

# Linking Community of Practices and Open Innovation Through Absorptive Capacity: A Conceptual Framework for University-Industry Collaboration

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## ABSTRACT

Across organizations, community of practice (CoP) plays an important role for knowledge creation. This informal structure assists intra-community knowledge transfer which facilitates the learning or absorption of new knowledge. However, lack of research examines the role organizational absorptive capacity in assisting CoP towards open innovation. Based on resource based view and dynamic capabilities theory, this paper proposes a conceptual framework to investigate the relationship between CoP involvement and absorptive capacity and open innovation. This framework provides a sound basis for further research to shed light on the effects of R&D CoP with regards to university industry collaboration. Contributions to research and practice are discussed.

**Keywords:** University-industry collaboration, absorptive capacity, resource based view, dynamic capability.

## I INTRODUCTION

University-industry collaboration (UIC) has taken place around the world with the notion that university as a knowledge producer will transfer knowledge into industrial sector. Operators who have knowledge in excess with respect to the internal capacity enhancement, or whose mission is the exchange of knowledge like universities and training systems in general, give knowledge to those who need it and who have the ability to acquire and enhance it (Davenport & Prusak, 1998).

Firms are increasingly streamlined in their operations and have typically developed boundary spanning collaborations for knowledge creation (Jonsson, Holmström, & Lyytinen, 2009). This is due to the rapidly rising costs for research and development (R&D) and shortened product and technology lifecycles (Sandberg, Holmström, & Levén, 2015). The reasons for these linkages are also diverse and ranging from student practical training to production and commercialization of new products (Othman & Omar, 2012). Other forces drive this collaboration also due technological advances, the shortening of

product life cycles and changes in governmental support for universities which make companies and universities to combine their resources and efforts to remain competitive (Plewa, Korff, Baaken, & Macpherson, 2013).

For universities, this collaboration will benefit primarily in economic terms, including financial support for future research (Harman, 2001), as well as the application of basic research results to industry problems (Lee, 2000). This interaction provides immense opportunities for the utilisation such newly generated knowledge in both its teaching and research activities, if it can enhance its own learning and absorptive capacity (Sparrow, Tarkowski, Lancaster, & Mooney, 2009). However, the gaps remain in respect of the role of universities in what might be termed the new open innovation landscape (Gassmann et al., 2010).

To be innovative, knowledge must be continuously created in individual, group and across organization. community of practice (CoP) create “epistemic cultures” (Knorr Cetina, 1999) where knowledge is created and transferred across organization. Originally developed by Lave & Wenger (1991) in a study of situated learning in apprenticeships, the CoPs approach has since been used to analyse and facilitate knowledge transfer in a wide variety of inter and intra organisational environments (Amin & Roberts, 2008). A common identity among members in the networks and social structures in the network (Brown & Duguid, 2001) impacts knowledge mobility since it increases motivation to participate in interactions and willingness to share experiences (Dhanaraj & Parkhe, 2006).

There has been an increased pressure put on universities to address ideas suggested by the outside and take on board actual problems faced by the industry. In doing this, the necessity of community formed in industry has been mentioned in several studies (e.g. Giudice, Peruta, & Maggioni, 2013), but lack of studies conducted in the university contextual situation. Considerable work is still required to elucidate the roles of research communities in universities and how it interacts toward the open innovation. It also remains largely unexplored how these communities benefit from

absorptive capacity to turn knowledge derived from community into innovation. In particular, there is a lack of knowledge of the degree to which the open innovation is affected by their absorptive capacity (AC) of an organization. There are needs for theoretical development and specific studies such as the impact of certain organizational antecedents, such as structures and informal networks on AC (Volberda, Foss, & Lyles, 2010).

This study develops a conceptual framework linking Research and Development (R& D) CoP involvement and AC to open innovation capability. Specifically, this research adopts Resource Based View (RBV) and dynamic capability theory to explore how CoP involvement can contribute open innovation through AC. In the following section we first introduce the conceptual framework for investigating the interplay of CoP, AC and open innovation. The subsequent section explains the background of used theories and the propositions of this study. Next, we discuss the contributions which this work makes to research and practice.

