Linking inter-organizational collaboration, innovation, and internationalization in SMEs: a systematic review

ABSTRACT

Inter-organizational collaboration (IOC) has been widely claimed as influential in enhancing SMEs innovation and internationalization performance. However, the literature on this topic is fragmented, consistent views on the relationships between the three constructs (IOC, innovation and internationalization) is largely missed. To address this gap, we conducted a comprehensive systematic review (with narrative synthesis technique) of 117 empirical studies published between 2000 and 2016 that address relationships between these three constructs (IOC-innovation, IOC-internationalization, and IOC-innovating-internationalization) in SMEs setting. Our study reveals that there is an upward trend (yet varies across the three relationships) in publishing articles on this subject overtime. In addition, we show the building blocks underpinning the dominating variables in these studies including enablers, moderators, mediators, and outcomes. Overall, the analysis suggests that while IOC, innovation and internationalization research has made significant progress over the years, there are still substantial gaps in the literature, which leave important areas for further investigation.

Keywords: Inter-organizational collaboration, innovation, internationalization, SMEs, systematic review

1. INTRODUCTION

Small and medium-sized enterprises (SMEs) make a significant contribution in economic growth in terms of job creation and gross domestic product (OECD, 2006; Nassr & Wehinger, 2015). This sector, therefore, has attracted a considerable research interest. Within this body of research, a growing number of studies have highlighted the increasing relevance of inter-organizational collaboration (IOC) for innovation and internationalization of SMEs, noting that the IOC is an important strategy for small firm that can invariably drive innovation and internationalization (Chetty & Wilson, 2003; De Mattos, Burgess, & Shaw, 2013). For instance, IOC plays a significant role to overcome deficiencies in scientific knowledge (Lee, 2007), resources and capabilities (Partanen, Chetty, & Rajala, 2014), commercialize the new invention (Kang & Park, 2012) and create the innovative products and services (Verbano, Crema, & Venturini, 2015). Similarly, IOC becomes an effective strategy for SMEs to internalize knowledge and experience necessary for reducing uncertainty (Oparaocha, 2015)and cost typically associated with the internationalization process (Ling-yee & Ogunmokun, 2001). In addition to these two directions, the literature shows emerging interest in studying the interrelatedness between the three constructs: IOC, innovation and internationalization in SMEs (Nordman & Tolstoy, 2016).

The state of the literature has suggested that the field has gained momentum and majority of the publications appeared in the last seventeen years. However, the contributions in this field are unsystematic, causing the lack of organized body of research on SMEs' IOC activity, innovation and internationalization. Specifically, to the best of our knowledge, no article specifically dedicated to conduct systematic review of articles concerning the link between IOC, innovation and internationalization in SMEs. With a general focus, some contributions have reviewed existing literature on specific strategy topics, such as networks and innovation (Pittaway, Robertson, Munir, Denyer, & Neely, 2004), the role of university-industry collaboration for innovation (Perkmann & Walsh, 2007) and inter-firm R&D partnerships (Hagedoorn, 2002). This indicates an important gap in our knowledge, as small firms have unique characteristics as well as idiosyncrasy in developing and managing IOC. Other reviews have focused on international involvement of SMEs (Martineau & Pastoriza, 2016) and innovation, exporting and growth of small firms (Love & Roper, 2015). Hence, understanding of IOC for innovation as well as internationalization of SMEs is still unclear, enduring an issue of interest for academics and practitioners.

To address this gap, we conducted the systematic review to create shared insights through narrative synthesis, thus strengthening the methodological rigour and establishing the reliable knowledge base for future researchers and policy-makers (Tranfield, Denyer, & Smart, 2003b). For this reason, we analysed 117 articles published between 2000 and 2016 that considered SMEs as their empirical setting.

This paper helps us to offer the first review of the literature by examining the influence of IOC on innovation and internationalization in SMEs. In particular, our constitution is threefold. First, based on the narrative synthesis of 117 articles, we combine the empirical claims in three categories based on their research relationships: IOC-innovation (IOC-INN), IOC-internationalization (IOC-INT) and IOC-innovation-internationalization (IOC-INN-INT). This novel classification allowed us to

observe trends and integrate scattered findings regarding SMEs practice in these relationships. Second, we identify and show the three dominant clusters in each of the three research relationships: enablers, moderators, mediators, and outcomes. Finally, we define several themes for future research directions as informed by our systematic analysis.

In the remainder of this paper, after detailing the methodology of articles selection and analysis, we illustrate the framework to report the review findings (see Figure 4). Then, we discuss the gaps in the literature and suggest the future research agenda.

2. METHODOLOGY

Given the dispersed nature of the literature, we adopted a systematic review methodology to deepen our understanding of the interrelatedness between IOC, innovation and internationalization in SMEs setting. We used narrative synthesis by following the guidelines suggested by Briner and Denyer (2012), adhering the principles of organization, transparency, replicability, quality, credibility and relevance. Specifically, our review followed a protocol that is based on Denyer and Tranfield (2009) approach, as outlined in Figure 1.

INSERT FIGURE 1 ABOUT HERE

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2. 1 Review scope, study screening and selecting

We started by defining our objective, which was to establish what is known about key aspects of the dynamics between the three constructs, and to find out how these aspects may be conceptually related. Therefore, we set our question as: How can IOC influence innovation and internationalization in SMEs?

We limited our review to peer-reviewed journal articles as a validated source of knowledge with high impact on the field (Ordanini, Rubera, & DeFillippi, 2008). Following Rowlinson, Harvey, Kelly, and Morris (2011), we chose to target the articles published in journals listed in the academic journal quality guide of Association of Business Schools (ABS) (see Appendix 1). Though we limited the scope of review by constricting the search to high grade journals (described as 3 or 4 starts journals), this measures mitigates potential reliability/validity concerns (Matthews & Marzec, 2012; Nguyen, de Leeuw, & Dullaert, 2016). We explored databases including EBSCOhost Business Source Complete, Science Direct, SAGE Journals and Wiley Online Library to identify our initial sample. The search period included the year 2000-2016. We selected this cutting point as some review studies on this topic can be found before 2000 (e.g., Leonidou, Katsikeas, & Piercy, 1998; Nooteboom, 1999).

Every database was searched using the wide-ranging keywords that were divided into three categories: IOC, innovation (INN) and internationalization (INT). In particular, we defined keywords for each of the three categories as well as the settings (SMEs), see ‘group string’ in Appendix 2. Then we combined between the four groups to create three research combinations (see the ‘combined strings’ in Appendix 2). For example, combined string 1 integrates "Inter-organizational collaboration" OR "Inter-firm cooperation" OR "Strategic alliances" OR "Network" OR "Partnership" OR "Cooperation" AND "Innovation" OR "Innovativeness" OR "New product

development" OR "Research & Development" OR "R&D" AND "Small and medium-sized enterprises " OR "SMEs " OR "Small enterprises " OR "Small companies" OR "New small ventures"

INSERT TABLE 1 ABOUT HERE

Overall, we conducted the identification, screening and selection process of articles in three steps, see Figure 1. First, we used the keywords in the three combined strings to search the databases, which yielded 3269 potentially relevant studies. These were imported into bibliographic software EndNote.

Second, we checked these studies against the 'quality' and 'time' screening criteria, Table 1, to refine our sample. Duplicate papers were removed using the 'find duplicate' function in EndNote. At this step, 2303 items were excluded on the basis of quality and time criteria, as well as 437 due to duplication, leaving 529 article for further screening.

Finally, and as the third step, we thoroughly scrutinized the abstracts of the 529 article by using the fit-for-purpose inclusion/exclusion criteria (Adams, Jeanrenaud, Bessant, Denyer, & Overy, 2015), as illustrated in Table 1. In a number of cases, it was difficult to clearly identify the study aim, theory, research method, and findings (Thorpe, Holt, Macpherson, & Pittaway, 2005), therefore articles introduction and/or conclusion were examined. In general, fit-for-purpose criteria concern about the validation of studies to meet the intended purpose of review (Boaz & Ashby, 2003), and is used when the important consideration is the contribution of the studies to synthesis and understanding (Van Aken & Romme, 2009; Macpherson & Jones, 2010). Therefore, in our case, this criteria was set to define the role of IOC for innovation and internationalization in SMEs. For this review, we defined IOC as the partnership between two or more organizations, that remain independent organizations, to share some resources and costs (Hagedoorn, 2002). Innovation has been defined based on Edwards & Gordon's innovation concept that refers to "a process that begins with an invention, proceeds with the development of the invention and result in the introduction of a new product, process or service to the marketplace" (Edwards & Gordon, 1984, p. 1). Here it is important to mention that, to be considered, an innovation must be capability to innovate, technology related new product/process and also minor/major change in product and process. This is due to the fact that small firms maintain a minimum level of in-house technology capacity and therefore they prefer to utilise IOC to support technology related innovation activities (Narula, 2004). Internationalization refers to the process of increasing involvement in international markets (Welch & Luostarinen, 1993). The application of this term provided us two different advantages. First, it allowed us to differentiate between two distinct dimensions of internationalization: internationalization speed (elapsed time between the year of firm founding and the year of first international venture), internationalization performance (attainment of desired objectives and revenue in international markets). Second, we were able to focus on export, which is a common entry mode used by small firm to enter international markets (Wolff & Pett, 2000; Haahti, Madupu, Yavas, & Babakus, 2005). By relying on these definitions, we included the studies that offered the empirical explanation of IOC for innovation outcome and for

internationalization performance. We also considered the studies that sought to empirically relate IOC, innovation and internationalization performance in SMEs. We found such information in purely quantitative studies, qualitative studies and some mixed method studies. To further clarify this criteria, we found many studies that tested the hypotheses that IOC can lead to innovation and internationalization. Despite the significance of this finding, all these papers elaborated the linkage in large firms rather than SMEs. We removed such studies because they were beyond the scope of our fit-for-purpose criteria. In addition, we specifically excluded the studies that focused on the internationalization adaptation, external collaboration or innovativeness for general firm performance. Studies, which empirically studied IOC and hence best illustrate the link with innovation and/or internationalization in SMEs, were included for final analysis. In case of ambiguity, both reviewers closely discussed the study and relied on the fit-for-purpose criteria to make the final decision. Eventually, this process resulted in 117 papers, which constituted our final sample.

