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How knowledge collecting fosters organizational creativity
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How knowledge collecting fosters organizational creativity

1. Introduction

After its first initial burst early in the 1990s, the issue of organizational creativity is gaining new momentum in many areas of social science. Even within the broad field of management, this issue has been addressed from different perspectives along several levels of analysis, aiming at drawing new conceptual models and finding evidence concerning antecedents, enablers, and moderating factors.

According to the interactionist perspective drawn by Woodman *et al.* (1993), creativity can be seen as "the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system" (p. 293). In so doing, Woodman and colleagues argue that, in order to understand organizational creativity, it is essential to look at several aspects, such as the creative process, the creative product, the creative person, and the creative situation, as all of them interact with each other in determining creativity.

Following this, a plethora of studies has been developed. Being as individual creativity is the "seed of all innovation" (Amabile *et al.*, 1996, p. 1155), and acquires managerial significance when applied to practical artifacts such as products, procedures, and processes (West, 2001), scholars have investigated the effect of personal characteristics on organizational creativity (e.g. Amabile, 1988; Amabile *et al.*, 1996; Oldham and Cummings, 1996; Woodman *et al.*, 1993). Other studies have widened the field by analyzing some characteristics of the organizational context, such as job complexity, supportive and controlling supervision (e.g. Oldham and Cummings, 1996), specific organizational creativity mechanisms (e.g. Bharadawaj and Menon, 2000), and organizational and technology factors (Lin, 2007; Wang and Wu, 2012). Another specific distinction has been the concentration or the dispersion of the *loci* in which organizational creativity might take place, whether in localized or dispersed teams (Prasad and Akhilesh, 2002; Reis, 2014; Reis and Curzi, 2010).

Based on the interactionist perspective of Woodman *et al.* (1993) and its subsequent applications (e.g. Gumusluoglu and Ilsev, 2009), this paper presents an original contribution to the field of intra-organizational mechanisms by combining the joint effect of interpersonal dynamics with the internal circulation of ideas and knowledge.

Despite the abundance of studies on the subject of organizational creativity, only few considered it as a dependent variable and tried to understand its antecedents. In line with Woodman *et al.* (1993), we conceive organizational creativity as a function of the creative results of individuals (and their knowledge) interacting and exposed to contextual influences (i.e. top management support and ICT use) and, accordingly, try to address the following research question: "*What is the relationship between knowledge collecting, ICT use and top management support in determining organizational creativity?*". For this purpose, we empirically analyze survey data of 362 employees operating in the subsidiaries of five multinational corporations (MNCs) located in Italy. The need to focus on the subsidiaries of MNCs is consistent with the idea that these companies, by virtue of their peculiar features, generally embed both the *technical* and the *social* elements for analyzing knowledge sharing, its effects, and contextual influences (e.g. Brandes *et al.*, 2004; Cavaliere and Lombardi, 2015; Cavaliere *et al.*, 2015; Gupta and Govindarajan, 2000; Zaidman and Brock, 2009), thus representing a valuable empirical setting to be observed for developing this study. Our data show that while knowledge collecting is strongly and positively associated with organizational creativity, high ICT use surprisingly negatively moderates the relationship between knowledge collecting and our dependent variable, while top management support does not show a significant moderating effect on the association between knowledge collecting and organizational creativity.

2. Conceptual development

2.1. The antecedents of organizational creativity

The adoption of the interactionist perspective (e.g. Gumusluoglu and Ilsev, 2009; Woodman and Schoenfeldt, 1990; Woodman *et al.*, 1993) allows study of the joint effect of

interpersonal dynamics with the internal circulation of ideas and knowledge. Following the seminal contribution of Woodman and Schoenfeldt (1990) on individual creativity, several studies have tried to investigate the "contextual influences" affecting it, such as the effect of interpersonal relationships (e.g. Kurtzberg and Amabile, 2001). The interactionist model of organizational creativity proposed by Woodman *et al.* (1993) saw "knowledge" as one of the components of individual creativity and "social information" as the mechanism for sharing such knowledge at an interpersonal level. Lately this process has been investigated as the way individuals gain knowledge and learn from others as an antecedent for fostering individual creativity. In this regard, the process of knowledge collecting meant as "consulting colleagues in order to get them to share their intellectual capital" (Van den Hooff and de Leeuw Van Weenen, 2004) has been considered a commitment to organizational innovation and creativity (e.g. Cavaliere and Lombardi, 2015; Lilleoere and Holme Hansen, 2011; Lin, 2007; Van den Hooff and De Ridder, 2004). In such a context, the fact that individuals "work interdependently towards a shared goal" (Harvey, 2014, p. 324) enables and enacts the transition from individual knowledge to the upper level aggregation of creativity (group, organization; e.g. Carmeli *et al.*, 2015; Majchrzak *et al.*, 2000; Pinho *et al.,* 2012; Vera *et al.*, 2014).

Taking an interactive approach also allows extension of the analysis to contextual elements (Woodman *et al.*, 1993) likely to affect organizational creativity. Woodman and Schoenfeldt (1990) point out that creativity results from an individual's behavior in a given situation, where the situation is defined by the contextual influences that affect creativity. They argue that "from an interactionist perspective, […] both situation and organism and the interaction that unfolds over time must be explained to fully understand the organism-in-its-environment. […] there is always something more to understanding behavior than just describing the observed behavior *per se*" (Woodman and Schoenfeldt, 1990, pp 279-280). Furthermore, following Woodman *et al.* (1993), "the premise that behavior is a complex interaction of person and situation is repeated at each level of social organization", namely at the individual-, group-, and organization-level (p. 296). Similarly, given the contextual nature of

any knowledge transfer activity (e.g. Chen *et al.*, 2014), the research has stressed seeking knowledge and help from others as a routine which is strongly shaped by the work context in which this behavior is performed (Grodal *et al.*, 2015), however, these contextual influences are not clear. Woodman and colleagues (1993) note several examples, such as "organizational culture, reward systems, resource constraints, the larger environment outside the system" as well as "physical environment, task and time constraints" (p. 296), "components of causal reasoning" (p. 299), "resource availability" (p. 302), "availability of creativity programs" (p. 305), "organizational structure" (p. 313) and so on. This allows for a broad interpretation of the influences which fall under the "contextual" category. Given the broad meaning of "contextual influences", we position our argument within extant research, stressing that knowledge transfer processes and the related outcomes (e.g. creativity) should be investigated while looking at both *hard* and *soft* factors (e.g. Goh, 2002; Hlupic *et al.*, 2002; Van den Hooff and de Ridder, 2004). The former include authority, power, and job design, but especially technological infrastructure, such as knowledge management tools that support knowledge sharing, knowledge capture and codification (Goh, 2002; Hlupic *et al.*, 2002); among the latter are less technical issues, such as culture and top management commitment. Following this, our model explores the role played by both *hard* and *soft* factors in affecting the relationship between individual knowledge collecting behaviors and organizational creativity. Of these, top management support (Connelly and Kelloway, 2003; Kim and Lee, 2006; Kim *et al.*, 2015; Lin, 2007; Lin, 2006; Lu *et al.*, 2006; MacNeil, 2004; MacNeil, 2003; Tan and Zhao, 2003) and the use of information and communication technology (ICT) (Hendriks, 1999; Huysman and Wulf, 2006; Kim and Lee, 2006; Lin, 2007; Majchrzak *et al.*, 2000; Sheng *et al.*, 2013; Van den Hooff and Huysman, 2009; Yeh *et al.*, 2006; Zack, 1999) have been demonstrated to support knowledge sharing and organizational innovation (Lin, 2007; Lindič *et al.*, 2011), as well as employee engagement (Korzyński, 2015) and individual-level creativity (Baer and Oldham, 2006; Kim *et al.*, 2010; Madjar *et al.*, 2002). Despite prior research stressing the importance of information and communication for fostering creativity (e.g. Damanpour, 1991), and of support for creativity

from supervisors (e.g. Baer and Oldham, 2006; Tierney and Farmer, 2004), little is yet known with regard to the role indirectly played by ICT use and top management support in affecting organizational-level creativity. As a result, this study accounts for the complexity of organizational creativity while considering *hard* and *soft* factors as contextual influences likely to shape it, and interpersonal knowledge sharing dynamics.

