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Absorbing in-bound knowledge within open innovation processes. The case of Fiat Chrysler Automobiles

AQ:au **Diego Matricano, Elena Candelo, Mario Sorrentino and Aurora Martínez-Martínez**

Abstract

Purpose – The purpose of this paper is to investigate the way companies involved in Open Innovation Processes (OIPs) routinize the procedure through which they can absorb in-bound knowledge, i.e. knowledge that comes from the outside and, in particular, from the crowd. In-bound knowledge passes through the phases of acquisition, assimilation, transformation and exploitation. Thus, companies need to define mechanisms and paths – related to their potential and realized absorptive capacity – to manage and exploit it.

Design/methodology/approach – The present paper is based on a longitudinal case study, an OIP launched by Fiat Chrysler Automobiles (FCA) that has already been implemented for three times. Multiple direct interviews with FCA top managers have allowed rebuilding the routinized procedure through which the company absorbs in-bound knowledge.

Findings – To routinize the procedure of absorbing in-bound knowledge, the company has settled specific mechanisms and paths and has established some bottlenecks over the process of acquisition, assimilation, transformation and exploitation of in-bound knowledge. These mechanisms and path, as well as these bottlenecks, are identified and described in the paper.

Research limitations/implications – Beyond the limitations linked to the use of a single case study, another limitation might be the reference to a big company in a specific industry. Anyway, with due caution, achieved findings can be referred to other industries as well.

Originality/value – This paper contributes to exploring if and how companies managing OIPs routinize the procedure through which they can absorb in-bound knowledge.

Keywords Open innovation, Knowledge management, Case study, Absorptive capacity, Automotive industry

Paper type Case study

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1. Introduction

Nowadays, more and more often, management scholar celebrate Open Innovation – OI, as it can stand for a strategy that allows companies innovating by leveraging external knowledge (Díaz-Díaz and de Saá Pérez, 2014; Randhawa *et al.*, 2016; Chesbrough, 2017; Popa *et al.*, 2017; West and Bogers, 2017; Bogers *et al.*, 2018a, 2018b; Cano-Kollmann *et al.*, 2018; Von Krogh *et al.*, 2018; Cheng *et al.*, 2019; Gershman *et al.*, 2019). By excluding crowd funding – a kind of OI through which proponents of new ideas can get funds, i.e. a kind of micro lending (Allison *et al.*, 2015) – OI is largely considered as a process through which companies can launch dedicated call to get external or in-bound knowledge (Chesbrough, 2003, 2004; Chesbrough and Crowther, 2006; Enkel *et al.*, 2009; Loren, 2011; Scuotto *et al.*, 2017). As underlined by Hopkins (2011), companies launching open innovation processes – OIPs can gather fuzzy ideas (*crowd-wisdom*) or new ideas to be embodied in new products/services (*crowd-creation*) or judgements to classify knowledge (*crowd-voting*) from the crowd. This means that a very interesting aspect, on

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which management scholars focus their attention, deals with the exploitation of collected ideas. Several contributions can be cited in this vein. Chesbrough and Appleyard (2007) investigate the link between OI and strategies; Della Peruta *et al.* (2018) underline the connection between OI and new product development; Frankenberger *et al.* (2014), explore the relationship between OI and business models; Rayna and Striukova (2015) underline the relevance of Web applications; Martino and Bartolone (2011) highlight the importance of soft skills hold by companies; Heim (2011) remarks the weight of leadership exerted by top managers; Carpenter (2011) underlines the role of crowd and the extent to which it is important motivate it. Eventually, Gaule (2011) identifies the most common mistakes that should be avoided when implementing and managing OIPs. Other researchers focus their attention on benefits and costs of OI (Greco *et al.*, 2019) or they investigate the effect of the not-invented-here syndrome that can affect OI (Foegel *et al.*, 2019; West and Bogers, 2014). Still other researchers (Feldmann *et al.*, 2019) analyse the human component of OI, i.e. how to incentive human resources to use external knowledge and to engage in in-bound OI activities. Eventually, Martins and Terblanche (2003) analyse the determinants of organizational culture able to absorb external knowledge linked to OI and to involve individuals and teams.

By focussing attention on the exploitation of external ideas, some scholars have also investigated another stream of research dealing with knowledge management within OIPs. In particular, by recalling Cohen and Levinthal's (1990) contribution about absorptive capacity – ACAP, some management scholars underline the relevance of ACAP in OIPs (West and Gallagher, 2006; Huang and Rice, 2009; Lichtenthaler and Lichtenthaler, 2009; Hughes and Wareham, 2010; Spithoven *et al.*, 2010; Robertson *et al.*, 2012; Bessant and Trifilova, 2017). Among the above scholars, some of them propose theoretical contributions (Lichtenthaler and Lichtenthaler, 2009; Robertson *et al.*, 2012); others investigate what happens in SMEs (Huang and Rice, 2009) and still others explore the role of R&D personnel (Spithoven *et al.*, 2010). To the knowledge of the authors, only few scholars have tried to explore the role of absorptive capacity to exploit in-bound knowledge within OIPs. In particular, Hughes and Wareham (2010) have explored and rebuilt the role of ACAP within OIPs in reference to a global pharmaceutical company. The present paper embraces this approach and tries to investigate the way companies involved in OIPs routinize the activities through which they can absorb in-bound knowledge, including the important role of the human factor. An absorbed capability context and a knowledge management are required to maintain an appropriate balance between potential and realized absorptive capacity (Cepeda-Carrion *et al.*, 2012).

Basically, the research question of the paper is the following: can it be identified a procedure that companies promoting OI can adopt to absorb and exploit in-bound knowledge? Thus, the main aim of this research is to examine mechanisms and paths – related to their potential and realized absorptive capacity – which companies need to define to manage and exploit in-bound knowledge. In other words, this model is less explored and hence less well understood by in academic research and also in industry practice. This is the main theoretical highlight of this research along with its involvement with the managerial practice.