2. 2 Analysis and synthesis

Since avoidance of undue emphasis on one study relative to other requires the transparent synthesis process (Mulrow & Cook, 1998; Tranfield, Denyer, & Smart, 2003a), we considered narrative synthesis (Dixon-Woods et al., 2006) to combine findings from 117 studies. The narrative synthesis allows to identify the story underpinning the diverse body of literature by giving reviewers flexibility to thematically explore the relationship between and inside studies (Nijmeijer, Fabbricotti, & Huijsman, 2014; Bailey, Madden, Alfes, & Fletcher, 2015). Our approach to narrative synthesis is guided by Popay et al. (2006) methodology.

First, we started by analyzing each study based on the investigated relationship, context of SMEs, types of outcomes, theoretical perspective, geographical location, sector, industry and methodology. We designed the worksheet to record this information and carefully scrutinized the information for potential errors (Bailey et al., 2015). This worksheet, thus, allowed us to create the map of field in terms of density, frequency and emerging patterns (Macpherson & Holt, 2007).

Second, as informed by our analysis outcome above, we grouped the articles in three categories: (1) IOC-INN, (2) IOC-INT and (3) IOC-INN-INT, as depicted in Figure 2. Using the Nvivo, we started in-depth line-by-line coding process to search in studies for the themes and concepts that are central in three research categories. This approach resulted in three major clusters under each category: (1) relationship enablers (2) relationship moderators and mediators, and (3) relationship outcome.

Third, we determined the sub-clusters by searching in studies for the information that is central in three major clusters. For example, from resource-based view, capabilities to manage a relationship facilitate the establishment and success of external linkages, which untimely result in innovation. From this perspective, network competency is identified as a sub-cluster. Finally, we explored the heterogeneity in the outcomes of all the articles. For example, some studies reported that supplier-based collaboration is useful for internationalization outcome rather than competitor-based collaboration. Also, some studies distinguished between the types of innovation that is product, process, radical and incremental.

INSERT FIGURE 2 ABOUT HERE

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3. FINDINGS

We start this section by presenting the descriptive outcomes of analysis, followed by the evidence on theoretical perspectives. We then use the framework in Figure 4 to organize and report the analytical findings regarding each of the relationships between the three constructs.

3. 1 Descriptive Findings

Examining the distribution of papers foci across the three research relationships, the IOC-INN relationship emerged as dominating (n = 73/117). A small majority of the studies investigated IOC-INT link (n = 37/117). Interestingly, research into IOC-INN-INT was limited (n = 7/117). With respect to type of outcomes, innovation performance (n = 54), product/process innovations (n = 16) and radical and incremental innovations (n = 6) were the most frequently investigated outcomes for IOC-INN relationship. On the other hand, INT success/performance (n = 36) and INT speed (n = 7) were mostly considered in studies that investigated outcomes for IOC-INT relationship. For publication pattern, we sorted the publications by year as in Figure 3. Since the research for IOC-INN and IOC-INT relationships was published almost every year, it is worth considering that number of publication was rapidly increased in the last five years, specifically for IOC-INN (n = 33) and IOC-INT (n = 16). Also, it is evident that IOC-INN-INT relationship (n = 4 in) has gained prominence during last five years, which highlights this combination as an emerging future research.

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In terms of industry, there was substantial bias towards manufacturing industry (n = 42) and high-technology/low-technology industry (n = 32). A number of studies considered manufacturing and services industry (n = 19) as well as multiple industries (n = 7) as empirical setting. Despite the changes in the structure of developed countries (Cimoli & Katz, 2003; Alexandersson, 2015), there is lack of research focus on trade, retail and media industries. The research clearly favours manufacturing and technology industries, which suggests that innovation is primary activity of manufacturing industries in SMEs. In addition, there is pronounced research gap in the setting of new ventures (n = 12), albeit IOC is an attractive activity for new small businesses (Marion, Eddleston, Friar, & Deeds, 2015).

In terms of the research methodology, survey design was dominating (n = 60), where method of analysis varies from regression analysis (n = 60) to complex structural modeling (n = 23). In addition, the response size varies in the studies with a low of 41 responses to a high of 830 responses, but most survey studies had respondents between 100 to 275. Other methodologies involved longitudinal quantitative data (n = 17), secondary data (n = 10), single case study (n = 21), and longitudinal case study (n = 4). A small number of studies used mixed method approach (n = 5).

The primary geographic source of the studies was the Europe (58), followed by Asia (n = 20), the United Kingdom (n = 14), America (n = 11), Australia (8), Africa (n = 4) and Ireland (n = 2). In terms of diversity of countries in a research, most of the papers considered one country (n = 101), two countries (n = 3) and three countries or more (n= 13). The prevalence of countries' diversity suggests the universal research cooperation. Overall, the research was conducted in 32 different countries. Some studies focused on the emerging markets, yet research into these economies is still limited. We investigated the correlation between the location and method of study. This established that the European countries are using both methods – quantitative and qualitative. However, there is discrepancy between the UK and Asia, where the former relies on quantitative method while the later uses qualitative method. Notably, the dominance of quantitative method can be an indicator of the fact that rigorous proxies are available to measure the concept of IOC, innovation and internationalization.

Considering publications outlets, as illustrated in Appendix 1, most articles were published in entrepreneurship and small business, Innovation and Operations Research and international business journals. Yet, it is apparent that research is lacking in general management journals like Strategic Management Journal (n = 4), Academy of Management Journal (n = 1) and Journal of Management (n = 1). It is debatable that general management research is biased towards large enterprises despite the fact that SMEs play an important role in the economic development (OECD, 2013). Consequently, it is an important area of research, which requires theoretically enriched research in the future.

3. 2 Theoretical Perspectives

Despite the fact that research is moving away from phenomenological focus towards greater emphasis on theory (Ruzzier, Hisrich, & Antoncic, 2006), surprisingly we counted 12 empirical studies with no theoretical foundation at all. These studies relied on the collaboration, innovation and internationalization literature to suggest testable hypotheses. For the rest of empirical studies, we have identified several different theoretical frameworks. However, majority of the articles build upon Resource-Based View (RBV) (Ling-yee & Ogunmokun, 2001; Tang, 2011; Subramanian, Angappa, Muhammad, & Crystal, 2016), transaction cost economics (e.g., Quintana-García & Benavides-Velasco, 2004; Freel & Harrison, 2006), organizational learning theory(e.g., Bruneel, Yli-Renko, & Clarysse, 2010; Inemek & Matthyssens, 2013), and social-exchange theory (e.g. Chetty & Blankenburg Holm, 2000; Eberhard & Craig, 2013; Wu, Wu, & Si, 2016) as theoretical perspective.

Considering research relationships, IOC-INN was studied mainly using RBV followed by transaction cost economics and social exchange theory. In contrast, IOC-INT research was dominated by RBV, social exchange theory and organizational learning theory. Studies on IOC-INN-INT relationship considered social exchange theory as principal theoretical lens. Notwithstanding, a small proportion of studies have used various combination of theories. For example, Tolstoy and Agndal (2010) integrated resource-based view with network theory. They argued that resource are critical success factor for global competitiveness; however, resource accumulation process often span

organization boundaries, providing small firms advantage over their competitors. Table 2 provides a consolidated review of the theoretical perspectives as applied in studying the relationships between collaboration, innovation, and internationalization.

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3. 3 Analyzing research into relationship between inter-organizational collaboration, innovation, and internationalization

Overall, the analysis highlighted four clusters as underpinning research into each of the three relationships (IOC-INN, IOC-INT, and IOC-INN-INT), including: enablers, moderator, mediators, and outcomes. In what follows, we map these clusters and their sub-clusters, as summarized in Figure 4.

INSERT FIGURE 4 ABOUT HERE

3.3.1. IOC-INN relationship

Enablers

The cluster 'enablers' basically refers to essential factors that allow SMEs to develop innovation-centric collaboration. On this premise, four sub-clusters emerged: IOC drivers, network competency, social capital and partner fit. IOC drivers refer to organization motivations to embark on a collaboration activity. Typically, SMEs suffer from limited internal resources, which is necessary for building technology-related competitive advantages, thus are forced to look beyond their organizational boundaries (Bianchi, Campodall'Orto, Frattini, & Vercesi, 2010). Specifically, from innovation perspective, it has been argued that small firms need to optimize their R&D process due to complexity and increasing cost of innovation (Tomlinson, 2010; Dooley, Kenny, & Cronin, 2015), therefore IOC emerged as an optimal option. In terms of competitive advantage, scholars stress that globalization force the small firms to create value over time by developing innovative products (Verbano et al., 2015), where SMEs only path to innovation is IOC (Fukugawa, 2006). Subject to this, IOC is a useful strategy to shorten innovation time, reduce cost and risk and increase the operational flexibility of SMEs (Iturrioz, Aragón, & Narvaiza, 2015; Verbano et al., 2015).

