



# Interfirm collaboration for knowledge resources interaction among small innovative firms

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## ABSTRACT

For innovative SMEs, acquiring knowledge resources may serve as an important source to enhance their knowledge base of management practices. In line with the resource interaction approach, an essential way to do this is to participate in informal interfirm networks. Yet, researchers have only given cursory attention to resource exchange in cooperative networks. This study examines the structural, relational, and motivational drivers that lead firms to establish informal networks of relationships to find, exchange, and combine knowledge resources. Following a mixed methods research design using interview data and social network data, the study demonstrates that informal networks play a pivotal role for SMEs to capture valuable resources increasing their knowledge stock, forge organizational standing, and gain social connectivity through reciprocity. This research implies that knowledge as a resource transcends the individual organization, which offers implications for resource interaction in inter-organizational knowledge networks and management practice.

## 1. Introduction

Knowledge resources are a strategic priority for small and growing firms. Given the environmental conditions of competitive intensity, market dynamism, and new managerial practices, firms must leverage various channels for knowledge acquisition to keep their knowledge resources current (Agostini and Nosella, 2019; Baraldi et al., 2012; Baraldi and Ratajczak-Mrozek, 2019; Lee and Trimi, 2018). Such concerns are particularly salient to small growth-oriented firms, which require the ability to access and exploit knowledge resources as a source of value creation (Reim et al., 2019). As the firm grows larger, it needs to recruit human resources for the management of change (Penrose, 1959/2009). Small and medium-sized enterprises (SMEs) quickly need to set up processes to select, hire, train, promote, evaluate, and reorganize people. Research in the human resource management (HR) domain has made explicit arguments about the importance of knowledge in allowing SMEs to compete (Festing et al., 2017).

From a resource interaction perspective, the value of a knowledge resource lies in how it interacts with other resources (Prenkert et al., 2022). Knowledge exchange among firms is embedded in structures of social relations that provide opportunities yet constrain the behavior of social agents (Granovetter, 1985). These networks provide support,

ability to identify knowledge resources, and chances to participate in knowledge flow, combining internal knowledge stock with externally appropriated resources (Gray and Purdy, 2018). Whereas existing research has focused on formal networks such as contractual strategic alliances (Baraldi and Ratajczak-Mrozek, 2019), there is however an absence of studies theorizing and empirically testing the role of informal networks—non-contractual or strategic—in fostering knowledge resources exchanges and specifically HR knowledge. The present study assesses how knowledge exchanges derived from a SME's network of informal and cooperative ties influence their ability to leverage external network resources, resulting in organizational learning capability and innovation.

From the growth of the firm theory perspective (Penrose, 2009), the role of HR knowledge is generally informed by strategic issues that focus primarily on managing internal HR knowledge to enhance human capital and produce performance improvements (Ferraris et al., 2019). Small innovative firms sometimes have this expertise by virtue of the founders' background and experience, but more often they get this expertise on the market by hiring a HR generalist, or someone with other expertise combined with HR (McClellan and Collins, 2019). However, SMEs are typically resource constrained and need to bootstrap (Harrison et al., 2004; Jones and Jayawarna, 2010); yet to grow, they need

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versatile resources (Penrose, 2009; Nason and Wiklund, 2018). Such bootstrapping requires ingenuity and ability to find, exchange, and combine resources, which can be obtained through participating in interfirm networks (Baraldi et al., 2012).

Drawing on the resource interaction approach and the growth of the firm theory and its emphasis on resource management in the complex and dynamic environments (Arya and Lin, 2007; Prenekert et al., 2019), this paper adopts a mixed method approach within a sequential explanatory research strategy that combines social network and qualitative data analyses (Molina-Azorin, 2012). It presents a study of 50 SMEs physically co-located in a Science and Technology Park (STP) but whose relationships are not based on formal contractual agreements. For SMEs, this type of relationship is more likely to emerge under certain conditions of proximity, for example in industrial districts (Capone and Lazeretti, 2018), STPs (Lindelöf and Löfsten, 2004), and industrial hubs (Hervas-Oliver et al., 2021).

The unique contribution of this paper lies in providing evidence of how informal networks of SMEs harness resource interfaces and facilitate exchange of knowledge resources (Burt and Soda, 2021). We demonstrate that SMEs form such an informal network where participation is unevenly distributed, with a set of more connected firms in the core vs other firms on the periphery. We show that this division affects the sharing of HR knowledge: the core group of firms gains easier access to the HR capabilities held by other firms. We draw on the resource interaction approach to offer insights into the reasons why firms participate in the HR knowledge network: they do this, first, to complement their scarce resource base, second, to create reciprocity and mutually exchange knowledge, and finally, to improve their standing among peers and build prestige.

## 2. Theoretical background

### 2.1. Resource interaction in informal networks

The resource interaction framework informs the understanding of how networks of relationships between firms can facilitate the acquisition of knowledge so that it becomes a valuable resource for growing SMEs. According to this view, in the process of interaction with other firms in their network, SMEs access and combine resources (*ibid.*), potentially mobilizing assets that they cannot access otherwise. The ability to mobilize heterogeneous resources that are critical for growth (Nason and Wiklund, 2018; Penrose, 2009) is particularly important for small and growing enterprises, and this ability is shaped by interfaces with other firms in the network. The resource interaction approach has been used to examine how products, organizational units, and facilities can be mobilized as resources through interaction in the network; however, to date, it has not been used to elucidate HR knowledge as a resource.

Growing SMEs often do not participate in formal interorganizational networks but rely on the personal networks of their managers. Such networks are interpersonal, yet they are primarily business in character, consisting of informal and cooperative ties (Peng et al., 2018). In the absence of established formal networks, the interpersonal ties that their managers maintain become a key conduit for learning and knowledge acquisition. As we focus on the knowledge about human resource management, we describe this network as an HR knowledge network. However, HR knowledge is hardly the only topic of discussion; rather, it is one of many topics related to different management functions.

