The application of these criteria provides us with 441 articles. We read the abstracts of these articles and, starting from the topic of our review that concerns the field of IORs involving SMEs, we exclude those articles that are not pertinent, as articles that deal with social networks (e.g. Facebook or LinkedIn), physical networks (e.g. ICT network), network analysis as methodology (e.g. neural network analysis), and networks not involving SMEs. Moreover, those articles assuming an intra-firm perspective are not included in the final sample, because they examine internal connections among different functions. Finally, the subject is narrowed to for-profit organizations.

After excluding these articles, 297 relevant articles remain, which represents the base of the subsequent analysis.

Bibliographic coupling and factor analysis

The bibliographic coupling technique was introduced by Kessler (1963) and represents one of the key historical antecedents of co-citation analysis. Based on the assumption that it is probable that two articles that have many common references are reporting on a similar research topic, the bibliographic coupling strength between two articles is defined as the number of common references cited by both articles. Therefore, two articles are related because they cite the same third one. The other common bibliometric method is the co-citation analysis that refers to documents which are related because they are cited together by several other documents; the relation is not established actively by the documents in question, but it is created by third documents referring to them. Co-citation analysis is adopted as the de facto standard in 1970s, and has enjoyed that position of preference ever since. However, only recently there has been resurgence in the use of bibliographic coupling that is challenging the historical preference for co-citation analysis (Jarneving, 2005). The choice of which method to employ depends on the goals of the analysis. The latest studies show that the accuracy of bibliographic coupling in representing a research front of a specific field is better than that of a co-citation analysis (Zupic and Čater, 2014; Boyack and Klavans, 2010) that is, instead, preferred when the aim is to map older articles and trace the knowledge base of those papers (Sternitzke and Bergmann, 2009). In this article, we adopt bibliographic coupling because we are investigating a specific field, i.e. SME IORs, whose publications have registered an increasing trend in the last years. Due to the fact that co-citation analysis fails to support current trends as it is not the current works that are mapped in co-citation analysis but the older ones (Sternitzke and Bergmann, 2009), bibliographic coupling is the most suitable technique to analyze this literature. Moreover, previous studies have examined the validity and accuracy of bibliographic coupling and suggested that it is more effective for topic clustering than other citation analysis methods (Yuan et al., 2015).

The main output of bibliographic coupling is a correlation matrix that quantifies the proximity between the articles in our sample; based on this type of information, articles are grouped into factors by means of a factor analysis (see Fig. 1). This allows us to identify the literature subfields in which sampled articles can be grouped; those articles are then carefully read and mapped in a structured spreadsheet including different fields, namely the purpose of the article, the methodology, the theoretical grounds, the alliance/network aim, partner size, and main results. This last step allows us to discuss the results obtained with the factor analysis and to identify paths for future research.

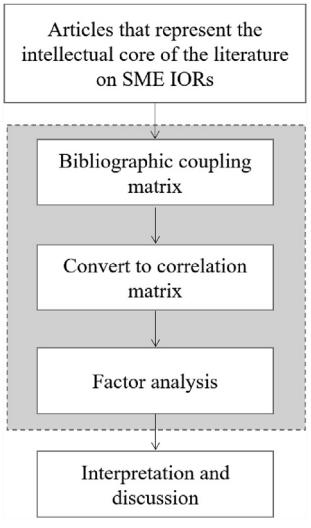

Fig. 1. Methodological steps of the bibliometric analysis.

Tools

Different tools are available for carrying out the different steps of a bibliometric analysis. In this study, following Fahimnia et al. (2015), we use BibExcel to convert data obtained from ISI Web of Science to a graph dataset where sampled articles are shown as nodes and citations are represented by the edges between the nodes. Indeed, BibExcel generates data files that can

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be imported to Excel, or any program that takes tabbed data records, for further processing, thus assisting a user in analyzing bibliographic data (Persson et al., 2009). For this reason, BibExcel supports the bibliographic coupling analysis. Then, the software SPSS is used to perform a factor analysis on the data of the correlation matrix generated by Ucinet on the basis of the squared matrix containing the number of common references between each couple of articles in the sample.

Data analysis

Factor analysis

As anticipated, the bibliographic coupling strength between two articles is defined as the number of common references cited by both articles, based on the assumption that it is probable that two articles that have many common references are reporting on a similar research topic. While carrying out the procedure using BibExcel, in the squared bibliographic coupling matrix, that contains the articles in the row and in the columns and the number of common reference in the cells, we set the minimum number of common references at one. This means that all articles that have at least one article in common with at least another article in the sample are retained. Then, once exported the squared bibliographic coupling matrix in Excel, we eliminate those rows (and respective columns) having more than 70% of zero values. This means that if an article has no common reference (which produces a zero value in the bibliographic coupling matrix) with more that 70% of the other articles, it is removed. This approach follows the widely adopted tendency to use thresholds to focus on articles closely related to each other, thus identifying the core of the literature on the theme of interest (e.g. Soranzo et al., 2016; Di Stefano et al., 2010). Moreover, imposing thresholds allows reducing the complexity of analyzing hundreds of documents, of course paying attention not to be too reductive, as different authors suggest (e.g. Vogel and Güttel, 2013). This procedure reduces the stock of articles from the 297 initially selected items to the 142 most interrelated ones, thus retaining the 51.5% of articles, which is in line with previous studies (e.g. Swoboda et al., 2011; Vogel and Güttel, 2013; Di Stefano et al., 2010). The updated squared raw data matrix containing the number of common references between one article and each of the others is converted to a correlation matrix based on Pearson's coefficient through Ucinet. Correlations, which are measures of relative document similarity, have the advantage that they take the coupling 'profiles' of these documents into account, instead of the absolute co-occurrence of references related to the frequency counts (Vogel and Güttel, 2013; McCain, 1990). This matrix represents the input for the factor analysis in SPSS. Principal component factor analysis is performed using Varimax rotation.

A four-factor solution is the results of a Scree Test to determine the number of extracted factors and the total variance explained is 76.7%. Specific criteria on factor loadings are established to identify which articles load on the different factors. More particularly, the articles which do not load on any factor (all factor loadings lower than 0.45) are eliminated while those articles that have only one factor loading higher than 0.45 are assigned to the respective factor. Those articles loading on more than one factor are excluded, a part from those that load on two or three factors but with a difference between factor loadings higher than 0.15 that are maintained, provided that they conceptually fit with the factor with the higher factor loading. This choice is supported by Hair et al. (1998) indication suggesting that articles can be assigned to a factor considering both the factor analysis results and conceptual foundation. This allows us not to exclude any pertinent article from the analysis. Fig. 2 provides a visualization of the identified factors, that hereafter will be called streams, that include the final 107 articles: 32 in Stream 1 (S1), 30 in Stream 2 (S2), 24 in Stream 3 (S3), 21 in Stream 4 (S4). Details on the results of the factor analysis are available under request.

Results: identification and analysis of streams

Before discussing these four streams in the following paragraphs, it is interesting to notice that journals where articles belonging to the four streams are published reflect each stream's content (see Table 1), thus providing further support to our results. Moreover, data regarding cohesion density, calculated as the ratio of realized links to all possible links within a group and reflecting the extent to which each stream of research pursues its agendas on common grounds (Vogel and Güttel, 2013), demonstrate the four streams are highly cohesive within each stream of research.

Stream 1 — SME strategic alliances

Articles in this stream mainly regard strategic alliance, a topic that, within this broad body of literature, seems to have mainly developed taking inspiration from a core of older articles (e.g. Gulati, 1995, 1998; Das and Teng, 1998) related to the topic of strategic alliance among large firms. Most authors in this stream agree on the definition of alliance, intended as a cooperative arrangement aimed at achieving shared goals, thus suggesting a deliberate and voluntary agreement characterized by some defined steps, namely formation, establishment and evaluation. Accordingly, the analysis of these specific steps in the context of alliances established among SMEs is one of the main issues investigated in this stream. As Table 2 exhibits, most authors focus on the formation phase (Rice et al., 2012; Marino et al, 2008; BarNir and Smith, 2002; Supphellen et al., 2002) and the decision to terminate or not the alliance (Bakker and Knoben, 2014; Lee et al., 2012; Yang et al., 2010; Pansiri, 2008). There is only one article that investigates the critical success factors of SMEs alliances along the development stages of an alliance; instead, there are some others which simply prove the consequences that establishing alliances has in the context of SMEs.

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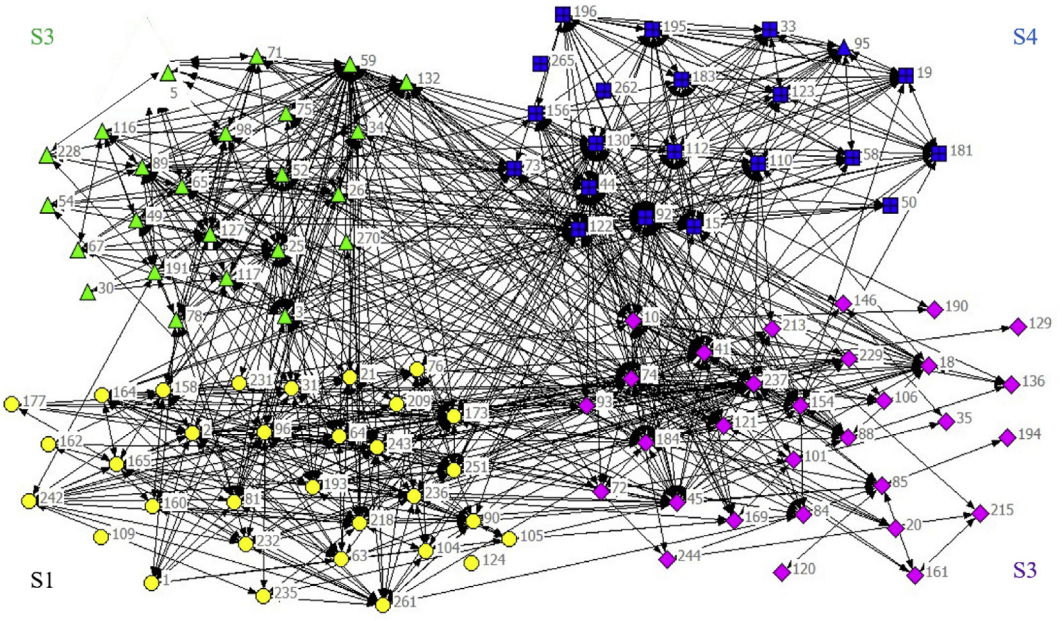

Fig. 2. The identified streams with included articles.

Table 1
Top journals in the identified factors.