Network competency – refers to the firm' ability to manage the collaboration relationship efficiently - is also a likely enabler of IOC-innovation relationship (Ritter & Gemünden, 2003). It is noteworthy that network competency includes the concept of alliance management capability, which relates to coordination, communication and scanning skills for the effective management of IOC (Schreiner, Kale, & Corsten, 2009). The analysis reported several dimensions of network competence in SMEs, including design office, R&D spending, attributes of top management, previous experience and strategic value assessment. When design office exists, it is argued that partners become more determined to form collaboration because they know better who to inform

in case of technical difficulties (Bougrain & Haudeville, 2002). The design office can be oriented towards the refinement of existing products/service, which develops the capacity of small firms to learn from partners. With respect to R&D spending, Kang and Park (2012) find that internal R&D intensity enables a small firm to overwhelm the geographic distance in search of partner with specialized knowledge. Specifically, internal R&D efforts complements the IOC due to ability to learn from diverse range of partners. Along the same line, attributes of top management are worth considering, since they influence the receptiveness to external linkages (Classen, Van Gils, Bammens, & Carree, 2012). In this vein, the specialist qualification (i.e., education level) of CEO has been viewed critical as it allows the identification of partners who can bring the quality ideas for innovation and fit well with the internal resources (Muzzi & Albertini, 2015). Hence, well-educated top managers are important to the point that they place strong emphasis on effectiveness of external partners' operations and their resources, which are important for the development of innovation through IOC (Classen et al., 2012; Kang & Park, 2012). Moreover, social qualification such as, communication skills, conflict management skills, extraversion, compassion, emotional stability and cooperativeness, is of special interest to determine the quality and success of IOC (Ritter & Gemünden, 2003; Ceci & Iubatti, 2012). This is due to the fact that innovation is a complex activity and partners bring different ideas. Therefore, it requires the social qualification to maintain the relationship quality while pursuing for innovation (Lee, 2007; Petrick, Maitland, & Pogrebnyakov, 2015). With respect to previous experience, it has been argued that manager' previous work experience is a profound enabler of IOC as experiential knowledge allows to anticipate and evaluate critical situation during relationship and to select suitable actions (Baum, Calabrese, & Silverman, 2000; Romijn & Albaladejo, 2002; Nieto & Santamaría, 2007). In the same vein, IOC experience is a natural form of forming IOC for innovation because it entails a lower level of uncertainty and opportunism (Nieto & Santamaría, 2007; Wincent, Anokhin, & Örtqvist, 2010; Franco & Haase, 2015). From a learning perspective, SMEs establish shared understanding and common ways of innovation through repeated partnering, which allows to sustain the pattern of interaction over time (Nieto & Santamaría, 2007; Howard, Steensma, Lyles, & Dhanaraj, 2016). Last but not least sub-cluster, strategic value assessment – a capability to evaluate the effectiveness of a collaboration – is also a key enabler of IOC. Nijssen, Hillebrand, de Jong, and Kemp (2012) highlight that rational assessment of innovation collaboration helps the small firms to scan and identify the right partner to perform better in IOC. However, strategic value assessment is cited only once, which could be considered in the future research.

Social capital - which is the set of resources available to a group through social relationships - emerged as a critical enabler for IOC-INN relationship (Iturrioz et al., 2015). Three dimensions shape the social capital: structural, cognitive and relational. While in our review sample only Camps and Marques (2014) draw on the three dimensions, most scholars draw on one or two dimensions of the social capital. When the relational dimension exists, it implies that trust, norms, reciprocity and commitment are needed to subordinate the desires of SMEs to joint innovation goals (Wincent et al., 2010; Gronum, Verreynne, & Kastelle, 2012b). Sating differently, relational dimension allows the small firms to avoid opportunistic activities, which ultimately makes them attractive partner for the exchange of resources and capabilities (Wang & Chen, 2016). Where

cognitive dimension is at play, partners seek for shared vision, shared codes and language as well as shared narratives (Ceci & Iubatti, 2012), which facilitates the visualization of potential collective innovation (Dooley et al., 2015). Finally, the structural dimension can increase the chance of establishing collaboration (for innovation purpose) as having several weak holes can facilitate the allocation of appropriate partners (e.g., prospect partners with complementing technology or learning potentials) (Fukugawa, 2006; Lee, 2007). Taken together, social capital is an important enabler of IOC for the purpose of innovation in small firms (Tomlinson & Fai, 2013).

Similarly, partner fit is revenant in enabling SMEs IOC for innovation purpose. The concept of partner fit has been stressed in terms of technological capability, resource complementarity and resource similarity (Fukugawa, 2006; Verbano et al., 2015), because these features can determine the view of SMEs' collaboration. Technology capability is often characterized as tacit and complex, which is difficult to trade through market channels; therefore, IOC enables SMEs to gain access to such capabilities (Verbano et al., 2015), increase social interaction between partners thus strengthening the technological base (Gupta & Barua, 2016). Small firms can be motivated towards the collaboration if they see that potential partner has distinct technological capabilities, which may add value to innovation generation (Baum et al., 2000). Along the same line, resource complementary pushed small firms to collaborate in order to combine resources and create synergy as well as avoid opportunistic behavior (Subramanian et al., 2016). Furthermore, perceived resource similarity is also vital for enabling IOC as SMEs can increase the economies of scale in their innovation development process (De Mattos et al., 2013).

Moderators

Moderators of IOC-INN relationship can be categorized under three levels (or sub-cluster): firm, network, and environmental. Firm level analysis involves moderators that exist within the firm, including absorptive capacity and entrepreneurial orientation. Absorptive capacity, describes organization's ability to use prior knowledge to recognize, assimilate and use external knowledge, causes a variety of influence on IOC and innovation (Lee, 2007). Since the collaboration requires the exchange of information, SMEs with a stronger absorptive capacity can be better in generating new ideas during information exchange process, recognize their value and integrate them in their innovation development process (Caloghirou, Kastelli, & Tsakanikas, 2004; Kang & Park, 2012). However, the moderating effect of absorptive capacity is stronger in case of collaboration with suppliers and competitors than research institutes because suppliers and customers provides unique resources and knowledge, which can be used for commercialization of innovation (Tsai, 2009). On the other hand, entrepreneurial orientation - refers to the degree to which organizational culture is related with aggressive strategic attitude - allows SMEs to make significant use of collaboration for innovation performance (Gupta & Barua, 2016). In this vein, it is suggested that weak entrepreneurial orientation is likely to generate more benefits of collaboration for innovation because weak entrepreneurship does not allow the small firms to take risky innovation actions rather rely on external linkages (Baker, Grinstein, & Harmancioglu, 2016).

At the network level of analysis, there are certain moderating factors to be considered, namely governance mechanisms, strength of ties, geographic location and power asymmetry. The adequate governance mechanisms strengthens the innovativeness of a small firm in collaboration relationship (Kaufman, Wood, & Theyel, 2000). Governance involves various mechanisms including transactional (i.e., contracts, formal control) and relational (trust, reciprocity and social bonds) (Hanna & Walsh, 2002; Bouncken, Clauß, & Fredrich, 2016). Bouncken et al. (2016) argue that transactional governance mechanism reduces the willingness of competitors to cooperate because fear of opportunism forces them to add more clauses in the contract. In contrast, relational governance provides greater flexibility to small firms because partner trust each other and believe that collaboration will lead to mutual benefits (Wasti & Wasti, 2008; Bouncken & Kraus, 2013; Wu et al., 2016). Strength of ties (i.e., frequency of interaction among partners) has profound role to moderate the relationship between IOC-INN. For instance, Poorkavoos, Duan, Edwards, and Ramanathan (2016) argue that strong ties are critical to obtain secret information and critical resources for innovation. However, Wang and Chen (2016) contend that strong partnerships restricts the small firms' access to new opportunities in the market and reduce innovation potential. Although strong ties prevent novel innovations, such ties can allow the partners to know the right person to contact in case of problem and exploit information for modifying the existing innovations (Fukugawa, 2006; Wincent et al., 2010). In the same line of reasoning, geographic location is important network-level moderator but we found some inconsistencies in the literature. For instance, one group of scholars argues that closely located partners are able to frequently interact, extract valuable information and avoid spillover of knowledge (Freel, 2000; Freel, 2003; Poorkavoos et al., 2016). However, it permits the opportunism behaviour among partners to deploy the knowledge in favour of one partner (Bouncken & Kraus, 2013). On the contrary, the findings of other empirical studies suggest that international alliance development facilitates the small firms to get advanced scientific knowledge, create common platforms for products and services, and open new markets for innovations (Kang & Park, 2012; Inemek & Matthyssens, 2013). Finally, power asymmetry – that is the degree to which one partners holds substantially low or high power than another partner in alliance relationship – is a pivotal construct that affects the IOC-INN relationship (Wang, 2011). Power asymmetry constraints the trust and commitment between collaborators and hampers the knowledge flow, which lowers the overall innovation outcome (Inemek & Matthyssens, 2013; Franco & Haase, 2015).

