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A repositioning organizational knowledge dynamics by functional upgrading and downgrading strategy in global value chain

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Abstract

This research has been conducted to study the relationship between the repositioning strategy of small and medium enterprises (SMEs) and the effectiveness of their cross-innovation strategy. In particular, we focus on the organizational knowledge dynamics that drive the functional upgrading and downgrading strategy of the SME, and how these enable the organizations to exploit external paths to market by developing and selling new knowledge.

The strategy and operations of SMEs are often marked by limited resources and a high dependence on others. The scope of their business often gets narrower as they seek to adapt to the dynamics of the new knowledge-intensive context. In their relationship with multinational enterprises (MNEs), SMEs are driven to a continuous specialization of their knowledge and technological resource bases. SMEs then seek to source global knowledge by positioning along a global value chain often driven MNEs. In the process, SMEs use organizational knowledge to drive their strategy for functional upgrading or downgrading within the global value chain (GVC). This can, in turn, reveal new opportunities for SMEs to increase their network and find an optimum position in the market. Thus, SMEs are able to leverage on a combination of dynamic and technological capabilities along with high degree of involvement in knowledge management process.

This subject is investigated through the study of 532 European knowledge-intensive SMEs via structural equation modelling. Our findings have relevant implications for policy-makers and managers of SMEs, informing the efforts to employ organizational ambidexterity for their repositioning strategy in the global value chain.

Keywords

Global value chain, dynamic capabilities, SMEs, knowledge management, innovation performance, functional upgrading, functional downgrading

1. Introduction

The recent dynamics of location and ownership strategies of multinational enterprises (MNEs) are amongst the most significant challenges in the global economy. There is a wide consensus in the literature that decision making in MNEs has become increasingly sophisticated and often relies on fine-slicing the activities of firms and finding an optimum location for each of those very specialised activities (Haworth, 2013; Buegelsdijk et al., 2009; Contractor et al., 2010; Mudambi, 2008; Linares-Navarro et al., 2014). In the current context of globalization of the business, MNEs are often driven towards collaboration with intermediary, local firms that contribute to such specialised activities by supplying not only raw materials, components, parts and sub-assemblies at a reasonable price (Mudambi, 2002; Morya and Dwivedi, 2009) but also knowledge (Buckley and Carter, 2002; Nadayama, 2019; Sheng and Hartmann, 2019). Such suppliers are normally micro, small and medium size enterprises (SMEs), which have come to play a crucial role in the MNEs' strategic supply chains and beyond, in the global supply chain setup (Prashantham and Birkinshaw, 2019). This is described by Buckley and Strange (2015: 238) as a "complex strategy by MNEs to reduce location and transaction costs, with global value chains linked together by international flows of intermediate products". There is a great need to use global sources (Kotabe, 1992). Alongside, Buckley and Carter (2002) emphasise the role of the knowledge resources that influence the relationship between MNEs and SMEs. Those authors emphasise the importance of the following knowledge-related factors in this relationship: drivers, that is characteristics of knowledge and the value generated by dynamic capabilities in knowledge management; limitations which are expressed in the participants' attitude and knowledge transfer of technology; and finally, outcomes concerning organizational structure and performance. Thus, there seems to be agreement in the extant literature that through knowledge and its management MNEs' strategies often have a direct impact on the mindset and context of local SMEs, thus contributing to deepening the international division of labour.

However, on occasions that knowledge-driven relationship with MNEs gives SMEs an edge against competitors as part of their strategic supply chain management by enabling them to play an active role within the MNEs' business strategies. This edge is strengthened when a dynamic and agile knowledge management strategy is present in the SME and its context, which facilitates the exploration of external knowledge, as well as its adoption and exploitation for the benefit of the organisation and its business (Oliva et al., 2011; Oliva and Kotabe, 2019; Gold et al., 2001). This new knowledge would not only be related to the MNE's and SME's products and services but include all types of knowledge capital – tacit knowledge, skills and competencies, attitudes and behaviors, explicit knowledge, procedural knowledge, organizational culture, reputation, and network relationships that enable the learning and growth that drive sustainable innovations (Garcia-Perez et al., 2019).

This view opens new research ideas to be addressed in the knowledge-mediated relationship between the SMEs and MNEs. In our specific case, we explore how 532 European SMEs employ six variables: 1. combination of dynamic capabilities in knowledge management ; 2. Global value chain activities; 3.

A degree of SMEs' involvement in the KM process of MNEs; 4. SMEs' Involvement of technological capabilities of MNEs; 5. Functional upgrading strategies; and 6. Functional downgrading strategies to describe the repositioning organizational of SMEs within the global value chain and evaluate the correlation with SMEs' innovation performance by the intermediary role of functional upgrading and downgrading strategies.

Our research contributes to the international management literature by addressing a key research question on the subject of dynamic capabilities in knowledge management in different inter-organizational collaborations. We extend the current body of research on "process and structure in knowledge management practices" (Buckley and Carter, 2002) to offer additional insights into the subject of the repositioning firm strategies of SMEs within GVCs. In particular, we study whether their role within GVCs induces in SMEs a functional upgrading or downgrading strategies, which has been highlighted over a decade ago (Singer and Donoso, 2008) but still not researched to a significant extent, leaving the intermediary effect of repositioning strategies on SMEs' innovation performance unexplored to date. Indeed, Wieland et al. (2020) has recently suggested new conceptual directions which encompass supply chain management, focusing on upstream and downstream activities in the international business domain which are still to be addressed.

As a required contribution –and based on our review of the recent literature, such knowledge is still missing is presented by the fact previous studies have provided valuable insights into the nature and consequences of the co-operation between MNEs and SMEs within specific GVCs (Buckley & Prashantham, 2016; Punyasavatsut, 2007; Dunning and Lundan, 2008; Festel, 2010). Some scholars have focused on the upgrading processes of the firms involved in the GVC, studying the GVC dynamics over time. For example, the value chain functions of local SMEs have received significant attention from perspectives such as the SMEs' innovation capabilities (Lema et al., 2015); how different functions affect the SME products and processes (Humphrey and Schmitz, 2002; Blazek, 2015); the social functions of the enterprise (De Marchi et al., 2013); and the characteristics of such processes in developing-country firms (Gereffi et al., 2005; Luo and Tung, 2007; Pananond, 2015).