## II LITERATURE REVIEW

Striukova & Rayna (2015) classified collaboration between industry and universities into formal and informal. Formal engagements include licensing of university patents, university spin-offs, employment of graduates, collaborative R&D, copublications and mutual secondments. In contrast, activities such as meetings, jointly attended lectures and conferences, e-mail communication can be considered as informal relationships. For Schartinger, Rammer, Fischer, & Fröhlich (2002), the interactions between universities and industry can be classified according to four different categories: joint research (including joint publishing), contract research (including consulting, financing of university research assistants by firms), mobility (staff movement between universities and firms, joint supervision) and training (co-operation in education, training of firm staff at universities, lecturing by industry staff). To this respect, a large number of academics, especially those involved in applied research, use several types simultaneously (D'Este & Patel, 2007).

Meanwhile, Ankrah and Al-Tabbaa (2015) viewed UIC into two categories; i) rational process which focuses on planned resource and knowledge transfer and ii) irrational process which emphasizes on knowledge creation located within informal social interaction between the organization. Studies have shown how knowledge is created within communities (Johnson, 2010 and Kassicieh, 2010). Giudice, Peruta, & Maggioni (2013) describe CoP possesses the following elements a) members of a community learn knowledge that is embedded in the

community by participating in the community and practicing their jobs, b) firmly set by the task, culture, and history of the community, c) members belong to the community and d) the membership is fairly stable, while new members need time to learn about the community of practice and become fully participatory.

The strength of the CoPs approach is its focus on the social and practice-based interaction at the heart of the learning process (Gertner, Roberts, & Charles, 2011). Within this group, interdependent individuals are working together to develop shared identities and by having this mutual understanding facilitates knowledge transfer (Roberts, 2000). The interactions within these communities allow them to share, refine, pool and disseminate best practice for their work responsibilities (West & Lakhoni, 2008). In these communities, learning is a question of new meanings and structures emerging from common enterprise, experience, and sociability—learning by doing, and does not ensue from conscious design or recognizable rationality and cognitive frames (Cohendet & Llerena, 2003; Ancori, Bureth, & Cohendet, 2000). Brown & Paul (1991) refer to practice as the “way work is done”, where practice as a locus of learning and knowledge transfer (Gherardi, 2006).

Studying the impact of informal relation and social interaction is essential to understand innovation process in UIC as this process is rooted in the nature of knowledge creation as a socially embedded process (Ankrah and Al-Tabbaa, 2015). Innovation has been evolved from individual and internal process centric into inter-collaborative innovation. The open innovation model suggests that organisations should combine external and internal ideas and technologies as effective pathways to market when advancing and commercializing technologies (Wynarczyk et al., 2013 and Leydesdorff, 2013). Open innovation can be classified into inbound (outside-in) and outbound (inside-out). The research publication by universities acts as sources for further development by other researchers and industries which can be described as outbound (or inside-out) aspect of the Open Innovation process (Striukova & Rayna, 2015). Collaboration between university and industrial partners/organizations in the open innovation context aims to support companies and universities to share their research and development resources (knowledge, ideas, expertise, patents etc.) in order to better develop and valorize the created products and services (Perkmann et al., 2013 and Leydesdorff, 2013).

### III THEORETICAL FOUNDATION

#### Resource-Based View

To understand the linkage between community of practices and open innovation through absorptive capacity, this study integrates the resource-based view of the firm (RBV) into the development of theoretical framework. Building on a study conducted by Wernerfelt (1984), RBV of the firm has been defined as a simple economic instrument for evaluating the firm organizational resources. The evaluation is done by examining the strengths or weaknesses of the organizational resources in determining the ability of the firm to compete with other firms in the same market or industry.

Barney (1991) stated that valuable, rare, inimitable and non-substitutable resources can be a source of greater performance, enabling the firm to achieve sustained competitive advantage. To exemplify, distinctive assets, such as patents or brands are identified contributor for firm performance. Thus, a company must ensure that a firm's resources add value, rare, and costly to imitate. If a firm can create a position by which its organizational resources are difficult for other firms to imitate and these resources are highly important from the stakeholder's perspective, the firm has managed to create an organizational competitive advantage (Alvarez & Busenitz, 2001).

Based on this theory, community of practices (CoPs) is viewed as a distinctive resources and capabilities in which the deployment of these valuable resources is prominently central for the management to increase the value of the organization (Grant, 1996). CoPs allow an effective transfer of tacit knowledge through relationships and social interaction. Even though codified or explicit knowledge can be transmitted across time and space in tangible measures such as software, operating manuals, and patents, tacit knowledge transfer could only be implemented through demonstration and learning by doing (J. Roberts, 2000). Thus, tacit knowledge has distinctive capability which makes it more difficult to transfer and imitate (Szulanski, 2003). Similarly, Grant (1996) conclude that tacit knowledge is the core of firm-specific advantage.