To achieve the above aim, the paper is structured as follows. In Section 2, two dedicated literature reviews are carried out. The former deals with innovation in the automotive industry. The latter deals with ACAP, we focus on the distinction between what Zahra and George (2002) refer to as potential absorptive capacity (PACAP) that concerns acquisition and assimilation of external knowledge and realized absorptive capacity (RACAP) that deals with transformation and exploitation of absorbed knowledge. After this, the link between absorptive capacity, knowledge management and OI is theoretically rebuilt and defined. In Section 3, the methodology of longitudinal case study is presented. In particular, it is explained the reason why this methodology is adopted. Section 4 rebuilds the

longitudinal case study that refers to an OIP launched by Fiat Chrysler Automobiles (FCA) and entitled I AM FCA (an acronym standing for Innovation Award for Millennials). The aim of this OIP is to conceive innovative ideas and insights about “the car of the future and the future of the car” from millennials, who are considered young future consumers. After a pilot edition (launched in 2016), FCA has launched two extended editions (in 2017 and 2018). Up to now, FCA has somehow routinized the procedure through which in-bound knowledge gathered with OIPs is absorbed. In particular, from attentive analyses of the case study, it emerges that the company has settled mechanisms and paths and has established some bottlenecks over the process of acquisition, assimilation, transformation and exploitation of in-bound knowledge. In Section 5, the results emerging from the case study are presented and discussed. Eventually, in Section 6, after highlighting some limitations of the paper, which can also stand for possible hints for future research, the main conclusions and some managerial implications are drawn.

2. Literature review

2.1 Open innovation in the automotive industry

Traditionally, carmakers have leveraged internal R&D activities – able to create and share new knowledge – to foster innovation and compete on the market (Miller, 1994; MacNeill and Bailey, 2010). Thus, it is possible to share the idea that “knowledge is created by the human brain and then it is amplified and integrated into organizational knowledge by social interaction” (Bolisani and Bratianu, 2018, p. 19).

Over the past decade, however, deep changes have been taking place. The concept of OI is awakening growing interest and is being applied to different businesses or business models. Some research considers that OI is not a clear cut concept (Huizingh, 2011), it needs more research and unification of ideas, clarification of how it differs from closed innovation and anticipation of what it will be in the future. In the future, it seems interesting to relate it to and integrate it with traditional concepts (Huizingh, 2011). More integrated theories are needed, for example about OI to eco-innovation (Behnam *et al.*, 2018). See for example Chesbrough (2007) – who suggests changes to a firm’s business model, more collaboration and more participants (Chesbrough, 2017), as shown in Table I. Another point these definitions have in common is that they suggest absorptive capacity for knowledge to accelerate the innovation.

Bearing the above ideas in mind, this study defines OI as the capacity to absorb and manage of knowledge of the exterior as well as the interior to promote innovation in products or services with an optimization of resources and a shortening of realization times.

An industry that requires innovation, which involves high costs and constant as well as rapid changes, is that of carmakers. Carmakers are increasing their level of openness to foster innovation activities (Di Minin *et al.*, 2010; Enkel and Gassman, 2010; Ili *et al.*, 2010; Karlsson and Sköld, 2013; Lazzarotti *et al.*, 2013; Cano-Kollmann *et al.*, 2018; Wilhelm and Dolfma, 2018). Cost pressure, need for innovation – in particular, discontinuous innovation (Aggeri *et al.*, 2009) – and marginal growth in mature markets of industrialized countries or in emerging markets are forcing automotive companies to increase productivity of R&D activities by using both internal and external sources of knowledge (Ili *et al.*, 2010; Lazzarotti *et al.*, 2013; Amison and Bailey, 2014; Schulze *et al.*, 2015). Put simply, OI is becoming an emerging valuable top-down strategy in the automotive industry (Ili *et al.*, 2010) that is more and more widespread (Von Krogh *et al.*, 2018).

Several cases can be cited in this vein. Di Minin *et al.* (2010) have investigated an OIP launched by FCA to develop some features of diesel engines developed by the Fiat Research Centre (CRF) together with external engineers and technicians. Estellés-Arolas and González-Ladrón-De-Guevara (2012) and Saldanha *et al.* (2014) have rebuilt the MIO case, a large crowdsourcing process launched by FCA Brazil. Enkel and Gassman (2010)

Table I Key definitions of open innovation

<i>Open innovation . . .</i>	<i>Source</i>
"is a form of non-local search"	Russo-Spena and Di Paola (2019, p. 289)
is an activity "through which a firm extends its own knowledge base by searching, selecting, and integrating external knowledge from various external relationships"	Li-Ying et al. (2018, p. 53)
"is defined as the intentional management of inbound and outbound flows of knowledge for firms to advance their innovation strategies, by which firms leverage external partners both as sources of innovation and paths for commercializing their own innovations"	Greul et al. (2018, p. 393)
"can be a winning strategy in improving firm performance"	Ahn et al. (2016, p. 1009)
"looks outside the business for the new technology required, it is more quicker and cheaper than to develop it in-house"	Amison and Bailey (2014, p. 400)
"seeks external knowledge sources to innovate their absorptive capacity"	Díaz-Díaz and de Saá Pérez (2014, p. 433)
is "an increased need for external knowledge and networking capacities with different partners that possess knowledge"	Spithoven et al. (2011, p. 15)
"deals instead with relying on a firm's capability to carry out internally and externally technology management tasks along the innovation process"	De Massis et al. (2012, p. 219)
"refers to how firms source and acquire expertise and outbound to how firms attempt to sell ideas and resources in the marketplace"	Dahlander and Gann (2010, p. 700)
is a "way to delegate more of the management of innovation to networks of suppliers and independent specialists that interact with each other to co-create products and services"	Bughin et al. (2008, p. 1)
"involves opening up the firm's innovation processes to knowledge coming from suppliers, customers and other external sources to update the in-house knowledge"	Knudsen (2007, p. 117)
deals with "the use of purpose inflows and outflows of knowledge to accelerate innovation"	Chesbrough et al. (2006, p. 1)
"is how firms' use ideas and knowledge of external actors in their innovation processes"	Laursen and Salter (2006, p. 132)

Source: Personal elaboration

have recalled the BMW, the Wittenstein and Sevex/Elringklinger cases. As for the BMW case, the OIP has concerned a new device for controlling some functions within BMW's series 7 through a new men-machine interface developed by partners from the game industry. As for the Wittenstein case, the OIP was about using traction technology to stretch human bones and several experts from the medical industry were involved. Eventually, as for the Sevex/Elringklinger case, the OIP has dealt with production of heat shields for automobiles and so experts in the aluminium market were contacted. [King and Lakhani \(2013\)](#) have presented the case of Local Motors that has tried to innovate the design, engineering and manufacturing of cars by leveraging on an OIP dedicated to designers and technicians. [Lazzarotti et al. \(2013\)](#) have rebuilt the case of Pinfarina, which worked on several phases of the innovation process such as design, engineering and manufacturing, and the case of Bosch that has launched an OIP concerning products, functions, services, processes and business models. PSA Group is another case of OI in the automotive industry. Specifically, PSA Group has invited the crowd to re-design cars in terms of aesthetic models ([Bughin et al., 2008](#)) and asked academics, scientists and customers about some technological advancements, like car consuming, autonomous vehicles, bio-sourced carbon fibre and information systems (www.openinnovation.net). [Logan \(2011\)](#) has rebuilt the case of Tesla Motors that leveraged on an OIP with R&D centres of other major companies to foresee new electric vehicles.

