

KNOWLEDGE *VERSUS* CREATIVITY: WHICH OF THEM REALLY MATTER?

Daniele GIAMPAOLI
Massimo CIAMBOTTI

Abstract

It is common opinion that knowledge management practices and creativity are very important factors for firms facing a turbulent and dynamic environment. Knowledge and creativity in fact are a helpful support for managers that have to make decisions under uncertain and complex conditions: they are not only complementary but also synergic in the problem solving process.

This paper aims to shed light on the benefits that knowledge and creativity are able to produce for organizational decision making, underlining differences and analogies between them. Only once certain aspects have been clarified it will be easier to judge the opportunity of investing in KM infrastructure or, in the case it already exists, what kind of changes are needed to improve creativity and/or decision-making speed.

Keywords: *useful knowledge, knowledge management, creativity, problem solving, performance.*

1. Introduction

Nowadays there is no doubt about the importance of knowledge within firms, while knowledge economy states it is the most valuable resource in order to create a sustainable competitive advantage. Global and dynamic markets make knowledge value even more important because it is strongly connected to another important resource, that is time (Ragab and Arisha, 2013). One of the reasons that could explain the differences between firms' performance is the way knowledge is managed. That's why in the last few years knowledge management (KM) discipline and many papers and journals (*Journal of Knowledge Management, Journal of Intellectual Capital, Knowledge Management Research and Practice*, etc.) have been increasing.

Recently some empirical studies assessing the impact of KM on firm performance have appeared (Andreeva and Kianto, 2012; Kamhawi, 2012; Lee *et al.*, 2012). The overall conclusion is that KM has some kind of impact on performance but scholars do not agree as to whether this impact is direct or mediated by some other variables (Andreeva and Kianto, 2012).

Creativity has recently been identified as the most important attribute for firms in order to be successful but Schumpeter (1934) had already defined it as the core of capitalism: "*This process of creative destruction is the essential fact about capitalism*". That is perhaps why creativity has received more and more attention from scholars. However, to date, only few empirical studies have investigated the relationship between creativity and firm performance (Gong *et al.*, 2013; Khedhaouria *et al.*, 2015; Lee *et al.*, 2012; Weinzimmer *et al.*, 2011) and there still is not conclusive empirical evidence

showing that creativity impacts firm financial performance (Weinzimmer *et al.*, 2011).

KM and creativity, as such, should provide as many more benefits as many more knowledge-intensive are the activities which will benefit from them. Considering that decision making (DM) and problem solving (PS) are very knowledge-intensive activities and roughly equivalent (Huber and McDaniel, 1986), they should be able to greatly benefit from effective KM practices (Ragab and Arisha, 2013) and employees' creativity.

2. Knowledge and useful knowledge

KM aims to optimize the management of the most important resource, that is knowledge and potential knowledge. But in order to reach this goal we need first to understand better what knowledge is. To answer the question "*What is knowledge?*" is all but easy. To define how and what we know is very difficult both at an individual and a collective level. In fact, knowledge is a polyhedral concept that has involved intellectuals of past and modern eras, from Socrate to Popper, and unanimous consensus on its meaning does not exist yet. Nowadays knowledge is still object of study of many disciplines as philosophy, psychology, economics and so on.

For a better understanding of the concept of knowledge it is useful to adopt the following distinction. There are at least three types of knowledge (Vassallo, 2006):

1. direct knowledge (e.g.: "*I know daniele*");
2. know-how (e.g.: "*I know how to cook*");
3. know-what (e.g.: "*I know that Colosseum is located in Rome*").

We know something or someone directly when we have had a direct contact with them. In this sense it is possible to say we know our friends, our home, our favourite songs and so on directly. Know-how

consists in the competence to perform a specific task: e.g. Daniele is capable of playing piano, swimming, painting, etc. Know-what consists in knowing that a proposition is true, e.g. Daniele knows that his favourite pizzeria is closed on Thursday, Sir Arthur Conan Doyle is the author that invented the character of Sherlock Holmes, the King is the most important chess piece and so on.