Another area where limited progress has been made is the study of factors affecting the value chain functions in SMEs (Gereffi and Fernandez-Stark, 2011; Hansen et al., 2009). Although some efforts have been made to identify and understand the antecedents of supply chain management in specific areas (e.g. Kumar et al., 2017; Barber et al., 2017; Hernández-Espallardo, 2006; Kotabe and Mol, 2006; Fang and Zou, 2009; Aloini et al., 2015) and global sourcing strategies (Kotabe and Omura 1989; Kotabe, 1992), there is still a need for further studies which focus on the antecedents that can affect value-chain functions of SMEs. This is particularly relevant for those mediating factors between value chain functions (VCFs) and innovation performance of SMEs such as IT integration (Ahuja et al., 2009; Briscoe et al., 2001; Froese, 2010; O'Brien, 2000) and the sharing of risks and benefits of MNE SCM strategies (Aloini et al., 2012; Meng and Gallagher, 2012; Olsen and Osmundsen, 2005). If considered as the cross-functional process of designing, managing, and integrating the organization's supply chain

with those of its suppliers and customers (Srivastava, Shervani, & Fahey, 1999), then we can argue that an understanding of what makes an effective supply chain management process could help all parties involved achieve sustained competitive advantages and superior financial performance.

In line with the work of Barrientos et al. (2011), we recognise the repositioning strategy of an SME as their efforts to shift to either higher or lower value-added activities, and modify their technological, knowledge and skills bases in an effort to increase the benefits or profits deriving from their participation in a GVC. Increased adaptability would enable SMEs to be more innovative towards both exploring new opportunities derived from their participation in the GVC and exploiting established opportunities for the development of their business, turning them into ambidextrous SMEs which not only show performance improvements (Solís-Molina et al., 2018), but are better equipped to face the dynamic of the new markets where they operate (Kim et al., 2012; Limaj & Bernroider, 2017). Thereby, the outcomes of the repositioning strategy for an SME will depend on issues that include:

- The nature of the repositioning strategy sought by the SME. For example, a functional upgrading may seek to penetrate among higher tier suppliers or even among lead firms, and do so by abandoning some activities with lower added value, developing new (intermediary) market, and other mechanisms. Whereas, functional downgrading may be a passive, adaptive or strategic process, as defined by Blazek (2015).
- The nature of the SME's involvement in the production process, either through primary activities or secondary activities (De Chiara, 2017).
- The technological capabilities required for the SME to globally coordinate the following activities: responsiveness in the adoption and use of information and communication technologies (Ngo et al., 2017; Buegelsdijk et al., 2009;); technological knowledge sharing (Scuotto & Mueller, 2017; Gonzalez & de Melo, 2018; Malhotra & Majchrzak, 2004); and technology transfer (Hansen et al., 2009; Sandulli et al., 2013).
- The intellectual capital development required to build an ambidextrous organization with the consequent impact on innovation and long-term financial performance (Gatti et al., 2015; McDowell et al., 2018).
- The SMEs' ability to either invest in R&D or benefit from the outcomes of R&D strategies of other organizations, as a means to perform and benefit from the effects of technological innovations (Suh & Kim, 2014), which has been found to have a positive effect on functional upgrading (Jer, 2014).

2. Theoretical background and hypotheses

2.1. Dynamic capabilities in Knowledge Management as determinants of SME positioning in the global value chain

Organizations of all sizes operate today in a dynamic and knowledge-intensive business environment characterised by discontinuous and radical changes, globalization and a challenging competitive paradigm. Junni et al. (2013) describe those dynamic factors in their relation to the environment (e.g. uncertainty, competitiveness, turbulence), the firm (e.g. strategy, structure, culture) and the individual (e.g. employee's experience, leadership). For over a decade, the spread of information technologies and recent changes in production systems, distribution channels, and financial markets, have been found to drive enterprises towards integration into value chains that often operate across many different countries (Pietrobelli and Rabellotti, 2007). Multinational enterprises have had to develop new location and ownership strategies which in turn have a direct impact on the context and mindset of SMEs. As a consequence, SMEs are driven to a continuous specialization of their knowledge and technological resource bases, where acquisition and use of external knowledge become as important as the internal resources and capabilities in their efforts to advance innovation (Poorkavoos et al., 2016) and enhance performance (McDowell et al., 2018). Thus, the concepts of *ambidexterity* and *organizational learning* (Crossan et al., 1999) emerge as determinants of the long-term success and even survival of SMEs in their simultaneous and balanced pursuit of structures that are both explorative and exploitative in their relation to knowledge (Soto-Acosta et al., 2018).

Organizational learning, described in the literature as a key strategic variable that drives innovation (Stata, 1989), is a combination of a set of explorative structures and exploitative practices within the organization. Explorative structures enable members of the organization to interact with their stakeholders and learn about new possibilities and challenges related to the use of innovative approaches (Gupta, Smith, & Shalley, 2006; Mom et al., 2007). Exploration-related activities create new areas of competency by extending the firm's capabilities and involving new combinations of resources. Exploitative practices, on the other hand, are based on the existing firm's capabilities and procedural knowledge essential to support processes such as development, decision making, production, efficiency, selection, implementation or execution of business processes (Bontis, Crossan, & Hulland, 2002; Kim & Rhee, 2009; Scuotto, 2017).