Human resources play an important role in the creation of unique and valuable services, which underlie superior economic returns (Penrose, 2009). Human resources can complement and reinforce physical resources for achieving and sustaining competitive advantage; indeed material resources yield such an advantage depending on the knowledge that the human resources possess (Kor and Mahoney, 2000). Scholars within the HR domain concerned with knowledge as a source of sustained competitive edge have relied heavily on the human capital theory

drawing on the resource-based view (RBV) of the firm (Shaw, 2021). According to the RBV, effective management of an HR knowledge base or stock—in the form of systems, policies, and practices—enhances internal human capital and produces higher long-term financial returns and overall superior organizational performance for small growing firms (Chadwick et al., 2013; Way, 2002). Because the RBV paradigm emphasizes the unique nature of each organization, its core tenet lies in exploiting an organization's internal differences with those of other organizations. This has important implications for how firms can adopt, develop, and improve their internal HR capabilities to manage their employees more effectively. Managing a firm's knowledge stock as a source of value creation needs ongoing development, and firms are increasingly required to reach outside their organizational boundaries to access and combine knowledge resources (Phelps et al., 2012). We add a resource interaction perspective to the study of HR knowledge to provide insights on how connections with other firms impact the value of resources.

### 2.2. Research questions

Research Question 1: How does the acquisition of knowledge resources from informal interfirm networks take place?

Our first research question delves into the processes through which small innovative firms acquire HR knowledge from their informal interfirm networks. Knowledge flow is embedded in structures of social relations (Granovetter, 1985). Flows of different forms of knowledge generally go from the purely informal diffusion to formal transfer, where intention is explicit (Naumovska et al., 2021). Informal networks have been studied both within the small business management literature (Heavey et al., 2015) and the strategic management literature, underscoring the vital role that an informal network of SMEs plays in sharing knowledge between firms (Baraldi and Ratajczak-Mrozek, 2019). Informal networks are potentially important channels for the exchange of different types of knowledge, including technological knowledge and capabilities (Salavisa et al., 2012), product and market knowledge (Agostini and Nosella, 2019) and managerial (i.e., processes and practices) knowledge (Sammarrà and Biggiero, 2008). The HR literature has examined the interfirm transfer of HR practices, such as performance management systems (Martin-Rios and Erhardt, 2007). However, research on how HR knowledge flows between organizations remains limited. Firms may identify and recognize the value of external knowledge, which allows SMEs to learn and then assimilate new HR knowledge into existing knowledge base. A few studies in the HR field have noted the importance of external informal sources for HR knowledge (Martin-Rios, 2014). In their model of HR knowledge flow among entrepreneurial firms, Kang et al. (2007) argue that networks are important for firms pursuing exploratory learning. It is expected that the development of informal networks among managers of SMEs will be a path-dependent, self-perpetuating process, where initial knowledge gains from participating in the informal network foster the further development of the network that includes the exchange of HR knowledge.

Research Question 2: What are the structural characteristics of the HR knowledge network?

The second research question explores the structure of informal knowledge networks. According to social network theory, informal networks facilitate exchanges of knowledge resources, which (unlike most tangible resources) is highly tacit and experiential and disseminates informally, potentially creating benefits for both the participating firms and the network as whole (Uzzi, 1997). Such networks often form because of relatively sparse, unstructured, intermittent interactions and are marked by low centralization, i.e., having many firms with wide access to the network, rather than a small number of highly connected

firms (Prenkert et al., 2019). Informal networks of SMEs are often characterized by the heterogeneity of participation levels, i.e., different firms participate with different intensity. More cohesive ties among actors may present “a mechanism for gaining fine-grained information” (Gulati 1998, p.296). Thus, firms are more likely to participate and have active involvement in informal exchanges through their managers when they have ties with the managers of other firms (Tasselli and Kilduff, 2021). However, these informal networks can be heavily constrained by their members’ prevailing patterns of relationships (Swärd, 2016). Therefore, the configuration of a knowledge network might exhibit a densely connected subset of firms and a sparse, unconnected periphery (Borgatti and Everett, 2000). From a resource interaction perspective, some SMEs promote collaboration across firm boundaries in the pursuit of organizational objectives. For example, research on regional networks and knowledge-intensive sectors indicates that many firms are only loosely connected to the informal network’s dense core of firms that actively seek and exchange information to develop and regenerate their internal knowledge (Maghssudipour et al., 2020). In their study of the network of Italian motorbike manufacturers and suppliers Lipparini et al. (2014) distinguish between core and periphery firms in the innovation network. It is expected that the HR knowledge network also displays a core-periphery structure, where the core comprises a relatively interconnected (i.e., the network does not revolve around a single highly central actor) subset of SMEs establishing ties with several other firms interested in HR knowledge.

Research Question 3: Why do SMEs participate in an HR knowledge network?

The third research question delves into the issue of resources as unique to a firm or dynamic as they interact in a network of interconnected actors. Informal networks, by definition, do not rely on formal contractual agreements, which may lead to “knowledge leakage” that subsequently enhances competitors’ capabilities. Why then would a firm willingly engage in informal exchanges of HR knowledge? In the field of management, arguments are made that companies are less inclined to opt for informal interfirm networks for the exchange of resources with potential strategic relevance to the firm (like managerial knowledge) (Alexiev et al., 2016), since potential knowledge leakage and opportunistic behavior occur more frequently than in contractual networks grounded in economic transactions (Baraldi and Ratajczak-Mrozek 2019). From a resource interaction perspective, the value of a resource lies in how it interacts with other resources. Social network studies show that informal networks can trigger social embeddedness (Powell et al., 1996) and have the potential to elicit strong, non-competitive ties where knowledge resource exchanges flourish.