As far as relations among the three types of knowledge are concerned it immediately comes to mind the Greek concepts of *Epistème* and *Techné* that roughly correspond to the concepts of know-what and know-how. Some examples will help us to clarify their link. If we are capable of doing certain things probably we have some propositional knowledge concerning those things: if we are chess master we also know that each player has two rooks, two knights, two bishops, etc. We also know that bishops can make only diagonal movements while rooks move horizontally or vertically. One thing that should be noted is that the more propositional knowledge (know-what) we own the more know-how. In a chess match between two amateur players it is sufficient to know the basic rules of the game to win the match. A deeper knowledge (e.g.: how to castle, how to move *en passant*, etc.) will be probably more helpful and better used in a match between two chess masters.

The historian economist Mokyr to investigate the role of knowledge during the Industrial Revolution resorted to the concept of “useful knowledge”, by defining the latter as knowledge concerning natural phenomena potentially manageable as materials, energy, artefacts and so on. The scholar distinguishes propositional knowledge (know-what) concerning natural phenomena from prescriptive knowledge (know-how) that he calls techniques or set of instructions directed to realize some kind of product. Knowledge lies both in the human mind and other storing devices (Mokyr, 2004). It is possible to define the aggregated propositional knowledge of a society as the ensemble of the whole knowledge stored in human minds and any other storing devices. We can say that society knows something when at least one of its members knows it. According to Mokyr (2004) propositional knowledge represents the support for techniques used when economic production takes place. Both past intentional research and the outcomes of human curiosity flow into the ensemble of propositional knowledge. Consequently part of propositional knowledge does not represent the epistemic base of any techniques and therefore is not useful. However exactly as some parts of DNA that for the moment do not codify any proteins, possible environmental alterations could activate some kind of useful knowledge previously inactive (Mokyr, 2004). The presence of a knowledge base offers many opportunities but it does not guarantee that

someone will take advantage of them. For this reason both culture and institutions will have a key role. Culture affects preferences and priorities while institutions will determine incentives and penalties to increase the ensemble of techniques and partially the costs to access propositional knowledge. The greater the epistemic base is from which techniques draw, the easier the techniques will grow and expand. On the contrary a low understanding of the dynamics and reasons a techniques is based on will implicate diminishing returns of further improvements. In extreme cases the epistemic base of a particular techniques is so limited that we only know that it works. These techniques are generally an outcome of lucky and accidental discoveries (Mokyr, 2004).

According to Mokyr (2004) what has to be noted of the Industrial Revolution is not the reason why it happened but the fact that it was able to continue beyond the 1820s. In the past there had already been periods during which macro-inventions proliferated, particularly in XV century, with melting iron and navigation improvements. However the revolutionary potential of these inventions vanished before their effect could address economy towards sustainable growth. This was probably due to the limited epistemic base of technology which crystallized the new level of technical knowledge without stimulating a continuous flow of micro-inventions. Actually to introduce a new technology it was sufficient that someone was aware about a certain statistical regularity in order to exploit it (Mokyr, 2004). Finally it has to be underlined the fact that at the same time of the Industrial Revolution, a revolution of information technology also took place. A great amount of tacit and verbal knowledge begun to be codified in scientific texts and drawings. There was a change in the speed and efficiency by which knowledge spread. A lot of tacit knowledge spread thanks to the constant movement of qualified workers around different areas.

However, knowledge domain is limited and as such is not always able to answer our questions. Each time our thoughts and questions go beyond the boundaries of acquired knowledge maps, intuition, creativity, the ability to correctly evaluate the little available information and obviously to make the right decision, will be the only real instruments we could rely on in order to reach our goal. In this sense, for every new problem we will be able to solve new knowledge will be created.