2.2. Framing organizational creativity

Although organizational creativity, team innovation, and organizational innovation are terms often used to address similar phenomena, it is possible to draw some distinctions between these concepts (Gurteen, 1998; Hu and Randel, 2014; Hurt *et al.*, 1977). Since organizational creativity refers to the "creation of a valuable, useful" application (Woodman *et al.*, 1993) or artifact (West, 2001), the concept funnels creativity toward something characterized by novelty and/or originality, and therefore does not just refer to mere representations of original ideas, but rather to the organizational action and progress (Kanter, 1988; Vicari and Troilo, 2000). Following Woodman *et al.* (1993), innovation is a defining feature of organizational creativity; further, "organizational creativity does not coincide with innovation since it can also be achieved through incremental changes and not necessarily attributable to the discovery and adoption of new approaches and rules" (Borghini, 2005, p. 19).

Despite the works conducted by Amabile (1988) and her research team (e.g. Amabile *et al.*, 1996) addressing the subject of creativity "in context", such literature proposes an interpretative framework focusing on individual creativity (Chiang *et al.,* 2014). Further, creativity, at the individual or group level, is not independent from the specific environment in which it takes place (Phelan and Young, 2003; Rego *et al.*, 2014). Organizational creativity can therefore be investigated at three levels of analysis (Drazin *et al.*, 1999): 1) intra-subjective level (individual); 2) inter-subjective level (group); and 3) collective level (organization).

This paper acknowledges the existence and the intertwinement of these three levels by presenting an analysis conducted at the intra-subjective level in "complex social settings" (e.g. Woodman *et al.*, 1993). In fact, the research focuses on the interpersonal dynamics of knowledge management and the way they affect organizational creativity, both directly and via the effect of other moderators operating at the organizational level. Such an approach recalls the ones used in related studies (e.g. Brockmann and Anthony, 2002; Glynn, 1996; Hu and Randel, 2014; Koh, 2000; Lee and Choi, 2003). Inter-subjective or group creativity is commonly analyzed as the result of individual creative effort related to group composition or characteristics (e.g. formalization, norms, cohesion).

Consistent with the interactionist model proposed by Woodman *et al.* (1993), organizational creativity is here seen as a function of the creative results of interacting individuals (exchanging knowledge at an intersubjective level) exposed to contextual influences (such as top management support and ICT). Hence, as the authors suggest,

> … the creative output (new products, services, ideas, procedures, and processes) for the entire system stems from the complex mosaic of individual, group, and organizational characteristics and behaviours occurring within the salient situational influences (both creativity constraining and enhancing) at each level of social organization (p. 298).

Despite the amount of distinguished research on the subject of organizational creativity, there is still little knowledge about the conditions that are likely to influence it (Borghini, 2005; Drazin *et al.*, 1999; Oldham and Cummings, 1996). In particular, building on the evidence found by Calantone *et al.* (2002) of a link between learning orientation and firm innovation capability, this paper focuses on individuals' behaviors of getting knowledge from colleagues, using ICT and perceiving support from their top management while attempting to understand how this can contribute to fostering organizational creativity. While the relationship between knowledge collecting and organizational creativity seems to be

unanimously confirmed by extant literature, empirical evidence of the effects of ICT use and top management support on such an association are still lacking.

2.3. Knowledge collecting

Sharing knowledge at an intra-organizational level is critical to accomplishing any innovation (Cao and Xiang, 2012; Hu and Randel, 2014). In general terms, knowledge contributes to the generation of creative thoughts and eventually to innovation (Birasnav, 2014; Chen *et al.*, 2014; Coombs and Hull, 1998; Evanschitzky *et al.*, 2007; He *et al.*, 2014; Nightingale, 1998; Rechberg and Syed, 2014) and flows amongst different levels of creativity (Nonaka, 1991; Vicari and Troilo, 2000). Understanding the relationship between knowledge sharing and organizational creativity is particularly important as interpersonal dynamics (such as teams, task forces, internal communities) are often the ultimate mechanisms essential to achieving innovation (Brown and Duguid, 1991; Chi *et al.*, 2009; Chiaburu *et al.*, 2013; He *et al.*, 2014; Lin, 2010; West, 2002).

Current research widely shows that knowledge sharing among individuals belonging to the same organization stimulates mutual learning and encourages innovation (Brown and Duguid, 1991; Bruns, 2012; Eisenhardt and Tabrizi, 1995; Hu and Randel, 2014; Kogut and Zander, 1992). The necessary presence of a "complex social setting" embedded in the definition of organizational creativity adopted in this paper (Woodman *et al.*, 1993) requires the consideration of those concepts of knowledge sharing as a social process involving individuals that play the roles of "sources" and/or "receivers" (Cavaliere and Lombardi, 2015; Cavaliere *et al.*, 2015; Quigley *et al.*, 2007; Van den Hooff and de Leeuw Van Weenen, 2004; Van den Hooff and de Ridder, 2004) or "sellers" and "buyers" (Reid, 2003). Consistent with a multilevel perspective (Cole *et al.*, 2002; Drazin *et al.*, 1999; Quigley *et al.*, 2007), knowledge sharing represents a relational act involving two or more individuals, independently from their formal affiliation to specific or formalized groups. Within knowledge sharing, two different processes take place: knowledge donating and knowledge collecting (Lin, 2007; Van den Hooff and de Leeuw Van Weenen, 2004; Van den Hooff and de Ridder,

2004). The first represents the employees' willingness to communicate with others and voluntarily transfer their (pieces of) intellectual capital. The second is instead the process of asking colleagues to share their knowledge and, in turn, to learn from them. The consideration of such knowledge-sharing processes is also consistent with organizational learning as a process of distributed cognition (Salomon, 1993), according to which individuals appear to think in conjunction or partnership with others under the effect of their social, technical and cultural contexts, switching from the "person-solo" to the "person-plus" approach to learning (p. xiii).

One point is important to mention here: the complementarity of knowledge donating and knowledge collecting does not imply equality in nature and symmetry. As Van den Hooff and de Ridder (2004) pointed out, "such processes have a different nature, and can be expected to be influenced by different factors" (p. 118). In particular, knowledge donating refers to a voluntary behavior that employees take on their own initiative, and therefore would require the investigation of the motivational triggers at the individual (intra-subjective) level (Gagné, 2009). The investigation of knowledge collecting can instead be conducted by the actual observation of interaction among individuals (or its declaration of intention), through personal contact and trust (Brockmann and Anthony, 2002; Randel and Ranft, 2007), yet preserving the inter-subjective level of analysis.

Given its potential to contribute to individual and organizational learning and its direct linkage to interpersonal dynamics, this work focuses on knowledge collecting as a sub-dimension of knowledge-sharing activities (Lin, 2007). Based on extant research, knowledge collecting entails a specific request for information (i.e. knowledge) from colleagues and underlies the willingness to learn which has been proved to contribute to organizational creativity (Calantone *et al.*, 2002; Lin, 2007). Indeed, seeking relevant knowledge from colleagues catalyzes at the same time an individual learning orientation (Dixon, 1992), a crucial process of knowledge sharing (Gibney *et al.*, 2009; Grodal *et al.*, 2015; Moorman and Miner, 1998), and the capacity to combine previously unconnected elements of knowledge (Michealis *et al.*, 2015). This argument echoes prior research suggesting a model in which creativity is

strongly dependent upon the process by which individuals acquire new knowledge (e.g. Campbell, 1960).

While the relationship between knowledge creation processes and organizational creativity has been verified by several studies and tested in different settings (e.g. Amabile, 1988; Amabile *et al.*, 1996; Calantone *et al.*, 2002; Glynn, 1996; Gurteen, 1998; Koh, 2000; Lee and Choi, 2003), a specific analysis on knowledge collecting as part of the social, learning context has not yet been verified. Thus, we propose the following:

Hypothesis 1: Knowledge collecting has a positive effect on organizational creativity.

2.4. ICT use

Since the mid-1990s, the fields of innovation and knowledge management have been mainly investigated though the lens of instruments and tools that organizations might use as enablers for knowledge transfer and storage (e.g. Hansen, 1999; Swan *et al.*, 1999; Yeh *et al.*, 2006; Zack, 1999). "ICT use" is the actual utilization of ICT infrastructures by employees (e.g. Lin, 2007; Van den Hooff and de Leeuw Van Weenen, 2004; Van den Hooff and de Ridder, 2004). Information being a constituent of knowledge, ICT solutions have been traditionally considered as sources of firms' competitive advantage, also for their contribution to the storage of knowledge (Nonaka, 1991; Porter and Millar, 1985) through the usage of Intranets, groupware, repository systems, and collective memories (Alavi and Leidner, 2001; Avgerou *et al.*, 2004; Davenport and Prusak, 1998).