	Stream (No. of articles)	Top journals (No. of articles)	Cohesion density
F1	SME strategic alliances (32)	Journal of Small Business Management (5) Strategic Management Journal (5) Journal of Business Research (3) Management Science (3)	88.5%
F2	Social capital in SME networks (30)	Entrepreneurship & Regional Development (5) Small Business Economics (2) Creativity and Innovation Management (2) International Small Business Journal (2) Chinese Management Studies (2) The Services Industry Journal (2) R&D Management (2)	83.7%
F3	SME networks and innovation (24)	Technovation (4) International Journal of Technology Management (2) Journal of Small Business Management (2) Research Policy (2)	88.4%
F4	SME networks and internationalization (21)	International Marketing Review (3) Baltic Journal of Management (2) Entrepreneurship & Regional Development (2) International Small Business Journal (2) Journal of World Business (2) Small Business Economics (2)	83.3%

Whereas these articles have the different steps of the development process of alliances mainly involving SMEs as their object of study, some other articles concentrate on the benefits and shortcomings of alliances involving SMEs and large firms. The oldest studies (e.g. Stuart, 2000; Kalaignanam et al., 2007) stress the advantages SMEs gain in allying with large partners in terms of experience, resources, credibility and reputation in the context of technology alliance, but also of both channel and international alliances. Subsequent studies (Vandaie and Zaheer, 2014; Yang et al., 2014) question the overall conclusion that large, prominent firms are the most valuable partners for small firms, hypothesizing a contingent effect of some elements as the number of large partners, the purpose of the alliance or the governance form.

Firm size is addressed also by another group of articles, but as a moderation variable in the relationship between alliance features and alliance or firm performance, thus showing the different patterns of alliance behavior of large firms in comparison to smaller ones, mainly due to different resource availability.

Articles within this stream, due to the breadth of the topic and the variety of investigated research questions, use different theories such as the resource based view (RBV), the transaction cost theory (TCE), the game theory, the social capital theory (SCT), the resource dependence theory (RDT), even if the most influential theory is the RBV.

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Table 2
Summary characteristics of articles in Stream 1.

Article	Focus of the article	Method	IOR purpose	Main construct and definition (if provided)	Theory	Main results
Alliance development process						
Rice et al., 2012	Alliances as a means allowing firms to access or acquire new resources	Quantitative	ns	Strategic alliance *Social and relational arrangements of exchange between economic agents*	KBV, Strategic management literature	Firms seeking to introduce new products or services or to introduce or increase exporting tend to develop information seeking alliance. Firms with a focus on opening new business locations tend to develop marketing alliances in subsequent years; firms seeking to decrease production levels will tend to develop production-based alliances.
Marino et al, 2008	Determinants of strategic alliance formation intentions during and immediately following the Asian Financial Crisis	Quantitative	ns	Alliance	RDT, Information process theory, Organizational turnaround research	The strongest factor in determining future intentions to use alliances is current alliance usage. Firms that have more experience with alliance are more likely to employ them again to face environmental uncertainty
Supphellen et al., 2002	How small- and medium-sized companies seek information about potential international partners for cooperation	Quantitative	International alliance	Strategic alliance *"Voluntary arrangements between firms involving exchange, sharing or co-development of products, technologies, or services" (Gulati, 1998, p. 293)*	ns	In the formation phase of an alliance, closeness to strategic core and partner dissimilarity have positive effects on the perceived importance of personal information sources.
BarNir and Smith, 2002	The characteristics of a manager's network that are particularly supportive of creating interfirm alliances	Quantitative	Technology, manufacturing, and support (such as sharing of personnel training, marketing, advertising, or distribution)	Interfirm alliance *"The presence of deliberate relations between otherwise autonomous organizations for the joint accomplishment of individual operating goals"* (Schermerhorn 1975, p. 847)	SNT, SET	Social networks of senior executives account for 11–22 percent of the variance in the degree to which firms engage in alliances, depending on the type of alliance. The number of interfirm alliances is positively related to several networking properties.
Lee et al., 2012	Absorptive capacity (AC) as moderator of the relationship between uniqueness/ complementarity of partner resources and SMEs retention decision	Quantitative	ns	Partnership/alliance	RBV, RDT	After the partnership formation, the level of the AC of focal firms influences their intention to retain the partnership. The AC of focal firms (or SMEs) does matter in their consideration of alliance retention and suggests the importance of organizational learning for partnerships and internal management to enhance absorptive capacity.
Pansiri, 2008	Characteristics of alliance partners > Alliance performance evaluation	Quantitative	ns	Strategic alliance *Purposive arrangement between two or more independent organizations that form part of, and are consistent with participants' overall strategies*	ns	Compatibility between partners is only positively associated with general satisfaction with alliance performance; commitment and capability had a positive effect on general satisfaction and market share and profitability and overall alliance performance; control had a positive effect on satisfaction with technology transfer and alliance operational performance; general satisfaction with alliance performance was influenced positively by trust.

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Bakker and Knoben, 2014	External environment > Decision to terminate or not the alliance	Quantitative	ns	Alliance	Game theory	The higher the quantum and rate of change, heterogeneity, and level of concentration in a firm's environment the larger the share of time-bound alliances in strategic alliance portfolio
Beekman and Robinson, 2004	Firm growth > Maintaining, expanding, terminating partnerships	Quantitative	ns	Alliance, partnership *Continuing, long-term relationships with a supplier of critical component*	RBV, Organizational change: Darwin's model of evolution, Punctuated equilibrium	Sales growth is related positively to the percentage purchased from the supplier. The longer-term relationships offer significant benefits and these benefits are enduring
Yang et al., 2010	Definition of critical indicators to measure cooperative performance	Qualitative	ns	Alliance, cooperation	ns	Provide a definition of cooperative strategies and related critical indicators to measure cooperative performance
Hoffmann and Schlosser, 2001	Critical success factors of SMEs alliances, all along the development stages of an alliance	Quantitative	ns	Alliance	TCE, RBV, KBV, Sociological approaches	The most significant success factors are "Precise definition of rights and duties", "Contributing specific strengths and looking for complementary resources", "Establishing required resources", "Awareness of time requirements" and "Equal contributions from all partners". The variable assessed as very important by most of the companies is "Emphasizing the potential for joint value creation". Critical success factors for SMEs are concentrated in the early stages of alliance evolution.
Consequences of strategic alliance						
Rezaei et al., 2015	Supply chain partnerships in different functions > SME performance	Quantitative	ns	Partnership *A type of inter-organizational relationship that is placed in the middle of a continuum from contractual arm's length relationship to vertical integration*, (*Ellram and Cooper, 1990*)	Logistics and supply chain literature	Highly significant and positive effect of partnership in R&D on overall performance. Other functional partnerships have no significant effect on the overall firm performance
Wynarczyk and Watson, 2005	Characteristics of supply chain relationships > Firm growth	Quantitative	ns	Alliance/Partnership arrangements	TCE, RBV, Sociological literature, Agency theory	Findings show that there are incremental performance differences associated with the firms that conduct their inter-firm relationships on a partnership basis
Hsu, 2006	The extent (if at all) to which VC-funded start-ups engage in cooperative commercialization strategies (strategic alliances or technology licensing, or both) relative to a comparable set of start-ups, and with what consequences	Quantitative	ns	Cooperative commercialization strategies *Pursuing strategic alliances and/or technology licensing*	ns	Findings suggests substantial boosts in VC-backed cooperative activity of start-ups, as well as increased likelihoods of start-up IPOs, with accentuated results for more reputable VCs
Antoncic and Prodan, 2008	Developing and empirically testing a model of alliance-driven corporate technological entrepreneurship	Quantitative	ns	Alliance arrangements	Corporate technological entrepreneurship	It showed the value of engagement in strategic alliances for the development of corporate technological entrepreneurship activities and consequential performance improvements

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Table 2 (*continued*)

Article	Focus of the article	Method	IOR purpose	Main construct and definition (if provided)	Theory	Main results
Tsaur and Wang, 2011	Personal ties among senior executives in the strategic alliance > Reciprocity among firms > Performance of the horizontal strategic alliances	Quantitative	ns	Horizontal strategic alliances *Cooperative arrangements among the cooperating tour companies aimed at pursuing mutual strategic objectives*	SET, SCT	The results indicate that competitive intensity moderates the relationship between personal ties and performance of strategic alliance. Personal ties positively and significantly affect the cooperative performance in general.
Ren et al., 2010	Antecedents of partnership quality characteristics	Quantitative	Partnership in information system of information technology	Partnership *Inter-organizational relationship established to achieve the participants' shared goals*	ns	Outsourcing benefits, outsourcing management competence, outsourcing cognisance, top management's attitude towards outsourcing are positively related to partnership quality.
Weaver and Dickson, 1998	Reported frequency of contract non-compliance, perceived opportunistic behavior, meeting of financial expectations > quality of alliance outcome	Quantitative	ns	Alliance *Structured interfirm agreements that establish relatively enduring exchange relationships between cooperating firms*	TCE, SED, Social control theory	The expressed quality of alliance outcomes is negatively related to the reported frequency of contract noncompliance across the alliance relationships and to the perceived opportunistic behavior of the participants in the alliance, while it is positively related to the meeting of the financial expectations for the alliance.
Clauß, 2012	Contingency factors that influence the relationship between supplier and buyer for joint innovation	Quantitative	Innovation	Collaboration/relationship	Social psychology literature, Relational view	Results indicate that a relational context fosters joint innovation generation and problem solving. Interestingly, a high degree of formalization, if it is legitimated, can also lead to innovation. Sporadic superficial interactions as well as interactions dominated by tension hinder joint innovation generation, though.
Alliance between large and small firms						
Vandaie and Zaheer, 2014	Benefits and disadvantages of the alliance between large and small firms	Quantitative	ns	Alliance	RBV	The positive relationship between a small firm's capability and growth is weaker the higher the number of large partners in the firm's alliance portfolio
Yang et al., 2014	Advantages and disadvantages of exploration and exploitation alliance between large and small firms between large and small firms	Quantitative	Innovation	Strategic alliances *Cooperative agreements between firms involving exchange, sharing, or codevelopment of products, technologies, or service (Gulati, 1998)*	ns	A small firm's exploitation alliances with large firms have a greater positive effect on its market valuation than its exploration alliances with large firms. Small firms are better off governing exploration alliances with an equity-based structure, while governing exploitation alliances with a non equity-based structure; small firms reap the highest benefits from their non equity-based exploitation alliances with large firms, followed by equity-based exploration alliances.