Studies on interfirm relationships have also explored the potentially positive motivational outcomes of a firm’s participation, including gaining reciprocity (Uzzi and Lancaster, 2003), status (Podolny and Page, 1998), and reputation (Arya and Lin, 2007). These social benefits might be indirectly tied to various other benefits, which may explain some firms’ inclination to participate. One important motivational driver noted in the literature is organizational standing, which involves organizational legitimacy and prestige (Bitektine et al., 2020). Interfirm relationships are formed as organizations attempt to improve their reputation, usually by linking with firms of greater prestige. Another significant motive is reciprocity; firms participate in knowledge networks with the aim of establishing and maintaining long-term relationships. In informal relationships, reciprocity is often linked to source credibility which facilitates and maintains knowledge exchanges among independent actors. The motivation for engaging in informal ties to share HR knowledge are likely to be similar: SMEs can be expected to take part in an informal HR knowledge network motivated by reciprocity and to forge their organizational standing. Notwithstanding its importance, the social embeddedness of HR knowledge is surprisingly understudied, which warrants further attention.

### 3. Methodology

To examine the structural, relational, and motivational drivers that lead SMEs to establish informal networks of relationships, this study uses a mixed methods research design with interview data and social network data (Molina- Azorin, 2012). A combination of network analysis and qualitative data analysis allows for validation and expansion of findings, thus enriching the reliability and validity of the findings.

Given the complexity of capturing strong, informal collaborative relationships between independent firms, we conducted a case study in a science and technology park. STPs are common in many economies and, given their impact on resource acquisition, are particularly appropriate to study the role of networks for knowledge creation and recombination in SMEs (Hervas-Oliver et al., 2021). In the 1950s the first STPs were developed in the U.S. to increase high-tech firms’ productivity by forging physical proximity of firms and universities (Albahari et al. 2017). STPs have been the focus of extensive research regarding the establishment of non-commercial ties with the potential of capturing valuable resources in the form of knowledge between organizations in STPs (Diez-Vial and Montoro-Sanchez, 2015). The high level of embeddedness of local firms might potentially favor the development of a sense of community amongst the firms and thus the potential of exchange of resources. Recent studies suggest that STPs foster openness, resource ties, and socially embedded relations (Albahari et al., 2017).

Established by a public university and local, regional, and national public agencies, the STP not only acts as a business incubator, but also provides both institutional support for start-ups and basic services for long-established firms. It is populated by a heterogeneous group of small, rapid-growth firms operating in a wide range of high and medium-high technological manufacturing industries and services (Table 1).

Whereas most SMEs face a similar competitive business environment, there is little overlap in their commercial activities. Fig. 1 shows relational ties outside the firm that also span the organizational boundary of the STP. The size of the ovals enclosing the four types of firms reflects the relative number of firms in that group. The firms’ respective direct contacts with the university’s technology transfer office are shown in the grey oval. The key role of the office is to forge knowledge and innovation networks between members of the STP. Overall, the largest circle comprises the high-tech SMEs. The STP’s business incubator locates business projects (embryonic business ideas). Finally, there are publicly funded R&D research institutes whose management is located elsewhere.

#### 3.1. Network data collection

The social network survey includes a roster with an alphabetized list of the firms and the technology office to facilitate individuals’ recall of typical patterns of interaction (Labianca et al., 1998). Given their volatile nature, business projects in the incubator and externally managed

**Table 1**  
Frequency distribution.

Variables	<i>n</i> = 50	%
<i>Industry</i>		
Manufacturing	17	34 %
Services	33	66 %
<i>International</i>		
Domestic	24	48 %
International	26	52 %
<i>Employees</i>		
Less than 10	10	23.8 %
11–50	23	54.8 %
51–250	9	21.4 %
<i>Origin</i>		
Independent	38	74.5 %
Spin-off	11	21.6 %
MNCs	2	3.9 %

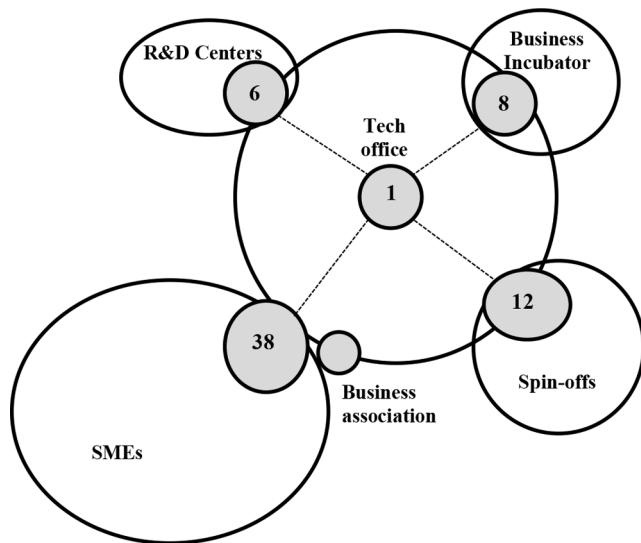


Fig. 1. Technology park's planetary map, showing relative weight and proximity of each grouping of firms to the Technology Office.

centers were excluded from the analysis. The first author of this study visited the 50 firm tenants in STP in 2015 and 2021. The complementary visit in 2021 was conducted in order to enrich the study. Although the COVID pandemic has resulted in several closures particularly in the business incubator, surveyed companies have stayed in the STP since its consolidation in the 2010s. Every CEO was contacted by email and then called by a researcher to request participation from the most knowledgeable informant. Many of the respondents were the CEOs themselves or other senior managers due to the absence of a formal HR management position. Respondents were asked to indicate the number of times that “your firm has shared or sought information relevant to your business in the past 6 months” (see survey questions in Appendix 1). Responses to this question represent the informal network in our analysis. Respondents were also asked to report “those with whom your firm has shared information on human resource practices in the previous six months”. To offer respondents examples of actual HR practices that SMEs may seek to implement, we listed a broad pool of 10 different practices (e.g., recruitment/selection, training, and compensation) based on Huselid's (1995) frequently adopted set of practices in HR research. Responses to this question represent the HR knowledge network in our analysis.