At the environmental-level of analysis, an implicit assumption is that changing and enduring conditions in the external environment of SMEs, including technological dynamism, market uncertainty and competition intensity are associated with amplification of IOC-INN relationship. For instance, the prevalence of technology uncertainty forces the small firms to seek IOC for the development of technological innovations in a timely and efficient manner (Bouncken et al., 2016).

Mediators

The number of studies that focus on the mediators between IOC and innovation are smaller than the vast literature that focuses on moderators between IOC-INN relationship. At the firm-level of analysis, internal collaboration is considered as mediator between IOC and innovation outcome.

For instance, Howard et al. (2016) argue that firms learn from outside partners and then form internal collaboration to share information, which ultimately result in innovation outcome.

Outcomes

This cluster encompasses the innovation outcomes of IOC (Hadjimanolis, 2000; Keizer, Dijkstra, & Halman, 2002; Gupta & Barua, 2016). In general, there is agreement that relationship with different collaborators, primarily suppliers, customers, competitors, and research organizations, improves the innovation performance of small firms (Hottenrott & Lopes-Bento, 2016; Howard et al., 2016). Indeed, the literature on innovation outcomes provides many forms of outcome (or sub-clusters), which have been divided into innovation capability, product, process, incremental and radical innovation.

First, IOC helps the small firms to develop innovation capability. Romijn and Albaladejo (2002) posit that collaboration (with suppliers, customers and research organizations) provide technological and marketing information, which complements internal learning processes and foster technological improvements. Along the same line, Sammarra and Biggiero (2008) argue that IOC provides the tacit knowledge to small firms for the development of innovation capability.

Second, several articles in this review indicate that IOC leads to product innovation (Fliess & Becker, 2006; Hottenrott & Lopes-Bento, 2016). It has been argued that collaboration partners provide the customized product design as well as increase the product portfolio (Rothaermel, Hitt, & Jobe, 2006). Tsai (2009) claims that collaboration with suppliers is necessary to identify potential technical problem and speed up the development of new products to meet the demands of markets. Nijssen et al. (2012) argue that customers also provide product ideas as well as tacit technological knowledge, thereby increasing innovation. Several studies also point to a direct relationship between research institutes-based collaboration and product innovation. Fukugawa (2006) posit that research institutions provide technical solution to small firms in product development and help them to conduct own research.

Third, process innovation is also an outcome of IOC. For instance, Freel and Harrison (2006) argue that competitors allow to access collective economies of scale and pool fixed cost in training and R&D activities. However, the role of customer and supplier collaboration for process innovation is not profound in SMEs because process innovations are linked to the development of technicians skills and improve the production process (Nieto & Santamaría, 2010), which can be developed internally.

Fourth, in terms of incremental innovation outcome, collaboration with customers and competitors provide a strong base for incremental development because their expertise and prior experience helps a small firm to make improvements to their products.

Finally, radical innovation is an important factor for the survival of small firm, which is pursued through IOC (Poorkavoos et al., 2016). In this vein, several studies point the importance of collaborators (i.e., suppliers and customers) for radical innovation because customers provide novel innovation ideas (Parida, Westerberg, & Frishammar, 2012) and suppliers reduce the risks of innovation development. Research organizations provide scientific and technological knowledge

to small firms and open new market for new products (Nieto & Santamaría, 2007). However, Partanen et al. (2014) argue that research organizations are not a fruitful source for radical innovation because the development of revolutionary products needs the integration with customers' processes who are the end-user of a product. Along the same line, coopetition, the simultaneous pursuit of cooperation and competition, enhance the radical innovation because partners obtain market power, complementary resources and share risks (Bouncken & Kraus, 2013). On the contrary, (Nieto & Santamaría, 2007) argue that competitors are not attractive partners for radical innovation due to their opportunistic behaviour, which decreases the trust and competitive advantage.

3.3.2. IOC-INT relationship

Enabler

In contrary to IOC-INN relationship, our analysis shows limited study into IOC-INT relationship enabler. Specifically, four enablers emerged: distance to foreign market, environmental uncertainty, network capability, and networking behaviour.

First, the distance (geographical and cultural) between company home country and international market is found as a significant enabler for SMEs to establish IOC (Ojala, 2009; Ciravegna, Majano, & Zhan, 2014). In this respect, research shows that greater distance to foreign markets will require further resources to enter into these markets (Ojala, 2015). Therefore, and due to their limited resources (Manolova, Manev, & Gyoshev, 2010; D'Angelo, Majocchi, Zucchella, & Buck, 2013), SMEs with internationalization ambition are typically driven towards IOC to acquire necessary knowledge and resources they lack (Chetty & Blankenburg Holm, 2000).

Second, an increase in environmental uncertainty demands the inter-functional expertise, skills and knowledge for SMEs to remain competitive and explore foreign opportunities (Freeman, Edwards, & Schroder, 2006; Oparaocha, 2015). The prevalence of environmental uncertainty, therefore, increases the chance of IOC development in order to overwhelm the liability of foreignness and expand abroad (Matanda & Freeman, 2009; Brouthers, Nakos, & Dimitratos, 2015).

Third, network competency enables small firms to exploit IOC for internationalization. For instance, Tolstoy and Agndal (2010) claim network competency - that is ability to identify resource complementarities and ability to proactively coordinate resources in network relationships- allows the small firms to select the right collaboration partner for internationalization. Along the same line, Sullivan Mort and Weerawardena (2006) posit that networking competency (i.e., ability to identify, acquire and reconfigure the resources) facilitates the selection of partner with appropriate knowledge and resources and determines the success of collaboration.

Finally, networking behaviour – proactiveness, commitment, openness and strategy – allows the small firms to strengthen the relationship with partner firms in internationalization (Tang, 2011).

There is limited research in networking capability and networking behavior sub-clusters, thus leaving room for further research in this domain (Mort & Weerawardena, 2006).

Moderator/Mediator

SMEs literature has provided evidence for the moderating factors (or sub-clusters) between IOC-INT relationship. At firm-level analysis, these include experiential learning and family ownership. Experiential learning is a firm level factor that negatively moderates the relationship between IOC-INT. For example, Bruneel et al. (2010) note that more experience a small firm gains by conducting cross-border activities, the more it learns to manage the complexity of foreign markets. Consequently, more experiential learning forces the small firm to reduce the reliance on IOC for internationalization. On the other hand, family ownership negatively moderates the IOC-INT relationship (Eberhard & Craig, 2013). This is due to the fact that family firms have autocratic and paternalistic culture, where family members distrust collaboration partners (D'Angelo et al., 2013). Family firms, therefore, are less likely to form collaboration in order to pursue international opportunities.

At network level, distance to network has been highlighted as a key moderator. Research has shown that closely located partners are able to interact face-to-face, broaden the scope of resource combination and nurture the trust in relationship (Richardson, Yamin, & Sinkovics, 2012; Salvador, De Villechenon, & Rizzo, 2014). In this vein, Boehe (2013) posits that locally embedded collaboration not only reduces the reliability of transmitted information but also lowers the potential of collaboration for internationalization of small firms.

Mediators

A number of scholars have considered the mediating factors for IOC-INT relationship. At firm level, there are two mediating factors: firm-specific capabilities and knowledge domain. First, firm-specific capabilities stand out as a mediator between IOC-INT. In this vein, Brouthers et al. (2015) consider the mediating role of R&D capability. They contend that exposure to IOC provides new ideas and tacit knowledge, which ultimately improves the R&D capability of small firms and consequently leads to internationalization of new products. Along the same line, Lu, Zhou, Bruton, and Li (2010) focus on adaptive and information acquisition capabilities that transform the IOC into successful internationalization. IOC results in closer interaction among firms, which enables them to learn approaches to collect and analyze the information about product attributes, and to become flexible and adaptive in responding to changing needs of customers; ultimately resulting in successful internationalization (Musteen, Francis, & Datta, 2010; Child & Hsieh, 2014). Second, knowledge domain – organization's ability to collect information that provides a base to take future actions - mediates the relationship between IOC and internationalization (Child & Hsieh, 2014). For instance, collaboration provides the foreign market information to small firms and increase their knowledge intensity, which can be used to achieve international performance (Haahti et al., 2005; D'Angelo et al., 2013).

Outcomes

Several studies have provided the evidence for positive relationship between IOC-INT (Ghauri, Lutz, & Tesfom, 2003a; Francioni, Vissak, & Musso, 2016; Kim & Hemmert, 2016). Within this research, three forms of outcome emerged: internationalization speed, internationalization success, and internationalization scope.

First, internationalization speed - the time elapsed between the firm foundation and the first export – has gained particular attention (Musteen et al., 2010; Ciravegna, Lopez, & Kundu, 2014). Numerous studies have found that collaboration partners provide distinctive resource and competencies to facilitate the early internationalization of SMEs (Belso-Martínez, 2006; Sullivan Mort & Weerawardena, 2006). Nassimbeni (2001) posits that suppliers and commercial agents permit the small firms to gather information about foreign demands, competition, limitations and the opportunities present in international markets. In contrast, competitor-based collaboration permits the sharing of resources and experience, thus simplifying the entry in foreign markets (Freeman et al., 2006). Second, internationalization success, financial performance in international market, is widely investigated outcome (Haahti et al., 2005; Oparaocha, 2015). The relationship with suppliers , customers and competitors provide the necessary market knowledge and facilitate the entry in international markets (Chetty & Wilson, 2003; Ojala, 2009). Finally, the concept of internationalization scope is relatively new in IOC literature as we identified only one study. Felzensztein, Ciravegna, Robson, and Amorós (2015) argue that having a broad range of collaboration relationships (i.e., relationship with suppliers, customers, competitors and research organizations at national and international level), small firms can expand the operations in diverse regions. This is a promising area for future research in SMEs.