From the above cases, it clearly emerges that most of the studies about OI in the automotive industry concern how companies acquire external knowledge from industrial and/or research partners ([Enkel and Gassman, 2010](#); [Di Minin et al., 2010](#); [Logan, 2011](#); [Lazzarotti et al., 2013](#)), from the industrial partners involved in the automotive value chain like designers ([De Massis et al., 2012](#); [King and Lakhani, 2013](#); [Lazzarotti et al., 2013](#)), from suppliers ([Karlsson and Sköld, 2013](#); [Lazzarotti et al., 2013](#)) or from copious and heterogeneous crowds ([Saldanha et al., 2014](#)). However, it seems that despite some cases – [Schuster and Brem \(2015\)](#), for example, investigate why some firms clearly profit more from openness than others in the automotive industry, while [Wilhelm and Dolfmsa](#)

(2018) focus their attention on the obstacles impeding OIPs – most of the above studies miss a dedicated focus on the management of in-bound knowledge (i.e. knowledge that is proposed by the crowd). Put simply, it seems that management scholars have not investigated – in a comprehensive way – the procedure through which they can absorb in-bound knowledge and the mechanisms and paths – related to their potential and realized absorptive capacity – that need to be defined to manage and exploit in-bound knowledge when involved in OIPs. This investigation reflects our basic research question.

2.2 Absorptive capacity

Knowledge management “refers to a set of organizational activities to achieving organizational objectives by making the best use of knowledge” (Zhang *et al.*, 2015, p. 803). From the above definition, it is clear the relevance of knowledge management for all the companies. For this reason, management scholars worldwide have addressed their research efforts towards knowledge creation (Nonaka, 1994; Nonaka and Takeuchi, 1995; Nonaka *et al.*, 2000) and knowledge transfer (Osterloh and Frey, 2000; Alavi and Leidner, 2001; Smith, 2001; Argote *et al.*, 2003; Stock *et al.*, 2013; Messeni Petruzzelli and Savino, 2014; De Massis *et al.*, 2016; Argote and Fahrenkopf, 2016). The combination of the above-cited topics of research has driven several scholars (Cockburn and Henderson, 1998; Lane and Lubatkin, 1998; Lane *et al.*, 2001; Tsai, 2001; Nooteboom *et al.*, 2007; Todorova and Durisin, 2007; Escribano *et al.*, 2009; Martín-de Castro, 2015; Tortoriello, 2015) to recall the concept of absorptive capacity – ACAP, i.e. “the ability of a firm to recognize the value of new external information, assimilate it and apply it to commercial ends” (Cohen and Levinthal, 1990, p. 128). As underlined by Cohen and Levinthal (1990) in their seminal work, in fact, companies need to develop their capacity to gain and to exploit new knowledge created by counterparts (Andersén and Kask, 2012). In this vein, absorptive capacity is a dynamic capability supporting innovation process (Teece *et al.*, 1997; Pisano, 2017).

Among all the contributions referring to the one authored by Cohen and Levinthal (1990), the work proposed by Zahra and George (2002) – who suggest splitting Cohen and Levinthal’s absorptive capacity into potential and realized ACAP – has generated a very intriguing and still ongoing debate (Todorova and Durisin, 2007; Camisón and Forés, 2010; Flatten *et al.*, 2011; Andersén and Kask, 2012; Lin *et al.*, 2012; Leal-Rodríguez *et al.*, 2014; Huang *et al.*, 2015; Patterson and Ambrosini, 2015). According to Zahra and George (2002), in fact, it is appropriate to differentiate potential from realized absorptive capacity. In their view, potential absorptive capacity (PACAP) refers to acquisition and to assimilation of external knowledge while realized absorptive capacity (RACAP) refers to transformation and exploitation of absorbed knowledge.

According to the above scholars, to proceed with acquisition and assimilation of external knowledge, companies need to be in contact with external partners and, at the same time, to develop their *prior knowledge* that makes them able to recognize the value of external knowledge (Cohen and Levinthal, 1990). By developing their PACAP, companies can properly evaluate external knowledge. RACAP, instead, refers to transformation and exploitation of knowledge that has been previously acquired and assimilated. By transformation it is generally meant the ability to combine knowledge already possessed by companies with knowledge acquired and assimilated from the outside. This combination originates new knowledge that companies can exploit later on. To achieve this aim, Cohen and Levinthal, (1990) underline that commercial ends need to be considered (for example the appeal of new products/services on the final market). By developing their RACAP, companies can be successful in combining internal and external knowledge to create new one and, hopefully, they can easily choose how to exploit resources according to a commercial perspective (new products/services to be launched on the final market) (Cepeda-Carrion *et al.*, 2012).

Because of the above differences, it seems rather clear the reason why [Zahra and George \(2002\)](#) assume that PACAP and RACAP are heterogeneously deployed inside companies. Activities useful to develop PACAP are totally different from activities useful to develop RACAP. Accordingly, the level of PACAP can be significantly different from the level of RACAP. Even if some scholars do not agree on this view, and thus criticize it ([Andersén and Kask, 2012](#)), some other scholars support it ([Jansen et al., 2005](#); [Camisón and Forés, 2010](#)) and invite other ones to share this view and investigate other aspects related to PACAP and RACAP.

By seizing up this call, in this paper, the difference between PACAP and RACAP is embraced and the role that PACAP and RACAP can have in OIPs is investigated. As already said, only some scholars ([West and Gallagher, 2006](#); [Huang and Rice, 2009](#); [Lichtenthaler and Lichtenthaler, 2009](#); [Hughes and Wareham, 2010](#); [Spithoven et al., 2010](#); [Robertson et al., 2012](#); [Patterson and Ambrosini, 2015](#); [Ali et al., 2016](#); [Ferrerias-Méndez et al., 2016](#); [Kim et al., 2016](#); [Bessant and Trifilova, 2017](#); [Ramirez-Portilla et al., 2017](#)) have paid attention on this topic. Out of them, some scholars have authored theoretical contributions ([Lichtenthaler and Lichtenthaler, 2009](#); [Robertson et al., 2012](#); [Ali et al., 2016](#)); others have explored the role of ACAP in OIPs in reference to SMEs ([Huang and Rice, 2009](#); [Ramirez-Portilla et al., 2017](#)) or to specific industries, such as the pharmaceutical ([Hughes and Wareham, 2010](#)) and biopharmaceutical ones ([Xia and Roper, 2016](#)) or the manufacturing of supercars ([Ramirez-Portilla et al., 2017](#)), and still others have investigated the role of R&D personnel ([Spithoven et al., 2010](#)).

