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Augmenting learning processes of absorptive capacity for innovation: Insights for effective leadership within global pharmaceutical companies

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Abstract
Absorptive capacity (AC), which comprises exploratory, transformative, and exploitative learning processes, enables organizations to exploit external knowledge for adopting innovation. Despite extensive research into AC, leadership styles have received little attention. This paper discusses the results of a study undertaken in three pharmaceutical organizations that augments AC theory relating to top- and middle-level management behaviour. The findings suggest that the influence of transformational and transactional leadership styles varies between the AC learning processes within and across organizations. We also explored CEOs' knowledge, trust in middle management, and intention towards sharing knowledge, which facilitate the learning processes. The research has implications for the enhancement of opportunities to enable successful innovations based on the recognition of leadership styles and managers' roles. We report several novel contributions that are of value to academics and practitioners.

KEYWORDS
absorptive capacity, innovation, leadership, organizational learning

INTRODUCTION

Leadership is considered one of the main factors that facilitate absorptive capacity (AC) learning processes and innovation (Darwish et al., 2020; Méndez et al., 2018; Naqshbandi & Tabche, 2018; Rezaei-Zadeh & Darwish, 2016; Sun & Anderson, 2012). AC refers to the organizational potential to identify, absorb, and implement external knowledge for commercial outcomes such as innovation (Cohen & Levinthal, 1990). Organizations rely more on external knowledge for innovation because of increasing competition (Chesbrough, 2003; Laursen & Salter, 2006). Therefore, organizations invest heavily in developing their capabilities, particularly their AC (Lichtenthaler & Lichtenthaler, 2009).

It is widely argued that the influence of leadership on AC and innovation goes beyond one level (Yukl, 2009). This is particularly important as the development of organizational knowledge, which is an outcome of organizational learning processes, depends on top and middle managers' leadership behaviours (Nonaka, 1994). Top and middle managers are leaders in organizations: top managers are leaders of entire organizations, and middle managers are leaders of their own departments.

Despite the significant contributions of past studies on the influence of leadership on AC and innovation, it is evident that they focus mainly on transformational leadership. Transformational leadership is defined as the type of leadership that strengthens collective interest in achieving common goals (García-Morales et al., 2012). This stream of research suggests a positive relationship between transformational leadership and innovation and between transformational leadership and AC learning processes (e.g., Jung et al., 2003, 2008; García-Morales et al., 2008a, 2012; Gumusluoğlu & Ilsev, 2009; Sun & Anderson, 2012; Méndez et al., 2018). The transformational leadership style is considered to be the opposite of the transactional leadership style. Transactional leadership refers to a type of leadership that sets goals and controls the organization's progress towards them to ensure the fulfilment of leaders' interests (Bass & Avolio, 2000). Accordingly, most of the existing research assumes that showing the influence of the transformational leadership style on AC means that the transactional leadership style

does not facilitate AC. Few recent studies have suggested that the effective management of AC learning processes and innovation requires a combination of both transformational and transactional leadership styles (e.g., Sun & Anderson, 2012; Waddell & Pio, 2015).

These conflicting views indicate the need for further investigation into transformational and transactional leadership styles to see how they facilitate AC learning processes. We suggest that the problem that hinders researchers' attempts to resolve these conflicting views is that they do not explore the influence of leadership on organizational outcomes, particularly on innovation, when studying AC learning processes. To address this problem, we suggest that researchers should not limit their studies to strategic leaders: they should also consider the organizational context for innovation.

Innovation occurs within organizations through either the adoption or the generation of creative ideas (Damanpour & Wischnevsky, 2006; Gopalakrishnan et al., 2010), and it has been consistently regarded as critically important to organizational effectiveness and performance (Damanpour & Wischnevsky, 2006). It is suggested that pursuing innovation through adoption enables organizations to access external sources of innovation (Crossan & Apaydin, 2010). It is apparent that organizations prefer to adopt innovation, which is driven by the availability of external knowledge (Gopalakrishnan & Bierly, 2001; Laursen & Salter, 2006). Therefore, we seek to explore how leaders facilitate AC learning processes within the innovation adoption context by focusing on the transformational and transactional leadership of top and middle managers. This approach is different from variance model that emphasis conceptual constructions that relate variables to one another, we adopt a process view that explores how phenomena emerge, evolve or terminate over time through activities and events (Cloutier & Langley, 2020; Langley, 1999). Such process research, which view AC as a process by which objectives become sequential, is essential to understand how external knowledge is realized through a set of actions (Cloutier & Langley, 2020; Darwish et al., 2020). Consequently, our motivation to conduct this research is the desire to integrate transformational and transactional leadership to explore the roles of top and middle leaders in facilitating the learning processes associated with AC. Recently, researchers have recommended cooperating transformational and transactional leadership when studying the influence of leadership on AC learning processes (Sun & Anderson, 2012; Darwish et al., 2020) but there is limited evidence of this approach. It has been noted, for example, that the combined influence of different managerial levels has received little attention. It is widely argued that leadership goes beyond one level (Yukl, 2009) and that the facilitation of learning processes depends on different leadership styles (Vera & Crossan, 2004). Therefore, we focus on both top and middle managers in this respect.