Some emblematic examples concerning the benefits of the combined effect of knowledge and creativity in solving problems or reaching our aims are the following: John Harrison (1693-1776) an artisan watchmaker who applied his knowledge to solve the problem of longitudinal calculation by creating the sea clock; John Bradmore (d. 1412)

combined his medical and metalworker knowledge to create a specific tool directed to extract an arrow penetrated in the face of Henry V of England; René Laennec (1781-1826), a French physician who after seeing children playing with a strange object foresaw that it would have been possible to apply the same technique in the medical field: that is how he invented the stethoscope.

Mokyr (2004) highlights the very important role that knowledge and even more knowledge sharing have on technological and economic development of society. At the same time the examples of Harrison, Bradmore and Laennec suggest that in order to successfully win some challenges knowledge could not be sufficient per se. Therefore we will be able to arrive where nobody else has been before only if we rely on the synergy between knowledge and creativity. Furthermore it seems clear that creativity deploys its greatest potential when it rests on strong epistemic basis. Harrison, Bradmore e Laennec were all very skilled in their respective fields.

3. Knowledge management

The main theories addressing the role of knowledge and its management within firms are the Resource-Based View (Barney, 1991) and Knowledge-Based View of the firm (Kogut and Zander, 1992; Spender and Grant, 1996). According to Resource-Based View (RBV) competitive advantage and better firm performance are due to a different resource endowment of the firm because they are rare, difficult to imitate and not easy to substitute (Barney, 1991). Scholars supporting RBV agree about the fact that resources able to reflect the aforementioned characteristics are those with high informative content, that is intangible resources. If RBV focuses on firm resources, the Knowledge-Based View of the firm (KBV) highlights the importance of one resource in particular that is knowledge and processes through which knowledge is created, shared and utilized so becoming an economic value source for firms. According to KBV knowledge is the main source of value because all human productivity depends on it and tangible products are only a kind of knowledge materialization. From this perspective different inter-firm performances are due to a different way by which knowledge is created, shared and utilized (Kogut and Zander, 1992; Spender and Grant, 1996). So, the ability of using knowledge at the right time in the right place represents a strategic asset for organizations, and KM processes can help the organization to deal with a continuous changing environment.

KM can be defined as “a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put

information into action in ways that strive to improve organizational performance” (O’Dell *et al.*, 1998). The notion of “right knowledge”, “right people” and “right time” underline the need of identifying useful knowledge among the huge amount of information that an organization produces daily, who has such knowledge and finally how and when it should be transferred to those who will have to use it.

Several empirical studies have shown that great investments in KM don’t necessarily bring a better performance (Kulkarni *et al.*, 2007). Considering the definition of knowledge and knowledge management adopted, the above leads us to suppose that non all firms are able to develop a good capacity to transfer the right knowledge to the right people at the right time, or to use their own knowledge to solve problems and make decisions effectively.

KM has a key role for decision making, a very knowledge-intensive activity (Ragab and Arisha, 2013) and generally considered the core of management. According to Huber and McDaniel (1986) decision making and problem solving are roughly the same thing, so in this paper they are considered as one. Many of the different definitions of knowledge found in literature emphasize the functionality of knowledge, that is its usefulness in solving problems and making decisions that allow people to reach their goals. Some definitions of knowledge found in literature are the following: “Knowledge is organized information applicable to problem solving” (Woolfh, 1990); “Knowledge is information that has been organized and analyzed to make it understandable and applicable to problem solving or decision making” (Turban, 1992); “Knowledge is reasoning about information and data to actively enable performance, problem-solving, decision making, learning and teaching” (Beckman, 1997); “Knowledge is the raw material, work-in-process, byproduct, and final outcome of decision-making” (Davenport and Holsapple, 2006).

In their empirical study Massingham and Massingham (2014) found that the most persuasive argument in order to convince managers in investing in KM practices are surely the benefits gained from problem solving.