Chen and Chen, 2002	Forming alliances with larger firms and their impact on alliance structure	Quantitative	ns	Strategic alliance *An exchange arrangement for partners to learn and acquire from each other the technologies, skills and knowledge that are not available within their own organizations*	ns	Firms from developing countries are more likely to engage in asymmetric alliances with larger foreign firms; in addition, the larger the firms and the higher the lack of interdependency, the more likely they will enter equity joint ventures as opposed to non-equity
Chinomona and Pretorius, 2011	Major dealers expert power > Trust, commitment, relationship satisfaction in the dyad > Relationship satisfaction > Channel cooperation in the dyad	Quantitative	Channel relationship	Cooperation *Coordinated actions taken by SME manufacturers and their major dealers in interdependent relationships to achieve mutual goals*	RDT	Major dealers' expert powers positively influence manufacturing SMEs' channel cooperation through trust, relationship commitment and relationship satisfaction in a significant way
Hagedoorn et al., 2008	Role of trust in the subsequent formation of R&D alliances between large and small firms	Quantitative	R&D	Partnership	TCE, Relationship Centred perspective, European network perspective	For the biotechnology industry, there is a negative effect of large size differentials in pairs of companies on the likelihood that they will continue to collaborate in the future. Inter organizational trust does not have to develop in such a situation, where partners are different in terms of size.
Gardet and Fraiha, 2012	Analysis of the coordination modes of a network of a small hub firm	Qualitative	Innovation	Inter-organizational network *Cooperation among at least three legally different organizations with the aim of realizing a common project.* Innovation network *A set of relations with diverse organizations (public/private; partners/providers), piloted by the project bearer*	ns	Analysis of the degree of formality, trust, division of benefits method, guarantees and the conflict resolution methods within a centred innovation network, showing the dependence degree of the hub firm on its partners.
Stuart, 2000	Size, degree of technological innovativeness of partner > Firm performance	Quantitative	Technology development	Horizontal strategic alliance *Agreements between two firms in the industry*	ns	Organizations with large and innovative alliance partners perform better than otherwise comparable firms that lack such partners. Young and small firms benefit more from large and innovative strategic alliance partners than do old and large organizations.
Kalaignanam et al., 2007	Factors influencing changes in shareholder values of partner firms following the announcement of asymmetric NPD alliances	Quantitative	New product development	Alliance	ns	Firm alliance experience has a positive and significant effect on the financial gains of both larger and smaller firms. The effects of alliance scope, alliance type, and partner characteristics on financial gains are asymmetric across larger and smaller firms. Larger firms gain more from broad-scope alliances, but smaller firms' gains are not related to alliance scope. In contrast, smaller firms gain from scale alliances, but larger firms' gains are not related to alliance type.
Audretsch and Feldman, 2003	Role that strategic research alliances play in biotechnology	Theoretical	ns	Alliance *An administrative arrangement to govern an incomplete contract between separate firms in which each partner has limited control* (Gomes-Casseres, 1997)	ns	Overview of the theoretical motivation and the empirical literature on small firm strategic alliances in biotechnology

(*continued on next page*)

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Table 2 (*continued*)

Article	Focus of the article	Method	IOR purpose	Main construct and definition (if provided)	Theory	Main results
Firm size as moderator						
Bouncken, 2011	Stable and repetitive activity patterns of project alliance management > Project alliances' innovation performance (size as moderator)	Quantitative	Innovative projects	Project alliances *Temporary coordinated and project-based activities between legally autonomous firms*	Project management and project organization theory	There is a moderating effect by revenue on the relationship between formal operating practices and planned innovation. With stronger use of formal operating practices large firms will face reduced planned innovation performance whereas small firms can improve their planned innovation success through formal operating practices.
Cao and Zhang, 2011	Supply chain collaboration > Collaborative advantage > Firm performance (size as moderator)	Quantitative	Supply chain collaboration	Supply chain collaboration *Two or more autonomous firms working jointly to plan and execute supply chain operations*	TCE, RBV	Large firms are more effective in jointly creating value with their partners than small and medium ones. The association of collaborative advantage with firm performance is stronger for smaller firms than for larger firms because smaller firms are more likely to be highly focused and thus their performance depends on the joint benefits of the supply chain collaboration for their limited set of products.
Lin et al., 2007	Ambidexterity approach in alliance formation > Parent firm performance (size as moderator)	Quantitative	ns	Alliance	Ambidexterity in alliances	Although an ambidextrous formation of alliances benefits large firms, a focused formation of either exploratory or exploitative alliances benefits small firms.
Sarkar et al., 2001	Alliance proactiveness > Firm market performance (size as moderator)	Quantitative	ns	Alliance	SNT, Entrepreneurship theory	Firm size negatively moderates the relationship between alliance proactiveness and performance, such that the larger the size of the firm, the weaker the relationship between alliance proactiveness and market based performance.
Ariño et al., 2008	How firms of different size adjust their alliances in the presence of governance misalignments or experience hold-up	Quantitative	ns	Alliance	TCE	Smaller firms will be less able to adapt alliances over time and thus bear the inefficiencies associated with governance misalignment. Larger firms appear to be better positioned to exercise discretion and adapt their collaborative relationships. Small firms tend to make greater transaction specific investments that stimulate contractual changes. Small firms are less likely to make contractual adjustments in their alliances in the face of such inefficiencies.

Finally, looking at the temporal evolution of articles within this stream, it contains on average the oldest articles in the sample, to signal that the issue of IORs between SMEs has been initially dealt with in the general context of alliances (see Fig. 3).

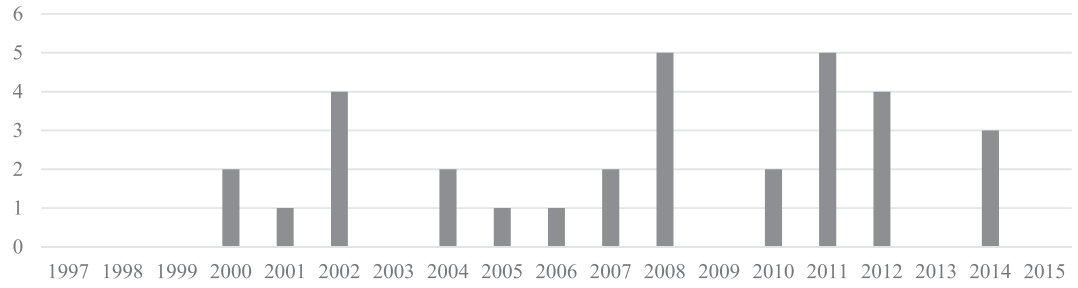

Fig. 3. Temporal evolution of articles in Stream 1.

Stream 2 — social capital in SME networks

The focus of articles in this stream is on the social aspects of networking. More particularly, articles base on the three concepts of embeddedness, social network and social capital and the three associated theories, namely Social Embeddedness Theory (SET), Social Network Theory (SNT), Social Capital Theory (SCT), which have started to be applied to the context of IORs involving SMEs since the early 2000s, as Fig. 4 exhibits. Almost all articles mention one of these theories or one of their pioneers (e.g. Granovetter).

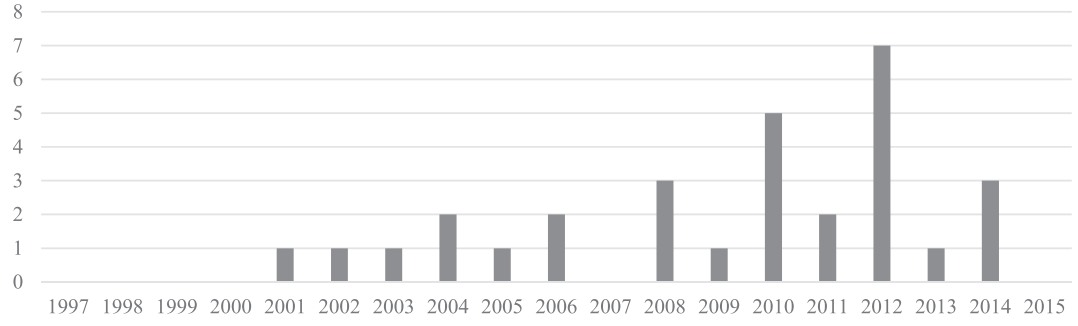

Fig. 4. Temporal evolution of articles in Stream 2.

The majority of articles in Stream 2 can be organized based on the three social capital dimensions identified by Inkpen and Tsang (2005), namely structural (i.e. "the pattern of relationships between the network actors", p. 152), relational (i.e. "the role of direct ties between actors and the relational, as opposed to structural, outcomes of interactions", p. 153) and cognitive (i.e. "the resources providing shared meaning and understanding between the network members", p. 153). As Table 3 shows, the structural dimension is the most investigated, with many articles (Semrau and Werner, 2012, 2014; Lu et al., 2012; Ceci and Iubatti, 2012; Lorentzen, 2008; Julien et al., 2004; Mackinnon et al., 2004; Uzzi and Gillespie, 2002) aiming to study the impact of this dimension, mainly in terms of network ties, on different performance measures. The debate concerning the effectiveness of strong vs weak ties is at the core of this stream, with more recent articles (e.g. Partanen et al., 2014; Jørgensen and Ulhøi, 2010) trying to solve it by looking at the circumstances in which strong and weak ties are more relevant respectively.

Within the scope of the structural dimension, configuration is also addressed, despite less assiduously (e.g. Semrau and Werner, 2014; Swoboda et al., 2011), whereas intermediaries are given more attention. Business associations and local institutions, as well as business science parks and brokers, may play a crucial role in changing and shaping the emerging network among SMEs (Koçak and Can, 2013; Vanhaverbeke, 2001) by encouraging network ties development (Kang and Park, 2012; He and Rayman-Bacchus, 2010; Vanhaverbeke, 2001), bridging distance between parties and providing SMEs with dedicated funds or competences for networking that they lack (Schoonjans et al., 2013; Wincent et al., 2012).

Authors who focus on the relational and, overall, the cognitive dimensions are occasional. Regarding the relational dimension, almost all articles stress the beneficial effect of trust for networks in terms of network success (Besser and Miller, 2011), innovation adoption (Ceci and Iubatti, 2012), achievement of joint objectives (von Friedrichs Grängsjö and Gummesson, 2006) and relationship satisfaction for SMEs (Lu et al., 2012).

Finally, there are some articles simply analyzing the effect of networking on firm performance. (Schoonjans et al., 2013; Felzensztein et al., 2012; Semrau and Werner, 2012; He and Rayman-Bacchus, 2010; Gilmore et al., 2006).

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Table 3
Summary characteristics of articles in Stream 2.