3.3.3. IOC-INN-INT relationship

Distinct from the studies above, another research focuses explicitly on the relationship between the three constructs: collaboration, innovation, and internationalization. However, this research stream was the lowest in density (as demonstrated in Figure 2). As a specific note, we realized only IOC-INN-INT path, where IOC proved to enhance innovation, and thus the internationalization of SMEs.

Enablers

In enabler cluster, we have found the evidences related to environmental dynamism. A number of researchers noted that environmental dynamism is characterized by changes in technology, customer preferences and fluctuation in product demand (Boso, Story, Cadogan, Micevski, & Kadic-Maglajlic, 2013). In the dynamic environment, the current products and processes can become obsolete and require the development of new ones (Chetty & Stangl, 2010). To minimize the threat of innovation disuse, small firms can capitalize on collaboration to create new products and meet the needs of customers (Stoian, Rialp, & Dimitratos, 2016). Furthermore, the

development of such innovation creates opportunities to explore new market niches and achieve internationalize performance (Ganotakis & Love, 2011).

Moderators

The analysis identified several factors as moderating this tripartite relationship, which we categorize into two sub-clusters: firm-level and environmental level. At firm-level, the role of organizational structure emerged. The structure of a small firm is important facilitator for the innovation development and internationalization performance (Andersson, Evers, & Griot, 2013). In particular, the organic organizational structure – that is decentralized and informal – gives employees' opportunity to interact frequently and bring ideas for innovation (Chetty & Stangl, 2010). Therefore, prevalence of organic structure encourages the development of new innovation and commercialization of innovation in international markets (Boso, Story, Cadogan, Micevski, & Kadic-Maglajlic, 2013).

At environmental-level, different articles examined the moderating role of industry clock-speed and environmental heterogeneity. First, industry clockspeed – the rate of change in industry in terms of products and processes – imposes mounting pressure on small firms due to lack of operating experience (Patel, Fernhaber, McDougall-Covin, & van der Have, 2014). Due to high rate of change in industry, there is a greater need to increase knowledge inflows, develop innovation and launch innovation in international markets (Chetty & Stangl, 2010). Accordingly, high industry clockspeed leads to increased IOC in order to gather knowledge, share R&D cost and develop innovations (Patel et al., 2014). Second, environmental uncertainty (competition among rivalries and changes in customer demands) moderates the linkage between innovation and internationalization such that high small firms require innovative products to meet the changing demands of customers and justify the increased investment in R&D due to increased competition in international market (Boso, Story, Cadogan, Micevski, & Kadić-Maglajlić, 2013).

Mediators

There is evidence of exceptionally low density of mediators between IOC-INN-INT relationship. Within firm level sub-cluster, authors pay attention mainly to innovation behaviour and collective efficiencies. First, the most investigated mediator is innovation behaviour (Mesquita & Lazzarini, 2008). In particular, innovation behaviour enables new ways of thinking, the development of strategies to enter international markets and increased commitment to international operations (Stoian et al., 2016). Whether SMEs are able to make practical use of innovation behaviour is, however, determined by IOC. Innovation behaviour is facilitated by collaboration where partners are willing to interact and share knowledge, which lead to improved innovation output, and eventually internationalization performance (Ganotakis & Love, 2010; Andersson et al., 2013). Second, collective efficiencies – that is manufacturing productivity and product innovation – mediate the impact of IOC on internationalization (Mesquita & Lazzarini, 2008). The coordination of SMEs' activities with collaboration partners guarantees the exchange of information, provision of efficient production processes and development of products (Ganotakis & Love, 2011). The

resulting collective efficiencies enable the SMEs to meet the expectations of international customers and leverage internationalization performance (Andersson et al., 2013).

These contribution, regardless of individual relevance, are random and unsystematic. Since they do not allow to identify a regular pattern among them, there is still a room for further investigation in this research.

Outcomes

In the literature on IOC-INN-INT relationship, the internationalization outcome is a multifaceted concept (Patel et al., 2014; Stoian et al., 2016). In particular, we realized two sub-clusters: internationalization speed and internationalization success. First, in terms of internationalization speed, prior research established that collaboration is a mean of early entry in international markets through innovation (Andersson et al., 2013). In particular, collaboration partners, namely customers, suppliers and research organizations, help SMEs to overcome the cost of their small size and collectively develop innovation, which ultimately facilitates the expansion in foreign markets (Chetty & Stangl, 2010). However, Patel et al. (2014) posit that early internationalization is not only the outcome of local collaboration but it requires the international collaborators because they help to develop more extensive loci of product attributes that fits with the requirement of international customers. Second, within internationalization success research, findings indicate that IOC contributes to the manufacturing productivity and product innovations, which are recognized as determinants of small firm's internationalization success (Nassimbeni, 2001; Ganotakis & Love, 2010). Despite the inspection of IOC-INN-INT relationship outcomes, the domain remains under-investigated to determine the causality between IOC-INN-INT. Actually, in line with Stoian et al. (2016), the literature relying on longitudinal data remains overlooked compared with the high volume of survey based studies.

4. DISCUSSION and CONCLUSION

Interest in IOC has grown by leaps and heightens over the past several decades, where such organizational arrangement is largely perceived as fundamental for SMEs innovation and internationalization (Kaminski, de Oliveira, & Lopes, 2008; Richardson et al., 2012; Hervas-Oliver, Boronat-Moll, & Sempere-Ripoll, 2016). Despite this growing interest, the body of knowledge in this area is still fragmented, which is likely to bedevil research progress. To address this gap, we conducted systematic review into 117 relevant papers to scrutinize the effect of IOC on innovation and internationalization performance in SMEs. To this purpose, we organized the review around three research relationships with three clusters and some sub-clusters, as depicted in Figure 4. In this section, we discuss our findings and suggest future research avenues as informed by our analysis, see Table 3.

INSERT TABLE 3 ABOUT HERE

4.1. IOC-INN relationship

A number of issues have emerged from this review. Considering the antecedent of IOC-INN relationship, a number of studies acknowledged the role of network competency. They all concern the different dimensions of network competency, i.e., design office, ability to obtain information, previous work experience and IOC experience. The studies, however, could go beyond and integrate all the dimensions of network competency to facilitate the IOC for the purpose of innovation. This can lead to a comprehensive explanation of the significance of network competency for IOC success in small ventures. Also, in IOC-INT relationship, environmental uncertainty is considered an enabler of IOC (Ghauri, Lutz, & Tesfom, 2003b), whereas in IOC-INN they are disregarded, even though environmental uncertainty encourages the small firms to develop complex innovations through IOC. Along the same line, social capital is considered an important enabler of IOC role of social capital (Camps & Marques, 2014), however a handful number of studies considered the relationship between social capital dimensions and IOC. On these premises, the following main questions can be considered:

- How environmental uncertainty impact on IOC?
- To what extent network competency can influence the success of IOC in SMEs?

Not only the enablers of IOC are partially investigated, but there is lack of agreement and accuracy over where IOC characteristics (i.e., strength of ties, partner diversity and IOC scope) fit within the wider conceptual sphere. Some studies (e.g. Classen et al., 2012) position partner diversity as antecedent of innovation performance, whereas others position partner diversity as moderator (e.g. Ebersberger & Herstad, 2011). Additionally, a small number seem to overwhelm the concept of partner's geographic distance as antecedent (Wincent et al., 2010; Partanen et al., 2014) and moderator (Freel, 2003). This discrepancy is probably an indicative of the lack of agreed definition and conceptualization of IOC. Specifically, the qualitative case study based research could better contribute to the unveiling of IOC definition. The conceptualization could be clear through investigation of following issues:

- How has IOC been defined and theorized?
- What is the moderating role of IOC characteristics on IOC and innovation outcome?

The articles in this stream of literature has focused almost exclusively on the enabler, moderators and outcomes, thus treating mediators as a black box. Our analysis shows that internal collaboration mediate the relationship between IOC and innovation (Howard et al., 2016). Given the fact that IOC involves different partners with different structures, corporate cultures and business goals (Zeng, Xie, & Tam, 2010), the successful development of innovation requires certain organizational practices, like delegation of responsibility and communication. For instance, the delegation of responsibility to right personnel reduces the cost of transmitting, receiving and processing information because employees know how to identify and assimilate external information and use for innovation projects (Foss, Laursen, & Pedersen, 2010). Moreover, the external partners' knowledge needs to be communicated to the firm units who are involved in innovation process (van de Vrande, de Jong, Vanhaverbeke, & de Rochemont, 2009).

- What are the organizational practices which may be associated with IOC-INN relationship?
- How can social capital moderate the relationship between IOC-innovation?