Knowledge is needed every time we look for a solution, that is to say when we have a problem to solve. According to Gray (2001) knowledge generate economic value when it is utilized to solve problems, exploring new opportunities and making decisions. Consequently PS becomes the way thanks to which it is possible to link firm knowledge to firm performance (Gray, 2001). Through PS activities an organization will improve the understanding of the surrounding environment increasing its absorptive capacity (Gray and Chan, 2000). Moreover, the time the organization spends in problem solving will increase the stock of knowledge available, allowing

the organization to adapt better to the environment (Gray and Chan, 2000).

Various philosophers have conceived the activity of scientific research in terms of problem solving (Blackwell, 1980; Goldman, 1983). In particular Blackwell (1980) claimed that scientific research starts with a problem and the will to solve it. According to René Descartes problem solving is the only way human beings can put order in the world and reach the truth. Wittgenstein states that knowing consist in an action driven by the will to change the state of thing. The assertion “I know” is strictly connected to “I can” but also to “I understand”. Finally, according to existentialists the only way we can build up our knowledge is by taking action and reaching our goals.

4. Problem solving, knowledge sharing and creativity

From a cognitive perspective PS consists of information analysis and transformation, aimed to reach a specific goal regardless the difficulty of the decision to make (Lovett, 2003). According to Teece *et al.*, (1997) the ability to learn through problem solving activities is one the most important strategic dynamic capabilities. Organizational learning consists in a change of the organizational knowledge base. Successful firms will be able to learn through problem solution and to transform new ideas in action faster than their competitors.

Considering the complex environment firms have to face and the complexity of problems they have to solve, the most effective way of organizing the search of solutions is the heuristic one. In heuristic search “an actor or a group of actors cognitively evaluate the probable consequences of design choices rather than relying solely on feedback after design choices are made” (Simon, 1991). This kind of theory-driven search speeds the problem solving process as it provides a base for evaluating information and, consequently, allows managers to select trials to do that maximize the probability of quickly discovering an effective solution (Nickerson & Zenger, 2004).

If cognitive skills of individuals were unlimited they could quickly absorb all useful knowledge to solve problems. Unfortunately human cognitive abilities are limited and so, the distinct sets of useful information and knowledge they need to solve complex problems will probably be scattered in the mind of many individuals (Nickerson and Zenger, 2004). Consequently, knowledge sharing and transfer are two fundamental aspects that we need to consider when examining the efficacy of heuristic research. As Reiter-Palmon and Illies (2004) claim the more information the more creativity of solutions. According to Cohen and Levinthal (1990) the prior possession of useful

(relevant) knowledge and skills is necessary in order to create new associations and links and allow creativity to emerge.

However knowledge and information per se are not sufficient to develop problem solving skills because the advantage of having more information will be capitalized only if individuals are able to recognize useful information and integrate them in a new way with existing knowledge (Reiter-Palomon and Illies, 2004).

Bartol and Shrivastava (2002) define knowledge sharing as the spread of personal knowledge within an organization so that all employees can take advantage from it. According to Dawson (2000) knowledge sharing is the most important phase of knowledge management. Knowledge sharing allows firms to avoid to “reinventing the wheel” and it is a key process in converting individual knowledge in organizational capabilities. The most restricting factors for knowledge sharing are, a lack of an appropriate organizational culture that stimulates collaboration, physical distance among people, status differences, the fear of losing the benefits related to one’s own knowledge and, finally, the lack of faith (Szulanski, 1996). Knowledge sharing among core employees is surely very useful for achieving a sustainable competitive advantage but it is also possible to take advantage of knowledge sharing among non-core employees (Cabrera and Cabrera, 2005) because every employee has the potential to impact firm performance. Moreover thanks to the acquisition and sharing of knowledge and information cognitive abilities of individuals and groups are amplified and, this, in turn, leads to a better ability in solving complex problems beyond individual capability (Mumford *et al.*, 1991). Literature has identified several organizational variables to have a positive impact on knowledge sharing within organizations (Cabrera and Cabrera, 2005). On this occasion we feel the need to examine the following in depth: work design, organizational culture and structure.