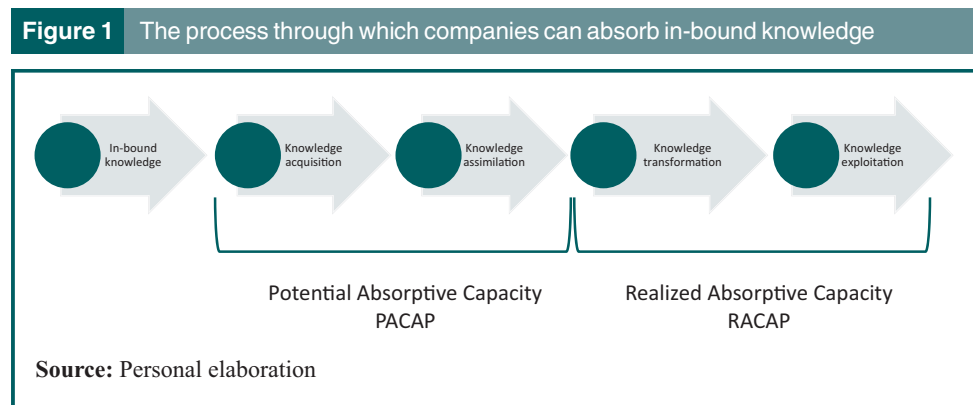
From the above literature review, a relevant gap seems to emerge. This concerns the procedure through which companies can absorb in-bound knowledge ([Figure 1](#)).

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In particular, the above literature review discloses that management scholars have paid scarce attention on the mechanisms and paths – related to their potential and realized absorptive capacity – that are necessary to manage and exploit in-bound knowledge and that companies should try to fix, or – in other words – to routinize, to manage OIPs in a proper way. In reference to organizational routines, of course, it is not possible to ignore a conspicuous body of literature ([Teece and Pisano, 1994](#); [Grant, 1996](#); [Teece et al., 1997](#); [Dyer and Singh, 1998](#)) that has investigated the origins of the phenomenon and has contributed to its development in management studies.

2.3 Linking absorptive capacity, knowledge management and open innovation

The use that firms make of external knowledge in the business models is called in-bound OI ([Chesbrough and Crowther, 2006](#)). OI stresses the participation of many knowledge agents ([Martinez-Martinez et al., 2019](#)) who have knowledge outside and inside firms waiting to be captured by firms and converted into profitable innovating products and services



(Chesbrough, 2003). These agents could be the drivers to introduce new innovations in the firms. However, it is known that firms need to absorb this knowledge.

Even if knowledge agents can be considered key drivers of OIPs, most research still “neglects the human side” of OI (Bogers *et al.*, 2018a, 2018b; Gassmann *et al.*, 2010). Generally speaking, the employees’ knowledge, skills and abilities obtained through education, training or experience are analysed in the literature (Chersbrough, 2003; Bogers *et al.*, 2018a, 2018b). However, we find a relative lack of focus on human factors able to acquire and use external knowledge and – above all – to solve the not-invented-here syndrome. In this sense, CEO characteristics aiming to promote and facilitate the use of external knowledge (Pontiskoski and Asakawa, 2009; Bogers *et al.*, 2018a, 2018b; Hynes and Mickahail, 2019) and to provide – by training – new skills to employees (Lunenborg, 2010), their leadership styles (Lindegaard, 2010; Taylor *et al.*, 2019) and the incentives they can determine to support the incorporation of external knowledge (Amar, 2004; Janzik and Herstatt, 2008) are key factors in OIPs. Bogers *et al.* (2018a, 2018b) suggest that firms with a diverse human capital pool are at an advantage with respect to engaging in OI, as they can exploit existing diversity and may not have to create such diversity by means of hiring new employees.

However, although knowledge passes through the boundaries of firms (Cui *et al.*, 2018), the latter have to develop mechanisms to the acquisition, assimilation, transformation and exploitation of this knowledge (Nonaka and Takeuchi, 1995). This involves the importance of capability to absorptive of knowledge this external knowledge (Cohen and Levinthal, 1990; Zahra and George, 2002).

In contrast, nowadays little attention is paid to absorptive capacity that must necessarily be developed in firms to successfully engage in in-bound OIPs (Spithoven *et al.*, 2010). The literature has emphasized that absorptive capacity positively improves innovation outcomes (speed, quality and frequency) (Zobel, 2017) and that the subsequent organizational learning from internal innovation efforts also recursively improves absorptive capacity itself (March, 1991; Crossan *et al.*, 1999; Volberda *et al.*, 2010). Several authors point out the importance of social integration mechanisms as well as knowing the procedure of absorption capacity (Spithoven *et al.*, 2011; Cepeda-Carrion *et al.*, 2012). In the future, OI will almost certainly be integrated in the management of innovation. For this reason, it is of utmost importance for the deepening of the managerial perspective regarding its influences and component elements (Ahn *et al.*, 2016).

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This research uses important processes of absorptive capacity differentiating between “potential” and “realized” absorption capacity (Zahra and George, 2002). It has analysed them in a managerial implication context with a case study in a large company that manufactures automobiles, and distributes them worldwide. This work provides routines that incorporate the important role of human factor in use of knowledge related to OI. These routines have been applied in this important company. A longitudinal study is also incorporated.

3. Research methodology

To shed some light on the role that PACAP and RACAP can exert within OIPs, and therefore to answer our research question, this paper is based on a longitudinal case study concerning an OIP launched by FCA. In particular, the case study refers to a big crowdsourcing-based OIP that FCA has already implemented for three times (in 2016, 2017 and 2018). As anticipated, this OIP is aimed at gathering ideas and insights “on the car of the future and the future of the car”. Before proceeding, it is important to argue the choice of a single case study, to clarify the nature of data and to explain the relevance of a longitudinal approach.

As for the choice of a single case study, dedicated literature supports the idea that a single case study can be used to corroborate theoretical developments (Eisenhardt, 1989; Dyer and Wilkins, 1991; Yin, 1994) when there are no copious theoretical and/or empirical contributions that can be used as references (Glase and Strauss, 1967). Of course, the selected case needs to have some characteristics that can justify and support the act of choosing it as a single case study. By referring to a knowledge intensive industry that is leveraging more and more on OIPs and by referring to one of the top-ten carmakers worldwide that has launched three editions of the same OIP, it results that reliability of case study cannot be questioned.