Our review revealed that innovation is a complex activity, which is measured in various ways. In general, it has been measured by using three different objective indicators: patent counts (e.g., Baum et al., 2000; Howard et al., 2016), innovation count (i.e., collecting information from databases about product/process offers) (Rothaermel et al., 2006) and sales generated by new products (Tsai, 2009). However, these measures are not widely used in our review sample. Although these measures are regarded as a valid source of knowledge, they are not often used in our review sample. This could be due to the fact that small firms have informal innovations (Gronum, Verreynne, & Kastelle, 2012a). The use of objective data is also not without limitation. For instance, some firms follow appropraibility regimes to avoid the high cost of patent registration; therefore some patents may not be registered (Leiponen & Byma, 2009). In such a case, patent count can act as invalid measure. In addition, the innovation count can risk the overestimation of innovation output by considering the products/processes that are not successfully marketed (Sammarra & Biggiero, 2008). The sale value has advantage over patent count because it indicates the success of innovation (Fu, 2012), but it can distort the innovation performance by including the sales of non-innovative products. A large number of studies used subjective measures particularly in the case of survey (Ritter & Gemünden, 2003). For instance, product/process innovation rate in 3 years (Inemek & Matthyssens, 2013), cost reduction in existing products/processes (Wincent et al., 2010) and increase in the novelty of products/processes (Bouncken et al., 2016). It is worth considering that these measures are developed by the researches and therefore subject to validity issues (Poorkavoos et al., 2016). Also, unlike patent count, subjective data does not allow the researchers to determine the degree of newness in products/processes. In order to overcome these issues, the researchers can use the combination of both measures: subjective as well as objective. It will allow to take advantage of both measures while overcoming their shortcomings.

- How does the use of both subjective and objective measures validate the innovation performance of SMEs?

4.2. IOC-INT relationship

As evident from analysis, the enablers, moderators/mediators and outcomes in the IOC-INT relationship are not extensive. In the enabler cluster, the literature has apprehended the important role of distance to foreign market (Brouthers et al., 2015) and network competencies (Eberhard & Craig, 2013) as enabler of IOC to obtain internationalization performance. However, the partner fit remains underexposed despite the fact that resource complementarity and technological resources makes a firm attractive partner and hence interfere in the decision to collaborate (Franco & Haase, 2015). Therefore, there is room to explore following questions:

- How does partner fit influence the formation of IOC for internationalization?

When considering the relationship between IOC-INT, it has been stressed that certain factors moderate this relationship (Ling-yee & Ogunmokun, 2001). Some scholars considered firm level moderators (Eberhard & Craig, 2013), while others have identified the moderators at network level (Boehe, 2013). However, earlier scholars have overlooked the important role of intuitional environment despite the fact that intuitional arrangements (i.e., rules and policies of government) legitimize or constraints the internationalization of small firms (Ciravegna, Lopez, et al., 2014). In other words, IOC can support the internationalization of SMEs by mainly erecting institutional barriers in foreign markets (Zhang, Ma, Wang, Li, & Huo, 2016). To close this gap, future studies can examine how IOC facilitates SMEs to overcome institutional challenges and consequently enter in international markets. We also encourage future researchers to investigate this phenomena in the context of young ventures because they have less experience, which may hamper their ability to early internationalize and cope with intuitional challenges (Kiss & Danis, 2008). Along the same line, emerging markets, like India and China have underdeveloped markets as compared to develop countries. It is a potential area of future research to consider the early internationalization of small firms from emerging markets to international markets (Yamakawa, Peng, & Deeds, 2008).

- Does institutional environment moderate the relationship between IOC and internationalization speed in SMEs?
- How IOC encourages the young ventures to internationalize from emerging markets to developed countries?

Another important issue concerns the strength of ties for the internationalization of SMEs. There are some controversial findings in our review. One group of scholars argue that strong network ties provide access to foreign market knowledge and information about customers' demands, which ultimately influence their speed of entry in new markets and improve international performance (Musteen et al., 2010; Zhang et al., 2016). In contrast, other researchers argue that strong ties increase the degree of resource dependence and constraint the potential of small firms to recognize international opportunities (Kim & Hemmert, 2016). Therefore, weak ties can enhance international speed and performance by providing the access to information quickly and at low cost than would be the case with strong ties (Wu, Luo, & Zhou, 2007). Considering the fact that strong or weak ties have different implications (Child & Hsieh, 2014), small firms are required to take a number of decisions regarding the scope of IOC. For instance, if partners are relying on strong ties, the issue related to relational governance mechanism could become central. Stating differently, the reliance on strong ties could enhance the requirement for trust, communication and coordination mechanisms in order to enhance the quality of information exchange, which is deemed crucial for access to international markets (Freeman et al., 2006). Even though, all these factors shape the internationalization speed and success of SMEs, the issue has not received the significant attention. Therefore, following questions are posited for future research:

- How do relational governance mechanisms facilitate the IOC and internationalization speed?

- Does the requirement for strong and weak ties differ for internationalization speed and success?

Considering the outcomes, internationalization speed and success are the most investigated, thus leaving room for further evaluation of internationalization scope. Internationalization speed has been measured as the amount of elapsed time (in years) between the year of firm founding and the year of its first international venture (Musteen et al., 2010; Ciravegna, Lopez, et al., 2014). Internationalization success has been measured using the ratio of export sales to total sales (Eberhard & Craig, 2013; Kim & Hemmert, 2016). Despite the significance of this measure, it is difficult to get the objective data because firms are reluctant to disclose the figures of international performance. This measure also has limitation of underestimating the international performance due to missing values and calculating the performance based on reduced number of observations (Boehe, 2013). Therefore, more direct indicator is developed based on firm-level survey. This approach is qualified as perceptual measure because information is obtained by asking questions, how satisfied a firm is with venture performance in terms of (a) the realization of goals and objectives, (b) profits, and (c) sales (Brouthers et al., 2015). This measure has also disadvantages because firms export to different countries. Using this measure, all international markets are treated indiscriminately and it is difficult to check the international performance in each of the exporting countries (D'Angelo et al., 2013). It is, therefore, central to upgrade this approach by asking the questions about international performance in individual country. Finally, internationalization scope is measured using number of foreign countries to which SMEs' products are exported (Zhang et al., 2016). This area is still underdeveloped as we found only one study. Therefore, future studies can consider the relationship between IOC and internationalization scope for small venture.

- How does the use of objective and subjective data determine the internationalization performance in each exporting country?

4.3. IOC-INN-INT relationship

The literature on IOC-INN-INT is not so extensive, but fruitful area for future research (Stoian et al., 2016). With a shift from resource-performance link towards capabilities research, it has been argued that possession of resources is important but capabilities are source of transforming the resources into products or service superior to competitors (Lu et al., 2010). In this sense, scholars have sometimes presented that articulation of IOC provides resources to attain the innovation competencies and production efficiencies that are unavailable for small firms to obtain alone, which in turn enhance the access to international markets (Mesquita & Lazzarini, 2008). This state of research suggests that there is a long way ahead to develop our understanding of how IOC-INN-INT relationship occurs. The attention can be extended towards the entrepreneurial proactiveness of small firms to seek IOC resources for the innovation development and internationalization performance.

- How does innovation mediate the IOC and internationalization performance in new ventures?
- How does entrepreneurial proactiveness encourage IOC for innovation and internationalization performance?

The consideration must be dedicated to methodological issues. Previous researchers heavily relied on cross-sectional design, which is not without limitation. First, cross-sectional studies collect data at single time point and make it difficult to determine the causality. Second, the impact of IOC on innovation and ultimately on internationalization needs time to take effect; however, cross-sectional studies suggest that effect takes place immediately. Third, cross-sectional studies collect data for all the variables at a single point in time from one informant usually. This is problematic because extent of effect differs for different intervals. Finally, there is reliance on self-report data, which raises the concern of common method bias (CMB). CMB is a measurement error which can undermine the validity of a research (Boehe, 2013). The future research can mitigate the issues of cross-sectional research by using multiple informants, time lags to collect data and objective data. Another future recommendation could be use of longitudinal research because it allows to determine the reverse causality between IOC-INN-INT (Stoian et al., 2016).

To conclude, we first outlined the methodology of review and then synthesized the findings of our review. This review structured the previous empirical literature in three research relationships, namely IOC-INN, IOC-INT and IOC-INN-INT. This research classification is consistent with research that studies IOC with innovation and internationalization (Tolstoy & Agndal, 2010). Second, our review recognizes the enablers, moderators/mediators and outcomes of each of the research relationships. Finally, we integrated the insights from our review to provide the direction for future researchers. This review has implications for researchers, practitioners and policy-makers to better understand the phenomena in SMEs and promote it.