Article	Focus of the article	Method	IOR purpose	Main construct and definition (if provided)	Theory	Main results
Structural social capital						
Impact of structural social capital on performance						
Fukugawa, 2006	Net ties (type) > Innovation performance	Quantitative	Kw sharing and R&D	Cross industry group *Voluntary organization among small firms belonging to various sectors, which aims at knowledge sharing and R&D cooperation*	SET	Close-knit networks contribute to joint product development + Contact with external sources of knowledge such as public research institutes is important to achieve technical success in innovation
Julien et al., 2004	Net ties (strong/weak) > Technological innovation (mod: abs cap)	Quantitative	Innovation	Network	Sociological theory, SET	Weak ties are important for technological innovation
Partanen et al., 2014	Net ties + Resources > Types of innovation	Qualitative	Innovation	Network	SET, Literature on innovation	The successful commercialization of radical innovation is more likely to require strong ties with customer partnerships, whereas the successful commercialization of incremental innovation is more likely to require strong ties with university and distribution partnerships
Lorentzen, 2008	Net ties (strong/weak) > Innovation	Theoretical	Innovation	Network, district	SET (not explicit, Granovetter), Literature on industrial district	Weak ties with distant partners are more important to innovation than close and strong ties because the latter leads to redundant knowledge and lock-in
Mackinnon et al., 2004	Net ties (strong/weak) > Access to knowledge sources	Qualitative	Knowledge sharing	Network	SET	Connections to extra-local networks play a crucial role in providing access to wider sources of information and knowledge
Uzzi and Gillespie, 2002	Net ties (duration, multiplexity, net size) > Discount/penality for the firm	Quali-quantitative	ns	Network	SET	SMEs with embedded ties to their bankers were more likely to have better conditions from banks
Le and Nguyen, 2009	Net ties (type) > Bank financing	Quantitative	ns	Network	Institutional theory	Networking with customers and government officials promotes the use of bank loans, while networking with suppliers and social ties reduces the need for bank loans
Semrau and Werner, 2014	Net ties (n° of ties-quality) > Resources	Quantitative	Access to resources	Entrepreneurs' network *The set of relationships or contacts held by entrepreneurs*	SET (not explicit, Granovetter), Entrepreneurship theory	Increasing network size and relationship quality results in diminishing marginal returns in terms of access to financial capital, knowledge and information, and additional business contacts.
Pavlovich, 2003	Net structure (ties) > Destination development	Qualitative	Marketing	Network	SNT	A portfolio of network relationships requires structural configuration reflected by the density of the network and its centrality position
McLeod et al., 2010	Net structure: mapping of knowledge sharing (business involved and linkages)	Qualitative	Knowledge sharing	Network *Formal business relationship between individual egos and alters was defined as one where they are working together for a business reason such as joint promotion or the purchasing of supplies*	SNT, SCT, Structuration theory + net theory, social capital theory, structural hole theory	There is an association of networking with knowledge sharing that contribute to performance. Tourism and hospitality businesses require knowledge and tacit knowledge in particular, for innovation.

Swoboda et al., 2011	Configuration > Alliance success	Quantitative	Internationalization	Alliance	Literature on alliances	International SME alliance success depends (in order) on structural fit, cultural fit and strategic fit. The findings demonstrate that problems in partner selection and negotiations/arrangements affect alliance success both directly and indirectly and that the relationships between alliance building, fit and success vary according previous partner knowledge, international experience and previous investments.
Wincent et al., 2012	Network board independence/ size > Network innovativeness	Quantitative	Innovation	Network *Intentionally formed groups of small- and medium-sized profit-oriented companies in which the firms (1) are geographically proximate, (2) operate within the same industry, potentially sharing inputs and outputs and (3) undertake direct interactions with each other for specific business outcomes (Human and Provan, 1997)*	Integration of SET and Agency theory	Net board size and independence have an inverted U-shape impact on net innovation
Wincent et al., 2009	Network board continuity > Network innovativeness (mod: net size)	Quantitative	Innovation	Strategic network	Literature on corporate boards	Managing board continuity is important to facilitate effective R&D management in strategic small firm networks; […] renewing the board is important regardless of the board's competence profile.
Batterink et al., 2010	Network orchestration	Qualitative	Innovation	Network	Systems of Innovation literature, Management literature	The innovation broker may have great added value for innovation networks, especially when he takes the lead in three network orchestration functions: innovation initiation, network composition and innovation process management.
Vanhaverbeke, 2001	Networks > SME learning	Qualitative	Increase market power	Spontaneous network, Value constellation	SET, Theory of clusters, literature about learning regions	Diverse business networks enhance the learning ability of SMEs
Role of structural social capital in fostering networks						
Koçak and Can, 2013	Role of science technology parks (STP) in fostering networks	Quantitative	Innovation	Network	Sociology and urban geography literature	Sectoral homogeneity is associated with greater numbers prevalence of knowledge sharing, joint development, and client ties. Tenants whose general managers have greater presence at the park have more equipment-sharing ties, and attendance at STP-organized events increases knowledge-sharing ties. STP managers' brokerage activities contribute to equipment sharing ties.

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Table 3 (*continued*)

Article	Focus of the article	Method	IOR purpose	Main construct and definition (if provided)	Theory	Main results
Iandoli et al., 2012	Knowledge complementarities > Network formation; Knowledge exchanges >< Structural properties of network	Simulation	Knowledge sharing	Firms' network *Collection of (often small) autonomous actors that pursue repeated and enduring reciprocal exchanges aimed at creating products or services for final markets*	SNT	Knowledge complementariness is sufficient to generate stable networks, but not with a few dominant players. Instead, relational embeddedness plays a role: as the relative weight of past links on the probability of establishing a link between two agents increases, the probability of observing the emergence of a network characterized by a quasi-hub and spoke structure increases.
Vanhaverbeke, 2001	How to establish value constellations	Qualitative	Increase market power	Value constellation *A customer-oriented inter-organizational strategy*	SET, Theory of clusters, Literature about learning regions	Initiatives established by local, informal groups or by major, top-down-induced organizational changes in the local social institutions might be the spark necessary to establish value constellations.
Relational social capital						
Impact of relational social capital on performance						
Jørgensen and Ulhøi, 2010	Network relationships and features (trust, power distribution, interpersonal interaction, geographical scope) > Innovation capacity	Qualitative	Innovation	Network *Collaborative arrangements established via the interactions between actors embedded in a social context (Sydow and Windeler, 2003)*	SNT	During early interactions with their first network partners, SMEs learn to co-ordinate and network, which were then critical skills for SME also to build trust + Developing and fostering network relationships early on in their evolutionary life cycle is critical in order to support learning, knowledge sharing and increase their capacity for innovation
Ceci and Iubatti, 2012	Type of relationship > Innovation	Qualitative	Innovation	Network *Hybrid coordination mechanism of economic activity that combines the advantages of both the traditional governance mechanisms of vertical integration and market exchanges*	SNT	The locus of innovation is not the locus of strategy: innovative activities are widely diffused within networks + The presence of trust, shared values and mutual objectives facilitates the adoption of innovation
Besser and Miller, 2011	Structural factors (type of net, size, age, education) > Social features (trust, relationship) > Resource exchange > Network success	Quantitative	Different purposes	Business network *Formal arrangements between independent businesses established to enhance member success*	SNT (not explicit)	Trust is the main determinants of net success + Larger networks have more difficulty in facilitating trust
Lu et al., 2012	Social capital (guanxi, specific investm, trust) > Satisfaction with the network	Quantitative	ns	Network	Integration of SCT and TCE	Strong *guanxi* networks, high level of transaction-specific investments and inter-personal trust significantly contribute to a high level of relationship satisfaction for agri-food SMEs in China
von Friedrichs Grängsjö and Gummesson, 2006	Social capital/Trust > Networking in marketing	Qualitative	Marketing	Network	SCT, Co-operative marketing theory	Social capital (trust, commitment, etc) enables the achievement of joint objectives among local competitors

Cognitive social capital						
Miller et al., 2007	Resource sharing + shared vision > Benefits to business > Net advantages > Net continuance	Quali-quantitative	Enhance business success	Strategic network	SNT, SCT	Shared vision and resource sharing among network members significantly benefited members' businesses and their satisfaction
General: consequences of SME IORs						
Schoonjans et al., 2013	Formal business networking > SME growth	Quantitative	SME growth	Business network *Groups of entrepreneurs and managers that voluntarily share knowledge and experiences*	SET (not explicit, Granovetter, strong/weak ties)	Participating in a formal business network has a highly significant positive effect on firm growth in terms of net asset and added value growth, but not on employment growth.
Gilmore et al., 2006	Networking > Marketing capability	Qualitative	Marketing	Network	Literature on SME networking	An SME owner/manager who was proactively networking and utilizing his/her marketing network displayed a more sophisticated level of marketing-led decision making
Felzensztein et al., 2012	Clustered/non clustered firms > Inter-firm marketing strategy	Quantitative	Marketing	Network - Cluster	SNT, Cluster literature	Managers of firms which are part of clustered industries tend to perceive more benefits and opportunities for inter-firm co-operation in marketing activities
Svahn and Westerlund, 2009	Social capital > Relationship value	Qualitative	ns	Network	SCT, SNT, Theories business networks and relationship value	For R&D collaboration relationships, the main sources of relationship value are the competent key technology gurus who possess advanced technological competencies in dominant and future technologies. In the case of marketing and distribution relationships, customer understanding, market leadership and the strategic fit of the total offer are the key sources of relationship value.
He and Rayman-Bacchus, 2010	Networking in a cluster > Commitment to innovation	Quali-quantitative	Innovation	Network	ns	Firm-level commitment to innovation is significantly stimulated by three groups of factors: competitor action and cooperation in the supply chain, membership of various government and industry associations and government stimulus policies in the cluster
Semrau and Werner, 2012	Network investments > Network venture formation/success	Quantitative	ns	Social network of entrepreneurs *The set of individuals and organizations to which the entrepreneur is linked*	SNT (not explicit), Entrepreneurship	The relationship between network investments and success in creating a new venture may be best described by an inverted U.
McGrath and O'Toole, 2012	Enablers and inhibitors of network capability of entrepreneurs	Qualitative	ns	Network *The set of business relationship between the focal firm and its customers, competitors, suppliers, distributors, funding agencies, research institutions etc. (IMP approach)*	ns	Enablers: Past network experience, information sharing and participation in coordinated consumer events. Inhibitors: desire for control over decision making, lack of knowledge sharing or joint problem solving and perception of value chain activity links and resources as unnecessary.

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In this stream, many authors (e.g. Felzensztein et al., 2012; Iandoli et al., 2012) assume a regional or industrial district/cluster perspective. This is typical of SMEs that are likely to be part of networks formed within a local community where a specific social environment exists (Felzensztein et al., 2012; He and Rayman-Bacchus, 2010). Moreover, in the context of SMEs, entrepreneurs frequently embody the whole firm, hence both personal and organizational networks are investigated and often seem to converge (Lechner and Dowling, 2003).

Stream 3 – SME networks and innovation

The common theoretical background of articles in this stream generally points to the domain of open innovation (OI) that most authors (e.g. Lee et al., 2010) refer to as a body of literature instead of as a theory and associate with other theories, as the RBV or SNT (Xiaobao et al., 2013).