According to Orlikowski and Gash (1994), ICT tools can be defined as "technological frames", since they embed assumptions, expectations, and knowledge that organizational members have regarding technology in their shared (social) contexts. Again, such perspective is consistent with the "complex social settings" proposed by Woodman *et al.* (1993) and considers technologies as social artifacts having material forms and functions (Avgerou *et al.*, 2004; Huysman and Wulf, 2006; Orlikowski and Gash, 1994; Zaidman and Brock, 2009).

In this fashion, ICT is able to contribute to organizational creativity via two main mechanisms: 1) the storage of explicit knowledge and its consequent accessibility and availability (De Long and Fahey, 2000); 2) a higher level of efficiency in the buyer/seller processes of knowledge transfer (Boland Jr *et al.*, 1994). Following this, we hypothesize that:

Hypothesis 2: ICT use has a positive effect on organizational creativity.

Since organizational creativity is intrinsically based on information, it is reasonable to expect that more information sharing will lead to higher knowledge creation and transfer, thus fostering creativity at the corporate level (Sundgren *et al.*, 2005). Similarly, Woodman *et al.* (1993) suggest that organizations whose members make use of ICT for free exchange of information, are likely to be more creative in that, conversely, constraints to open information sharing may have negative effects on creative performance. Hence, by making use of computer-based communication networks, groupware, management systems and so on, today employees can gain a host of new stimuli, divergent views and challenging inputs which can seed their creative performance. ICT has gathered the most attention for its potential to support knowledge-sharing activities and processes. Sheng *et al.* (2013) confirm this idea by suggesting the ICT accelerates knowledge sharing processes by enabling rapid search and retrieve of information as well as collaboration among colleagues, which in turn is likely to lead to increased organizational creativity. Based on this, we propose the following:

Hypothesis 3: The relationship between knowledge collecting and organizational creativity is moderated by ICT use in such a way that knowledge collecting is more positively related to organizational creativity when ICT use is high than when ICT use is low.

2.5. Top management support

In this paper, we adopt the view of prior research suggesting that social conditions influencing employees' behavior is likely to affect creativity (see Oldham and Cummings, 1996; Tierney et al., 1999), based on extant research (Woodman et al., 1993). In this vein, creativity stems not only from the individual's willingness to contribute to it, but also from the work environment that they perceive around them (Amabile et al., 2004). Among the characteristics of the work environment likely to lead to increased creativity is top management support (Dul and Ceylan, 2014). Scholars acknowledge that managers' support facilitates employees' ability to generate new ideas by creating a pleasant work environment, which is a critical determinant of the organizational-level creativity (Amabile et al., 2004). Recent empirical research has found that managerial actions strongly impact firms' innovative capacity, considered both in terms of product-market changes and administrative innovations (Anderson et al., 2014; Damanpour and Schneider, 2006; Dul and Ceylan, 2014; Elenkov et al., 2005). Such evidence is also consistent with the theoretical framework recently proposed by Harvey (2014). Extant research therefore sustains the following:

Hypothesis 4: Top management support has a positive effect on organizational creativity.

By falling under the wider category of organizational support, top management support has been found to be positively related to knowledge sharing (Lu *et al.*, 2006) as well as to several employees' outcomes (Riggle *et al.*, 2009; Valentine *et al.*, 2006). Among the various forms of support, the one exerted by top management seems to be the most important influence on organizational knowledge, as a means for providing the resources necessary to create new knowledge (Connelly and Kelloway, 2003; Lin and Lee, 2004). Hence, research suggests that, among all forces that impinge on employees' behaviors and actions, top management support is one of the most powerful. In particular, it can be expected that high perceptions of such support provide employees with encouragement and willingness to engage in learning processes with colleagues, thus helping them overcoming problems,

fostering mutual cooperation and enthusiasm about sharing ideas and opinions. This means that when employees perceive their supervisors to support them in learning from others by participating in knowledge sharing processes, this lead them to benefit their contribution to organizational creativity. Thus, top management support can nurture a working environment oriented toward sharing ideas for increased creativity. Therefore, top management support being a strong determinant of employees' behaviors, it might be expected to influence the impact that individuals' learning efforts have on organizational creativity. Therefore, we hypothesize that:

Hypothesis 5: The relationship between knowledge collecting and organizational creativity is moderated by top management support in such a way that knowledge collecting is more positively related to organizational creativity when top management support is high than when top management support is low.

3. Method

3.1. Sample and respondents

Data used for this research come from a research project conducted over the years 2011–2012. The population included the subsidiaries of manufacturing MNCs located in the Italian region of Tuscany and operating in various industrial sectors, but all characterized by a constant focus on innovation. According to the Chamber of Commerce database[1], the relevant population operating in Tuscany was composed of 33 subsidiaries. The need to analyze this specific set of firms is consistent with the importance of understanding the distinctive features characterizing these companies, which play a crucial role in the region's competitiveness. At the same time, Tuscany mirrors the Italian distribution of industrial activities (IRPET, 2014), so it can be considered as a reliable source for a larger

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[1] The Italian Chamber of Commerce represents all Italian companies and aims to link institutions, organisations, and associations, thereby providing services as well as development strategies likely to promote the growth of the national economy.

representativeness. Starting from the aforementioned population of 33 subsidiaries, five of them accepted to participate in this study (15.15%).

Following the purpose of this paper to investigate organizational creativity within the subsidiaries of MNCs, several reasons make the empirical setting particularly valuable. First, knowledge transfer activities are at the core of MNCs' business (Kostova, 1999), because their ability to internally share knowledge is fundamental for maintaining their competitive advantage. Second, given that knowledge transfer can be affected by country-level variables (Szulanski, 1996; Zaidman and Brock, 2009), this paper focuses on the subsidiaries of MNCs operating in a single country (i.e. Italy), thus holding factors such as cultural distance, host country risk, and FDI openness (Hébert *et al.*, 2005) constant and, therefore, excluding the influence of such factors on our results. Third, knowledge-sharing processes and organizational creativity might be highly specific to subsidiaries, in such a way that individuals working within certain subsidiaries are expected to collaborate on specific issues rather than others, as well as to have in common cultural aspects, to share the same language, similar ideas, and so on (Marschan-Piekkari *et al.*, 1999). This implies that adopting a more traditional subsidiary–headquarter perspective or a subsidiary–subsidiary one may overlook the important yet less-studied aspect of the phenomenon of within-subsidiary knowledge flows.

3.2. Data collection

As a preliminary to the survey (Hunt *et al.*, 1982), a draft questionnaire was pilot tested with 53 managers working for three different companies. The acquired feedback were analyzed and the first draft of the questionnaire was subsequently revised and tested again with 45 workers from a knowledge and service firm (Van Teijlingen and Hundley, 2001). For each of the five subsidiaries of MNCs, a meeting with the Human Resources Director was arranged, in order to illustrate the purpose and the relevance of the study. The meetings were also the occasions for identifying the employees to be involved in the survey. In particular, considering the research setting and questions, the survey was addressed to those

employees who were considered "nodes of knowledge", having a crucial role in affecting the strategic flows of information. More specifically, following prior studies (e.g. Ravichandran and Lertwongsatien, 2005) the sample included employees who could be considered potential critical contributors to organizational creativity as a consequence of possessing critical knowledge related to clients, suppliers, R&D, markets or specific technical issues. The study targeted those workers that Cohen and Levinthal (1990) identify as gatekeepers, standing at the interface of either the firm or the external environment or between organizational subunits, helping transfer information and knowledge across boundaries, and eventually playing a significant role in the absorptive capacity (ability to learn) of the firm. Such workers are crucial in the "spiral of knowledge creation" proposed by Nonaka (1991), given their ability to "translate" tacit and explicit knowledge into a form that can be easily acquired or better understood by anyone in the firm, therefore supporting organizational creativity and knowledge sharing.

Of the 757 invitations sent out for the survey, 362 questionnaires were filled in (47.82% response rate; year 2014).

3.3. Instrument validity and reliability

In line with Straub (1989), item reliability of each measure was assessed through a principal components factor analysis (PCA). Firstly, we conducted a PCA with varimax rotation as well as a Principal Axis Factoring (PAF) with promax rotation on the whole sample of observations. Secondly, we performed a PCA on each firm's subsample. We grounded on the need to retain the components able to explain at least 80% of the variance and, accordingly, kept only those principal components whose eigenvalues are greater than 1 (i.e. Kaiser criteria; Kaiser, 1960). However, some scholars also support eigenvalues lower than 1 (e.g. the scree test, Cattell, 1966; Zwick and Velicer, 1986). Moreover, following the literature (Raghunathan *et al.*, 1999), standardized factor loadings below 0.45 were not considered to be significant and then were eliminated. Both PCA and PAF extracted four factors. More specifically, both analyses showed that all questions that loaded highly on

factor 1 were all related to top management support. This led us to label this factor *top management support*. Similarly, all questions that loaded high on factor 2 related to organizational creativity, thus allowing us to name this factor *organizational creativity*. The same resulted for both questions loading on factor 3 and factor 4, which were reasonably grouped into respectively the *knowledge collecting* and the *ICT use* factor.