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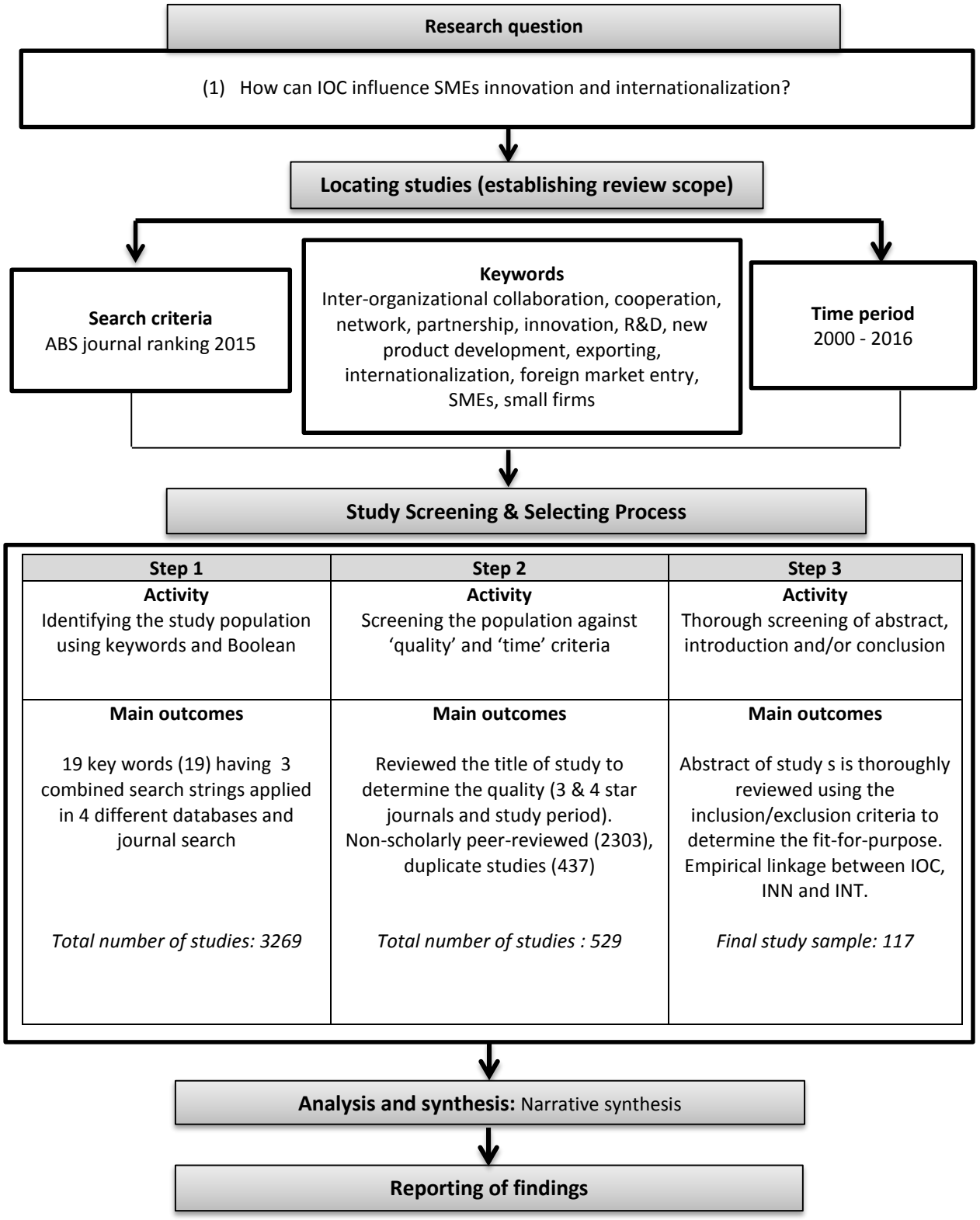

Figure 1- Summary of the systematic review methodology

Table 1: Inclusion and exclusion criteria

Description	Reason for inclusion	Reason for exclusion
Quality	• ABS 3/4 start journals	All non-scholarly peer-reviewed articles, books, and non-published materials.
Time period	• Study period 2000 to 2016	All articles published before the selected time period.
Abstract screening (fit-for-purpose)	• Indicates a relationship between elements of IOC and innovation in the context of SMEs • Innovation can be product/process as well as radical/incremental	➢ Conceptual paper ➢ This does not refer directly to determine the relationship between factors of interest (i.e., IOC, innovation and internationalization). ➢ The papers focuses on large enterprises rather than SMEs. ➢ Paper looking at learning as a proxy for innovation. ➢ Exclude articles looking at IOC for overall performance of firm in terms of return on assets.
	• Indicates the influence of IOC for internationalization of SMEs • Internationalization in terms of entry in foreign markets, rapid internationalization and internationalization performance	
	• Indicates the linkage between IOC, innovation and internationalization of SMEs	

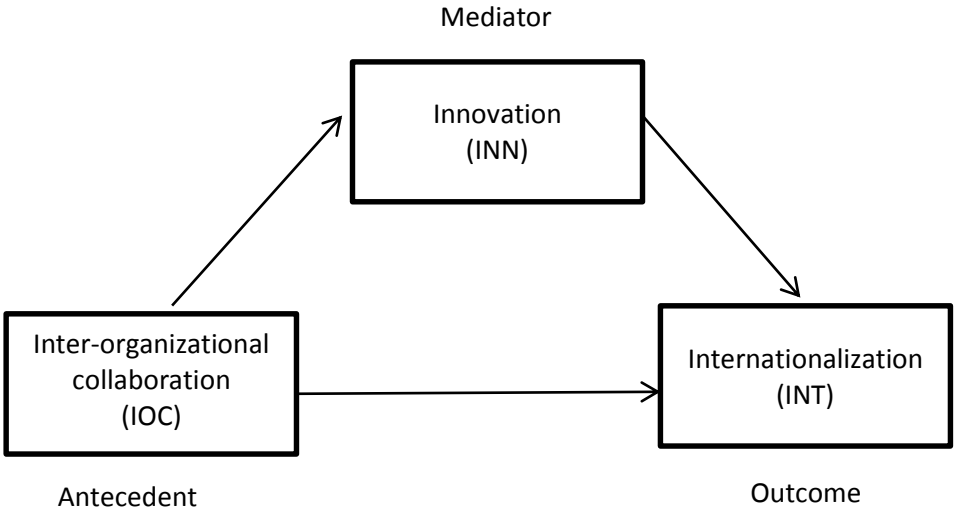

Figure 2: Framework of Inter-organizational collaboration, innovation and internationalization research in SMEs settings

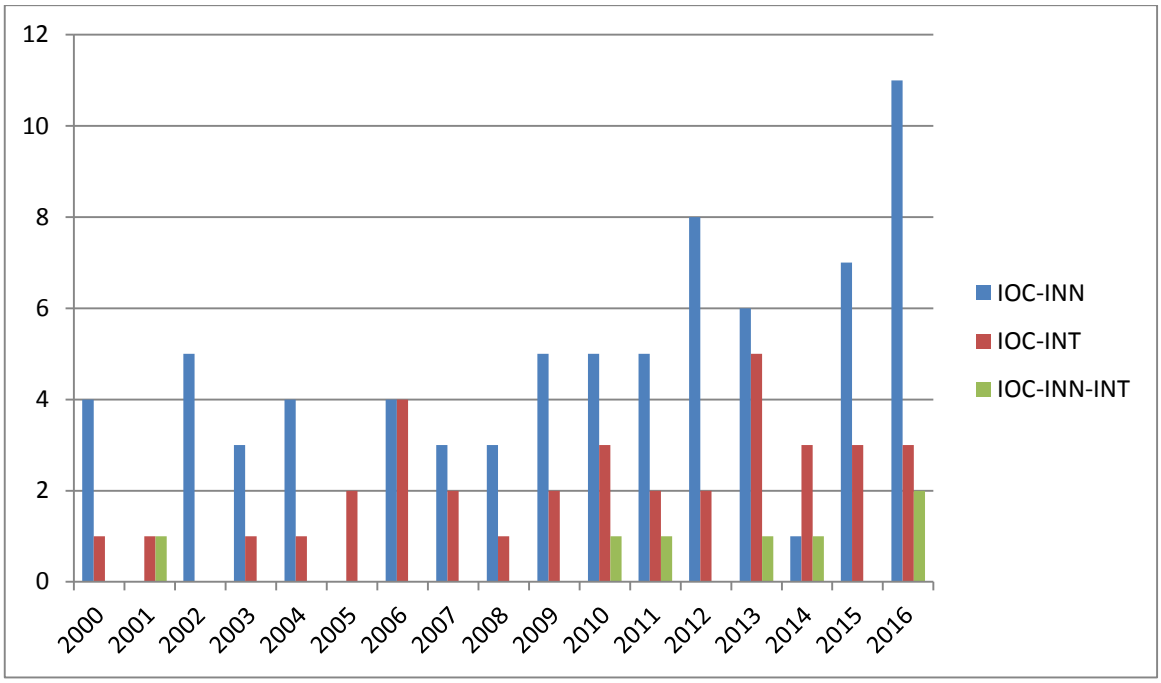

Figure 3: Number of publication by research field, from 2000 to 2016

Table 2: Summary of theoretical perspectives used in SMEs setting

Theory	Research relationship	How theory is used in studying the relationship	Selected examples
Resource-based view	IOC-INN	Firms are heterogeneous units containing of idiosyncratic resources that are rare, valuable, inimitable and non-substitutable . therefore, the strategic use of external resources can provide competitive advantage.	Kang and Park (2012); Lee, Park, Yoon, and Park (2010); Subramanian et al. (2016)
	IOC-INT	The firm's ability to exploit heterogeneous IOC is an intangible resource that creates value in terms of entering new markets.	Boehe (2013); Chetty and Wilson (2003)
Social exchange theory	IOC-INN	The social interaction between collaboration partners focus on the role of frequent linkage, which improves the culture of trust and commitment among partners for innovation development.	Gronum et al. (2012b); Wu et al. (2016)
	IOC-INT	Close personal ties among partners create the new contacts and allow the small firms to explore international opportunities.	Eberhard and Craig (2013); Ojala (2009)
	IOC-INN-INT	IOC is conducive of generating efficient innovation, which is important determinant of internationalization.	Boso, Story, Cadogan, Micevski, and Kadic-Maglajlic (2013)
Organizational learning theory	IOC-INN	IOC is a channel of new ideas through which organizational learn new skills and apply new ideas for innovation.	Baker et al. (2016); Inemek and Matthyssens (2013)
	IOC-INT	SMEs can build the knowledge and capabilities that are needed for the internationalization.	Bruneel et al. (2010)
Transaction cost economics	IOC-INN	IOC is an intermediate governance mechanism between markets and hierarchies.	Freel and Harrison (2006); Nieto and Santamaría (2007)