The concept of ambidexterity has been extensively used to refer to an organization's ability to perform, simultaneously, differing and often competing, strategic acts. Organizational ambidexterity has been viewed as an important research paradigm in organizational theory (Raisch and Birkinshaw, 2008) whereby firms are able to both explore and exploit knowledge for their strategic performance. According to Simsek et al. (2009), the more prevalent ambidexterity research takes the exploitation–exploration tradeoff as a starting point, but argues that firms are most successful when managers think and act ‘ambidextrously’ by trying to attain high levels of both exploration and exploitation simultaneously (e.g. Gibson and Birkinshaw, 2004; He and Wong, 2004; Tushman and O'Reilly, 1996). Thus, organizational learning and the resulting proclivity towards product innovations are determined by both the firm's inward and outward focus, reflected on a set of processes directly related to organizational ambidexterity (Gunasekaran et al., 2011; Deshpandé et al., 1993; Salavou et al., 2004;

Hurley and Hult, 1998; Jaworski and Kohli, 1993). Ultimately, knowledge is created through a combination of explorative and exploitative structures determining the firm's potential for creativity, innovation and competency creation not only in MNEs (Hernández and Pedersen, 2017; Cantwell & Mudambi, 2005; Cantwell & Piscitello, 2015; Ha & Giroud, 2015) but also in SMEs (Verwaal, 2017; Holmqvist, 2004; March, 1991; McGrath, 2001; Mom, Van Den Bosch, & Volberda, 2007; Benner and Tushman, 2003).

In some respects, SMEs are closer to customers than MNEs are, and can therefore develop better understanding of their particular needs through more direct interactions (Salavou et al., 2004). In order to remain a source of competitive advantage for MNEs, SMEs are driven to a continuous specialization of their knowledge and technological resource bases (Jacobides and Winter, 2005; Eriksson et al., 2014). This is possible because of the agile governance strategy of SMEs, their collaboration-oriented approach and their specific set of skills (Hernández and Pedersen, 2017; Weber and Tarba, 2014). Additionally, the extant literature shows that such specialization strategy in SMEs is also the result of their ability to simultaneously explore or exploit both the technical domain and the market domain where they operate. This ability to simultaneously pursue both exploration of new businesses opportunities and exploitation of established capabilities has been defined as organizational ambidexterity (Gibson, and Birkinshaw, 2004; Guisado-González et al., 2017) and deemed in the international business and management literature as a requirement for the success of both SMEs and MNEs (Fatehi, K., & Englis, 2012; Bandeira-de-Mello et al., 2016). This context has led SMEs to engage in knowledge exchanges whereby their entrepreneurial activity is clearly determined by their ability to perform very specific activities as required by MNEs.

The study of such knowledge exchanges in global inter-firm networks originates from the commodity chain approach (Gereffi, 1994) and investigates relationships between multinational companies, the “lead firms”, and other participants in global value chains (GVCs). In general, knowledge of relevance to the production process, such as R&D, design, marketing and distribution, flows through MNEs into SMEs often from developing countries (Kotabe and Kothari, 2016). The different lead firm-supplier dynamics, key underlying mechanisms, and related degrees of dependence/power asymmetries in global/international value chains drive SMEs, even those that have a global view of their domain, to acting cooperatively with MNEs in relation to three key value chain functions, namely upstream activities, middle-end activities and downstream activities (Magnani et al., 2018).

It is therefore expected that a combination of a dynamic capabilities in knowledge management influences the way SMEs adapt to and influence the value chain, and on this basis we propose the following hypothesis:

H1. A strategy that combines dynamic capabilities in knowledge management has a positive effect on global value chain activities performed by SMEs.

2.2. SMEs engagement with MNEs in the KM process

SMEs are constrained in their ability to afford heavy investments in production technology and to support highly qualified and competent personnel in production. Owing to scale economies, larger firms may have lower average and marginal costs, and more resources to meet the fixed costs of participation in production networks (Keeble & Wilkinson, 2017). SMEs are, according to authors such as Salavou et al. (2004), better prepared to introduce innovations not so much in core production technology which requires R&D budgets but in other aspects along the value chain. However, SMEs may overcome the disadvantage of firm size and engage in KM and production through mechanisms such as joining together in industrial clusters or concentrating on niche markets and emerge as leading enterprises. Wignaraja (2013) found that although large firms are the leading players, SMEs are increasing their role in production and knowledge networks in the context of the Association of Southeast Asian Nations. Authors such as Humphrey & Schmitz (2002), Nadvi & Halder (2005) and Pietrobelli & Rabellotti (2007) have come to similar conclusions. By applying the value chain concept to local and regional production systems in both developed and developing countries, they have been able to identify the potential for growth and development of such local economies, their SMEs and institutions in the context of international markets and global interactions (Parrilli et al., 2013).

On the other hand, explicit organizational learning strategies -often in the form of increased efforts for acquisition and deepening of their “technological capabilities” at any stage of a value chain (Bell and Pavitt, 1993; Lall, 1992), have enabled SMEs to adapt to the current changing conditions by moving towards more integrated production and value-added business models. Strategic alliances and participation in production networks have been describing as drivers of the SMEs’ efforts to develop their organizational learning strategies and the resulting improvement in their technological capabilities, performance and long-term innovation (Lee, 2007; Lin & Lin, 2016; Díaz-Chao et al., 2015).

This acquisition of new, superior functions in the value chain, such as design or marketing, or abandoning existing lower-value-added functions, to focus on higher-value-added activities, has been defined in the literature as functional upgrading and analysed in several contexts (e.g. Chin, 2012; Kindiki, 2011; Bailey et al., 2016). Functional upgrading to perform what are considered as primary activities would imply moving to higher skills and more complex capabilities that are in turn likely to provide larger benefits to local SMEs (Pietrobelli and Rabellotti, 2007).