Overall, 40 firms and the university's tech office completed the survey, which represents a response rate of 80.4 %. Nominations made by other actors helped reconstruct the structure of interactions. Reconstruction (imputing any ties reported by respondents about their relationships with the non-respondents) is generally the preferred imputation method, as it produces better results than simply ignoring the missing data (Huisman, 2009). The 1,275 directional ties ( $\frac{51 \times 50}{2}$ ) among these firms and the tech office constitute the social network data for our analyses. The network data was entered into two network matrices and processed using the UCINET software: one for the collaborative relationships network and one for the HR knowledge network. For each of the resulting two matrices, we performed an analysis of structural and relational embeddedness in the interfirm networks by calculating density and three centralization measures: Freeman's degree centralization, closeness centralization, and betweenness centralization. Density analyzes the number of links between network members out of the number of possible links between those members (Scott and Carrington, 2011). Degree centralization measures the overall network activity. Closeness centralization refers to the relative access to resources by means of interdependence with other firms in the network; and betweenness centralization measures the volume of resources between

firms that passes through a given firm (Freeman, 1979). Freeman's mean degree centralization was also calculated. It is defined as a global mean value of the number of ties that firms have—either outgoing (outdegree) or incoming (indegree) (Freeman, 1979). It therefore measures firms' level of participation in knowledge flow both in obtaining knowledge (indegree) and in seeking knowledge (outdegree). To determine tie strength (cf. Granovetter, 1973), we measured the frequency with which firms exchange knowledge reciprocally with each other, versus the number of exchanges that flow unidirectionally from one firm to another. Reciprocity is a suitable indicator of the degree of mutuality and reciprocal exchange in a network, which reflects trust, social cohesion, and credibility. In addition, a core-periphery analysis was performed to identify a cohesive subgroup of core firms and a set of peripheral firms that are loosely connected to the core (Borgatti and Everett, 2000). Cohesive subgroups are defined as “subsets of actors among whom there are relatively strong, direct, intense, frequent or positive ties” (Wasserman and Faust 1994, p. 249).

### 3.2. Interview data

Following a qualitative simultaneous design, qualitative interview data was gathered to ascertain the motivational reasons why firms share HR knowledge. Describing differences and similarities across firms exploits the combination of quantitative and qualitative data, inasmuch as the qualitative data reveals the experience and strategies the firms have, while the quantitative data situates where such experiences and strategies occur. Twelve field interviews lasting, on average, one hour each, were carried out with key informants from the SMEs. New-technology ventures, university spin-offs, and business projects were not included in the selection criteria. Interviews were conducted with seven CEOs and five HR managers. With the aim of obtaining a wide variety of answers, participants were selected considering the managerial differences that exist between smaller firms and those 10 % in the STP with 250 employees. A proportional number of interviews with companies in high-tech manufacturing activities and services was also taken into consideration. By interviewing almost 32 % of all surveyed firms, we guaranteed dispersion in answers and viewpoints from those informants who were actively participating in inter-organizational gatherings, as well as those that were less favorable towards interfirm collaboration. We developed a short interview protocol with open-ended questions that addressed aspects pertaining to the origins of the informal relations among firms, the common knowledge flow from one firm to another, the context in which this took place, and the organization's experience of collaboration to date. We sought to explore questions relating to the nature of knowledge sharing and that examined the extent to which informal networks facilitated exchange of HR knowledge. We also asked several questions regarding the reasons why firms engaged in HR knowledge sharing and the perceived benefits of both exchanging and receiving HR knowledge.

Our interview questions and initial themes were based on a literature review of motivational drivers for knowledge sharing including reciprocity, exploratory learning, and organizational standing (Gray and Purdy, 2018). Themes and quotes that showed signs of HR knowledge sharing, motivation, and types of knowledge being shared were identified. This resulted in a combined list of 78 quotes. Authors then engaged in an iterative process of sorting these quotes into three final motivational drivers to engage or to not engage in knowledge sharing. Confusing or problematic quotes were separated in the analysis and eliminated once they were confirmed to have no shared meaning.

## 4. Findings

The vast majority of senior managers interviewed answered affirmatively, in a very direct way, that informal exchange of HR knowledge did occur among firms in the STP. HR knowledge was generally intertwined with other important knowledge domain discussions, such as