Work design is an important tool to encourage knowledge flows. Working in teams gives employees the opportunity to work side by side and at the same time share knowledge and information. When teams have real problems to solve and are responsible for results, each employee is more likely to collaborate and share their knowledge (Cabrera and Cabrera, 2005). According to Hasgall and Shoham (2008) organizations should allow employees to organise as a group, have access to information and resources and use all available communication means because every employee and manager has the personal knowledge and capabilities to solve problems according to their position. Cross-functional teams strongly contribute to firm’s success. Also community of practices may be very effective in leveraging knowledge sharing.

Within community of practices as emergent and social activities, people working on similar problems self-organize in order to help each other and share their experience.

Organizational culture has been identified as a key element able to make the difference between the success and failure of KM initiative. It is defined as the basic assumptions shared within an organization. These assumptions have been learned through problem solving activities aimed to adapt the organization to the external environment, and are taught to new members as the correct way to solve those problems. According to Davenport and Prusak (1998) a knowledge-friendly culture is one of the most important factors that impacts on KM and its outcomes. Organizational culture is very important to stimulate collaboration among employees and nurture knowledge flows. Moreover, organizational culture gives employees the ability to self-organize their own knowledge and create networks to facilitate solutions for problems and share knowledge (O'Dell and Grayson, 1998). Organizational culture may influence knowledge sharing in two different ways: first, by creating an environment in which there are strong social norms concerning the importance of sharing knowledge among employees (Cabrera and Cabrera, 2005); second, by creating a culture of caring and/or of trust and cooperation. There is a wide consensus about the fact that employees will be more willing to share their knowledge in an open and trusting culture (Davenport and Prusak, 1998). The promotion of specific values such as tolerance toward mistakes, common goals and a confident environment, will encourage specific behaviour that has an impact on KM benefits (Davenport and Prusak 1998).

Another important dimension identified as very important for knowledge sharing is organizational structure (Daft, 2008). Organizational structure is a key element in order to allow knowledge to flow, and to be utilized within organization. Decentralization refers to the extent decision making authority is dispersed throughout the organization (Daft, 2008). Decentralization of power stimulate spontaneity and experimentation and at the same time allows creativity to flourish (Cheng and Huang, 2007). According to Baum and Wally (2003) to decentralize operations management yields front-line environmental information potentially useful in strategic decision. Many scholars assume that it is difficult to create knowledge in centralized organizations (Stonehouse and Pemberton, 1999) because bureaucracy and formal communication inhibit experimentation and freedom of expression (Bennet and Gabriel, 1999; Cheng and Huang, 2007). On the contrary, a flexible organizational structure should facilitate knowledge sharing and collaboration within the organization.

It is important to underline that when problems have already been faced and solutions exist, people and organization need only to use their own past knowledge. Instead, when facing new problems, people and organization will have to go beyond their knowledge maps and find a new path that will allow them to find new solutions. That is why PS involves a great deal of creativity (Weisberg, 2006).

The concept of creativity as a human mental activity process was defined by Henry Poincaré as the ability to link existing elements with new and useful connections. As Amabile (1988) argues the definitions of creativity based on its products instead of its processes are more appropriate because of the difficulties in observing and measuring the last ones. Measurements focused on products are surely easier and more effective (Amabile, 1988). Consequently the definition of creativity adopted in this paper is the following: "creativity is the production of novel and useful ideas by an individual or small group of individuals working together" (Amabile, 1988). Guilford's (1950) concept of divergent thinking is probably the second most widespread definition of creativity. Divergent thinking deals with the creation of ideas resulting from given information and focuses on the variety and the number of results (Guilford, 1950). However, all definitions of creativity fall in two camps. In the first there are definitions of creativity that consider a person or an action as creative, only if some socially valuable product is generated: e.g. the solutions of a very complex problem or work of geniuses. This is called big C creativity. In the second camp all the other definitions of creativity fall, that socially valuable things are not required: e.g. the activities people engage in every day as to avoid a traffic jam by finding an alternative route. This is little c creativity (Sawyer, 2006).