Wignaraja (2012) outlines the four main strands of theory that explain trade and production network activity of firms, moving from the concept of product cycle to cross border production sharing or fragmentation of production. Analysis of key factors defining each of those theories (e.g. importance of firm-specific advantages, firms’ specialization, firm heterogeneity, and technological capability and innovation) suggest that SMEs’ involvement in the knowledge management process either through primary or secondary activities determines the way SMEs adapt to and influence the value chain. By referring to Buckley and Carter’s study (2002) which investigate knowledge management process, we therefore hypothesise that:

H2. A degree of Involvement of SMEs in the knowledge management process has a positive effect on value chain activities

2.3. Technological capabilities transfer in global value chain

Knowledge has today become the primary factor of production, thus making of the shift from an advanced industrial to a knowledge-based economy the primary business challenge of the 21st century (Garcia-Perez et al., 2019). Knowledge capacity building, knowledge capabilities, and knowledge capital are the critical success factors for an effective transition. According to LaFayette et al. (2019), since the 1950s economists have attributed such a shift to the rising importance of services, availability of information, developments in information technology, and an increasingly educated and trained workforce, among other factors within the organization and in its context. More than three decades ago Porter (1985, p. 166) had described the firm as a collection of technologies, and argued that it is the technologies embodied in a firm's knowledge, manifested as product or service, that proffer a potential competitive advantage. Today there is no doubt that it is knowledge what has the potential to add value to the offer of a product or service by a firm (Kandampully, 2002).

In addition to internal knowledge capacity, capabilities and knowledge capital, mechanisms such as integration in value chains allow SMEs access to external knowledge, learn, and innovate through participation in these chains. Pietrobelli & Rabellotti (2011) have argued that in order to satisfy requirements related to product quality, delivery time, efficiency of processes, environmental, labour, and social standards imposed by global value chains, SMEs specialised in different functions have to learn and to innovate. Furthermore, Roper et al. (2006) argue that before innovations can be exploited to generate value, firms source the knowledge they need to undertake innovation and transform this knowledge into new products and processes. As they do so, they are able to compete effectively with other organizations where innovation, creativity, and learning are built into the day to day work environment (Ferreira et al., 2020). Knowledge and capabilities, of different types and from different sources, are the unifying factor providing the main operational link between the different elements of innovation in the value chain (Roper et al., 2008). We argue that in the current knowledge-intensive and dynamic context, sharing and adoption of knowledge related to both operational technologies and information technologies determines the functions that SMEs are able to perform within the value chain. On this basis the following hypothesis is proposed:

H3. Involvement of technological capability transfer has a positive effect on global value chain activities of SMEs.

2.4. Innovation performance and the repositioning of SMEs within the global value chain

As discussed in previous sections, SMEs are often marked by limited resources, a high dependence on others, and a scope of business that gets narrower as they seek to adapt to the current knowledge-intensive context (Paul et al., 2017; Hessels & Parker, 2013). For many years, SMEs have been perceived by scholars as being either highly entrepreneurial, fast-growing companies, or firms that remain small and largely adapt to innovations created by others (Mintzberg, 1973; Pérez-Luño, 2016; Laforet, 2013; Scuotto et al., 2017). In both cases, to meet external challenges most knowledge-intensive SMEs are currently under pressure to engage directly or indirectly in innovation activities. Such innovation is achieved either through a combination of exploration and exploitation of knowledge within the firm or through collaborative initiatives and relationships with others which may lead to a repositioning of the SMEs within the value chain (van de Vrande et al., 2009).

Several examples can be found in the extant literature of traditional actors -including SMEs, that have changed their business strategy and repositioned within the value chain in different contexts for the whole chain to shift to higher value products. Several repositioning strategies are reported which lead firms to either acquire new, higher level functions in the chain (i.e. functional upgrading) or to securing a better position within a new -perhaps more confined, market (i.e. functional downgrading). In addition to those described by Blazek (2015) and Hernández & Pedersen (2017), some cases become particularly relevant for this analysis. One of such cases was the study by Del Giudice et al. (2019) of how Chinese SMEs can gain advantage from both repositioning strategies and knowledge spillovers from both multinational enterprises from other SMEs in the value chain, and how these advantages can be turned into international growth. Ghanbari et al. (2015) studied how traditional telecom actors such as mobile network operators and telecom equipment vendors, which included SMEs, repositioned themselves in the existing value chain in the context of the Smart City service provision. Pananond (2016) argues that firms of all sizes from emerging markets can improve their power position and take more control of the chain by upgrading their technological capabilities and repositioning within the value chain. Campaniaris et al. (2015) proposed a strategy for the repositioning of SMEs and other actors within the Canadian apparel industry with an aim to enable its recovery from a decline that has lasted over a decade.

In most cases, particularly those related to functional upgrading strategies, innovation has been both a driver and outcome of the repositioning of SMEs within the value chain. If innovation performance is measured in terms of innovative inputs such as R&D collaboration among firms, innovation outputs such as patents, and market outputs such as those with broad global influence or the sales of innovative products (Kwan & Chiu, 2015; Lloréns-Montes et al., 2003), then it is fair to argue that the innovation performance of the firms involved in the repositioning has improved. On this basis, we propose the following hypothesis:

H4a. Functional upgrading strategies have an intermediary effect on SMEs' innovation performance.

H4b. Functional downgrading strategies have an intermediary effect on SMEs' innovation performance.

The interrelation between the proposed set of hypotheses are represented in the theoretical model in the Figure 1.