#### Dynamic Capabilities

The Resource-Based View has become a major paradigm in strategy research, offering a way of identifying unique resources and providing the basis for a new theory of the firm (Conner, 1991) and a theory of competitive advantage (Barney, 1991). However, critiques claim that RBV do not address appropriately the competitive advantages in situations that require rapid and unpredictable change

(Eisenhardt & Martin, 2000). Danneels (2002) argues that it is crucial for the RBV to have a dynamic perspective, in understanding how firms evolve over time, through their deployment and acquisition of resources. Moreover, firm's sustainability depends on the ability to renew and reconfigure if they want to survive (Zahra, Sapienza, & Davidsson, 2006).

The Dynamic Capabilities Approach which emerged in the 1990s, building the missing dynamic perspective to the RBV. The concept of dynamic capabilities provides additional insights in explaining dynamic environment (i.e. globalisation, shorter product life-cycles and rapid technological developments). Dynamic capabilities have been defined as "the capacity to renew competencies to achieve congruence with the changing business environment by adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competencies". (Helfat et al., 2007, p. 1) stated that a dynamic capability as "the capacity of an organization to purposefully create, extend or modify its resource base".

In a dynamic and turbulent environment, knowledge is a critical resource to create value and to develop and maintain competitive benefits (Teece, Pisano, & Shuen, 1997). In line with the discussion, the concept of absorptive capacity shows enough flexibility to be applied to diverse units of analysis and in research areas such as strategic management, industrial organization, organizational learning, and originality management (Zahra & George, 2002). Absorptive capacity can be defined as the ability to identify, incorporate, change, and apply external knowledge (Cohen & Levinthal, 1990). Measures of absorptive capacity as dynamic capability are often quantitatively done (Lichtenthaler, 2009).

Similarly, this study has adopted the notion of absorptive capacity to facilitate the development of theoretical framework. Foss, Iakovleva, & Kickul, (2013) agree that the dynamic capabilities view can offer a valuable theoretical lens for investigating innovation at the organizational level. In line with the nature of innovation, dynamic capabilities are more specifically associated with change (Zahra, et al., 2006). Firms must adapt their strategies and change their valuable resources to encounter and overcome multiple challenges over time. In adapting to these changes, absorptive capacity is central for firm learning processes as it can assimilate existing internal knowledge and new knowledge. Roberts, Galluch, Dinger, & Grover (2012) state that the capacity to absorb new knowledge can be leveraged to gain a competitive advantage in the marketplace, resulting in experimentation with new alternatives and knowledge about unknown market

opportunities. Therefore, the combination of existing and new knowledge via absorptive capacity allows open innovation to happen, which further expands the markets for external exploitation of innovation.

Nevertheless, a firm's absorptive capacity is fundamentally dependent on the tacit knowledge of its members, who experience the environment, add knowledge into the firm, and transfer the knowledge in products and processes (Cohen & Levinthal, 1990). The nature of tacit knowledge limits the ability of individuals to transfer the knowledge, which in turn limits the firm's absorptive capacity. The attainment of tacit knowledge is viewed as a process of learning and socialization, where members need to share tacit knowledge to participate in collaborative partnership (Gertner, et al., 2011).

Teece, et al. (1997) found that the capability of firm to manage boundary spanning collaborations efficiently is indeed a crucial capability for a firm to integrate, build and reconfigure competences to manage volatile changing environments. Therefore, the transfer of these intangible assets in collaboration or partnership is central to sustain firm competitiveness, which requiring new conceptual frameworks for business and competitive analysis. Drawing up on both RBV and Dynamic Capabilities theories, this study develops a conceptual framework to examine how university-industry collaboration can be leveraged by linking CoPs and open innovation through absorptive capacity.

## IV HYPOTHESES

### A. The role of CoP in open innovation

CoP is one of the organizational forms of structure which exist including in universities. Communities of practice can be defined as groups of people who are devoted to the same practice and share similar working visions (Giudice, et al., 2013). The value of the CoPs approach lies in its focus on the interactions between community members as they engage in their everyday work practices (Drew, Joanne, & David, 2011). This epistemic community is strongly dependent on the socialization of knowledge, increasing predominance of routines, and repeated interactions, in oppose to incorporation in rules or in an organizational design (Giudice, et al., 2013).