The OI paradigm can be understood as the antithesis of the traditional vertical integration model (Chesbrough, 2006), and this viewpoint shifts the focus from more formal vertical integration patterns towards more informal arrangements (Pullen et al., 2012b), thus explaining the use of alternative terms with respect to network such as cooperation or collaboration in Stream 3. Articles in this stream are also the more recent of the sample (see Fig. 5) and this topic has been expanding considerably since 2010.

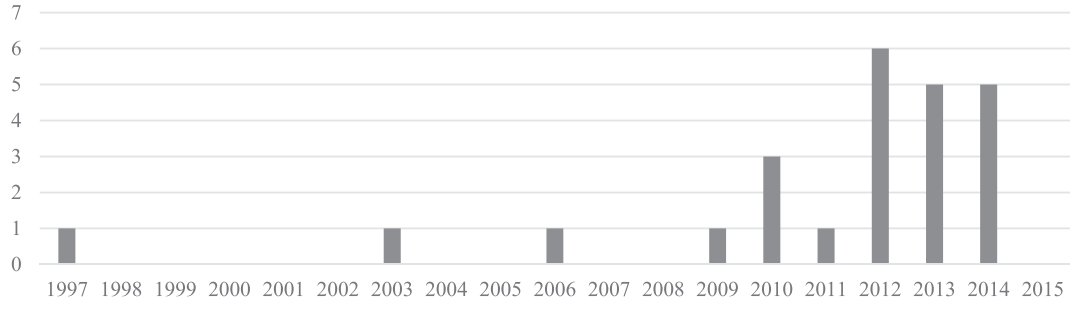

Fig. 5. Temporal evolution of articles in Stream 3.

To this regards, authors (e.g. Lee et al., 2010) recognize that discussions about the concept of OI in SMEs have been excluded from the mainstream of OI literature for a longtime, but this tendency has definitely been diverted to the point that SME networks for OI has become one of the main areas of inquiry.

Articles in this stream share the characteristic that the purpose of the networks they analyze is innovation and two main areas of research can be recognized: research on the drivers of innovation networks and research on the consequences of innovation networks on firm innovation performance. Most articles fall within the latter group, as Table 4 exhibits. The most investigated issue regards the impact of relationships with different types of partner on firm innovation performance, thus exacerbating the debate concerning the effectiveness of cooperating with other firms, intermediary institutions, research organizations and government agencies (Oke and Kach, 2012; Zeng et al., 2010).

The most common tendency is towards going more in detail regarding the dimensions of innovation performance, investigating which partners allow increasing radical innovation (Eggers et al., 2014; Minguela-Rata et al., 2014) product and process innovation success (Freel and Harrison, 2006). The main evidence here is that results are not so straightforward and the debate around which type of partner is more effective in which dimension of innovation performance is still open.

As for the drivers of innovation networks, using quantitative techniques, authors identify different streams fostering the propensity to engage in innovation networks, as a high share of PhD holders among the research managers and R&D experts (Teirlinck and Spithoven, 2013), technology innovation capacity (Xiaobao et al., 2013), firm size and export intensity (Blind and Mangelsdorf, 2013). Interestingly, an external support is fundamental for SME decision to enter an innovation network, which could be on the part of either the government (Kang and Park, 2012) or other intermediaries (Lee et al., 2010).

Stream 4 – SME networks and internationalization

The theoretical foundation of the articles within this stream is international entrepreneurship (Sullivan Mort and Weerawardena, 2006), most of the times discussed in combination with other theories. For example, authors mention the SNT, when considering the role of interpersonal ties in internationalization (Loane and Bell, 2006), or the KBV or capability view (Sullivan Mort and Weerawardena, 2006), when dealing with the capabilities required in the context of internationalization through networking, or the RBV, when stressing the ability of born global firms to access strategically relevant resources they lack, thus facilitating their internationalization (Eberhard and Craig, 2013; Ibeh and Kasem, 2011).

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Table 4
Summary characteristics of articles in Stream 3.

Article	Focus of the article	Method	IOR purpose	Main construct and definition (if provided)	Theory	Main results
Consequences of innovation networks on innovation performance						
Eggers et al., 2014	Network with industry partners > Radical innovation	Quantitative	Innovation	Inter-organizational networks *Formal linkages between several organizations that allow firms to access a variety of resources and complementary skills*	ns	Radical innovativeness achieves its highest level among the SMEs that are concurrently operating in highly technologically turbulent environments, engaged in networking with industry partners, and being responsive to customer needs.
Minguela-Rata et al., 2014	Cooperation with suppliers > Radical innovation	Quantitative	Innovation	Network	ns	Those firms that cooperate technologically with suppliers have a greater propensity for product innovation and, specifying, for radical innovations, despite radical product innovations depend of some characteristics of firms and environment.
Oke and Kach, 2012	Collaboration with non-supply chain partners > Innovation performance	Quantitative	Innovation	Network *Partnerships that manufacturing firms have with research institutions, universities and other firms that are typically formed for the sole purpose of gathering and developing knowledge through research and development in new products, services and processes*	KBV	Collaborations with non-supply chain partners are positively related to operational innovation, which in turn improve financial performance.
Beck and Schenker-Wicki, 2014	Network diversity > Innovation performance	Quantitative	Innovation	Network	RBV + 'neoclassical' field of mainstream industrial organization and transaction cost economics, strategic management approaches to inter-firm arrangements, evolutionary economics	The findings suggest that firms with greater diversity in their cooperation network benefit by generating new product innovations and that the diversity benefit is greatest for small firms. The study further detects a curvilinear relationship between diversity of collaborator types and innovation performance.
van Hemert et al., 2013	Network with different partners > Innovation performance	Quantitative	Innovation		Literature on innovation/abs cap/ exploitation-exploration + OI	Small innovative firms actively seek diverse partnerships and effectively learn most specifically from universities.
Kang and Park, 2012	Collaboration with different partners > Innovation performance	Quantitative	Innovation	Collaboration/partnership	Integration of the national innovation system approach and a RBV	SMEs that had established collaborations with domestic and international upstream partners and international downstream partners performed significantly better in innovation output than did their counterparts without the collaborations, and the magnitude of the influence of international partnerships was greater than the influence of domestic partnerships.
Zeng et al., 2010	Cooperation with different partners > Innovation performance	Quantitative	Innovation	Cooperation network	OI literature	Inter-firm cooperation, cooperation with intermediary institutions, cooperation with research organizations positively impact on innovation performance of SMEs (inter-firm cooperation is the most significant), but cooperation with government agencies does not.

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Table 4 (*continued*)

Article	Focus of the article	Method	IOR purpose	Main construct and definition (if provided)	Theory	Main results
						Moreover, vertical and horizontal cooperation with customers, suppliers and other firms plays a more distinct role in the innovation process of SMEs than horizontal cooperation with research institutions, universities or colleges, and government agencies.
Vrgovic et al., 2012	OI with different actors > Innovation performance	Theoretical (case studies from the literature)	Innovation	Network	OI literature	Establishing connections with independent inventors and marketing agencies and being supported by an intermediary government agency increase innovativeness.
Freel and Harrison, 2006	Cooperation with different partners > Innovation performance	Quantitative	Innovation	Innovation network *Explicit and formal arrangement between [firms] unrelated by ownership*	Innovation and networking literature (TCE cited)	There is a positive associations between cooperation with customers and the public sector and product innovation success, and between cooperation with suppliers and universities and process innovation success. However, networking, is neither a sufficient nor a necessary condition for innovation.
Ahlin et al., 2014	Networks > Innovation performance (mod: absorptive capacity)	Quantitative	Innovation	Network	"Network approach" to entrepreneurship	Absorptive capacity moderates the relationship between networks and innovation outcomes, but with some country level variations.
Xiaobao et al., 2013	Network openness > Innovation performance (mod: network information)	Quantitative	Innovation	Network	OI literature (bridge RBV and Social Net Theory)	Network information significantly affects the influence of network openness on innovation performance.
Pullen et al., 2012b	Network characteristics > Innovation performance	Quantitative	Innovation	Network	OI literature	Network characteristics (network position strength, resource complementarity, fairness trust, reliability trust and goal complementarity) in interaction have a direct positive effect on innovation performance.
Kesting et al., 2011	Role of HRM for successful innovation in networks	Theoretical	Innovation	Network *Relationships that are not based on legal arrangements, but rather shaped by highly institutionalised norms and values regarding collaboration and jointly held organizational identities*	Literature on networks, and innovation in networks in particular, and HRM	This paper emphasises the need to consider HRM as a way to exploit the potential for the collaborative learning and knowledge sharing that is needed for successful innovation in SMEs participating in networks.
Nieto and Santamaría, 2010	Technological collaboration > Innovation performance	Quantitative	Innovation	Technological collaborations *Interfirm alliances including collaborative R&D agreements, university and/or research institute agreements and technology licensing*	ns	Technological collaboration improves SME innovation, more in terms of product than on process innovation, and vertical collaboration always has a greater impact than collaboration with research organizations.
Freel, 2003	Cooperation for innovation > Product and process innovativeness (+spatial distribution)	Quantitative	Innovation	Cooperation for innovation	Innovation and networking literature	External collaboration is neither a necessary nor less a sufficient condition for innovation. Moreover, the spatial reach of innovation-related linkages is also likely to be greater for firms reporting the introduction of relatively novel innovations; in contrast, smaller firms

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						and firms engaged in incremental product innovations appear more likely to be locally embedded.
Pullen et al., 2012a	Profile of the ideal NPD network	Quali-quantitative	Innovation	Network	OI literature	Profile of the ideal NPD network: goal complementarity among partners, business-like attitude towards their NPD network partners, resource complementarity, high levels of trust, and low network position strength; it increases innovation performance.
Drivers of innovation networks						
Lefebvre et al., 2014	Type of partners involved, mode of information sharing, kind of support	Quantitative	Innovation	Network	RBV	The decision of food SMEs to join innovation networks is affected by: the presence of manufacturers and chain members instead of research institutes; confidentially information sharing among network partners instead of open information sharing; the support for building their networks of partners instead of support for developing innovations.
Teirlinck and Spithoven, 2013	Firm size, technical specialization of employees	Quantitative	Innovation	Research cooperation *Formal collaborative projects and informal networking activities with individuals and organizations*	OI literature, RBV	Very small firms engage significantly less in research cooperation than medium-sized firms and the propensity to engage in research cooperation is positively associated with the share of PhD holders among the research managers and R&D experts.
Xiaobao et al., 2013	Technology innovation capacity	Quantitative	Innovation	Network	OI (bridge RBV and Social Net Theory)	Technology innovation capacity has a remarkable positive effect on innovation network openness between organizations.
Blind and Mangelsdorf, 2012	R&D intensity, firm size and export intensity	Quantitative	Innovation	Alliance	RBV, KBV	R&D intensity exhibits an inverse U-shaped relationship on the likelihood to join alliances. Moreover, firm size and export intensity are positively correlated with participation.
Kang and Park, 2012	Government support	Quantitative	Innovation	Collaboration/partnership	Integration of the national innovation system approach and a RBV	Government support affected domestic upstream and downstream collaborations, and the magnitude of the effect of government support on upstream linkages was more than four times larger than the effect on downstream linkages.
Lee et al., 2010	Intermediation	Qualitative	Innovation	Network	OI literature	Intermediation is one way of enabling collaboration.