To explore the role of top and middle managers, we studied three pharmaceutical companies through interviewing managers and conducting observations. Documents were also analysed from sources of secondary data. Our outline findings indicated that both transformational leadership and transactional leadership influence the learning processes of AC. We explored three mechanisms that facilitate their influence. Our findings have contributed to our knowledge by showing how the roles of top and middle managers differ across the learning processes of AC, while certain managers have more influential roles. We have also contributed to the extant literature by revealing three mechanisms that moderate the leadership effects. Detailed explanation of our research theoretical background, method, findings, and contributions is provided in the following sections.

THEORETICAL BACKGROUND: AC AS LEARNING PROCESSES

Zahra and George (2002) identify that AC is a type of dynamic capability. Dynamic capabilities are organizational processes that enable organizations to modify, change, delete, enhance, or reconfigure their resources (Ambrosini & Bowman, 2009). Zahra and George's model broadly categorizes its processes as potential and realized AC. Potential AC enables organizations to value, acquire, and assimilate external knowledge, while realized AC facilitates transformation and the implementation of external knowledge for innovation. The linear relationship between the processes of AC has been criticized by Todorova and Durisin (2007). They suggest that the assimilation and transformational stages are not sequential but rather substitute each other. Proponents of Zahra and George's model argue that organizations analyse, comprehend, understand, and codify external knowledge before acquiring knowledge (e.g., Camisón & Forés, 2010). From this point, they support the linear relationship between potential and realized AC. It is suggested that the performance of learning processes facilitates the imitation and development of dynamic capabilities (Helfat & Peteraf, 2003). Accordingly, AC can be defined and conceptualized as learning processes, namely exploratory, transformative, and exploitative (Lane et al., 2006; Lichtenthaler, 2009). The main advantage of defining AC as learning processes is that it settles the challenge and disagreement about the construct. Moreover, it shows how the learning processes perform at the individual, group, and organizational levels.

The exploratory learning process occurs at the individual and group levels (Sun & Anderson, 2010, 2012). At an individual level, the exploratory learning process is enacted through the generation of initiatives and individual discussion of the acquired and simulated knowledge (Sun & Anderson, 2012). Prior market and technological knowledge are essential for the exploratory

learning process to occur (Lichtenthaler, 2009; Schweisfurth & Raasch, 2018). Market knowledge is important because organizations search for external knowledge in order to exploit competitive opportunities (Todorova & Durisin, 2007). Technological knowledge is essential because it determines the external knowledge sources and enables its assimilation for action (Zahra & George, 2002).

When organizations have no prior knowledge, they rely to a great extent on intermediaries for innovation (Kokshagina et al., 2017). Intermediary organizations provide solutions to knowledge seekers by searching for external knowledge and facilitating its acquisition from innovator firms (Hallerstede, 2013). We therefore expect to find that top and middle managers contribute not only as facilitators but also as participants because of their market and technological knowledge.

The transformative learning process connects exploratory to exploitative learning. The transformative learning process happens through interaction between individuals across organizations (Crossan et al., 1999; Sun & Anderson, 2010). The interaction between individuals during the transformative learning process enables organizations to combine newly acquired knowledge with internal organizational knowledge (Lane et al., 2006). Assimilation and transformation capabilities facilitate the transformative learning process. Assimilation capability enables organizations to combine externally acquired knowledge with organizational knowledge by slightly changing their knowledge structures, while transformative capability allows organizations to add external knowledge that does not fit easily into their knowledge structures (Todorova & Durisin, 2007). Distinguishing between assimilation and transformation capabilities demonstrates that organizations may add newly acquired knowledge to their existing portfolios of experience.

The exploitative learning process enables organizations to use combined knowledge in order to create new organizational knowledge and to achieve their commercial objectives, particularly in the context of products and services (Lane et al., 2006). Organizations ensure the reuse of knowledge during the exploitative learning process as combined knowledge is implemented at this stage (Lane et al., 2006; Sun & Anderson, 2010). This perspective illustrates the exploitative learning process is similar to exploitation capability. Exploitation capability enables organizations to frequently implement recently acquired knowledge over a certain period of time (Sun & Anderson, 2010, 2012). Reuse of knowledge means repeatedly doing activities in a similar pattern, which highlights the importance of organizational routines. Feldman (2000, p. 611) defines organizational routines as "repeated patterns of behaviour that are bound by rules and customs and that do not change much from one iteration to another".