Performing a PCA on each firm's subsample led to identical findings. Within each firm, we found that the questions resulted to be grouped according to the four main factors we found with the whole sample analysis. In other words, the results of the factor analysis performed on the firms' subsamples resemble those emerged with the whole sample of observations. Moreover, they show that those results hold constant across all firms observed. This confirms that our dataset and our measurement tool are not biased.

In order to further test the robustness of the analysis, we regressed the corresponding residuals on the control and independent variables firm by firm. This allowed us to investigate whether there is some residual relationship between the dependent and the independent variables when considered at firm level. In particular, we focused on Model 3 (see Table 3), as the R-squared and the F-test indicated that, among all the others, it is the most powerful one. The results showed that only one variable in Firm5 shows a significant t statistics (i.e. Gender, $\beta=-2.86$, $p < 0.001$). Despite its strong significance, we believe this is not relevant, as Firm5 includes only 1 woman among the 47 observations. We can thus conclude that there is no significant interaction between firm and the independent variables and that effect of the independent variables on the outcome variable is substantially homogenous across firms.

3.4. Measures

Self-reported measures were used to operationalize all variables (Spector, 1994), which in turn derive from scales adopted in previous studies and measured using a seven-point Likert type scale ranging from 1 = "Strongly disagree" to 7 = "Strongly agree".

Dependent variable: Organizational creativity. A three-item scale was used to measure organizational creativity (α=.91). The scale was drawn from Lee and Choi (2003) and Calantone *et al.* (2002), as they selected the previous measure proposed by Hurt *et al.* (1977). Following the pilot questionnaire test (van Teijlingen and Hundley, 2001), we re-sorted a combination of established scales and items in order to measure the extent to which the firm constantly looks for new ways of operating and experiments with new ideas and solutions[2]. While many studies have measured organizational creativity by assessing the mere existence of a "creative climate" (see Amabile et al., 1996; Ekvall and Ryhammar, 1999), we contribute to the extant literature by adopting a scale which is much more focused on its *outcome*.

Independent variable: Knowledge collecting. Van den Hooff and de Leeuw Van Weenen (2004) provided the scale to measure knowledge collecting (two-item scale). The respondents were asked to give their opinion about their orientation toward their tendency to ask their colleagues for knowledge and the subsequent willingness of colleagues to transmit what they know (α=.96).

Moderating variables. For measuring *ICT use* two items were isolated over a scale of nine items on technological factors based on Lee and Choi (2003) and Lin (2007) (α=.76). The four-item scale of *top management support* was adapted from Tan and Zhao (2003) (α=.92).

Control variables. The companies observed were identified as Firm1–Firm5. In order to reduce the variance caused by factors that are likely to affect employees' contribution to organizational creativity, we controlled for gender (dummy variable, 0=Male, 1=Female), years of education, seniority (years of work experience within the company), and managerial

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[2] In order to generate our measurement scale for organizational creativity, already published papers using the same scale were examined. We particularly consulted Lee and Choi (2003), Calantone *et al.* (2002) and Hurt *et al.* (1977). Although they all refer to the same scale, they make different use of it. Hurt *et al.* (1977) initially developed 53 items for building their innovativeness scale. Lee and Choi (2003) took five out of six items sorted according to those 53 items, while referring to both firm creativity and innovation. In turn, Calantone *et al.* (2002) applied all Lee and Choi's (2003) six items and called their variable "firm innovativeness". Based on this, we included all six items in our questionnaire and then sorted them into two main constructs: organizational creativity and firm innovation. While the former is more concerned with the extent to which a firm is creative (see Appendix 1), the latter refers to its innovation rate and capability (e.g. number of new products marketed over the last 5 years). Given that the purpose of this study is to explore organizational creativity, we only focus on the first part of the scale (three items) and not also on the second (three items). The results of a confirmatory factor analysis matched the validity of selected construct (λ=3.046) and its constitutive items (factor loadings: 0.876, 0.877, 0.829 - see Appendix 1, Organizational creativity, Items a, b, c).

role (dummy variable, 0=No, 1=Yes). Given that the literature widely highlights the role played by autonomy in strengthening creativity (Liu *et al.*, 2011), we also controlled for employees' autonomy in their job (two-item scale taken from Hackman and Oldham, 1974) and for employee willingness to communicate (two-item scale taken from Wasko and Faraj, 2000).

All items used for measuring the variables are provided in the Appendix 1.

4. Results

4.1. Descriptive statistics

Descriptive statistics for all variables are shown in Table 1. As for the distribution of responses among the five companies included in the analysis, over one third of them belong to Firm2 (32%), less than one third from Firm4 (27%) and 40% of observations come from Firm1, Firm3 and Firm5. Given this uneven distribution of data across different firms, it has been essential to control for it when running the regression analysis (see Table 3 in the following section). With regard to the control variables overall, the majority of respondents are men, participants have on average almost 17 years of education and approximately 10 years of seniority, most of them have a managerial role, have a high level of job autonomy (Mean=5.38), and perceive themselves as particularly open toward helping their colleagues by sharing their own knowledge with them (Mean=6.42).

The average values collected among participants in relation to their orientation toward collecting knowledge from their colleagues score high (Mean= 5.43) when compared to the other variables included in our model. This suggests that respondents perceive that colleagues tend to help them by sharing their own knowledge with them when they are requested to do so. Slightly lower values, but still high ones, have been recorded for ICT use and top management support, thereby showing that respondents widely use the available ICT infrastructure for communicating with others and sharing information and knowledge (Mean=5.19). Similarly, the descriptive statistics demonstrate that top management is perceived as giving support for helping their employees share what they know with others,

by providing the necessary resources (Mean=5.24). Finally, on average, responses show that the sample of participants perceive their organization as an innovative one (Mean=4.92), based on the extent to which it tends to frequently try new ways of doing things and explores new ideas and solutions.

By shifting the focus to each of the five organizations observed (Table 1) it can be noted that perceptions of organizational creativity are different among the firms observed, with high values in Firm2 (Mean=5.60) and below-average perception in Firm3 (Mean=3.94).

In Table 2 we provide the correlation matrix for all variables and Cronbach's alpha coefficients. The table shows good internal reliability of scales, which ranges from .76 to .96. Moreover, correlation coefficients show some values above .30, which is traditionally considered to be the threshold over which collinearity among variables may become an issue to be solved.

In order to check the robustness of the data, demographic variables and questionnaire responses between early and late respondents were compared, based on the assumption that late respondents are more closely similar to non-respondents than to early respondents (Lin and Schaeffer, 1995). Early respondents are those who filled out the questionnaire at the first message of invitation; late respondents provided their answers at the first or second reminder. As no difference was found between the two groups, we are confident that data do not suffer from problems of non-response bias.

TABLE 1 ABOUT HERE

TABLE 2 ABOUT HERE

4.2. Hypotheses testing

The results of the multiple regression analysis (Aiken and West, 1991; Cohen and Cohen, 1983) run using STATA13 are reported in Table 3. Given that some correlation coefficients went beyond the traditional threshold of .30, it was necessary to detect the presence of multicollinearity among explanatory variables. Starting from this, for each model and each variable the variance inflation factor (VIF) was calculated. As can be noted, all values are well below the threshold of 5 or 10 considered to be the maximum level acceptable signaling multicollinearity.

Moreover, because of the high correlation among some variables, in line with extant research (e.g. Hu and Randel, 2014), we tested the discriminant validity of the constructs through the comparison among the square root of average variance extracted (AVE) with all corresponding correlations. The results confirm that the constructs have strong discriminant validity.

In order to test the hypotheses, five different models were designed. In Model 1 only the control variables were entered; Model 2 includes also the main effect of knowledge collecting; Model 3 adds the main effect of ICT use and top management support; in Model 4 the moderating term of ICT use was entered; finally, Model 5 shows the overall model, also including the moderating factor of top management support.