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Table 5
Summary characteristics of articles in Stream 4.

Article	Focus of the article	Method	IOR purpose	Main construct and definition (if provided)	Theory	Main results
Impact of networks on internationalization						
Andersson et al., 2013	Networks > Internationalis.	Qualitative	ns	Network	Process Theory of Internationalization (PTI) and International New Venture Theory (based on international entrepreneurship research)	Two types of internationalizing firms emerge in this study: born global firms and born-again globals. Local networks in the cluster are important for influencing the internationalization of the born global firm at inception. In contrast, international networks serve as the main impetus for re-launching internationalization for the born-again globals. The local research institutions and their connections abroad help both firms develop and internationalize their innovations rapidly in the global marketplace.
Eberhard and Craig, 2013	Inter-personal/organizational networks > Internationalis.	Quantitative	Internationalization	Inter-personal and inter-organizational network	Network perspective and Social network theory	Both inter-personal and inter-organizational networks have a positive impact on SME internationalization, but within a different time horizon: the former are more effective at the beginning and the latter later on. Moreover, family ownership negatively moderates this relationship.
Boehe, 2013	Local collaborative intensity > Export intensity	Quantitative	ns	Network	RBV + Social network theory; contribute to SME management and international business literature	A firm's local collaborative intensity is positively related to its export intensity, and this relationship is moderated by the firm's distance from the local network's centre.
Chetty and Stangl, 2010	Variety of networks > Internationalis.	Qualitative	ns	Network *Inter-connected dyadic relationships such as the distributor's other relationships with customers, competitors, social, etc.*	Literature on internationalization, innovation and networks	Firms with limited network relationships have incremental internationalization, but those with diverse network relationships (i.e. customer, clients, competitors, etc.) have radical internationalization.
Prashantham and McNaughton, 2006	Collaboration with MNC subsidiaries > Internationalis.	Qualitative	ns	Network	Social capital theory and international entrepreneurship literature	Collaboration between SMEs and local MNC subsidiaries can help in the internationalization process; limits on information exchange and trust hamper collaboration, but the facilitation by a neutral agency may help to overcome these barriers.
Echeverri-Carroll et al., 1998	Symmetric/Asymmetric net > Internationalis.	Quantitative	ns	Network	Literature on Industrial Districts	Small firms establish local asymmetric relationships to enjoy the benefits of greater access to information by connecting themselves to a larger stock of knowledge (in the large firm) and to enhance the transfer of this knowledge by their spatial proximity to grow and penetrate foreign markets.
Impact of international networks on internationalization						
Ciravegna et al., 2014	How high-tech SMEs build and use networks to internationalize	Qualitative	Internationalization	Network	International business and entrepreneurship literature	Internationalization of high-tech SMEs is the result of both an active strategic search and serendipitous events. In any case, the vast majority of SMEs used networks to support their internationalization and adopted specific

						strategies to build such networks: exploitation of personal contacts and clients, hiring of foreign experts. Size, wealth and institutional development of the economy where firms are based do not strongly influence their internationalization path.
Boojihawon, 2007	How SMAs use international ties for internationalis.	Qualitative	Marketing	Network	Social capital theory and International entrepreneurship literature + Small firm internationalization	Small marketing agencies (SMAs) are likely to leverage their international networks for internationalization. The network structure and ties are unique for each firm and change continuously with their evolving strategic priorities.
Tolstoy, 2010a	How knowledge combination in networks underlies international venturing	Qualitative	Knowledge creation	Network *The directly and indirectly connected actors in a firm's environment*	International small business research, network theory and international entrepreneurship theory	International venturings are strongly shaped by proactive strategies of identifying and implementing knowledge combinations that span across internationally dispersed network relationships, and different strategies of knowledge combination in networks are pursued depending on the nature of the venture (namely, international product ventures and international market ventures). Small firms need to possess the flexibility to search the network for knowledge combinations and the stability to dedicate time and effort to implement these combinations in network relationships.
Tolstoy and Agndal, 2010	Type of resources required in different international ventures	Qualitative	Innovation and internationalization	Network	RBV + network perspective on resources	Network resource combinations vary with the nature of the venture; whereas new international product ventures exploit a broad set of network resources in concordance with the multifaceted challenges intrinsic to these endeavours (i.e., both redefining the product and redefining the market), new international market ventures depend on a more narrow scope of network resources, deployed with the primary aim to expand and deepen the customer base in foreign markets.
Ibeh and Kasem, 2011	Social and business networks > Stage of internationalis.	Qualitative	ns	Network	Network theory + International new ventures theory, resource-based internationalization literature	Both social and business networks were found to be important for internationalization, but social ties seemed more influential at initial stages, with business networks becoming more dominant subsequently.
Loane and Bell, 2006	Social and business net > Knowledge of international markets	Quantitative + qualitative	ns	Network	international networking literature and the integration of RBV and KBV	Existing social and business networks are a valuable resource for the small internet enabled firm to develop their knowledge of international markets and improve their international competitiveness. However, SMEs have to build new networks because of the advanced nature of their offering.
Hilmersson, 2013	International experience > Insidership in the network	Quantitative	ns	Business network	internationalization process theory	International experience is positively associated with both the country and customer experience in the newly opened business network, and country experience, in turn, is strongly associated with a firm's degree of insidership in the business network.

(*continued on next page*)

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Table 5 (*continued*)

Article	Focus of the article	Method	IOR purpose	Main construct and definition (if provided)	Theory	Main results
Sullivan Mort and Weerawardena, 2006	Networking capability > Global market entry	Qualitative	ns	Network	International entrepreneurship	The dynamic networking capabilities enable born globals to minimise the risks associated with global market entry decisions, but they must be complemented by entrepreneurial opportunity-seeking behavior. Moreover, networking capabilities must change over the evolution of the firm's internationalization process. The owner/manager plays a strategic role in identifying and establishing networks, and renewing and extending them over time.
Musteen et al., 2014	Kw of foreign market > International venture perf.	Quantitative	Internationalization	Network = "a set of actors and some set of relationships that link them" (Hoang and Antoncic, 2003, p. 167)	Social network and international entrepreneurship literature	Firms with chief executive officers who had developed strong and diverse international networks exhibited greater knowledge of foreign markets prior to internationalization and, in turn, foreign market knowledge prior to the first international venture had a positive impact on venture performance.
Musteen et al., 2010	Partner features > Pace of internationalis.	Quantitative	Internationalization	Network	Social capital theory and international entrepreneurship literature	Firms sharing a common language with their international ties are able to internationalize faster than firms that do not share a common language. Personal contacts hinders the performance of the first international venture and do not result in faster internationalization.
Tang, 2011	Type of resources/Net behavior > Pace of internationalis.	Quantitative	ns	Network	Internationalization literature	The availability of foreign business resources (information, clients/suppliers, distribution channels) is positively associated with the achievement of rapid internationalization, whereas general organizational resources are not. The ability of SMEs to plan and conduct networking activities strategically with key partners is beneficial to obtain the influential resources for accelerating foreign business development
Consequences of international networks						
Musteen et al., 2010	Variety of international networks > Firm performance	Quantitative	Internationalization	Network	Social capital theory and international entrepreneurship literature	Geographically diverse networks contribute to superior firm performance.
Tolstoy, 2010b	Network development > Kw combination	Quantitative	Knowledge creation	Networks *The directly and indirectly connected human and organizational actors in a firm's business environment (i.e. manifested by customers and suppliers)*	International entrepreneurship theory	Network development is a strong requisite for knowledge combination in the realm of the foreign market. In turn, the model showed that knowledge combination had a positive impact on knowledge creation.

Generally, authors in this stream use "network" as the main construct, despite they rarely provide a clear conceptualization.

Within this stream, both the aspects of networks for internationalization and international networks are discussed, as Table 5 shows, even if authors generally speak about internationalization without distinguishing them. The former denotes SMEs that take advantage of network relationships, mainly local, to enter foreign markets. The latter refers to firms collaborating with foreign partners, based on the rationale that small firms also need to be internationally cooperative if they want to be internationally competitive (Boojihawon, 2007).

Articles in the first group mainly analyze the impact of networks on internationalization, agreeing upon the general evidence that networks with different types of partners, overall when facilitated by an industry association, support SMEs in their internationalization process (Andersson et al., 2013; Eberhard and Craig, 2013; Prashantham and McNaughton, 2006; Echeverri-Carroll et al., 1998).

Articles in the second group mainly focus on the impact of international networks on internationalization, with a particular focus on how to achieve superior firm performance through international collaborations, and mainly providing indications on partner characteristics sustaining internationalization performance (Ciravegna et al., 2014; Musteen et al., 2014; Hilmersson, 2013; Tolstoy, 2010a; Sullivan Mort and Weerawardena, 2006). Differently from previous streams, authors here adopt a more dynamic approach and recognize the need to change continuously their networking strategies to be internationally competitive (Ibeh and Kasem, 2011; Musteen et al., 2010).

There are only a couple of articles assuming the perspective of the consequences of international networks on the firm. Tolstoy (2010b) prove that network development in an international context seems to be a strong requisite for knowledge combination that, in turn, has a positive impact on firm knowledge creation, whereas Musteen et al. (2010) observe that geographically diverse networks contribute to superior performance for the firm.

The presence of more qualitative than quantitative articles denotes that this stream of research is still in an exploratory phase, which is in line with the recent nature of these articles (see Fig. 6).

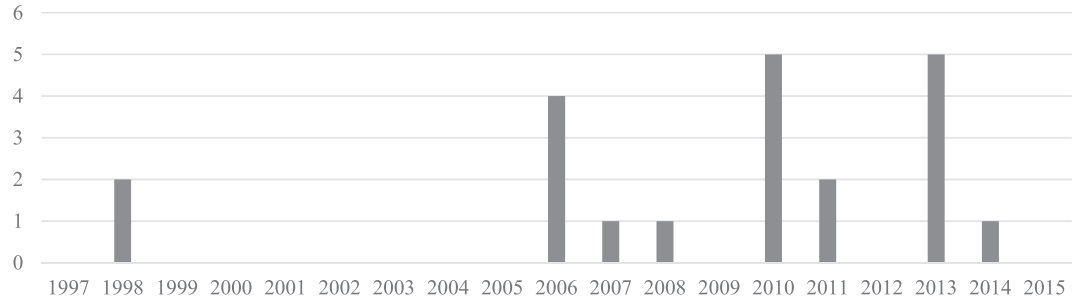

Fig. 6. Temporal evolution of articles in Stream 4.