As for the nature of data, we need to premise that the role that PACAP and RACAP exert on OIPs cannot be measured (it is not quantitative in nature). Thus, the analysis is based on qualitative data that needs to be carefully collected. The possibility to interviewing FCA top managers – who were responsible of the OIP and who could provide and share detailed information – stand for a valuable strength.

As for the relevance of a longitudinal approach, the fact that data have been longitudinally collected (Prasad, 2002; Barrett *et al.*, 2011) noticeably reduces the risk of misinterpretation of data, by warranting consistency and comparability of data. The longitudinal case study, in fact, is not a simple description referred to an event, or a spot phenomenon. It helps to rebuild what really happens and – above all – how it really happens (since it is reiterated over time). Thus, longitudinal case studies can really help to catch and sum up habitual activities or recurrent practices and, in turn, to contribute to the emergence and development of a generalized theory or model.

Despite the above assumptions, helpful to strengthen the methodology of longitudinal case study (Eisenhardt, 1989; Yin, 1994), it is not possible to ignore that management scholars still debate about the generalization of achieved results and the proposal of a general theory or model starting from a single case study (Dyer and Wilkins, 1991; Eisenhardt and Graebner, 2007).

Twenty-four in-depth, on-site interviews with four corporate managers were conducted over the three-year period of the OIP. Each manager has been interviewed twice in each year of execution of the OIPs (2016, 2017, 2018). The entire data collection phase, including direct access to OIP's documents and interviews, lasted from September 2016 to September 2018.

The positions of the four interviewed managers are diverse. The first manager is the former FCA Chief Operating Officer, EMEA (Europe, Middle-east and Africa) Region. He planned and promoted the OIP and showed strong personal commitment on the three editions of the initiative. He was involved in transformation and exploitation of new ideas and knowledge generated by the OIPs. The second manager is the Head of FCA Product Planning & Institutional Relations, EMEA Region. He is responsible of the OIP and has managed its routinization within FCA. He was also involved in the pre-assessment, assessment, assimilation and exploitation of ideas and knowledge coming from the OIPs. The third manager is Responsible of Feature Portfolio Planning FCA Italy/Product Planning and Institutional Relations. He was involved in the transformation, development and exploitation of the novel ideas and knowledge coming from the OIPs. The fourth manager is FCA Press Office Manager. He was involved in the organization of the OIPs and was responsible of whole communication activities of this OI initiative. Thus, in adherence with Robert Yin's theory (Yin, 1994), a number of criteria were used to select the respondents: direct interaction with innovation activities and knowledge management processes, personal involvement in the design and/or management of the three editions of the OIP, functional and hierarchical relevance and diversity. Following George Huber and Danial Power's proposal (Huber and Power, 1985), we selected knowledgeable informants who were presumed to be able to provide the most relevant information as they were directly involved in the investigated phenomena, thus providing direct experiences and perceptions.

Semi-structured, open-ended questions were used. Items included in the interviews to FCA managers were referred to various aspects that relate to both OI and knowledge management. These aspects first included previous OI activities, previous crowdsourcing-based OI activities, existing knowledge management processes and management of crowdsourcing ideas. Second, items included in the interviews investigated several aspects of the three OIPs promoted by FCA. These aspects include the absorption of in-bound knowledge collected with the OIPs with particular emphasis on the management of the knowledge acquisition, assimilation, transformation and exploitation procedures.

Given the longitudinal research setting, the open questions were built according to the advancement of the OIP (first, second or third edition). Consequently, the open questions were modified according to the reached level of routinization of the knowledge management process over the three editions of the OIP. At the same time, open questions were tailored according to the role and functions of the interviewed managers. On average, the face-to-face interviews lasted for 90 min. After that, dedicated meetings, follow-up calls and detailed e-mails were organized to highlight the key points and to get – if possible – additional information.

Besides direct interviews, we performed multiple on-site visits and had direct and extended access to lots of information and organizational procedures concerning how the in-bound knowledge has been progressively managed and absorbed by the company. This gave us the opportunity to analytically summarize and critically assess the results of all available evidence on the investigated phenomenon. In this way, we tried to reduce the presence of bias in our evaluations and judgments. In particular, the search for all relevant information on the procedure of absorption of in-bound knowledge – including searching for disconfirming evidence (Wolf, 2012) – and the presence of analytic judgments have been assured with the aim of mitigating distortions due to confirmation bias or to the halo-effect (Thorndike, 1920; Nisbett and Wilson, 1977).

4. The Fiat Chrysler Automobiles case study

To present the longitudinal case study of FCA, the OIP has been divided into five phases. Actually, these phases do not describe the whole OIP (the planning activities carried out by FCA top managers are not reported), but they mainly focus on the process through which the company has absorbed in-bound knowledge.

Phase 1. The procedure through which the company has absorbed in-bound knowledge starts when the company gets insights and ideas proposed by the crowd through a Web platform. As already said, the FCA OIP is aimed at gathering insights and ideas on “the car of the future and the future of the car”. The three OIPs have been targeted on Italian university millennials attending management schools. The three OIPs have reached excellent results in terms of both number of participants – almost 2.800 millennials – and ideas gathered – more than 11.000 (as the pilot edition, it has been established that each participant could propose more than one idea). A quantitative analysis was carried out to disclose the most common insights and ideas that the crowd refer to the car of the future. Contemporarily, FCA top managers involved in strategic planning, product planning, engineering and R&D, carried out a qualitative analysis. According to the principles of originality, feasibility and sustainability, FCA top managers were involved in the identification of innovative insights and ideas. Over the pilot edition, participants were 500 and FCA top managers selected 40 innovative ideas. Over the second edition, participants were over 1,300 and FCA top managers selected 150 innovative ideas. Eventually, over the third edition, participants were 1,000 and FCA top managers selected 200 innovative ideas. As underlined by FCA top managers, the amount of incoming responses was not established a priori. FCA top managers classified proposed ideas as innovative or not. The company adopted this approach to bring in all the innovative insights and ideas provided by millennials.

Phase 2. After identifying innovative insights and ideas proposed by millennials, FCA top managers were directly involved in their selection. Of course, as expected, this stage of the OIP is very critical. Over this stage, in fact, FCA top managers evaluated all the innovative insights and ideas and because of their background, skills, capabilities, competencies and ability to foresee future strategies, they could select insights and ideas that were more innovative than the other ones and that – hopefully – could be considered for further developments. This means that a comparative selection was carried out.

Over this phase, FCA top managers adopted a different approach from the one held in Phase 1. In this case, in fact, the amount of innovative insights and ideas to be selected was predetermined. Over the pilot edition, they selected 12 insights and ideas. Over the second and the third editions, they decided to select 18 insights and ideas.