Given that Firm5 is the baseline for interpreting the results (Buis, 2012), Table 3 demonstrates that, when compared with Firm5, Firm3 shows a strong negative impact on organizational creativity, whose significance remains across all models (see Model 1, β=-.88, p<.001; Model 2, β=-.88, p<.001; Model 3, β=-.90, p<.001; Model 4, β=-.87, p<.001; Model 5, β=-.89, p<.001), although Firm3 is not the highest numbered category. Similarly, Firm1 also negatively influences the dependent variable, in comparison with Firm5. However, the significance is weaker (see Model 1; β=-.63, p<.05) and disappears when moving from Model 1 to Model 2. Conversely, data show that Firm2 has a more positive influence on organization creativity than Firm5 (see Model 1, β=.67, p<.01; Model 2, β=.66, p<.01), even if the statistical significance disappears in Model 3.

Among the control variables, autonomy in the job shows a significant association with organizational creativity in such a way that the higher the autonomy, the stronger the impact on the overall organizational creativity (see Model 1, β=.27, p<.001; Model 2, β=.19, p<.01; Model 3, β=.13, p<.05; Model 4, β=.14, p<.05; Model 5, β=.15, p<.01). Moreover, employees' willingness to communicate is positively associated with the dependent variable as shown in Model 1 (β=.23, p<.01) and Model 2 (β=.17, p<.05). Conversely, employees' gender, level of education, seniority, and managerial role do not affect the extent to which firms are creative in their operation.

Model 2 shows that the extent to which employees look for relevant and useful knowledge by asking their colleagues for it is positively related to the level of organizational creativity (see Model 2, β=.23, p<.001). In particular, this high significance persists across all models when ICT use, top management support and the moderating terms are included in the analysis (see Model 3, β=.13, p<.01; Model 4, β=.11, p<.05; Model 5, β=.12, p<.01). Hypothesis 1 is thus strongly supported.

Model 3 demonstrates that when individuals heavily use ICT infrastructures, this enhances organizational creativity (see Model 3, β=.14, p<.01; Model 4, β=.13, p<.01; Model 5, β=.12, p<.01). This evidence endures also when the moderating factors are added in the regression (see Model 4, β=.13, p<.01; Model 5, β=.12, p<.01), thus clearly supporting Hypothesis 2. Similarly, the extent to which top management provides organizational members with support for sharing what they know with others is strongly and positively associated with organization-level creativity (see Model 3, β=.24, p<.001; Model 4, β=.25, p<.001; Model 5, β=.26, p<.001), thus providing strong evidence regarding Hypothesis 4. Such empirical evidence also validates the choice of investigating the moderating role that these two variables (i.e. ICT use and top management support) may play in the relationship between knowledge collecting and organizational creativity. As for the interaction effects, Model 4 surprisingly indicates that the relationship between collecting knowledge from others and organizational creativity is weakened when individuals make use of ICT infrastructures for sharing knowledge with others (see Model 4, β=-.06, p<.05; Model 5, β=-.07, p<.05).

Therefore, Hypothesis 3 is not supported by our analysis, as we postulated a positive interaction effect.

Finally, Model 5 shows that the moderating effect of top management support on the relationship between knowledge collecting and organizational creativity is not significant. Therefore, our data do not support Hypothesis 5.

Figure 1 exhibits a summary of the research model together with the coefficients of the hypotheses we tested.

In order to present the interaction effects, we plotted both the relationship between knowledge collecting, ICT use, and organizational creativity, and that between knowledge collecting, top management support, and organizational creativity (Fig. 2).

As can be noted from Figure 2a, ICT use moderates the association between knowledge collecting and organizational creativity in such a way that while high ICT use is beneficial for low levels of knowledge collecting, it becomes detrimental to high levels of knowledge collecting. Conversely, low degrees of ICT use decrease the relationship between knowledge collecting and organizational creativity only when knowledge collecting is low, but this turns out to be favorable when knowledge collecting is high.

Although we did not find statistical significance with regard to Hypothesis 5, Figure 2b shows that high levels of top management support are always beneficial for fostering the relationship between knowledge collecting and organizational creativity. The graph indicates that the dependent variable assumes its highest values when both knowledge collecting and top management support are also high.

Finally, the adjusted R-squared and the F-test reported in Table 3 provide evidence of the significance of the increase in the R-squared. The increase in the adjusted R-squared demonstrates that adding new terms from Model 1 to Model 4 improves the goodness of fit of the overall model, apart from the addition of the second interaction term which, from Model 4 to Model 5, does not help to explain more variance relative to the total variance. In this case, the adjusted R-squared thus does not change (=.44). The F-test also shows that, except for Model 5, the increase in the R-squared is always statistically significant.

As a further check, we performed the Wald test which works by testing that the parameters of interest (i.e. the variables that are added to the model) are simultaneously equal to zero. Based on the p-value (.000), we were able to reject the null hypothesis, thus suggesting that including ICT use, top management support and the two interaction terms in our models create a statistically significant improvement in the fit of the whole model.

TABLE 3 ABOUT HERE

FIGURE 1 ABOUT HERE

FIGURE 2 ABOUT HERE

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5. Discussion

The findings of our analysis suggest that investigations on organizational creativity might conditioned by the specificity of the single firm. This may not be surprising, as our dependent variable is inherently influenced by several firm-level factors that we aimed at capturing by controlling for the five companies we observed. Hence, as the literature highlights, for instance, firm age (Kotha *et al.*, 2011), firm size (Birasnav, 2014; Leal-Rodríguez *et al.*, 2015) and organizational culture (McLean, 2005) may play a critical role in determining the degree of organization-level creativity.

As for the control variables, autonomy in the job plays a significant role in affecting firm creativity. This confirms prior research demonstrating that organizations which stimulate their members to independently define how to accomplish their tasks and carry out their job will be more successful in terms of creativity and innovation compared with organizations that do not (McLean, 2005).

Based on the findings of our empirical analysis, we demonstrate that the extent to which employees are oriented toward learning from others by asking them for information and knowledge significantly increases organizational creativity (H 1). This is consistent with current research stating that one of the most relevant characteristics of organizational creativity is its relation to the opportunity to access critical knowledge inside the firm (Sundgren *et al.*, 2005). Similarly, our argument starts from the premise that firm innovation is primarily the function of individuals' efforts and behaviors (Bharadwaj and Menon, 2000) and, accordingly, that organizational creativity necessarily requires internal communication and learning. Again, this idea points to the importance of focusing on organizational creativity as a fundamental issue for firms that aim at avoiding stagnation (Kanter, 1988; Van Dijk and Van den Ende, 2002).

Moreover, in contrast to our expectation, our data show that the relationship between individuals' knowledge-collecting behaviors and organizational creativity is significantly weakened when ICT use is high (H2). We suggest that this might be due to the following. Creative outcomes usually require the implementation of tacit knowledge (Lam, 2000). By definition, tacit knowledge is more difficult to articulate but also less likely to be imitated and replicated (Jasimuddin *et al.*, 2005; Nonaka and Von Krogh, 2009; Polanyi, 1962), as it is rooted in intuition, implicit rules of thumb, physical proximity, personal experiences, emotion, commitment, and so on. Given that ICT use necessarily implies the use of explicit knowledge (e.g. database, groupware, blog, etc.), it might be that when ICT infrastructures are heavily used for exchanging information within the organization, this stimulates the flow of more codified knowledge, while inhibiting less formal. That is, tacit knowledge being a critical source of firms' competitive advantage, innovation, and creativity, in order for it to be

exploited, informal and interpersonal interactions, rather than technology-based relationships, should be stimulated.

Finally, our data do not provide evidence with regard to the interaction effect between knowledge collecting, top management support, and organizational creativity (H3). While we postulated a significant and positive moderating role of top management support on the relationship between knowledge collecting and organizational creativity, our findings do not allow us to draw any significant relationship in this regard. The lack of empirical evidence may in part be due to the way the measurement scale captures top management support. Given that the items mainly refer to the extent to which supervisors are concerned with the knowledge sharing activities of their employees (see Appendix 1), their actual support for creativity might be not completely captured by our data. In this regard, Baer and Oldham (2006) focus on supervisor 'support for creativity', defined as the "extent to which supervisors and coworkers encourage employees to develop and refine creative ideas" (p. 965). Given the way that sharing knowledge with others and the ability to come up with creative ideas is intertwined, a possible explanation of the lack of statistical significance of the moderating effect of top management support on the relationship between knowledge collecting and organizational creativity may be that clearly distinguishing between support for sharing knowledge and support for creativity is challenging and conceptually difficult to pursue.