It is very important for researchers to pay attention to the role that knowledge and experience have on creativity (Woodman *et al.*, 1993). According to Amabile (1988) to enhance creativity of the problem solver both knowledge (domain-relevant skills) and cognitive abilities (creativity-relevant skills) are indispensable. In fact even if an individual has an high level of knowledge and competence he will not be able to reach a good creative performance without the right cognitive abilities (Amabile, 1988). Also motivational factors are very important. The motivation level of the problem solver can make the difference between successful and unsuccessful creative efforts. No knowledge, competence or creative thinking will ever compensate for a lack of motivation in pursuing a specific goal. Motivation toward a goal determines the extent to which knowledge, competence and cognitive abilities will be engaged in creative performance (Amabile, 1988).

Considering an organizational context Woodman *et al.* (1993) define creativity as the creation of a new and useful product, service, idea or procedure, by individuals working together in a complex social system. Management scholars showed that organizational creativity cannot be explained through an individual approach. If we want to understand how the most important innovations have been developed inside organizations we have to examine some aspects such as work design, collaboration, organizational culture and structure other than contextual factors such as market and norms (Sawyer, 2006). Because organizational creativity it is not the amount of each individual creativity, in order to make a creative organization is not sufficient to hire creative people (Sawyer, 2006). Organizational creativity is a complex and emergent property that depends both on its employees and organizational structure. Both managers and employees should learn to take risks thanks to a trustworthy, free, tolerant and creative environment. Even if employees are very creative they will not be able to express their ability in a stifling organizational structure (Sawyer, 2006).

Employees creativity efforts will bring great benefit to firm performance. Baer and Oldham (2006) assume a positive association among creativity, firm performance and competitiveness. Some researchers argue that organizations able to stimulate creativity will generate a competitive advantage (Woodman *et al.*, 1993) and that competitive advantage will lead to improvements in revenue growth and profit growth (Geroski, 2000). Some empirical research show that increased organizational creativity results in a better organizational performance (Lee *et al.*, 2012). The few empirical studies investigating the relationship between creativity and financial performance found a non-significant (Von Nordenflycht, 2007), if not completely absent (Khedhaouria, 2015), effect. Results seem to be coherent because creativity (the generation of new and useful ideas) is different from innovation (the successful implementation of ideas).

Recently scholars have begun to suppose that the very important aspect to consider is the firm's capacity to put creativity into practice and not creativity itself (Weinzimmer *et al.*, 2011). Action orientation is defined as the ability to make decisions and implement cognitions, emotions and behaviour in order to reach specific goals (Jaramillo and Spector, 2004). Others use the concept of realized absorptive capacity, that is the ability to transform (convert) and exploit (apply) new knowledge to better firm performance (Gong *et al.*, 2013). Transformation deals with the ability to convert new knowledge and combine it with existing knowledge while exploitation refers to the ability to apply converted knowledge to commercial ends. The few available empirical results seem to support the above

hypothesis (Gong *et al.*, 2013; Khedhaouria, 2015; Winzimmer *et al.*, 2011).

Then, similarly to the psychology literature also strategy literature has to take into account company ability to enact creativity, because creativity impact on performance depends on it (Weinzimmer *et al.*, 2011).

What is written above suggests considering creativity as raw material that has to be refined and implemented (Puhakka, 2012), and that creativity is only indirectly related to performance through increased innovativeness, risk-taking and proactiveness. It should be noted that on one hand creative ideas need to be implemented in order to improve performance and, on the other hand, the implementation of non-creative ideas does not give any kind of competitive advantage over competitors (Gong *et al.*, 2013).