Phase 3. Over this phase, FCA top managers invited the millennials proposing the selected ideas (12 people in the pilot edition, and 18 in the second and the third editions) to present and defend them over dedicated sessions with FCA product planning team and Fiat Research Centre (CRF) top managers.

Before planning and organizing these dedicated sessions, FCA top managers were aware of both obstacles and potentialities that could arise. Obstacles were linked to the differences occurring between proponents and FCA product planning team and CRF top managers. FCA top managers were conscious that huge obstacles – linked to different roles (university students vs R&D officers), ages (millennials vs elder people), backgrounds (university students vs graduated or Ph.D.), experiences (students vs officers) and languages (common vs specific/engineering terminology) – could characterize dedicated sessions. Anyway, they wanted millennials to face them. The reason was to test the potentialities that could derive. In the FCA top managers' view, innovative insights and ideas that could overcome the above difficulties were really innovative and so it was worth focussing on them.

Over this phase, FCA product planning team and CRF top managers have tested robustness of millennials' insights and ideas to try to work on them and implement them in the company.

Phase 4. After the dedicated sessions, FCA top managers, FCA product planning team and CRF top managers selected the best insights ideas. In particular, on the hand FCA top managers selected the best ideas whose proponents had the opportunity to make an internship at FCA. Over the pilot edition, FCA top managers selected four winners. Over the second and the third edition, FCA top managers selected six winners each. Contemporarily, on the other hand, FCA top managers selected the ideas that could fit with already started or potential R&D projects managed by FCA. As already said (see Phase 1 above), per each year a quantitative analysis was carried out to disclose the most common insights and ideas that the crowd refer to the car of the future. The most common ideas deal with:

- The emotional car, which uses recent advancements in sensors to monitor emotions (this car can recognize drivers' emotional state to automatically play the playlist most fitting with their emotions).
- A car that memorizes how drivers behave in their cars – i.e. if they exceed the speed limit, if they are distracted and so their cars swerve – and, once arrived at destination, on the car display it is summarized the correct/incorrect drivers' behaviour so that they can improve their driving performance and risk less.
- An advanced cloud system that can improve safety and performance while driving.
- A technological windscreen on which holograms can be projected and news can be read without diverting attention.

- A pet-friendly car equipped with dedicated tools that can make pets' transportation more comfortable.
- A she-car that can satisfy the women's needs (a drawer for makeup or a compartment for accessories).

Phase 5. The ideas that could fit with R&D projects managed by FCA were handled by FCA product planning team and CRF top managers. These officers had to test if and to what extent innovative insights and ideas could be incorporated in R&D projects to improve or enrich achieved results and make the car of the future more similar to the expectations of millennials. In reference to this aspect, up to now (September 2018), we have information about important results achieved. CRF top managers officially declared that some of the innovative insights and ideas have been already implemented. Software that might stand for security intelligence of cars has been developed and incorporated in a project called Panda SIM – where SIM stands for simulation. Ideas and insights about an advanced cloud system have been developed for Panda Waze that is a social car, always connected. Other ideas are under evaluation. In particular, under the supervision of FCA top managers involved in strategic planning, some engineers involved in product planning are working on a system through which the car can memorize how drivers behave in their cars to reveal the correct/incorrect drivers' behaviour, on an advanced cloud system. In addition, they are working on the development of a technological windscreen. Other engineers involved in R&D activities are trying to develop the idea of the emotional car. Eventually, marketing managers involved in market analysis are collecting consumers' comments about a pet-friendly or a she-car. Of course, CRF top managers strongly invited us to think about the time-span that is necessary to introduce innovations in the automotive industry: several security controls and a severe regulation necessarily delay the time to market of innovations (Rubenstein, 2014). The fact that FCA top managers have launched and implemented a second and a third edition of I AM FCA means that they are satisfied with the project and that they are collecting innovative insights and ideas about the car of the future.

5. Findings and discussion

The above listed activities carried out by FCA over three editions of its OIP can be framed and interpreted from a knowledge-management perspective. In particular, the contribution authored by Zahra and George (2002) is recalled and adopted herein. As already said, the scholars talk about PACAP and RACAP. In particular, by PACAP they refer to the acquisition and to the assimilation of external knowledge; by RACAP, instead, they refer to transformation and exploitation of absorbed knowledge. In the present paper, attention is paid on the four phases knowledge goes through (acquisition, assimilation, transformation and exploitation) that constitute PACAP and RACAP.

For a start, attention is focussed over the phase of knowledge acquisition (Yli-Renko *et al.*, 2001; Rusly *et al.*, 2015). Generally speaking, knowledge acquisition consists in recognizing knowledge created from other/external sources and trying to decode it to realize if it can be useful for the company. In this vein, a short note about characteristics and size of involved crowd is necessary. If the target is copious and heterogeneous, then there is the risk of addressing wrong innovative paths. At the same time, if the target is homogeneous and narrow, then group thinking prevails and no robust results are achieved (Hopkins, 2011; Phillips, 2011). In both the cases, there is a high risk that responses (i.e. provided information and knowledge) do not concern the topic of the OIP. Accordingly, companies need to manage this phase in a proper way to reduce the above risk.

The second phase of Zahra and George's (2002) contribution deals with assimilation. Generally speaking, the aim of this phase is to test if external knowledge previously acquired can fit in with internally generated knowledge without modifying this last one. Top

managers need to be aware of the state-of-the-art of innovation in their companies and in the industry they are in, so that they can evaluate the more or the less innovative insights and ideas.

At this stage, some reflections about the role of PACAP (comprehending acquisition and assimilation of knowledge) in OIPs can be presented and discussed. FCA top managers did not aim to acquire all the insights and ideas proposed by the crowd. Some of them, in fact, were not innovative enough. An *ex post* evaluation confirmed that they were similar to the innovation standard already widespread on the market or they were not referable to the automotive industry in a proper way. Accordingly, a selection (meant as a kind of pre-assessment) was useful to focus attention only on innovative insights and ideas. To reduce the risk of choosing a wrong selection criterion, FCA top managers just decided to adopt a dichotomous one: insights and ideas were classified as innovative or not. Over the three editions, FCA top managers have received an increasing number of acquirable insights and ideas and they have been involved in determining if these insights and ideas could be useful for the company (see *Phase 1* above). FCA top managers collected and evaluated all the innovative insights and ideas proposed by millennials without predetermining the amount of innovative ones. These were considered as such if they were original, feasible and sustainable.