Paths for future research

The analysis and discussion of the streams of research allow identifying interesting gaps within each of them. Therefore, subsequent paragraphs present paths for future research for the four streams.

Paths for future research on SME alliances

First, results show that authors in Stream 1 mainly make use of the construct "alliance", often providing a shared definition of it that implies the existence of a development process of alliances. However, if alliances evolve through a process, what lacks in this stream is a dynamic approach of investigation that takes the dimension of time into account. To address this gap, longitudinal studies could be beneficial to unveil how alliances evolve day after day and the activities and competences that managers should respectively perform and possess to make alliances more successful. The evolving nature of alliances combined with their notorious instability (Madhok et al., 2015) increases the complexity of this phenomenon that we believe has not been fully comprehended yet. Consequently, analyzing how resource requirements, governance mechanisms, commitment, goal sharing, to mention a few, change throughout the alliance development or how the alliance co-evolves with its environment and partner strategies represent fruitful avenues for future research. And if alliances are a complex phenomenon, in the SME context where entrepreneurs and managers have shortage of resources to be specifically dedicated to alliance development and do not possess all necessary competences, understanding how managers can develop these competences, which role support institutions and brokers can have in helping entrepreneurs in setting and developing their alliances, and finally whether some policies can foster not only alliance formation but also success definitely require further examination. Moreover, always considering the peculiarities of SMEs, with a particular

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glance at their very flexible and responsive, but at the same time inward, unplanned, and informal processes, a question arises regarding how they can match their nature with the requirements of such a complex phenomenon requiring organization and plans. To this regards, recently the literature (e.g. Dekker et al., 2016) has stressed the important role of a performance management system supporting partners in sharing information and responsibilities, communicating results to partners, monitoring outcomes and setting new goals, which might reveal key for SME alliance success; however, this issue has been overlooked.

Paths for future research on social capital in SME networks

In Stream 2, the network seems to be considered as an emergent feature of the firm having different types of ties with other partners (e.g. Musteen et al., 2014; McGrath and O'Toole, 2012), thus authors mainly adopt the perspective of the firm to investigate the antecedents and consequences of the existence of these ties. They largely examine the networking structure comprising the set of formal and informal links established by the firm or by the entrepreneur, as well as the drivers to such relationships or the impact of these relationships on firm performance; however, how the network develops is treated as a black box. This evidence confirms the claim that little empirical evidence exists for a theory of network development (e.g. Jack, 2010), despite a focus on key changes or transformations sharpens the potential for developing valuable insights into network processes that would be of interest to practitioners (Bizzi and Langley, 2012). For example, since networks are not static, but they evolve over time by leveraging social components (Hite, 2005), studying how the structural, cognitive and relational aspects of networks evolve over time becomes highly significant. This involves aspects as how the network configuration changes over time, how personal ties may transform into business ties, how trust mechanisms evolve or how different members of the network develop a shared culture. This social perspective on network is perfectly in line with networks seen as sites of continuously evolving interactions performed by individuals on behalf of companies, where the network is seen as a process with actors, activities and resources having a different importance in the network at each time (Halinen et al., 2012). Moreover, in this specific context (i.e. SME networks), this focus on people is reflected by the investigation of personal networks of SME entrepreneurs, as well as networks among SMEs. Is it the same phenomenon but called with different names, or are they different phenomena? The literature does not seem to distinguish them clearly, which could be a relevant shortcoming. If networks are seen as a way to extend the potential resource base of the entrepreneur, then the process leading to this transformation remains obscure; if authors point to the same phenomena, the terminology should be clarified and the specificities of such a phenomenon in the SME context investigated in deeper details.

Paths for future research on SME networks and innovation

Similarly to what happens in Stream 2, authors investigate the drivers of innovation networks and the consequences of innovation networks on innovation performance, overlooking the dynamics behind them. The OI literature (Huizingh, 2011) distinguishes two relevant processes related to open innovation: the former is related to the transition from closed to open innovation that details the steps through which firms open up their innovation process, whereas the latter is related to the practices of OI and refers to how to do OI. In the sampled articles, authors have concentrated on the “with whom” and “with what purpose” dimensions, but not on the “how”, thus leaving room for the investigation of how these processes occur in the context of SMEs. Some studies exist in the body of literature on open innovation (e.g. Huston and Sakkab, 2006), but mainly for large firms, while SMEs have not received specific attention with this regard.

The implications are that, on the one hand, we miss the details of the steps through which SMEs open up their innovation process. This means understanding the organizational changes (e.g. the change of the ongoing operations, the role of top management, the shift of attention towards identifying, absorbing and making use of external knowledge) occurring within an SME. On the other hand, the issue of practices and management capabilities becomes highly significant, considered that aligning inbound knowledge flows with the firm's in-house innovation activities is key to benefit from OI; for SMEs that hardly engage in formal R&D, it is particularly important to study the facilitating role of integrative managerial practices (Brunswicker and Vanhaverbeke, 2015). This implies investigating more in depth how to integrate inflows of knowledge with internal innovation activities and other integrative managerial practices for OI contexts in SMEs.

Furthermore, another interesting result is that external collaboration is not a necessary nor sufficient condition for successful innovation (Freel and Harrison, 2006; Freel, 2003). The literature (e.g. Huizingh, 2011) had already called for more research on the costs of openness, as well as on the strategic risks. In view of that, resizing the benefits of networking for innovation could be fruitful, as well as investigating whether there are some circumstances under which a collaborative approach towards innovation is preferred or even required. Within this domain, also the investigation of failure cases of SME network for innovation could reveal interesting insights.

In this discussion, the sampled articles assume only the inbound perspective of openness in the context of innovation, i.e. internal use of external knowledge. However, also the outbound perspective, i.e. external exploitation of internal knowledge, should be adopted, considered that SMEs are likely to develop different technologies, but they rarely exploit them commercially. Networking for this purpose represents a viable strategic approach to increase the

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economic returns from their technology investments, without building or acquiring costly downstream complementary assets (Bianchi et al., 2010). However, this aspect has not received sufficient attention in the context of SMEs. A possible reason can be that outbound OI activities imposes a higher level of managerial challenge due to the imperfections in the markets for technologies and lack of systematic internal process to drive such initiatives (Parida et al., 2012). Therefore, in the context of SMEs, understanding how to overcome these obstacles is even more stimulating.

Paths for future research on SME networks and internationalization

In Stream 4, overall, there is room for future research on international growth-seeking SMEs that are obliged to leverage external parties' assets in order to complement and augment their typically thin resource bundles (Ibeh and Kasem, 2011) in an attempt to penetrate foreign markets. The first issue deserving further attention is the distinction between international networks and networks for internationalization. The literature does not seem to be sharp in differentiating them, but they are clearly two different phenomena. The former refers to relationships with foreign partners established for a number of purposes, whereas the latter refers to relationships with local partners with the purpose to boost SME internationalization (e.g. enter foreign markets, increase exports). The two strategies imply different dynamics that are not clearly distinguished. International networks seem to have received greater attention than networks for internationalization. Moreover, within this context, authors mainly deal with the influence of networking on SME exports, overlooking other internationalization modes, as sales or manufacturing subsidiaries in the foreign market or global sourcing. Whether networking can play a role in these internationalization modes, that obviously require a different level of commitment and have different implications, is not analyzed in depth. This could reflect the fact that most SMEs use networking to increase exporting activities, as the literature reports (e.g. Musteen et al., 2010). However, there are also signals that SMEs may have a more radical approach towards internationalization, thus raising the interest towards understanding the complexity of more sophisticated internationalization modes through networking in the context of SMEs and the different capabilities required (Stoian et al., 2017), which represents a promising avenue for future research.

Generally, the literature on SME networks and internationalization is still in its infancy and it has been developing with a higher attention towards the time dimension and the dynamic nature of networks Therefore there is room for future research in this domain regarding the strategic and operational facets of SME internationalization through networking, as if and how SMEs need to adapt their internal practices, the capabilities required to internationalize through networking, or how to select partners for internationalization purposes to mention some examples.

As a more general consideration, internationalization represents only one of the aspects of IORs focused on downstream activities. In fact, others exist, as brand networks or channel networks that seem to be under-investigated within the SME domain. We have found a few articles mentioning these types of network that do not belong to any stream because they load on two or three streams, without having a clear connotation within one of the identified subfields.

Conclusions

The purpose of this study was to ascertain the subject of SME IORs as a field of research, and delineate its intellectual structure by identifying the major research streams that comprise it, thus supporting academic researchers make a step forward in this complex and quite fragmented body of knowledge. To accomplish this objective, we performed a bibliographic coupling and factor analysis based on a sample of selected articles in the field. In the case of SME IORs, the study of its intellectual structure is of particular relevance because the field is still seeking its own identity (Volery and Mazzarol, 2015), considered that the literature is quite recent and it has developed substantially around the mid-2000.

Overall reflections on the literature on SME IORs

Four main streams of research emerged from the analysis and, as discussed above, each of them offers different interesting paths for future research. Enlarging the perspective beyond each single stream, some conclusions on the sampled literature on SME IORs arise.

Among the four streams identified, one (i.e. S1) revolves around a specific typology of IOR, focusing on the alliance construct, another one (i.e. S2) around the social capital theoretical background in the context of networks and the other two (i.e. S3 and S4) around networks established for pursuing innovation and internationalization objectives respectively, thus emphasizing the IOR purpose. This means that the identified streams are classified along different dimensions of analysis (e.g. typologies of IOR, theoretical backgrounds, IOR purpose), which conducts to a number of intersections among them.

The first one refers to the terminology. As anticipated, articles in S1 clearly identify the alliance as their object of study and authors provide a widely shared conceptualization of it as a voluntary arrangement among firms involving exchange, sharing or co-development of products, technologies, or services. Instead, in the other three streams (i.e. S2, S3 and S4), authors mainly use the construct network, but without sharing a clear conceptualization. This leads to a series of considerations on the definition of constructs. After carefully examining all the streams, we cannot find consistent definitions within each stream or across streams. For example, in some cases, the network construct refers to the social network of the entrepreneur,

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in others to the network of direct and indirect ties among firms, whereas in others it is conceptualized as an alliance (as in Stream 1, i.e. a voluntary arrangement among firms). This suggests that, on the one hand, there are different constructs used with the same meanings and, on the other hand, different conceptualizations are attributed to the same construct network. This has relevant implications, based on the evidence that using a multiplicity of constructs of interest as a basis for theorizing without a clear and consistent definition could lead to certain biases in the field, because the development of a coherent, robust and generalizable theory requires a base of well-defined constructs (Gilliam and Voss, 2013). Therefore, careful attention should be paid to wording and construct conceptualization to provide solid grounds for future research within this area where construct proliferation has emerged because of the fast-growing body of literature on the topic (Podsakoff et al., 2016).