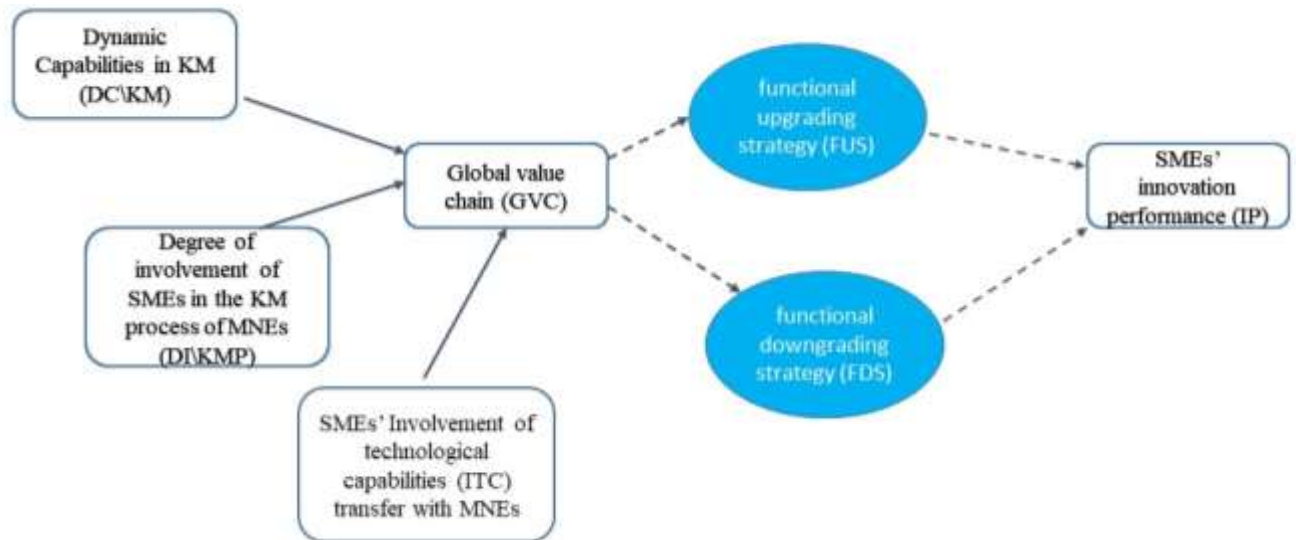


Figure 1. Proposed theoretical model

3. Methodology

3.1. Data collection

SMEs are considered the backbone of the economy. This is particularly true in the European context. SMEs have indeed generated approximately 85 percentage of jobs, improving social integration, and enhancing innovation (Kuzmisin, and Kuzmisinova, 2016). This growth has been positively influenced by the economy aggregation approach, which is turn derived by the global value chains phenomenon, recognised as a nexus of new trade-investment, services and know-how. Such phenomenon has also brought up others benefits such as more productivity, more flexibility and more available resources (European Commission 2017).

On this basis and on the literature review, an empirical research is conducted on a sample of 532 European SMEs out of 1,975 European SMEs from a diverse set of sectors. Those SMEs were selected from the Eurostat database (2018) by three relevant factors:

- By the European Commission 's classification (2003), SMEs Up to 250 employees
- $\leq \text{€ } 50 \text{ m}$ of turnover were included;

SMEs have been involved in the global value chain by inter-organizational collaborations in the last five years.

3.2. Measures

These SMEs operate in the knowledge-intensive industry, have generated an innovative product and/or service in the past five years, and their collaboration with MNEs is based on the development of functional upgrading or downgrading strategies. Furthermore, *based on the definition of global value chain stated by* (Gereffi and Fernandez-Stark, 2011) “*the full range of activities that firms and workers perform to bring a product from its conception to end use and beyond*”(p.4) accompanied with the current concept of “global factory” (Hernández and Pedersen, 2017; Buckley, 2011; Buckley and Ghauri, 2004), we select six variables: 1. combination of dynamic capabilities in knowledge management ; 2. Global value chain activities; 3. A degree of SMEs’ involvement in the KM process of MNEs; 4. SMEs’ Involvement of technological capability transfer with MNEs; 5.Functional upgrading strategies; and 6.Functional downgrading strategies to describe the repositioning organizational of SMEs within the global value chain and evaluate these correlation with SMEs’ innovation performance by the intermediary role of functional upgrading and downgrading strategies (see table 1).

Table 1. Elements and items

<i>Measures</i>	<i>Items</i>	<i>References</i>
<i>Dynamic Capabilities in KM (DC\KM)</i>	<ul style="list-style-type: none"> - exploration–related activities - exploitation–related activities - A mix of exploitation and exploration activities. 	<p>Hernández and Pedersen, 2017;</p> <p>Fatehia and Englis, 2012; Gatti et al., 2015;</p> <p>Gonzalez and Melo, 2018; Gonzalez et al., 2017; Limai and Bernroider, 2017; Ngo et. Al, 2017; Solis-Molina et al. 2018.</p>
<i>Global Value Chain (GVC) activities</i>	<ul style="list-style-type: none"> - upstream activities - middle-end activities - downstream activities. 	<p>Hernández and Pedersen, 2017; Magnani et al., 2018;</p> <p>Singer and Donoso, 2018.</p>
<i>SMEs’ degree of involvement in the KM process (IPP) of MNEs</i>	<ul style="list-style-type: none"> - Primary activities - Secondary activities 	Hernández and Pedersen, 2017

	- Interrelation of primary and secondary activities.	
<i>SMEs' involvement of technological capability (ITC) transfer with MNEs</i>	<ul style="list-style-type: none"> - Technological knowledge sharing - ICTs usage - Technology transfer 	Fu et al., 2011; Buegelsdijk et al., 2009; Hansen et al., 2009; Sandulli et al., 2013
<i>Functional upgrading (FUS) strategies</i>	<ul style="list-style-type: none"> - Penetration among higher tier suppliers or even among lead firms - Abandoning some activities with lower added value, - Developing new (intermediary) market. 	Blazek, 2015; Tokatli and Kizilgün, 2004).
<i>Functional downgrading (FDS) strategies</i>	<ul style="list-style-type: none"> - Passive downgrading - Adaptive downgrading - Strategic downgrading 	Blazek, 2015
<i>SMEs' innovation performance (IP)</i>	<ul style="list-style-type: none"> - Patents - New products - R&D collaboration among firms 	Kwan & Chiu, 2015; Lloréns-Montes et al., 2003; McDowell et al., 2018

3.3. Data collection

The measures were used to structure the 24 closed-ended questionnaire which was administrated from February 2017 to August 2017. All respondents received the questionnaire along a brief introduction of the research scope by using their direct email address. If the email address was not available, the respondent was approached by phone requesting an email address and then the questionnaire was sent out.