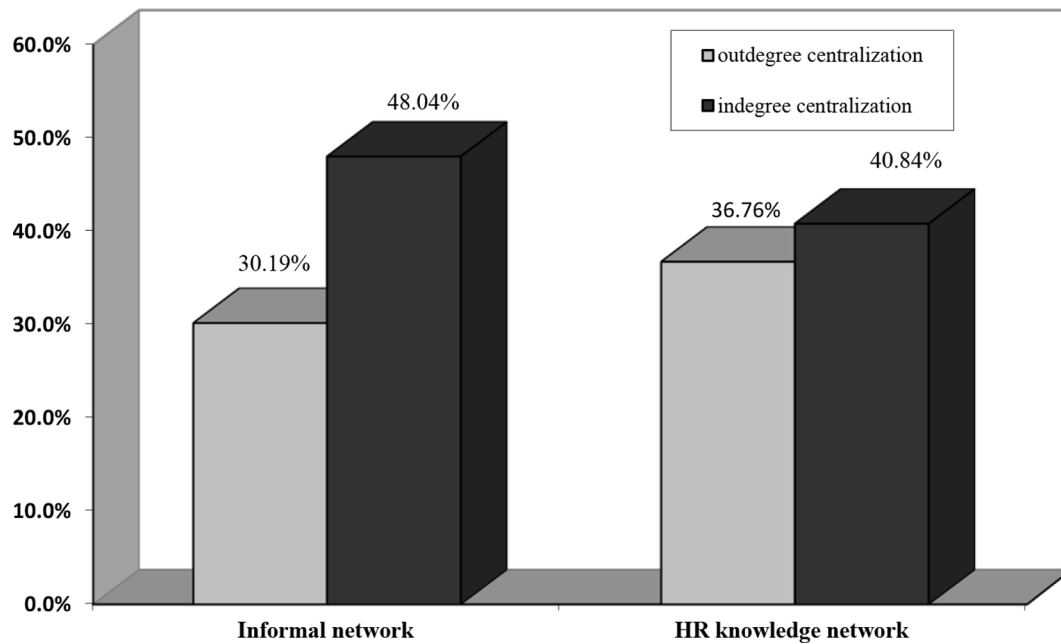


Fig. 2. Freeman's outdegree and indegree network centralization.

those concerning technology, products, markets, legislation, or financial matters. In response to the question of how sharing of HR knowledge usually takes place, a common theme revealed in our fieldwork was the value of informal exchanges at social events. Several CEOs referred to trade fairs, exhibitions, congresses, and conferences where participation occurred through various informal networks, and informal HR-related discussions. The STP was deemed to be beneficial to establishing collaborative relationships based on shared location and experience, combined with a sense of general trust that was actively promoted by the STP's technological office. Participating firms noted the importance of discussing and exchanging solutions and sharing best practices linked with HR issues through these informal formats, as one HR manager noted,

“Sometimes during a coffee break or a drink after work, someone mentions something that unexpectedly raises some ideas; something you didn't know or hadn't given much thought to previously: perhaps changes in a given HR practice, or simply a tip for conducting a difficult exit interview.”

Fig. 2 illustrates Freeman's degree centrality values for the informal network and HR knowledge network. Mean degree centrality represents how centralized (higher percentage) is the indegree centralization (firms obtaining knowledge) and outdegree centralization (SMEs seeking knowledge). The HR knowledge network shows low difference between these centralization measures which indicates that relationships between SMEs are slightly more centralized in seeking knowledge than in obtaining knowledge. The overall informal network reveals that direct

firm-to-firm relationships are well consolidated and presents an illustration of generalized trust in other SMEs with relatively low levels of centralization, which enables knowledge sharing within the network. The HR knowledge network can be seen as emerging from these informal interfirm relationships. In terms of reachability more than 70 % of firms are reachable through the HR knowledge network channels. Fourteen firms are not involved in the HR knowledge network. The existing ties form a weakly connected network component.

Network measures have been calculated both with the tech office and excluding it from the analysis (Table 2). The university's technological office plays a critical role in connecting the firms in the network. The office is the most central node and, hence, the most influential node in the network. Its centrality (Freeman, 1979) relates to its role as a knowledge provider and as a broker across structural holes, as it develops strong ties with most firms and serves as a broker in the diffusion of knowledge resources. The differences in density and centralization, total knowledge exchanged, and other network indexes between the network with the tech office and without it illustrate the critical position of the office in promoting a collaborative environment that supports and nurtures interfirm relationships (Diez-Vial and Montoro-Sanchez, 2015).

#### 4.1. Structural and relational embeddedness

For the analysis of the structural and relational embeddedness of the HR knowledge network, we calculated main network indexes, including variations in centralization (degree centralization, closeness

Table 2  
Structural and relational results of the networks.

	Informal network		Knowledge network	
	Tech office included	Tech office excluded	Tech office included	Tech office excluded
Isolated nodes	4/51 = 7.8 %	6/50 = 12 %	13/51 = 25.4 %	15/50 = 30 %
Density	0.181	0.160	0.068	0.053
Total knowledge exchanged (sum of degrees)	462.00	392.00	174.00	130.00
Network centralization index (%)	24.64	19.39	46.03	21.54
Closeness centralization (%) <sup>a</sup>	57.33	10.48	53.23	54.06
Betweenness centralization (%)	21.38	36.91	23.26	47.68

<sup>a</sup> Disconnected nodes are excluded.

**Table 3**  
Densities between groups in the knowledge network.

Partial densities in network sections		Knowledge receivers	
		Core	Periphery
Knowledge donors	Core	0.258	0.027
	Periphery	0.029	0.007
Final fitness of model: $r = 0.436$			

centralization, and betweenness centralization) and density measures of the knowledge network (Table 2). Particularly, network densities reveal significant results. The computed density value for each network indicates knowledge flows across firms, which can be interpreted as the probability that firms will share knowledge. The informal network has an average density of 0.181, while the density for the HR knowledge network is 0.068. In other words, out of all possible channels of resource interaction in the HR knowledge network, firms actually use 6.8 % of the channels. These results indicate that ties tend to be sparsely connected through intermittent interactions. The overall network closeness centralization is relatively low, implying low-to-medium levels of centralized access to knowledge, with a medium centralized access to HR knowledge (53.2 %). Overall network centralization is relatively low, indicating a relatively low level of centralized access so that flows of HR knowledge are distributed among multiple firms. Notably, the degree centralization index is much higher for the specific HR knowledge network than for the overall informal network. Still, betweenness is relatively low for the HR network (23 %). This variable ranges from zero—no connections—to 100, where just one firm connects all other firms. A network with low betweenness centralization is likely to have few central firms, or bridges, linking disconnected groups.