Secondly, some articles in both Stream 2 and Stream 3 deal with the impact of the type of partner/tie on some firm performance dimensions through a different lens. More specifically, in Stream 2 some authors base on the social embeddedness theory or social network theory to investigate the impact of strong/weak ties on innovation; similarly, in Stream 3 some authors analyze the impact of having a network with different types of partners on innovation mainly adopting an OI perspective. This implies that the same issue appears to be developing along different theoretical grounds (i.e. OI literature and SNT), remaining confined within each of them respectively and overlooking the other. This implies that the breadth and complexity of the topic may induce the risk of some similar topics remaining encapsulated within the domain of a specific viewpoint. On this basis, a stronger fusion of theoretical backgrounds could prevent the insulation of common topics within a single stream of research, and thus proliferation of literature on the same topic and fragmentation of the body of literature.

Thirdly, always related to the theories, there are some theories that are not widely adopted in the four streams, which suggests there are some areas of research that remains uncovered. To make an example, we find a few articles using the institutional theory and focusing on policies only among those not included in any stream. The fact that they do not load on any of the four identified factors suggests that they deal with a separate matter that has not developed into a stand-alone stream of research. Within this domain, in all the four streams of research, intermediaries are mentioned as having a very important role. Indeed, different governments have recognized the high potential of IORs, and have implemented a series of policy actions at the regional and national level (Spence, 2003; Verschoore and Balestrin, 2011). Nevertheless, this issue has received limited attention in this body of literature and policy implications are still very scarce. For example, the influence of different government policies on the development of SME IORs has never been considered so far, nor has the kind of support SMEs expect from intermediaries.

Fourthly, the lack of a time dimension across the analyzed streams calls for studies adopting a “process theory” approach instead of a “variance theory” approach (Mohr, 1982) to investigate antecedents and consequences of IORs. This matter deserves careful attention because intertemporal choices can have significant implications for the functioning and performance of IORs. Indeed, when studying processes, time becomes an important variable for looking at dynamic changes, which is lacking in the sampled articles in the SME domain. We recognize the complexities of this issue, due for example to the involvement of different actors, the existence of different levels of analysis, and the influence of contingent aspects. This poses tough challenges to researchers, which could have significant implications as far as the methodology is concerned. For example, the use of more specific methods of study, as flow mapping, point mapping and sequential mapping, offers network researchers alternative approaches to explore how time is perceived and how it becomes part of understanding IOR processes (Halinen et al., 2012).

Moreover, as far as contingency is concerned, a number of scholars (e.g. Chowdhury, 2011; Woodward, 1965) have been challenging the idea of the “one best way”, arguing that organizational structure's effect on organizational performance depends on contextual aspects that need to be taken into consideration. The emergence of two streams dedicated to purpose-specific networks (i.e. innovation and internationalization) can be regarded as a preliminary response to this matter. On such grounds, we encourage authors to specify the purpose alliances and networks have, thus moving beyond one-size-fits-all solutions, to build consistent streams of research developed around specific typologies of IOR, as the broad literature on SME IORs (e.g. Eberhard and Craig, 2013) suggests.

All this reasoning leads us to suggest how to approach the wide and complex field of SME IORs (see Fig. 7). Three main elements have emerged as significant from the discussion above, namely the construct definition, the theoretical background and the IOR purpose, that are directly connected to the aim of articles. Since constructs serve as the fundamental building blocks of theory (Provan et al., 2007), we sustain that authors should focus on construct identification and definition before going in depth of their research. The main difference seems to be between alliances and networks, despite we recognize other constructs may emerge within the IOR context. If they are recognized as different constructs, their clear conceptualization is required not only to identify the nature of the concept of interest, but also to help distinguish the focal concept from other, seemingly similar concepts in the field, thus providing the foundation for theory building. The identification of the IOR purpose further contributes to delimit the scope of investigation, thus identifying consistent streams of research.

At this point, the theories, which contribute to shape the article aim and the gaps to be bridged as well as to set the framework of the study, should be identified, taking into consideration the complexity of the phenomena and the fact that often a variety of theories are employed.

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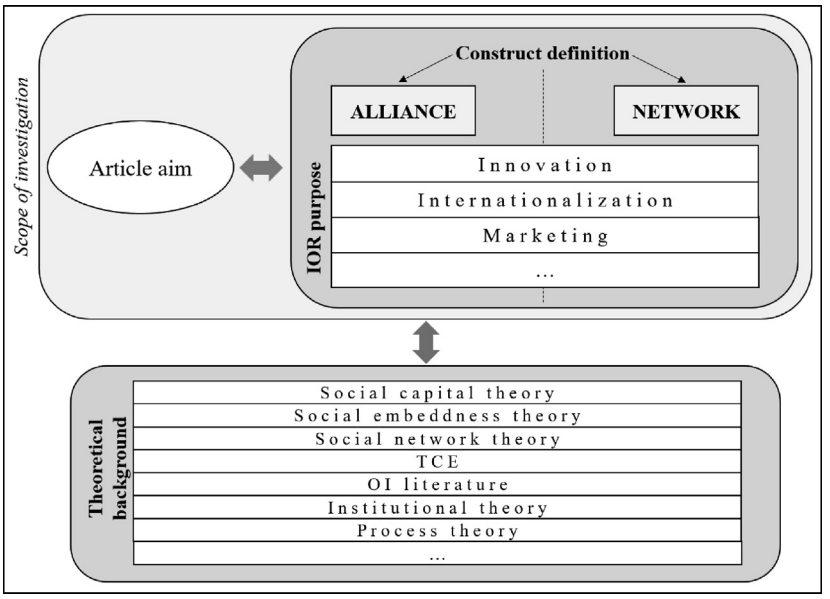

Fig. 7. Approaching the study of SME IORs.

Implications for theory and practice

This bibliometric analysis contributes to the research on SME IORs in several relevant ways. The present analysis permits identifying the different research fronts that emerge within the domain of SME IORs. In doing so, researchers may understand how SME IORs are evolving as a field of study and capture potential paths for its future development, summarized in Fig. 8.

Being a complex organizational phenomenon, our study is expected to have a strong impact on the academic community, because building a strong and coherent base of theory should be the core focus of researchers investigating an emerging field of research. In addition, being focused on SMEs, this study can valuably contribute to the creation of a consistent body of knowledge specifically dedicated to SMEs that seem to have a different behavior in the IORs formation and establishment.

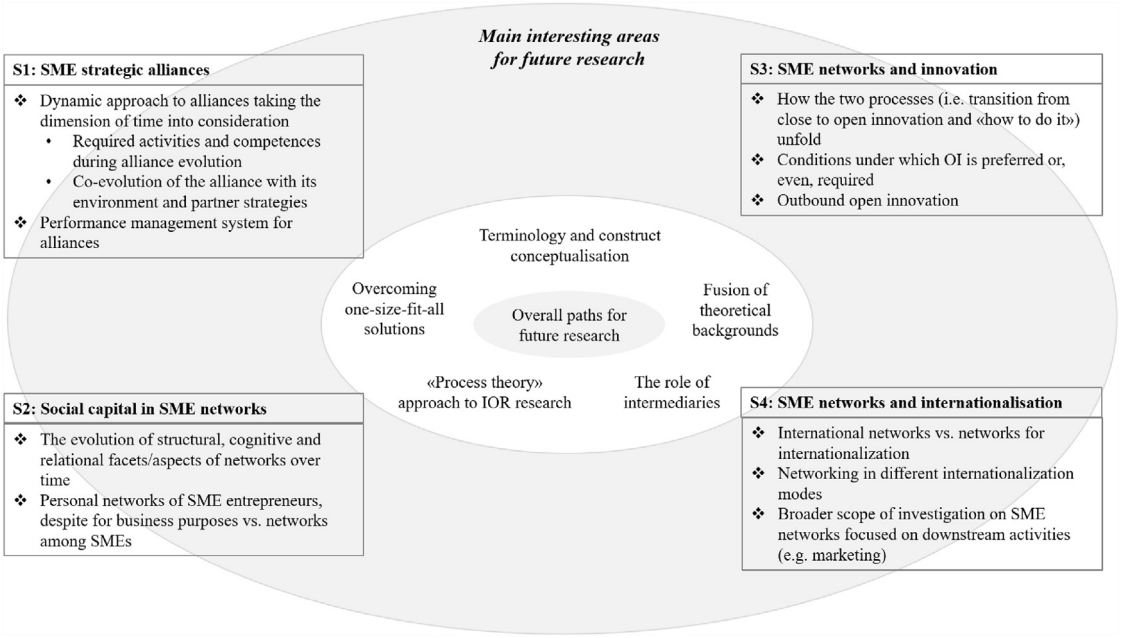

Fig. 8. Summary of interesting paths for future research.

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This study has also some interesting practical implications. By providing an analysis of the content of articles in the four subfields of research, entrepreneurs, managers and policy makers can have an overview on the drivers of alliances and networks, with particular reference to networks for innovation and internationalization. Moreover, some successful factors emerge from this study, as for example how to get the most from networks in order for SMEs to improve radical innovation, as well as product and process innovation. Furthermore, a couple of key messages for entrepreneurs and managers are conveyed by our analysis: the former concerns the need for SMEs to adopt a proactive approach to networking, which calls for entrepreneurial opportunity-seeking behavior; the latter is that by changing over time, IORs require SME entrepreneurs and managers to cultivate their networking capability to promptly respond to evolving strategic priorities.

Limitations

Beyond the above-mentioned contributions, the chosen methodology entails some limitations. Indeed, the quantitative approach of bibliometrics cannot account comprehensively for the complex nature of citing behavior because it does not capture the rationale behind why authors refer to other works (Vogel and Güttel, 2013).

With particular reference to bibliographic coupling, by considering documents independently of the number of citations, it reflects the production rather than consumption of scientific publications, which may cause the loss of information regarding the most influential contributions to a given field; moreover, articles with more references will be more likely to present intersections with the reference lists of other publications, and this issue is not taken into account (Vogel and Güttel, 2013). With particular reference to this study, we must recognize that this technique permits the classification of only a limited fraction of articles because, for example, some documents are excluded after the factor analysis because they load on more than one factor; moreover, the emergence of the four subfield indirectly reveals the presence of a group of researchers who share the same interests and coincide in citing the same references (Ramos-Rodríguez and Ruíz-Navarro, 2004).

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