The questionnaire was in English and validated by a pre-test conducted with fifteen SMEs owner/managers. The pre-test avoided any misunderstanding and bias. According to Lewis et al. (2005) a pilot test can be validated by a small sample which results to be representative of the whole analysed research sample.

Moreover, following Bryman's technique (1984), the questionnaire was structured, starting from ancillary questions to ending with more-focused ones. The reason of this structure was to offer an overall view of the situation along a deep analysis of some relevant issues. For instance, at the beginning interviewees were asked to specify: key people (e.g. CEO or founder), annual turnover, number of employees and number of innovation projects developed in the last five years. Secondly, other questions were posed to investigate the preferences between upgrading and downgrading functions. These two functions were also critically interrogated in relation to a combination of a combination of dynamic capabilities in KM, global value chain functions, the degree of involvement in the KM process and involvement of technological capability transfer. Additionally, the relevance of these functions on their innovation performance was part of the ending questions.

All specific statements were valued by a seven-point Likert's scale (1932), where the "code 1" means strongly agree, while "code 7" means strongly disagree. In addition to this, a nominal-polytomous response scale for close-ended questions was applied in order to reduce the percentage of response bias (Saris and Gallhofer, 2014).

In order to validate our questionnaire, a control test was conducted on a sample of 27 SMEs – one for each country. The questionnaire was administrated to 27 participants appointed as founder or CEO in order to evaluate its intelligibility and understanding. As we expected, the meaning of upgrading and downgrading activities was not clear and so we added a note to specify those concepts.

Consequently, another control test was conducted, involving the first same group of 27 participants and a new group composed of 27 CEO or founders from other SMES. As emerged, the questionnaire was easy to understand for both groups.

Furthermore, we also applied a common method bias comparing who filled in the questionnaire with who did not. No issues emerged, receiving a response rate over 56%

3.3. Data analysis

Based on the aforementioned variables, the research design was drawn to assess the correlation of a combination of dynamic capabilities in knowledge management; a degree of SMEs' involvement in the KM process of MNEs; SMEs' Involvement of technological capability transfer with MNEs on global value chain activities which is then evaluate its effect on SMEs' innovation performance by an intermediary role of functional upgrading strategies; and functional downgrading strategies. By examining the research design by using structural equation modelling (SEM), the hypothesis 1; 2; 3; 4a and 4b are assessed. This data analysis technique allows to analyse interconnected hypothesis in a single, systematic research design. Especially, it enables a multi-variable analysis based on latent constructs and observable factors (Gefen et al., 2000). Each observable variable is grouped in a latent variable. In this specific case, seven latent variables are individuated and for each of them tree

observable factors are associated (see table 1). The latent variables, moreover, are divided in in latent exogenous and endogenous variables.

3.3.1. Exogenous variables

A combination of dynamic capabilities in knowledge management In the global factory, SMEs operate through the combination of resources and capabilities which can be part of the internal organizational environment or generated by the external collaborations. This is has resulted in a greater adoption of a mix exploration and exploitation activities (Soto –Acosta et al., 2018). As stated before, explorative activities bring up new innovative approaches (Gupta et al., 2006; Mom et al., 2007). Whereas, exploitative activities integrate and improve existing knowledge (Bontis et al. 2002; Kim & Rhee, 2009). Hence, the latent construct “combination of a mix of resources and capabilities is formed by:

- exploration–related activities
- exploitation–related activities
- a mix of exploitation and exploration activities.
-

A degree of involvement of SMEs in the KM process of MNEs. As stated by Hernández and Pedersen (2017), the collaboration between SMEs and MNEs generate a global flow to reduce “location and transaction costs” as well as improve innovation processes (see also Salavaou et al., 2004; Wignaraja, 2013). This induces an interrelation between primary and secondary activities. Therefore, the latent construct “degree of involvement in the production process” is made of:

- Primary activities
- Secondary activities
- Interrelation of primary and secondary activities.

SMEs’ Involvement of technological capabilities (ITC) transfer with MNEs The interrelation of primary and secondary activities involve a more dynamic knowledge flow and technology transfer and use (Bojica & Fuentes, 2012; Fu et al., 2011; Buegelsdijk et al., 2009; Hansen et al., 2009; Malhotra et al. 2007). This stimulates an advancement of technology capabilities at any functions of the GVC (Bell & Pavitt, 1993; Lall, 1992). On this basis, the latent construct “Involvement of technological capabilities” is composed of:

- Technological knowledge sharing
- ICTs usage
- Technology transfer

3.3.2. Endogenous variables

Global value chain activities

The exogenous variables are evaluated in correlation with global value chain functions (latent construct) which is configured in upstream activities; middle-end activities; and downstream activities (Hernández and Pedersen, 2017). These activities are originated through the process of exploitation and exploration of both knowledge and technology which, consequently, support the work of primary, secondary and a mix of both activities in the GVC (Priem and Swink, 2012; Tansuchat et al., 2016; Nicovich et al., 2007; Pananond, 2013; Singer and Donoso, 2008; Verbeke et al., 2016). Thus, the latent construct “value chain functions” is correlated to:

- upstream activities;
- middle-end activities;
- downstream activities

Functional upgrading strategies

In the global economy, to develop a better efficient systematic organizational environment SMEs are moving along the GVC in two directions functional upgrading and downgrading (Blazek, 2015; Humphrey & Schmitz, 2004). Specifically, there is an increasing interest in the innovation function (Ghanbari et al., 2015; Pérez-Luño, 2016) which has induced SMEs to penetrate among higher tier suppliers or even among lead firms, or abandon some activities with lower added value, or develop new (intermediary) market. Such activities are, thus, associated to the latent construct “Innovation functional upgrading”.

Functional downgrading strategies

Whereas the innovation functional downgrading involves the following activities: passive downgrading, adaptive downgrading, and strategic downgrading (Blazek, 2015; Plank, 2015; Kaplinsky et al., 2010). In fact, these activities are correlated as observable variable to the latent construct “Innovation functional downgrading”.