A core-periphery model analysis was performed to identify cohesive subgroups of actors within the HR knowledge network. The results in Table 3 suggest that the HR knowledge network has a core-periphery structure. The final model fit of  $r = 0.436$  indicates that the HR network data approximates an ideal core-periphery structure fairly well. Firms in the core group tend to be highly interconnected amongst themselves, and peripheral firms tend to establish loose links with the core firms and virtually no interconnections with other peripheral firms. Partial density of knowledge exchanges among the core firms is 25.8 %. Compared to the HR knowledge network’s overall density of 6.8 %, the HR knowledge shared within the core is considerably more intense. Those SMEs in the core group whose relationships are more embedded in the network are likely to share knowledge to access and combine knowledge resources in the form of HR knowledge. Qualitative data can help identify ties between company network position and its motivational objectives.

**4.2. Motivational drivers**

We gathered interview data to explore both motives for participation and lack of participation in HR knowledge exchanges. The positive motives, indicated in Table 4, include: exploratory learning, reciprocity, and organizational standing. The negative motives include the absence

**Table 4**  
Motivational drivers for and against engaging in knowledge sharing.

Reasons to share HR knowledge	Reasons not to share HR knowledge
<p><b>Reciprocity</b> “Honestly, as I see it, you can build a collaborative relationship, while fostering a win-win situation. Kind of ‘you scratch my back and I’ll scratch yours.’”</p>	<p><b>Absence of reciprocal ties</b> “Firm cooperation is a two-way deal. In the absence of this understanding, I’ll be careful about what I share.”</p>
<p><b>Exploratory learning</b> “There is no doubt that in the process of exchanging knowledge we always expect to learn something back.”</p>	<p><b>Absence of perceived benefits</b> “What if instead of engaging in a healthy exchange they just simply imitate us what we do best? There is a risk that we may lose talent and we would be in worse position to attract new talent.”</p>
<p><b>Organizational standing</b> “Leading firms are just expected to share. They are considered benchmarks for companies in quest of reliable HR information.”</p>	<p>“Why should I [share HR knowledge] if I don’t have to? Whatever the truth of the matter, it is apparent that the benefits of sharing information with other firms, even if they are honest and friendly partners, is uncertain.”</p>

of perceived benefits of exchange participation and reluctance to rely on others due to the absence of reciprocal ties.

Three of the executives we interviewed (who are with isolated firms in the HR knowledge network) remarked that, on occasion, sharing HR knowledge was not appropriate for their businesses. These executives were particularly aware of the fact that sharing what considered exclusive knowhow about their management practices might put them at risk of potentially losing valuable knowledge to competitors. Reluctance to share valuable resources is consistent with strategic RBV approaches that warn firms of the risks of sharing proprietary HR knowledge (e.g., Shaw, 2021). In the following quotation, the CEO from a firm in the periphery of the HR knowledge network describes the typical mistrust about informal collaboration and the perceived threat to firm effectiveness that is associated with participating in resource interaction:

“We come in to get work done, not to waste time talking to other firms. This is about making money, not friends. Besides, you can’t possibly believe anything coming from other firms. We must be economical with the truth to disguise our weaknesses and highlight our strengths. Business is all about secrecy because at every turn there is a risk of losing business opportunities.”

Interviews revealed that when it came to sharing, several executives drew the line between critical and non-critical HR knowledge to explain their reluctance to participate in HR knowledge networks. Even among firms actively engaged in sharing knowledge, some were more restrictive than others. Interestingly, there was no shared definition of what critical HR knowledge included. In general, some aspects of the HR function were less prone to be shared, such as certain aspects of compensation and talent management, but there was less agreement on other HR issues.

Similarly, we explored executives’ underlying motivations for sharing HR knowledge with colleagues informally. For firms acting as recipients, participation in knowledge flows provided the benefit of access to new knowledge and the opportunity to transfer it to their HR systems. In several accounts, senior managers from companies in the core group reported clearly articulated objectives for purposefully searching for HR knowledge. In those cases, executives mentioned their interest in obtaining insight they could put into practice via innovation, by changing existing practices, or by implementing new HR practices. In other instances, the motivation for participation was related to accessing certain knowledge to help managers either develop their awareness about a specific HR practice or facilitate learning. A large proportion of CEOs and HR managers in the periphery group highlighted the fact that informal networks facilitated access to exploratory knowledge, which could be further channeled into their internal HR knowledge stock. As the network data further supports, more firms (both in the core group and the periphery) sought resource accumulation and exchange.

Firms in the core group that shared HR knowledge seemed to pursue diverse objectives and obtain different benefits than those reaped by recipient firms. Most donor firms shared knowledge to increase their perceived standing as a trustworthy partner by other firms. Also, the firm’s desire to demonstrate or improve its reputation and image further

motivated participation. Some executives shared specific accounts of their internal HR knowledge base and, by doing so, positioned their firms within the HR knowledge network as leaders in specific HR practices. For example, one of the core firms in the STP had faced financial difficulties and had to carry out restructuring plans, which it did successfully. The current CEO explained that other firms contacted them, due to the prestige and experience they had gained in those difficult times:

“We are currently holding meetings with a couple of senior managers to comment on their collective re-organizational procedures. We have always drawn upon state-of-the-art HR practice [...] [Firms] talk to us because they know of our long-standing commitment to state-of-the-art HR practices.”

For SMEs, being innovative and successful in managing HR practices is considered an exceptional achievement. In this sense, the enhancement of organizational standing was also cited as a significant motive in the decision taken by periphery firms to establish links. In our network survey, respondents rated every other firm’s prestige in aspects pertaining to their HR practices. The results of social network correlation analysis (Krackhardt, 1988) show that prestige is positively correlated with participation in the HR knowledge network (0.432,  $p < .01$ ).

In other accounts, cooperative behaviors were tied to the expectation of reciprocity, which may increase the likelihood that firms maintain enduring relationships with each other. Firms sharing HR knowledge forged reciprocity and expectations of long-lasting relationships, which could represent opportunities for the future exchange of knowledge resources. Reciprocity was deemed essential for developing informal ties. This was particularly clear in the case of firms holding an informal leadership position within the STP network. On occasion, these firms felt a sense of obligation to share. The HR manager from one firm in the core group explained how she shared the many intricacies that impact people management when working in the international arena:

“Managing people is one of the most complex things a firm faces when pursuing an international strategy. I’m always willing to tell how we are solving the difficulties and eager to learn how others are navigating their way through them.”