6. Conclusions and managerial implications

Consistent with the interactionist framework proposed by Woodman *et al.* (1993) and in line with the view that linkages among people, departments and divisions are crucial to the intra-organizational knowledge transfer activities (Savory, 2006), this paper conceptualizes organizational creativity as a function of the creative results of interacting individuals which are exposed to contextual influences (e.g. Mittal and Dhar, 2015; Zhang *et al.*, 2015). In so doing, it attempts to contribute to extant research by offering a new model likely to capture the complexity of organizational creativity's antecedents. For this purpose, it starts from the

importance of looking at employees as individuals who ask their colleagues for information and knowledge to satisfy their need to learn (i.e. knowledge collecting). Moreover, it postulates a moderating effect of both ICT use and top management support on the relationship between knowledge collecting and organization creativity. Accordingly, this study aims to capture the inherent complexity of organizational creativity (Woodman *et al.*, 1993), by conceiving of it as a function of the creative results of individuals interacting and sharing their knowledge with others while being exposed to contextual influences. In an attempt to build a comprehensive research model, we focus on both *hard* and *soft* contextual factors, by looking at employee ICT use for exchanging information and knowledge, and top management support for knowledge sharing behaviors.

In order to test the hypotheses, we empirically examine a sample of survey data from 362 employees collected from five subsidiaries of MNCs located in Italy and considered to be crucial for both local and national competitiveness. After controlling for the firm as well as for a number of demographic factors, our data show that a greater knowledge-collecting orientation is positively associated with organizational creativity, in such a way that the more employees tend to ask others for information and knowledge they need, the more this is likely to foster organization-level creativity. Contrary to our expectation, the analysis demonstrates that the association between employees' knowledge collecting and organizational creativity is negatively influenced in the case of high ICT use. Finally, we do not find any evidence of the moderating role of top management support on the relationship between knowledge collecting and our dependent variable.

Based on this, our study contributes to the research on organizational creativity by shedding light on the role played by both individual knowledge sharing and contextual influences. It enriches the understanding of what matters in order for organizational creativity to be improved, while focusing on individual-level behaviors and context-based factors which necessarily affect such behaviors.

6.1. Managerial implications

In an attempt to enrich the understanding of the antecedents of organizational creativity, this paper offers several suggestions for practitioners open to establishing a clear path to increase their firm's creativity. Providing employees with autonomy in carrying out their job (e.g. Hackman and Oldham, 1974) can be an important determinant likely to lead to increased creativity. Contributing to creating a work environment where individuals value other's knowledge and try to learn from them by asking them to share what they know is found to play a critical role in strengthening corporate creativity. This would implicitly require employees to be aware of their own limits and, accordingly, would stimulate them rather than leading them to feel threatened by alternative views, motivating them to embrace new methods of personal development and growth. This argument recalls the view that any knowledge management strategy is meant to start with the individual, in such a way that "organizations are to act as facilitators: a place where knowledge can be created and shared" (Rechberg and Syed, 2014, p. 434). In other words and in line with prior research (e.g. Kogut and Zander, 1996), managers should understand that organizational knowledge is dependent upon the social relationships of individuals (i.e. knowledge collecting behaviors). This is because individuals are the primary source of creativity within the firms, those who actively participate in knowledge sharing and creation processes in the first place and the only ones with the ability to interpret situations, generate the meaning of things, reflect on experiences and, ultimately, learn. Indeed, learning begins with the individual and "all learning takes place inside human heads" (Simon, 1991, p. 125). Similarly, while engaging in knowledge sharing processes, individuals tend to build a common language, common beliefs and, accordingly, to build mutual trust, which has found to positively affect creativity (e.g. Bidault and Castello, 2009; Tsai *et al.*, 2012). Based on this, our work suggests that practitioners pay attention to the management of their employees by valuing their knowledge and their potential to contribute to organizational creativity, and by stimulating their social interactions for mutual learning.

The empirical evidence regarding the use of ICT provides interesting clues for managers. When considered in relation to employees learning from others (i.e. knowledge collecting),

the use of ICT decreases organizational creativity. In particular, the evidence that high levels of ICT are not beneficial to creativity when employees strongly engage in knowledge collecting behaviors, points to the importance of clearly distinguishing between interpersonal dynamics and interaction and the use of technological infrastructure. This highlights the importance for firms of making the right investments in ICT infrastructure, while always remembering that the most critical source of competitive advantage cannot be stored in a computer (Wang and Noe, 2010). It will instead be embedded in more intangible and invisible support, such as interpersonal relationships: our work indicates that firms should carefully plan their ICT investment, as they may even hamper the positive connection between increased knowledge flow and organizational creativity. In so doing, this paper enriches understanding of the ontological dimension of knowledge, which deals "with the physical, technical or social supports on which and in interaction with which knowledge is created" (Akehurst *et al.*, 2011, p. 184). This also recalls the knowledge architecture model proposed by Jafari *et al.* (2009) which suggests that the acquisition and transfer of knowledge depends upon several factors, such as people, processes, behaviors, and processes. Similarly, it demands immediate attention to find ways to balance the need to store huge amounts of knowledge and information with the need to improve a firm's creativity as a critical component of competitive advantage. This challenge is particularly salient in knowledge intensive firms, which, by definition deal with R&D activities, market data analysis and, accordingly, need to accumulate and then manage great quantities of data. Given that ICT use and knowledge collecting may compensate for each other in determining organizational creativity, we recommend that managers monitor the level of employee knowledge sharing behaviors. Where such a level is high, the use of ICT should be restricted; conversely, when knowledge collecting is low, improving ICT use may help mitigate the lack of strong interpersonal relationships and learning opportunities.

With regard to the role played by top management support in determining organizational creativity, this paper shows that, on one side, it is fundamental for organizational creativity to be enhanced, but that on the other side, there does not appear to be a significant

relationship when associated with knowledge collecting and organizational creativity. Such evidence leads to specific recommendations for managers. To begin with, they should seriously consider their own role in building a work environment committed to firm-level outcomes, and be ready to make a personal contribution to its success. When employees perceive their superior's support, this is likely to result in increased organizational creativity. Such support might be substantiated, by providing subordinates with the resources needed for exchanging opinions with others and fostering personal orientation toward innovation. This calls for building what is known as "creative leadership" (e.g. Basadur, 2004), which is the tendency of leaders and supervisors to pass challenges to their collaborators, and also transfer the ownership of these challenges, in order to stimulate creative thinking and the generation of creative solutions, ideas, operating methods. Based on our findings, top management support per se can strongly improve organizational creativity. When perceived in a work environment characterized by diffused knowledge sharing and collecting behaviors, it may be expected to further increase organizational creativity. If management is interested in boosting creativity, the way it supports employees in exchanging their knowledge with others is critical.

Overall, this study suggests that knowledge-intensive firms should have a clear understanding of the role played by both knowledge sharing activities and *hard* and *soft* contextual influences that affect their creativity. In practice, they should cautiously plan their investments in ICT infrastructure and consider their potential usability and actual use in relation to the less formal but more powerful interactions among employees who mutually exchange knowledge in order to learn from each other. They should thus motivate their employees to engage much more in interpersonal relationships with their colleagues, rather than spending time and effort using technological support to obtain the knowledge they need. In order to support their creativity, these firms should be aware that fostering learning experiences within the organization is particularly beneficial if ICT use is not high.

7. Limitations and future research

This study presents several limitations that could be the basis for future investigation. A structural limit of the study is that the consideration of knowledge-sharing processes as described by Van den Hooff and De Ridder (2004) inhibits the distinction between tacit and explicit knowledge and its vehicle of transmission (e.g. Hu and Randel, 2014). Further, differently from other papers, the study considers organizational creativity as the object of analysis without considering its link to organizational performance. For future research, the findings here reported could reinforce the consideration of organizational creativity as a mediator of firm performance (e.g. Calantone *et al.*, 2002; Lee and Choi, 2003). Moreover, the study does not observe the effect of team-level antecedents, while He *et al.* (2014) demonstrate that both empowerment, within-team competition (i.e. team hypercompetition and team development competition) affect the knowledge transfer within teams. Further, MNCs have been considered as *loci* for testing the hypotheses under the assumption that they are structurally adequate to provide the social and technical environment for nurturing organizational creativity. Nevertheless, the headquarter–subsidiary exchanges were not considered, neither were the dynamics related to the presence of globally distributed teams (e.g. Reis, 2014). Further, other diverse organizational settings (SMEs, NGOs) could present completely different conditions and return different results. In this vein, the localization of the subsidiaries in Italy greatly limits the cross-cultural facet of knowledge sharing and its contribution to organizational creativity (e.g. Zaidman and Brock, 2009). In conclusion, given that this study does not take into account the role that organizational culture may play in determining organizational creativity, and the little current work existing on exploring this relationship (McLean, 2005), future research could complement this paper by expanding the interest in contextual factors (e.g. Korzyński, 2015), thus devoting more attention to the organizational cultural issues.