SMEs' innovation performance

As aforementioned in the literature (Kwan & Chiu, 2015; Lloréns-Montes et al., 2003), the outcomes to measure SMEs' innovation performance are:

- Patents
- New products
- R&D collaboration among firms.

Given the recognised value of these three outcomes into innovation performance, the latent construct “SMEs innovation performance” is associated to them.

3.4. Results

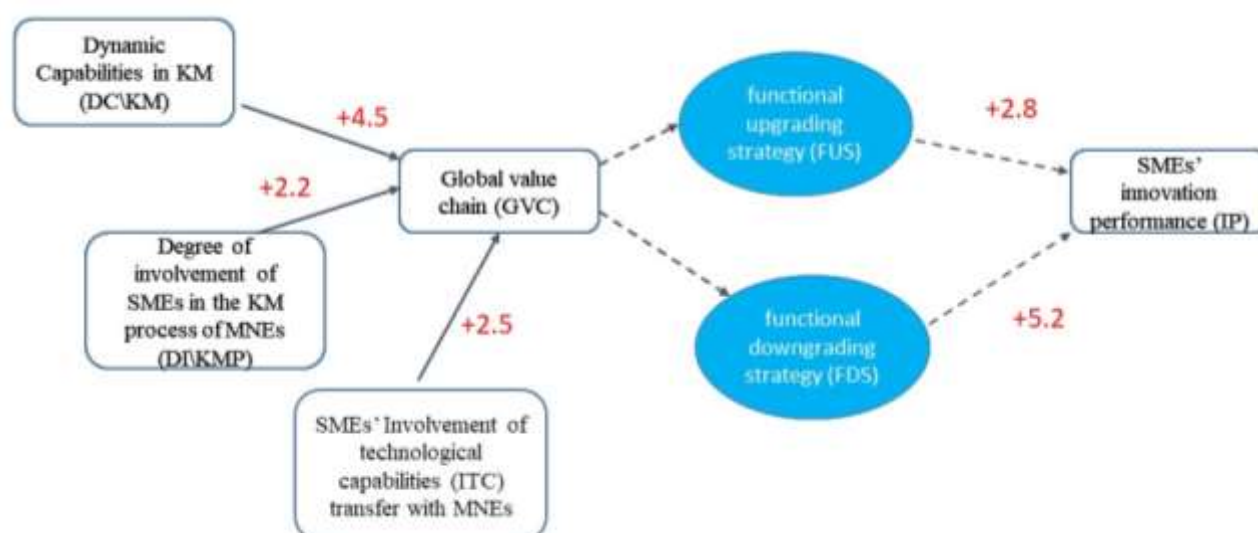
The data analysis was found to support all correlations, showing a significant value for each of them. Therefore, as emerged by using bootstrap approach to evaluate the correlation of the latent constructs (Chin & Newsted, 1999), hp 1; 2; 3; and 4a and 4b are confirmed. Especially, *H1. “A strategy that combines dynamic capabilities in knowledge management has a positive effect on global value chain activities performed by SMEs” is confirmed by a value of 4.5; H2. “A degree of Involvement of SMEs in the knowledge management process has a positive effect on value chain activities” is validated by a value of 2.2; H3. “Involvement of technological capabilities transfer has a positive effect on global value chain activities” is also confirmed by a value of 2.5.* Therefore, the correlation of the all exogenous variables with the latent construct” global value chain functions is positively validated. Furthermore, the bootstrap approach also validates the last two hypotheses, id est *H4a. “SMEs’ functional upgrading strategies as part of the global value chain have an intermediary effect on their innovation performance” with a value of 2.8 and H4b. “SMEs’ functional downgrading strategies as part of the global value chain have an intermediary effect on their innovation performance” with a value of 5.2* (see table 2 and figure 2).

Table 2. Path Analysis results

Hypothesis	Path	t-statistics	p-value	Decision
Hp1	DC KM → GVC	4.5	***	Supported
Hp2	DI\KMP → GVC	2.2	***	Supported
Hp3	ITC → GVC	2.5	***	Supported
Hp4a	FUS → IP	2.8	***	Supported
Hp4b	FDS → IP	5.2	***	Supported

Notes: ***: Standardized regression coefficient is significant at the 0.001 level (two-tailed).

Figure 2. Research Design and Results



Moreover, to assess the endogenous latent variables, id est global value chain activities, functional upgrading and downgrading strategies, and SMEs' innovation performance, R-squared analysis is applied. As showed by table 3, R-squared values offered a strong uphill (positive) linear relationship for the endogenous latent variables, id est value chain functions and SMEs' innovation performance. While, a moderate uphill (positive) relationship for functional upgrading and downgrading strategies (Cameron & Windmeijer, (1997).

Table 3. R²

	VCF	IFU	IFD	IP
R ²	.81	.53	.68	.78

Along the measurement of the correlation of the latent constructs, the analysis of the observable variables with their relative latent constructs are assessed by two techniques: 1. Cronbach's Alpha (see table 4) and 2. Internal consistence coefficients and correlations between measures and items (see table 5). The Cronbach's Alpha is calculated to verify the reliability between latent and observable variables. In the present analysis the value is positive .73 and so the reliability is significant. Additionally, the significant correlation between the observable variables with their relative latent constructs is also

validated by the internal consistence coefficient technique which his model is accompanied with the measurement model which analyses the correlation between each latent variable and relative manifest variables. Therefore, to assess this correlation, Cronbach's alpha technique is employed, showing the positive reliability with the value of 0.81 (table 4). Following this assessment, the internal consistence or internal correlations as showed by table 5.