Network data shows that the percentage of reciprocated ties of the HR knowledge network is 21.54 %, a slightly higher amount of local pair-wise relationships than in the informal network. Of all pairs of actors that have any connection, 53 % of the pairs have a reciprocated connection. This suggests a rather non-hierarchical structuring of the HR knowledge network. Reciprocity is based on the idea that firms that share knowledge resources with other firms would also be active recipients of knowledge. As one young HR manager brought up during an interview:

“To me, those who do not share knowledge and expertise when requested are rather untrustworthy. They should not expect to collaborate with us or draw on our expertise on any account.”

The motivational nature of the knowledge network is supported in the reciprocity index. The results from the calculations are shown in Table 5. Firms were classified by the other firms in the STP into two categories according to whether they were recognized by their HR practices. Firms with high prestige, to a large extent, forged reciprocal ties with other prestigious firms. Almost 26 % of ties are reciprocated ties between two prestigious firms. Alternatively, firms with low status

**Table 5**  
Reciprocity between the prestige groups in the HR knowledge network.

Partial reciprocity in knowledge networks	HR knowledge network	
	Low prestige	High prestige
Low prestige	0.0000	0.3333
High prestige	0.2353	0.2564

establish more reciprocity with high prestige firms than with other low prestige firms (33.3 %). From these results, we can infer that for firms with low prestige, a link to a firm with high prestige might be more valuable than a link to another firm with an equivalent status (measured by how likely-one node is to return information to the firm that shared knowledge). Finally, we addressed newcomers’ network style. We ran t-tests analysis to observe relationships between firm prestige and age and analyzed SMEs in the core/periphery in terms of their age. Prestige and coreness were evenly distributed among SMEs in the network. When it comes to participating in HR knowledge networks, younger SMEs do not differ significantly from older firms.

Overall, the resulting HR knowledge network was relatively decentralized and had low density, but it was also particularly interactive (based on the number of reciprocated ties), and most actors were reachable by all others. Results showed that SMEs participated differently within the network and that such differences were both due to firm knowledge bases and to their degree of embeddedness in the HR knowledge network. A portion of SMEs were actively engaged in knowledge exchanges. Some of them participated based on perceived benefits related to resource acquisition and organizational competitiveness. Others had relatively active roles and were highly reciprocal, and some were leaders among firms in the STP. Of the latter group, the need to enhance organizational standing made participation in informal HR knowledge networks more salient.

## 5. Discussion and conclusion

In this paper, we set out to explore how collaborative (informal and non-market mediated) networks enable resource interaction in the form of HR knowledge among small, growing firms clustered in a STP. Our study is grounded in the resource interaction approach (Prenekert et al., 2022) according to which SMEs access and combine resources through networks of relationships. Study findings suggest that collaborative interfirm relationships stimulate the development of interfirm ties where certain HR knowledge exchanges take place as HR knowledge itself is seen as a valuable resource to the firm. Through a multi-method approach, combining social network analysis and qualitative analysis, the study demonstrates that innovative SMEs acquire valuable HR knowledge from their interfirm network, which extends the middle range theorizing of resource interaction to the management and strategy field, in particular HR knowledge as a resource in business networks (Prenekert et al., 2019).

This study points to the importance of exploratory knowledge gains as an underlying motivation for participating in interfirm knowledge flow. While knowledge stocks provide the foundation for a firm’s core competencies, knowledge flows are necessary for facilitating entrepreneurial learning by enabling a firm to expand, refine, and keep its knowledge base current (Phelps et al., 2012; Shaw, 2021). In that regard, our findings add to a central debate regarding the versatility of resources as a source of value creation (Nason and Wiklund, 2018) whereby non-contractual interfirm networks provide opportunities for SMEs in terms of gaining access to resources and complementing their scarce resource base. Indeed, it is important for firms to participate in interfirm networks where HR knowledge flow may be positively and significantly related to resource acquisition with the potential of unleashing innovation and organizational learning. Better understanding as to how HR knowledge resources spread across firms may result in more effective ways of seizing such flows, which can contribute to increased HR knowledge stocks. Additionally, as our qualitative analysis illustrates, cooperative diffusion of managerial experience has positive consequences not only for firms that obtain HR knowledge but also for those that share knowledge, where sharing leads to greater legitimacy and prestige for all concerned (Naumovska, Gaba, & Greve, 2021).

Our findings suggest that a core group of SMEs succeeded in building strong relationships in a socially embedded network with similarly core firms. In doing so, firms in the core network obtained HR knowledge,

forged organizational standing, and gained greater social connectivity through reciprocity. This paper therefore contributes and extends the extant literature by suggesting the relevance of strong yet informal interfirm relationships for the acquisition of knowledge resources. Informal and non-market mediated networks, rich in collaborative relationships, are likely to enable firms to access new knowledge by allowing connections among parties across firm boundaries (Gray and Purdy, 2018). From a resource interaction viewpoint, interconnected SMEs can leverage relations and acquire HR knowledge.