Over the knowledge assimilation phase, instead, FCA top managers' approach radically changed. As already said, the aim of knowledge assimilation was to test if external knowledge previously acquired could fit in with internally generated knowledge without modifying this last one. Thus, before starting this phase, FCA top managers already predetermined the amount of insights and ideas they wanted to get to. Of course, this choice was not arbitrary but based on the idea that R&D efforts need to be addressed only towards feasible projects. According to this, FCA top managers carried out a comparative selection between ideas (see *Phase 2* above). In this vein, knowledge assimilation represents a bottleneck.

According to the above, the role of PACAP – based on the criteria of originality, feasibility and sustainability over the acquisition phase and based on background, skills, capabilities, competencies and ability to foresee the future over the assimilation phase – radically changes.

At this stage, it is possible to move attention towards the transformation phase, the third phase proposed by [Zahra and George \(2002\)](#). Over this phase, in-bound knowledge is turned into new knowledge deriving from mixing in-bound and internal generated ones ([Jang et al., 2002](#)). The role of FCA product planning team and CRF top managers in discussing innovative insights and ideas and the role of FCA top managers, FCA product planning team and CRF top managers in selecting insights and ideas that could fit with already started or potential R&D projects managed by FCA are of crucial importance to transform knowledge ([Del Giudice et al., 2015](#)). The more effective is this phase, the easier is the fourth phase, concerning exploitation of knowledge.

Over the last phase, i.e. exploitation of knowledge, after testing if and to what extent innovative insights and ideas could be incorporated in R&D projects, FCA product planning team and CRF top managers try to make the car of the future more fitting with expectations of millennials.

Some reflections about the role of RACAP (including transformation and exploitation of knowledge) in OIPs can be presented and discussed. FCA top managers, FCA product planning team and CRF top managers aimed to turn in-bound knowledge into new knowledge. To be effective, FCA top managers decided *ex ante* the amount of insights and ideas eligible for transformation. By classifying insights and ideas on the bases of their level of fitting, FCA top managers wanted to ensure that the most fitting ones could be selected (see *Phase 3* and *Phase 4* above). In reference to the OIP managed by FCA, knowledge

transformation stands for a bottleneck. Again, FCA top managers determined *a priori* the amount of insights and ideas to be considered.

Over the knowledge exploitation phase, FCA top managers' approach changed again. In this case, FCA product planning team and CRF top managers did not determine *a priori* the amount of insights and ideas to exploit even if – by definition – it is destined to decrease dramatically. For sure, some innovative insights and ideas have been already implemented (see *Phase 5* above). Of course, still others might be implemented. In reference to this, it is important to underline that carmakers require long time to exploit innovations. This means that in-bound knowledge can be acquired, assimilated and transformed into new one, but it is not possible to know in advance if and when it might be actually exploited. Again, and for sure, the fact that two other editions of the OIP have been launched means that FCA considers this a promising way towards innovation.

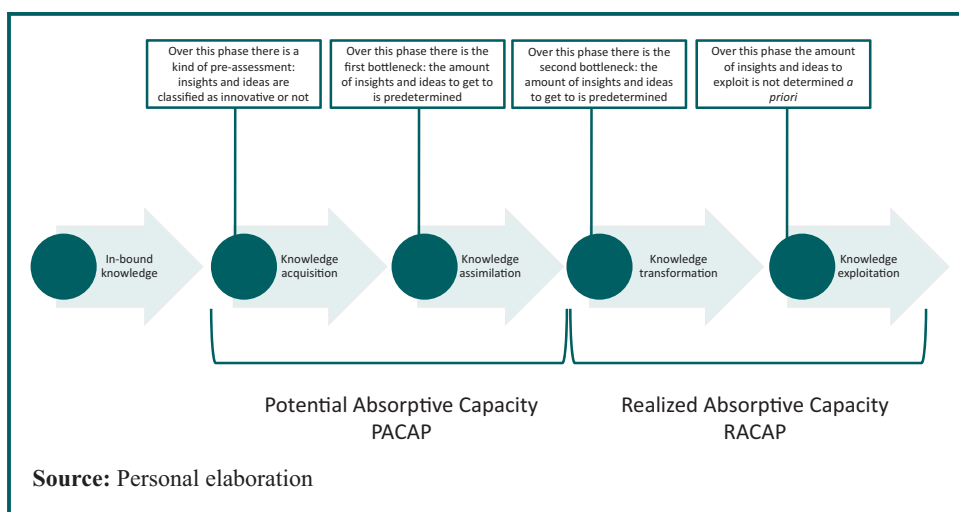
According to the above, also the role of RACAP – based on background, skills, capabilities and competencies of FCA product planning team and CRF top managers over the transformation phase and based on the possibility to fit ideas with R&D projects over the exploitation phase – changes over the phases in a radical way.

F2 The most critical aspects of the process routinized by FCA are shown in [Figure 2](#), which recalls [Figure 1](#).

Results deriving from the case study need to be properly commented to overcome possible misunderstandings that might derive from the use of this methodology ([Flyvbjerg, 2006](#)). In particular, comments deal with the way absorptive capacity positively improves innovation outcomes – in particular, in the automotive industry, quality of innovative ideas is more relevant than speed and frequency ([Zobel, 2017](#)).

The process that comes out from FCA case study is not a mechanical sequence of activities and actions. It stands for a true social integration mechanism that – by putting together different skills and capabilities related to innovation, marketing and strategies, by carrying out planning activities and analysis of feedback and by combining internal and external competences – discloses the FCA whole procedure of absorption capacity ([Spithoven et al., 2011](#); [Cepeda-Carrion et al., 2012](#)). Each of the components of this mechanism (above all we refer to human factor) plays a specific role that is not mechanical but is

Figure 2 The most critical aspects of the knowledge process routinized by FCA



symbiotic. If not all the components are managed as a whole, then results will be totally different (in a negative way) from expected ones.

6. Conclusions

The longitudinal case study presented above and concerning I AM FCA, the OIP launched by FCA over the years 2016, 2017 and 2018, has allowed rebuilding the role of absorptive capacity when companies try to exploit in-bound knowledge within OIPs. Authors like [Huizingh \(2011\)](#) have already concluded that case study research is very useful, as it increases our understanding of how things work, and it enables us to identify important concepts and phenomena.

Of course, this paper has some limitations that need to be highlighted before concluding. It is hoped that management scholars can read these limitations as possible hints for future research.

The first limitation deals with methodology adopted. A longitudinal case study was chosen as authors were directly involved in the OIP. This gave access to lots of information. Despite this, and in line with prominent scholars ([Dyer and Wilkins, 1991](#); [Eisenhardt and Graebner, 2007](#)), readers need to be aware of obstacles concerning the generalization of achieved results and the proposal of a general theory or model starting from a single case study. In this sense, future research should be followed by quantitative studies involving larger samples in various industries and countries.