Table 4. Reliability

Reliability test		
Cronbach's Alpha	Cronbach's Alpha (Standardized Items)	Items
.73	.70	532

Table 5. Internal consistence coefficients and correlations between measures and items

		<i>Cronbach's Alpha</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)	(DC\KM)	0.72	1						
(2)	(DI\KMP)	0.73	0.510**	1					
(3)	ITC	0.70	0.010**	0.207**	1				
(4)	VCF	0.70	0.300**	0.591**	0.497**	1			
(5)	FUS	0.74	0.104**	0.014**	0.373**	0.503**	1		
(6)	FDS	0.72	0.028**	0.193**	0.378**	0.611**	0.100**	1	
(7)	IP	0.73	0.369**	0.299**	0.320**	0.198**	0.425**	0.599**	1

** Significant at 0.01.

4. Discussion

The present research provides a more comprehensive account of the repositioning strategies of SMEs within GVCs by considering a number of factors highlighted in the current literature. These include the combination of dynamic capabilities in KM, the functions played by SMEs within the GVC, the technological capabilities required and available within the SME to deliver those functions, the degree of involvement of SMEs in the KM process and the factors defining the nature of the functional upgrading/downgrading to improve SMEs innovation performance. In doing so, we expect to contribute

to the current literature on the subjects of international management literature, with particular emphasis on the functional upgrading and downgrading strategies of local SMEs as a result of their role in the global value chain.

As showed before, all hypotheses are confirmed, demonstrating a positive impact of the combination of dynamic capabilities of KM, the degree of the involvement in the KM process and the involvement of technological capability transfer in the value chain functions. This result evokes the concept of ambidexterity and organizational learning expressed by Crossan et al (1999) and the exploration and exploitation activities described by Soto-Acosta et al. (2018). The latter generates more knowledge as well as innovation reducing location and transaction costs (Hernández and Pedersen, 2017; Wignaraja, 2013). It also creates flow between primary and secondary activities embraced into the global value chain and stimulates collaboration between SMEs and MNEs. In this way, SMEs can cover their lack of resources and be more prepared to introduce innovation in their core – production process (as opposite to Salavou's study (2004)).

Alongside, a SME becomes more innovative by advancing its technological capabilities which comes from a more dynamic knowledge flow and technology transfer and use (Bojica & Fuentes, 2012; Fu et al., 2011; Buegelsdijk et al., 2009; Hansen et al., 2009). These capabilities are spread along the whole GVC (Bell & Pavitt, 1993; Lall, 1992) through three levels of activities: upstream activities; middle-end activities; and downstream activities (Hernández and Pedersen, 2017). On this basis, a SME makes the decision to reposition itself in the GVC to develop a better efficient systematic organizational environment SMEs. The repositioning takes place in implementing a functional upgrading or downgrading strategy.

From the present analysis, both strategies resulted to be positive and significant in the relation with SMEs' innovation performance. Although, there is a slightly different in the value emerged. For instance, the value of functional upgrading is +2.8; while the value of functional downgrading is +5.2. This difference may reflect the fact that SMEs are more prone to set up a functional downgrading rather an upgrading. In this line, SMEs can decide to undertake one of three directions: 1. Passive downgrading; 2. Adaptive downgrading; and 3. Strategic downgrading. The first one is based on the shift of the production, offering simple goods. In a nutshell, to become a strong supplier in the market thanks to the high level of demand (Kaplinsky et al., 2010). The second one is implemented when the firm cannot face up the high competition and therefore it focuses on a smaller market, providing part of the components of the final good (Plank and Staritz, 2015). And finally, the strategic downgrading, the third one, regards the moving to a specific target market in order to better direct its capabilities and resources and so be more profitable (Herrigel, 2004).

In sum, the local economy of a country increases, bringing up a global network (Humphrey & Schmitz, 2002; Nadvi & Halder, 2005; Pietrobelli & Rabellotti, 2007) and improving SMEs' innovation performance, offering new patents, products, and more R&D collaborations (Kwan & Chiu, 2015; Lloréns-Montes et al., 2003).

5. Conclusions

This research has studied the repositioning firm strategies of SMEs and their antecedents, as derived from the nature and consequences of the co-operation between MNEs and SMEs within global value chains. Our study has focused on the analysis of dynamic capability transfer of SMEs, their engagement in the MNEs KM process, and technological capabilities of SMEs as determinants of their positioning in the global value chain. In doing so, we have contributed to the understanding of the factors affecting the global value chain functions in SMEs, leading to a series of implications for policy-makers and SMEs managers by highlighting the growing importance of their repositioning organizational SMEs within the global value chain. From a managerial point of view, given that the high-tech is a very dynamic and fast-changing industry, the choice between functional upgrading and functional downgrading can determine the effectiveness of cross-innovation strategies and KM process. The right repositioning strategy often enables SMEs to acquire the right knowledge more effectively, be more flexible and ensure a more appropriate response to the dynamics of their sector. This would mean that managers should invest time and resources in better repositioning their business across the main elements discussed in this paper.

Finally, as highlighted by several studies (Soto-Acosta et al., 2018; Barrientos et al., 2011; Crossan et al., 1999), SMEs suffer from a lack of resources and capabilities to develop and commercialise innovative solutions, despite the bulk of creative knowledge and ideas they drag out (Paul et al., 2017; Hassels and Parker, 2013; Chesbrough, 2010, 2013; Kutvonen, 2011; Del Giudice et al., 2017; Scuotto et al., 2017a; 2017b). Therefore, they might exploit external paths from the market by revealing or selling their ideas, knowledge and technologies. Our findings suggest that SMEs could create a competitive value and enhance their innovativeness by tapping into resources and knowledge of external collaborations through a more strategic positioning.

Our results suggest that there are areas which would benefit from further exploration in the context of our study, such as functional downgrading which, despite our efforts, remain at early stages of analysis in the literature particularly when compared to functional upgrading (Blank, 2005). This could be addressed by future studies by focusing for example on other advanced markets or emerging economies (Kaplinsky et al., 2010). Opportunities for future research can also be found on the activities related to both functional upgrading and functional downgrading which are implemented more frequently in SMEs. We deem that this is another aspect which would benefit from further studies through explorative, quantitative analyses. Potential research areas that remain unanswered in this subject include the circumstances that would lead SMEs to implement passive, adaptive or strategic downgrading; or the relationship between MNEs and SMEs within the GVC in the SMEs repositioning strategies and related processes.

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