Innovations often arise from re-combination of existing methods, components or sub-systems in novel syntheses (Arthur, 2007). Contemporary organizations increasingly leverage external knowledge sources in their innovation processes

(Chesbrough, Vanhaverbeke, & West, 2008). As innovation often emerge in unpredictable ways, and informal communication and common practices are essential for knowledge transfer, open forums and informal communication channels are key ingredients of well- functioning innovation networks (Tsai, 2001).

Intra-community interactions also offer the prospect of defining the boundaries of a given innovation community (West & Lakhoni, 2008). The interactions might be extended to inter organisational level as the deliverables of particular projects might require external sources of knowledge. Open innovation advocates argue that there are particular benefits in combining competencies from academic and industrial sources in networks of innovators (Chesbrough, 2003; Levén, Holmström, & Mathiassen, 2014). By participating in such innovation networks, universities can receive financial benefits, generate valuable research findings and contribute to economic growth (Etzkowitz & Leydesdorff, 2000 and Lind, Styhre, & Aaboen, 2013).

*H1: R &D CoP involvement is positively related to open innovation*

### B. The mediating effect of absorptive capacity

Cohen and Levinthal's (1990) define of absorptive capacity: "a limit to the rate or quantity of scientific or technological information that firm can absorb". AC may be affected by the internal organization structure and that different divisions/units may be able to absorb different kinds of knowledge (Van den Bosch et al. 1999; Cohen and Levinthal (1990, p. 135) but also may have different capabilities for transferring that knowledge internally (Volberda, et al., 2010).

Knowledge externalization and socialization in the research group of specialists are important activities in human resources development process (Draghicia, Babanb, Gogana, & Ivascua, 2015). These activities are based on the knowledge transfer process inside and outside the research groups where open innovation could better support the knowledge creation process through the knowledge transfer processes (Volberda, et al., 2010).

We argue that absorptive capacity may mediate the relationship between R &D CoP involvement and open innovation. The experience of participating in working groups by sharing and exchanging tacit knowledge may increase the ability to acquire, assimilate, transformed and exploited knowledge

from external including industry. In turn, absorptive capacity can enhance open innovation, since the more the members can absorb knowledge from industry, the higher the chance they can create innovative solutions as results of this capability. The proposed framework is shown in Figure 1.

*H2: Organizational absorptive capacity mediates the relationship between R & D CoP involvement and open innovation.*

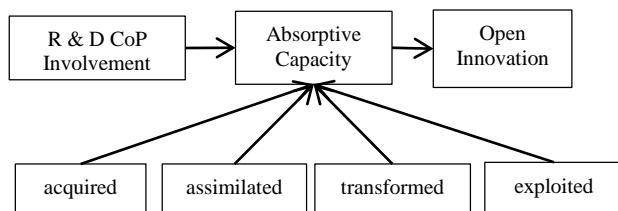


Figure 1: Conceptual Framework

## V CONTRIBUTIONS

### A. Contributions to Theory

First, studies on CoP within UIC have been previously conducted but how this structure lead toward open innovation through AC is not being investigated. There is insufficient evidence of theoretical development and specific studies such as the impact of CoPs and AC for open innovation capability from university context. This research contributes to the body of knowledge by formulating a conceptual framework that shows the link between CoPs and absorptive capacity for open innovation by focusing on university context.

Second, this research extends the concept of CoPs by integrating the theory of RBV and Dynamic Capabilities into the conceptual framework to examine how university-industry collaboration can be leveraged by linking CoPs and open innovation through absorptive capacity. This study considers the importance of absorptive capacity to link CoPs and open innovation between university and industry. The previous study did not incorporate the absorptive capacity for CoP approach for knowledge transfer in universities (Gertner, Roberts, and Charles, 2011). In other words, this study adds insights on how academic and industry can enhance collaboration by exploring the effect of CoPs on absorptive capacity.

### B. Contributions to Practice

This research offers a number of contributions to practice. First, while CoP has been discussed widely as a strategic approach for fostering learning and

transferring knowledge, its benefits that can link university and industry have not been realized. This study provides insights to university and industry stakeholders on how the relationship of university-industry can be improved through absorptive capacity approach for CoP.

Second, the conceptual framework addresses the need for both university and industry to give attention to CoPs as a strategy for open innovation. The success of CoPs in absorptive capacity may contribute to the promotion of collaborative interaction in which the university and industry work together for open innovation.

## VI CONCLUSION

The central aim of this article has been to understandings of how CoPs can be linked to open innovation through absorptive capacity approach. Our proposed framework lays the groundwork for future study to examine the relationships between CoP, absorptive capacity, and open innovation.

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