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Acknowledgments:

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Variable	All firms				Firm1		Firm2		Firm3		Firm4		Firm5	
	Mean	S.D.	Min	Max	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Firm1	.12	.31	0	1	-	-	-	-	-	-	-	-	-	-
2. Firm2	.32	.47	0	1	-	-	-	-	-	-	-	-	-	-
3. Firm3	.16	.37	0	1	-	-	-	-	-	-	-	-	-	-
4. Firm4	.27	.44	0	1	-	-	-	-	-	-	-	-	-	-
5. Firm5	.13	.33	0	1	-	-	-	-	-	-	-	-	-	-
6. Gender	.25	.43	0	1	.15	.36	.30	.46	.11	.31	.43	.50	.02	.14
7. Years of education	16.73	2.87	6	20	13.76	2.63	17.09	2.63	16.12	2.95	18.14	2.21	16.18	2.67
8. Seniority	10.61	8.88	0	41	12.78	11.49	8.40	6.55	13.78	9.64	11.05	9.11	9.45	8.65
9. Managerial role	.59	.49	0	1	.44	.50	.50	.50	.64	.48	.84	.36	.36	.48
10. Autonomy	5.38	1.22	1	7	5.06	1.42	5.47	1.06	5.21	1.34	5.51	1.28	5.36	1.10
11. Willigness to communicate	6.42	.79	1	7	6.42	.66	6.57	.62	6.11	.98	6.42	.77	6.28	.93
12. Organizational creativity	4.92	1.33	1	7	4.23	1.10	5.60	1.06	3.94	1.40	5.05	1.11	4.77	1.39
13. Knowledge collecting	5.43	1.32	1	7	4.71	1.50	5.57	1.21	5.42	1.39	5.56	1.29	5.45	1.25
14. ICT use	5.19	1.48	1	7	4.56	1.47	5.93	1.12	4.65	1.52	5.20	1.43	4.52	1.54
15. Top management support	5.24	1.38	1	7	4.82	1.55	5.72	1.10	4.80	1.59	5.33	1.29	4.73	1.35

Table 1
Descriptive statistics of all variables distinguished among all sample of firms and each firm observed.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
irm1	-														
irm2	-.24***	-													
irm3	-.15**	-.30***	-												
irm4	-.21***	-.41***	-.25***	-											
irm5	-.13**	-.26***	-.16**	-.23***	-										
Gender	-.08	.08	-.14**	.25***	-.20***	-									
Years of education	-.37***	.07	-.07	.30***	-.09	.26***	-								
Seniority	.08	-.18***	.14**	.02	-.04	-.03	-.41***	-							
Managerial role	-.11*	-.14**	.03	.30***	-.18***	-.02	.16**	.14**	-						
Autonomy	-.12*	.05	-.07	.07	-.01	-.04	.04	.06	.11*	.90					
Willingness to communicate	.06	.12*	-.19***	.03	-.08	.11*	.05	-.08	.13*	.29***	.95				
Organizational creativity	-.17***	.35***	-.34***	.09	-.02	.07	.06	-.10	.05	.33***	.27***	.91			
Knowledge collecting	-.20***	.09	-.04	.06	.00	.07	.06	-.03	.05	.37***	.24***	.36***	.96		
ICT use	-.14**	.36***	-.19***	.04	-.18***	.15**	.07	-.06	-.03	.19***	.19***	.43***	.24***	.76	
Top management support	-.09	.26***	-.15**	.06	-.13*	.05	-.07	.06	.11*	.30***	.31***	.52***	.40***	.39***	.92

$p < 0.05$, $p < 0.01$, $p < 0.001$
Cronbach's coefficients are shown in italic on the diagonal

Table 2
Correlation matrix and Cronbach's Alpha for all variables (n = 362).

	Organizational creativity				
	Model1	**Model2**	**Model3**	**Model4**	**Model5**
Intercept	3.32***	3.67***	4.50***	4.57***	4.64***
	(6.04)	(6.89)	(8.53)	(8.94)	(9.26)
Firm1	-.63*	-.45	-.50	-.47	-.47
	(-2.45)	(-1.77)	(-1.97)	(-1.79)	(-1.80)
	1.81	*1.85*	*1.85*	*1.86*	*1.86*
Firm2	.67**	.66**	.25	.26	.23
	(2.81)	(2.86)	(1.09)	(1.11)	(.99)
	2.54	*2.54*	*2.85*	*2.85*	*2.88*
Firm3	-.88***	-.88***	-.90***	-.87***	-.89***
	(-3.39)	(-3.49)	(-3.76)	(-3.61)	(-3.66)
	1.97	*1.97*	*1.97*	*1.98*	*1.99*
Firm4	.22	.21	-.02	-.00	-.03
	(.79)	(0.79)	(-.07)	(-.00)	(-.14)
	2.78	*2.78*	*2.86*	*2.87*	*2.90*
Gender	.00	-.04	-.06	-.05	-.03
	(.01)	(-.27)	(-.48)	(-.42)	(-.23)
	1.22	*1.22*	*1.23*	*1.23*	*1.25*
Years of education	-.04	-.03	-.02	-.02	-.01
	(-1.67)	(-1.41)	(-.67)	(-.73)	(-.68)
	1.65	*1.65*	*1.68*	*1.68*	*1.69*
Seniority	-.01	-.01	-.01	-.01	-.01
	(-1.12)	(-.91)	(-1.40)	(-1.22)	(-1.29)
	1.36	*1.36*	*1.36*	*1.37*	*1.37*
Managerial role	.13	.13	.10	.07	.07
	(.89)	(.95)	(.73)	(.57)	(.55)
	1.23	*1.23*	*1.26*	*1.26*	*1.26*
Autonomy	.27***	.19**	.13*	.14*	.15*
	(4.53)	(2.99)	(2.19)	(2.34)	(2.54)
	1.14	*1.27*	*1.30*	*1.31*	*1.32*
Willigness to communicate	.23**	.17*	.08	.07	.06
	(2.78)	(2.15)	(.96)	(.91)	(.77)
	1.19	*1.22*	*1.27*	*1.27*	*1.28*
Knowledge collecting		.23***	.13**	.11*	.12**
		(4.43)	(2.64)	(2.25)	(2.61)
		1.25	*1.39*	*1.42*	*1.48*
ICT use			.14**	.13**	.12**
			(2.96)	(2.76)	(2.71)
			1.37	*1.39*	*1.41*
Top management support			.24***	.25***	.26***
			(4.69)	(4.90)	(5.19)
			1.57	*1.57*	*1.63*
ICT use*Knowledge collecting				-.06*	-.07*
				(-2.33)	(-2.42)
				1.09	*1.21*
Top management support*Knowledge collecting					.03
					(1.30)
					1.33
R^2	.33	.37	.45	.46	.46
Adj R^2	.31	.35	.43	.44	.44
F-test	20.45***	19.66***	20.14***	5.42*	1.69
M © Emerald Group Publishing Limited	1.69	1.67	1.69	1.65	1.66