5. Knowledge Management, creativity and performance

KM practices improve firm performance and several empirical results seem to support this hypothesis (Lee *et al.*, 2012). Some scholars assume there is a direct relationship between KM and performance but this could oversimplify the real nature of this link. This assumption could lead to believe that simply investing in KM will directly increase firm performance (Kamhawi, 2012). Actually, great investments in KM don't necessarily bring a better performance (Kulkarni *et al.*, 2007). Therefore it is not clear from the current literature if KM practices impact directly on performance or if their effect goes through stages or intermediate levels of outputs. One might expect that KM practices are able to impact many aspects of organizational performance such as quality, innovation or productivity. Even if in very few cases KM has showed to have a direct impact on financial performance (Andreeva and Kianto, 2012) it is common opinion that KM can impact on financial performance only indirectly (Demarest, 1997).

The assumption of a positive association between creativity and firm performance is widespread (Baer and Oldham, 2006). However some scholars argue that the generation of creative ideas cannot directly improve firm performance until the time they are developed and implemented. In other words, it is firm ability to take action that determine the extent to which creativity will impact firm performance (Weinzimmer, 2011). Previous research investigating creativity impact on performance have considered it as a multidimensional phenomenon (Von Nordenflycht, 2007) without distinction between organizational and financial performance. However, considering the doubts, the lack of empirical results and in order to achieve a better understanding about the link

between creativity and performance, the authors of the present paper think it should be better to analyse the impact that creativity (creative problem solving) has on organizational performance and the impact it has on financial performance separately.

6. Conclusion

From literature review it seems there are some evident analogies between knowledge and creativity that we think is worth noting.

Knowledge is considered raw material useful for solving problems (Davenport and Holsapple, 2006). Similarly to other resources what really matters to achieve a sustainable competitive advantage is the ability to use knowledge in an effective and efficient way.

Like knowledge, creativity is considered raw material to define and implement (Puhakka, 2012) and what really matters for a better firm performance is the ability to use it (Weinzimmer *et al.*, 2011). Several researchers stress the functional side of creativity that is its usefulness in solving problems and reaching goals (Amabile, 1988), while Joly (1993) states creativity itself is the ability to set and solve problems.

From our perspective the most important difference between knowledge and creativity is that the latter will allow us to go beyond acquired knowledge maps and reach new goals. So, similarly to knowledge, for creative ideas to actually improve a firm's performance they have to be implemented (Gong *et al.*, 2013; Khedhaouria *et al.*, 2015; Weinzimmer *et al.*, 2011).

Furthermore it is a widespread belief that both KM and creativity are able to improve the whole firm's performance, but there are still some doubts about the distinct effects on organizational performance and financial performance.

Moreover, it is not clear if their impact on performance is directed or mediated. Firms' ability to use knowledge and creativity seems to mediate their impact on performance (Kogut and Zander, 1992; Spender and Grant, 1996; Weinzimmer *et al.*, 2011).

Now it does not seem so surprising the fact that studies on KM and creativity very often focus on the same organizational variables (work design, organizational culture, decentralization, etc.). This is probably due to the fact that factors enabling knowledge sharing are the same for enhancing creativity and the speed of decision-making. However, even if employees and managers are able to reach their goals or solve problems, it is not possible to assess if they have relied on their knowledge rather than their creativity, nor if the way in which knowledge is managed actually enhances creativity and/or the speed of decision making. Finally the examples of John Harrison, John Bradmore and René Laennec show that knowledge and creativity other than being complementary give rise to a synergy in the problem solving process. In fact, in order to create new knowledge we need creativity. At the same time creativity deploys its greatest potential when it rests on strong epistemic base. Knowledge and creativity seem therefore destined to be linked in a never ending relationship and a deep understanding of their benefits will be possible only by considering the synergy knowledge and creativity give rise to.

Therefore there is a strong need of empirical evidence to prove the above hypothesis because only once these aspects have been clarified it will be easier to judge the opportunity of investing in KM or, in the case it already exists, what kind of changes are needed to improve creativity and/or decision-making speed. In fact, depending on the adopted strategy and the competitive environment it could be necessary to invest more resources on creativity than on speed (and vice versa) if not on both.

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