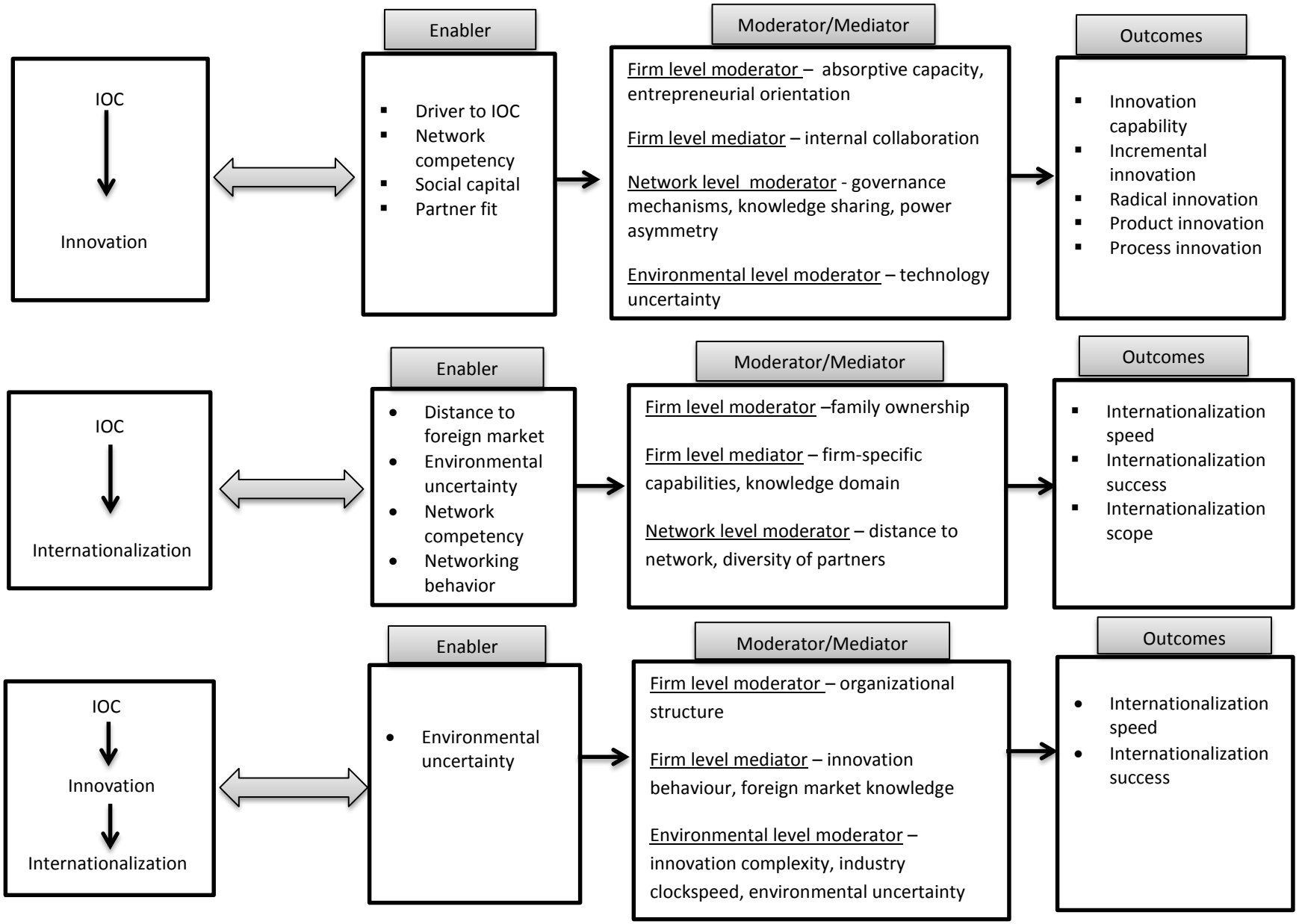

Figure 4: Conceptual framework of analysis

Table 3: Summary of findings and research gaps

Research relationship	Findings	Research gaps
IOC-INN	• Network competency, social capital and partner fits enables IOC for innovation • Absorptive capacity and entrepreneurial orientation facilitates the relationship between IOC-INN • Product/process and radical/incremental innovation outcomes are result of collaboration with different partners	□ Absence of research on the network competency (particularly integrating the dimensions of network competency) □ Lack of research on the conceptualization of IOC □ IOC characteristics (i.e., partner diversity and strength of ties) are regarded as antecedent rather than moderators
IOC-INT	• Distance to foreign market and environmental uncertainty encourages the SMEs to develop IOC for international performance • Geographic proximity promotes the relationship between IOC-INT • Family ownership matters for IOC-INT because family firms are reluctant to collaborate and share information with outsiders • IOC promotes the firm capabilities to acquire the information and adapt with the changing demands of customers, which ultimately promote internationalization • IOC partners accelerate the speed of internationalization and improve international performance	□ A need to consider the issue of partner fit for the success of IOC □ Lack of research on the moderating role of institutional environment for IOC and internationalization speed □ Contextualize IOC for internationalization speed of young venture from emerging markets to developed markets □ Less interest in the relational governance mechanism □ Need to focus on the effect of strong and weak ties for internationalization speed and success
IOC-INN-INT	• Technology uncertainity forces the SMEs to establish IOC • Small firm's organic structure promotes the information sharing, innovation development and internationalisation performance • Uncertain environment requires IOC for innovation generation and international performance • IOC is beneficial for innovation, which ultimately result in internationalization	□ Very little research in IOC-INN-INT relationship □ Need to consider the role of entrepreneurial proactiveness to enable IOC for INN and INT □ More research is required for moderators like partner diversity, social capital □ Longitudinal research is needed to determine the direction of causality

APPENDIX 1: LIST OF JOURNALS USED IN SYSTEMATIC REVIEW AND NUMBERS OF ARTICLES

Journal title	Article count	Journal ranking (ABS 2015)
Entrepreneurship and Small Business		
Entrepreneurship Theory & Practice	2	Grade 4
Strategic entrepreneurship journal	1	Grade 4
Entrepreneurship & Regional Development	4	Grade 3
International Small Business Journal	1	Grade 3
Journal Of Small Business Management	12	Grade 3
Small Business Economics	2	Grade 3
General Management/ Strategic Management/Organisation Studies/ Regional Studies Journals		
Academy of Management Journal	1	Grade 4*
Journal of Management	1	Grade 4*
Strategic Management Journal	4	Grade 4*
Journal of Management Studies	1	Grade 4
Long Range Planning	2	Grade 3
European Management Review	1	Grade 3
Regional Studies	1	Grade 3
Innovation and Operations Research Journals		
Journal of Product Innovation Management	4	Grade 4
R&D Management	7	Grade 3
Technological Forecasting and Social Change	3	Grade 3
Technovation	14	Grade 3
International Journal of Production Economics	2	Grade 3
Marketing Journal		
Journal of Marketing research	1	Grade 4*
European Journal of Marketing	1	Grade 3
Industrial Marketing Management	5	Grade 3
Journal of Business Research	9	Grade 3
Journal of International Marketing	1	Grade 3
International Marketing Review	2	Grade 3
Economics/ International Business Journals		
Journal of International Business Studies	3	Grade 4*
Journal of World Business	5	Grade 4
Research Policy	12	Grade 4
Oxford Economic Paper	1	Grade 3
International Business Review	13	Grade 3
World Development	1	Grade 3
Total	117	

Appendix 2 – Keywords and Search Strings

No:	Category	Search strings
1	Group string 1	"Inter-organizational collaboration " OR "Inter-firm cooperation" OR "Strategic alliances" OR "Network" OR "Partnership" OR "Cooperation" OR
2	Group string 2	"Innovation" OR "Innovativeness" OR "New product development" OR "Research & Development" OR "R&D" OR
3	Group string 3	"Exporting " OR "Internationalization " OR "Foreign market entry" OR
4	Group string 4	"Small and medium-sized enterprises " OR "SMEs " OR "Small enterprises " OR "Small companies" OR "New small ventures" OR
5	Combined string 1	"Inter-organizational collaboration " OR "Inter-firm cooperation" OR "Strategic alliances" OR "Network" OR "Partnership" OR "Cooperation" AND "Innovation" OR "Innovativeness" OR "New product development" OR "Research & Development" OR "R&D" AND "Small and medium-sized enterprises " OR "SMEs " OR "Small enterprises " OR "Small companies" OR "New small ventures" OR
6	Combined string 2	"Inter-organizational collaboration " OR "Inter-firm cooperation" OR "Strategic alliances" OR "Network" OR "Partnership" AND "Exporting " OR "Internationalization " OR "Foreign market entry" AND "Small and medium-sized enterprises " OR "SMEs " OR "Small enterprises " OR "Small companies" OR "New small ventures" OR
7	Combined string 3	"Inter-organizational collaboration " OR "Inter-firm cooperation" OR "Strategic alliances" OR "Network" OR "Partnership" AND "Innovation" OR "Innovativeness" OR "New product development" OR "Research & Development" AND "Exporting " OR "Internationalization " OR "Foreign market entry" AND "Small and medium-sized enterprises " OR "SMEs " OR "Small enterprises " OR "Small companies" OR "New small ventures" OR