Firm5 as the baseline.
t statistics in parentheses. *Vif values in italics*; * *p* < 0.05, ** *p* < 0.01, *** *p* < 0.001
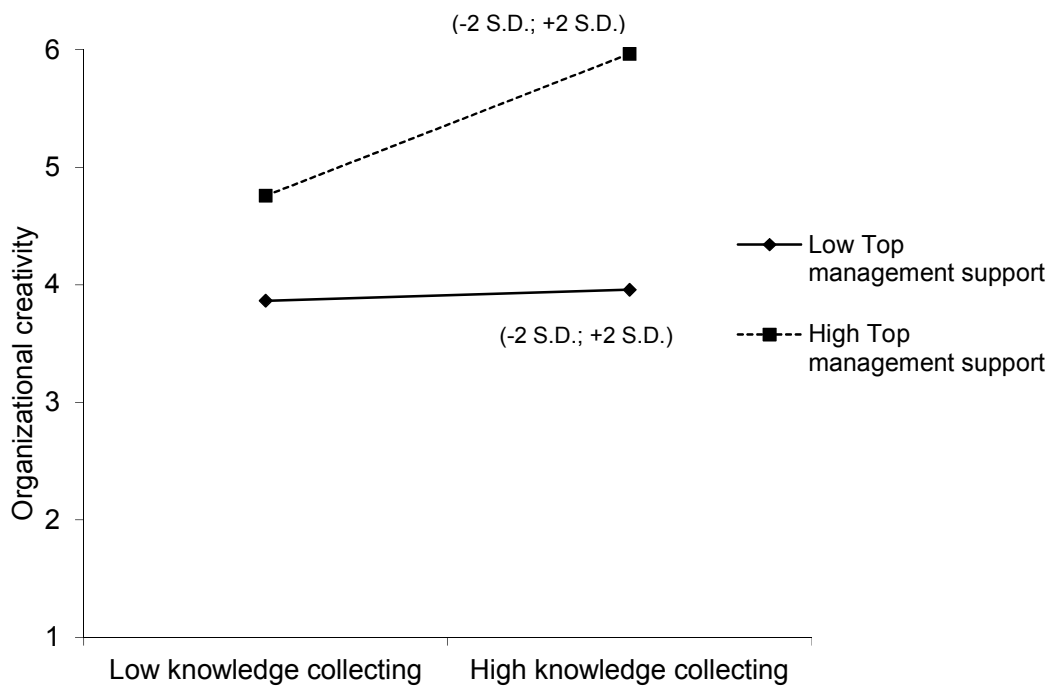
Table 3
Results of the multiple regression analysis on organizational creativity (n=362).
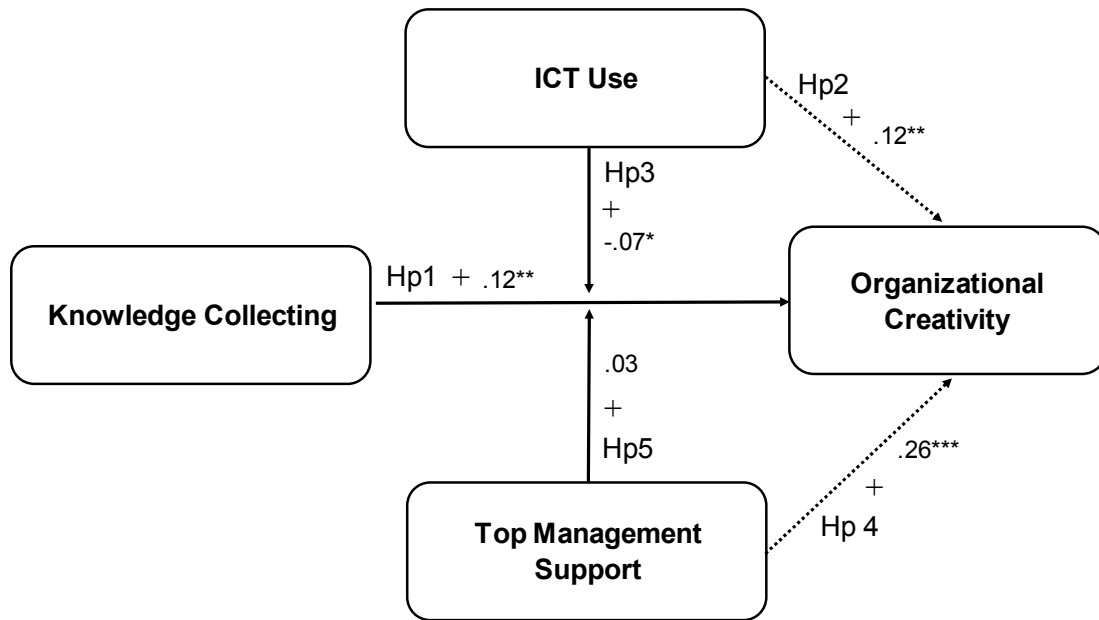
Figure 1
The research model.
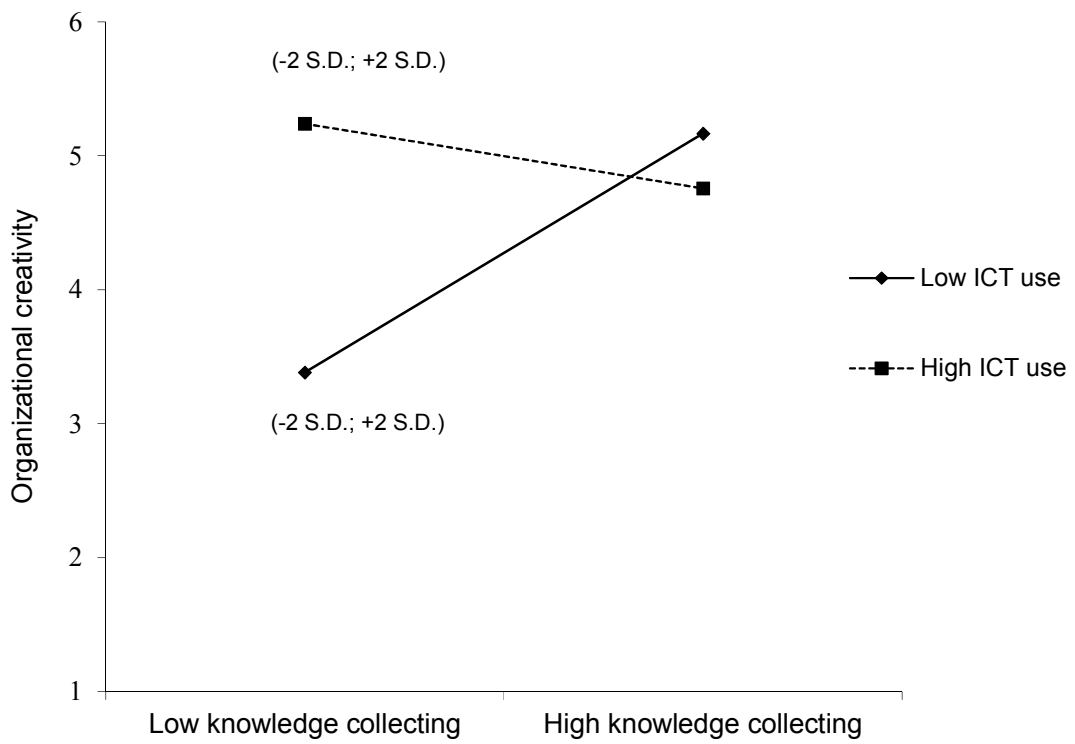
2a) Interaction effect between knowledge collecting, ICT use, and organizational creativity

2b) Interaction effect between knowledge collecting, top management support, and organizational creativity

Figure 2
Interaction effects.

Appendix 1. Measurement scales and items.

Variable	Items description	Scale	Source
Organizational creativity	Please rate your agreement with the following statements: a) Our company frequently tries out new ideas b) Our company seeks new ways of doing things c) Our company is creative in its operating methods	7-point Likert scale from 1=Strongly disagree, 7=Strongly agree	Lee and Choi (2003); Calantone *et al.* (2002); Hurt *et al.* (1997)
Knowledge collecting	Please rate your agreement with the following statements: a) Colleagues in my company share knowledge with me when I ask them to b) Colleagues in my company share their skills with me when I ask them to	7-point Likert scale from 1=Strongly disagree, 7=Strongly agree	Van den Hooff and De Leeuw Van Weenen (2004)
ICT use	Employees in my organization…: a) Make extensive use of electronic storage (such as online databases and data warehousing) to access knowledge b) Use knowledge networks (such as groupware, intranet, virtual communities, etc.) to communicate with colleagues	7-point Likert scale from 1=Strongly disagree, 7=Strongly agree	Lee and Choi (2003); Lin (2007)
Top management	In this organization, top managers…:	7-point Likert	Tan and Zhao

support	a) Think that encouraging knowledge sharing with colleagues is beneficial b) Always support and encourage employees to share their knowledge with colleagues c) Provide most of the necessary help and resources to enable employees to share knowledge d) Are keen to see that the employees are happy to share their knowledge with colleagues	scale from 1=Strongly disagree, 7=Strongly agree	(2003)
Firm1 – Firm5	Dummy variables	1=Firm1-5 0=Else	-
Gender	Dummy variable	0=Male; 1=Female	-
Years of education	Years of work experience within the company	-	-
Managerial role	Dummy variable	0=No; 1=Yes	-
Autonomy	Please rate your agreement with the following statements: a) The job gives me considerable opportunity for independence and freedom in how I do the work b) The job gives me the opportunity to use my personal initiative or judgment in carrying out the work	7-point Likert scale from 1=Strongly disagree, 7=Strongly agree	Hackman and Oldham (1974)
Willingness to communicate	Please rate your agreement with the following statements: a) I enjoy sharing my knowledge with colleagues b) I enjoy helping colleagues by sharing my knowledge	7-point Likert scale from 1=Strongly disagree, 7=Strongly agree	Wasko and Faraj (2000)