A second limitation deals with the industry the company works in. As emerged from the case study, the fact that a small amount of in-bound knowledge turned into innovation needs to be carefully examined. It does not necessarily depend on the scarce level of innovation of in-bound ideas. Rather, it seems to depend on the fact that complex and radical innovations in the automotive industries can take a long time to be introduced. This is a limitation that – however – does not impact generalization of achieved results. The bottlenecks determined by FCA managers – in fact – still keep their validity in reference to absorptive capacity that companies need to develop.

Despite the above limitations, the FCA case study discloses some intriguing results concerning the mechanisms or paths that companies promoting OI can adopt to absorb and exploit in-bound knowledge, i.e. the research question at the basis of this paper.

Over the acquisition phase, PACAP has a prominent role since it allows identifying innovative ideas. The criteria adopted by FCA top managers (i.e. originality, feasibility and sustainability) are widely known but – in this case – they are strictly referred to the automotive industry. They have a role of filter, as they allow distinguishing innovative from non-innovative ideas. According to this, FCA decided not to predetermine the amount of innovative ideas to identify.

Over the assimilation phase, the role of PACAP acquires more and more importance. Comparative evaluations, in fact, require a deep and careful evaluation that needs to be based on background, skills, capabilities, competencies and ability to foresee the future. In this case, the choice of predetermining the amount of more innovative ideas – a bottleneck within the process – is necessary to focus subsequent efforts.

Over the transformation phases, the role of RACAP is crucial. Over this phase, in fact, FCA product planning team and CRF top managers select the most innovative ideas that might fit with FCA R&D projects (already started or potential). Again, the choice of predetermining the amount of the more innovative ideas – another bottleneck within the process – is central to proceed with the possible exploitation.

Eventually, over the exploitation phase, the role of RACAP seems to decrease since the match with R&D projects can be postponed because of several reasons. This result seems

to confirm that, as highlighted by [Laursen and Salter \(2006\)](#), wide and deep search of external ideas is curvilinearly related to innovation performance.

In reference to FCA case study, the role of PACAP and RACAP seems to achieve its pick over the assimilation and the transformation phase when FCA top managers have predetermined the amount of innovative ideas they wanted to get (bottlenecks). Accordingly, background, skills, capabilities, competencies and ability to foresee the future of FCA top managers and background, skills, capabilities and competencies of FCA product planning team and CRF top managers are of crucial relevance to make the OIP successful.

Starting from the above, management scholars could try to investigate if and to what extent the dynamics taking place in a big company working in the automotive industry are similar the ones of other companies in other industries. This might be useful to compare OIPs in reference to different kinds of companies (depending on the size) and to different industries (more or less innovative).

At this stage, some managerial implications can be advanced. The first one deals with human dimension of OI ([Del Giudice et al., 2018](#)). In line with this, and in reference to other previous studies ([Jansen et al., 2005](#); [Camisón and Forés, 2010](#)), PACAP (held by top managers) and RACAP (held by product planning team and research officers) are heterogeneously deployed inside companies. Managers are expected to be aware of this, as it can disclose a gap between expected and achieved results when implementing and managing OIPs. This evokes further contributions by management scholars to investigate, in a more appropriate way, the role that absorptive capacity – both PACAP and RACAP – can have within OIPs ([Lowik et al., 2017](#); [Wang et al., 2017](#)).

A second managerial implication deals with innovative performance (depending on absorptive capacity) of OIPs ([Ahn et al., 2016](#); [Ali et al., 2016](#)). The role of absorptive capacity within OIPs is not relevant if it does not drive companies to achieve better performances in terms of innovation and – in turn – of economic results. According to this, managers must see acquisition, assimilation, transformation and exploitation of knowledge as habitual activities or recurrent practices that take place at both individual and organizational levels.

A third managerial implication deals with institutionalization of OIPs. If positive innovative performances are achieved, then managers should aim to reconfigure the knowledge capacities of the companies they work for to acquire, assimilate, transform and exploit external knowledge in an organized way. In other words, managers should aim to develop a systematic openness ([Lichtenthaler and Lichtenthaler, 2009](#)) that could really favour the incoming of external knowledge.

Future directions of research might concern OIPs managed by other companies, working in different countries and industries and involving dissimilar targets. This might add new insights, by corroborating or denying achieved results, about the process through which companies can absorb in-bound knowledge when managing OIPs. Contemporarily, another point of future research is to analyse the OI from inside-out perspective. In other words, OI requires organizations to allow unused and underused knowledge to go outside of the organizations for others to use in their products or services.

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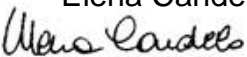
La sottoscritta Elena Candelo nata a Torino il 24 giugno 1971 e residente in Via Evangelista Torricelli 48 – 10129 Torino, in qualità di coautore dell'articolo "Absorbing in-bound knowledge within open innovation processes. The case of Fiat Chrysler Automobiles", in *Journal of Knowledge Management*, Vol. 23, Issue 4, pp. 786-807, ISSN 1367 – 3270, <https://doi.org/10.1108/JKM-10-2018-0625>, consapevole della responsabilità cui può andare incontro in caso di dichiarazione mendace o di esibizione di atto falso o contenente dati non più rispondenti a verità nonché delle sanzioni penali richiamate dall'articolo 76 del D.P.R. n. 445/2000, per le ipotesi di falsità in atti e dichiarazioni mendaci;

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Io sottoscritta ELENA CANDELO nata a Torino il 24 giugno 1971 e residente a Torino in via Torricelli 48, in qualità di coautore dell'articolo Matricano D., Candelo E., Sorrentino M., & Martinez Martinez A. (2019), "Absorbing in-bound knowledge within open innovation processes. The case of Fiat Chrysler Automobiles", in *Journal of Knowledge Management*, Vol. 23, Issue 4, pp. 786-807, ISSN 1367–3270, <https://doi.org/10.1108/JKM-10-2018-0625>, consapevole della responsabilità cui può andare incontro in caso di dichiarazione mendace o di esibizione di atto falso o contenente dati non più rispondenti a verità nonché delle sanzioni penali richiamate dall'articolo 76 del D.P.R. n. 445/2000, per le ipotesi di falsità in atti e dichiarazioni mendaci;

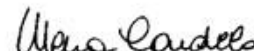
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DICHIARO

che seppur frutto di un lavoro congiunto sono a me attribuibili i paragrafi 2 Literature review: subsection 2.2 "Absorptive capacity" e 2.3 "Linking absorptive capacity, knowledge management and open innovation"; 3. "Research methodology" e 6. "Conclusions".

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