Our study is consistent with research that highlights the uniqueness of SME characteristics, in particular their high use of informal relations to access a broad array of resources (Erhardt et al., 2022; Martin-Rios et al., 2021; Mayson and Barrett, 2006). The personal dimension of employer-employee relations in SMEs drives most small firms to organize their human resources differently, often eschewing formal HR systems and practices (Storey et al. 2010). Yet, as Kitching and Marlow (2013) argue, there are limits to the benefits of informality in HR. Oftentimes, small firms foresee formalization when faced with internal employee demands and external forces and incentives (Gilman et al., 2015). In essence, for some SMEs different degrees of formality-informality in HR practices can be considered as coexistent (Marlow et al., 2010). In such contexts, participating in HR knowledge flow may have potential benefits for SMEs that intend to adopt, develop, and improve their either formal or informal HR knowledge base as a source of value creation. Yet, because SMEs differ in their ability to identify and assimilate new knowledge, it is unlikely that they will all have the same degree of embeddedness in informal networks (McClean and Collins, 2019). Knowledge networks are particularly salient for seemingly resource constrained SMEs actively seeking HR knowledge. Our findings show that a core group of firms participated in socially embedded networks with other core firms with the purpose of sharing HR knowledge and gaining access to the HR capabilities held by other firms.

For SMEs in the core group, the network facilitated flow of HR knowledge resources as well as exploratory learning, legitimacy, prestige gains, and also fostered reciprocal relationships between firms. Our findings imply that, for active firms, interfirm knowledge networks may have potential internal benefits in HR system effectiveness (e.g., learning better ways of managing employees) and may strengthen reciprocal relationships by opening ties through which knowledge can flow (Svärd, 2016). Moreover, when considering HR knowledge flow, we assert that not only the strategic reasons (tied to tangible benefits), but also the motivational and socially embedded mechanisms, such as organizational standing and reciprocity, affect SMEs' participation in knowledge networks.

### 5.1. Practical implications

Our study implies that SMEs should develop strategies that maximize the benefits of informal knowledge networks. Through embeddedness in networks of HR knowledge, growth firms expect reciprocation and recognize increased source credibility. Firms with more experience in cultivating interfirm relationships may recognize more clearly the kinds of knowledge resources other firms have to share. As a result, managers in embedded firms can use network relationships to access and apply that knowledge to generate superior returns for the company. "Reinventing the wheel" is a common problem within firms, resulting in valuable resources being poorly allocated. SMEs can reduce this strain by building ties with outside firms and connecting with other people to gain expertise, instead of exclusively dedicating precious internal resources to create something that others may have already developed or improved upon.

An external HR knowledge network adds an additional tool to save valuable resources, grant access to original HR practices, and help foster new ones. As our fieldwork suggests, organizations on the cutting edge of HR may obtain further motivational benefits, such as improved

reputation and legitimacy as industry "thought leaders". A good HR reputation can lead to positive employer branding and, hence, help to attract and retain talent (Gardner et al., 2011). Together with these benefits, interfirm relationships encourage informal benchmarking to be up to date with competitors' HR practices. This limits an excessive intra-firm myopia. However, top managers and HR managers must acknowledge the strategic dimension of HR knowledge stocks, in terms of the cost-benefit balance between the risks and returns from participation in HR knowledge flows, particularly in the context of SMEs, where HR is not always formalized.

In addition, SMEs participate in collaborative relationships and will therefore need to provide managers with HR responsibilities for those firms without a formal HR function, with the network-related expertise and skills necessary to build fruitful network relationships. Managers and HR professionals should participate actively in professional online discussion forums, conventions, and conferences to engage in these informal networks, to learn from others' mistakes, share success stories, and forge new ties.

### 5.2. Limitations and future research

While this study offers rich insights regarding informal networks of HR knowledge, given its exploratory nature and sample, there are limitations that are important to address. The research site chosen was a small but rapidly growing STP. Such parks make it possible to examine informal interactions between SMEs within the boundaries of a relatively formal setting. Yet, knowledge sharing in STP and clusters may show some idiosyncratic features because firms in similar industries experience substantial pressure to adopt similar policies (Hannan and Freeman, 1977). This can be seen as an asset to the study as well. Creating and fostering participation in the park is a common means to enforce efficient knowledge sharing in a way that benefits the whole system. The study essentially tests the extent to which this is happening, although it does not compare with a control group.

Another aspect that is worthy of future consideration is the potentially positive consequences of interaction derived from participation in multiple networks, both formal and informal, inside and outside the STP (local business associations, key customers, and suppliers, etc.) and the unexplored consequences of the weakening or absence of ties in informal networks. Finally, we encourage additional research within and across industries (Kurt and Kurt, 2020).

In conclusion, the aim of this study is to provide some of the missing empirical evidence about whether innovate SMEs engage in HR knowledge flows through participating in informal interfirm networks and, if so, what structural and motivational aspects underlie these knowledge exchanges. By focusing on HR knowledge, this study departs from past research, which has, for the most part, neglected the existence of HR knowledge sharing in informal interfirm networks. We used a mixed methods approach, relying on multiple relational data and whole networks. A combination of network analysis and qualitative data analysis allows for validation and expansion of findings, thus enriching the reliability and validity of the findings. By applying a resource interaction perspective, this study provides an important bridge between social network and human resource theorists by identifying both the reasons that account for the development of channels through which HR knowledge spreads across small growing firms, and the structural factors influencing HR knowledge sharing. From this research, we have begun to understand the importance of informal network structures and the relationship between agents and these structures in the process of sharing resources such as HR knowledge.

### CRedit authorship contribution statement

**Carlos Martin-Rios:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Niclas L. Erhardt:** Writing –



review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Ivan Manev**: Writing – review & editing, Validation, Methodology.

#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Appendix. . Selected survey items

Questions	Aided recall of knowledge configurations
Q.1. Could you indicate, among firms included in the roster, those with whom your firm has sought or shared information relevant to your business in the previous six months?	- Technology and technological matters Marketing and product-related information Human resource management Production and innovation
Q.2. Could you indicate, among firms included in the roster, those with whom your firm has shared information on human resource (HR) practices in the previous six months?	- Recruitment, selection, and retention Training Compensation and rewards Collective bargaining Personnel administration Appraisal and development Personnel organization Health and safety Employee termination Communication
Q.4. Could you indicate the extent to which this firm [name in the roster] is recognized by their HR practices and the way they are managed?	

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