Since middle managers are more involved with daily activities in an organization, they have important roles during the transformative and exploitative learning processes. Their technological knowledge helps them to assimilate and/or transform external knowledge and combine it with organizational knowledge. Moreover, they can directly control the constant application of the new knowledge due to their positions. Top managers can facilitate the transformative learning process by supporting middle managers. However, because of their position, they do not involve themselves excessively in daily activities. We therefore expect to see that they do not have a direct influence on the exploitative learning process.

LEADERSHIP AS FACILITATOR OF INNOVATION AND AC

Leadership facilitates innovation and AC (Darwish et al., 2020; Méndez et al., 2018; Naqshbandi & Tabche, 2018; Rezaei-Zadeh & Darwish, 2016; Sun & Anderson, 2012). Leaders increase innovation in several ways. Their support in the early stages of innovation promotes creativity. They also facilitate interaction by enhancing effective communication between employees. Finally, they create conditions to implement innovation successfully. Converting individual learning to organizational knowledge relies, to some extent, on leaders because they can facilitate the communication, sharing, and transfer of knowledge (Cohen & Levinthal, 1990; Naqshbandi & Tabche, 2018; Rangus & Černe, 2019). Leaders facilitate employees' interactions to increase knowledge absorption, and this allows the development for understanding external knowledge (Van den Bosch et al., 1999). Further, a recent study shows a positive relationship between employee involvement in innovation activities and increasing organizational AC (Rangus & Slavec, 2017). Managerial leaders may act as organizational gatekeepers in order to establish the relationship between internal and external sources of knowledge (Cohen & Levinthal, 1990). At the middle level, they can become change agents to enhance AC (Jones, 2006).

It is suggested that leadership is a component of organizational management because organizational performance relies upon its effectiveness (Bedeian & Hunt, 2006). The term leadership styles and management styles can be interchangeably used (Berson et al., 2006). For example, transactional leadership style can be considered as management approach because this leadership style emphases on control, planning, and guiding followers. Accordingly, we consider an overlap between leadership and management to study the influence of leaders on AC.

AC studies have extensively used the terms innovation, innovation performance, and organizational

innovation. However, there is no clear evidence in AC studies of how top and middle management leadership enhances innovation adoption. These studies do not consider the type of organization. Innovation-adopting organizations follow structured and linear stages (Damanpour & Schneider, 2006). We consider adopting organizations because they implement external knowledge to innovate (Damanpour & Schneider, 2006).

In order to facilitate innovation adoption, and because of their position, top managers provide access to the external environment (Cohen & Levinthal, 1990). Meanwhile, middle managers transfer their learning from interaction with the external environment within and across their organizations because they directly manage operational activities (Sun & Anderson, 2012). To date, few studies have considered the roles of both top and middle management leadership in facilitating the learning processes of AC. To our knowledge, this is the first study that has highlighted the importance of "type" of organization in studying the influence of AC on innovation. Consideration of the type of organization was originally suggested by Damanpour & Schneider (2006).

TRANSFORMATIONAL VERSUS TRANSACTIONAL LEADERSHIP EFFECTS ON AC

Leadership style refers to attitudes and behaviours that are constantly performed by managers (Bass, 1995). The transformational leadership style has a significant positive impact on innovation and AC (García-Morales et al., 2008a). Through this approach, leaders encourage and improve individuals' performance by transforming followers' personnel values and moving their needs to a higher level (Bass, 1995; Jung, 2001). The transformational leadership style involves four behavioural patterns: (1) idealized influence (or charisma), which brings trust, respect, and admiration; (2) inspirational motivation, which provides encouragement by communicating an interesting vision; (3) intellectual stimulation, which allows individuals to think about organizational problems in a new way; and (4) individualized consideration, which values individuals' needs for growth and achievement (Bass et al., 2003). These four behavioural patterns encourage employees to participate in all aspects of organizational objectives and challenges (García-Morales et al., 2008b).

There is a dichotomy between transformational and transactional leadership, as proposed by Bass (1995). The relationship between transformational leadership and innovation, it is argued, is mixed (Rosing et al., 2011). The transactional leadership style involves two behaviours: (1) contingent recognition, where leaders clarify what reward individuals will receive; and (2) management by expectation, where leaders specify tasks, control activities closely, identify the consequences of failure, and occasionally penalize unfulfilled objectives (Bass et al., 2003). The assumption is that the transformational leadership style is more effective than the transactional leadership style because it has a more positive influence on performance (Bass & Avolio, 2000) and is more adaptive to environmental change (Jung et al., 2008).

It is suggested that transformational leadership increases performance by enhancing knowledge and innovation (García-Morales et al., 2008a). Transformational leadership influences organizational knowledge absorption through R&D investment and by changing organizational structure in such a way that it can meet the strategic requirements for learning (Cohen & Levinthal, 1990; Van den Bosch et al., 1999). This gives employees freedom and fosters communication for knowledge sharing (Cohen & Levinthal, 1990), which enhances knowledge creation (Nonaka & Takeuchi, 1995). It is also shown that the influence of transformational leadership on innovation is greater when leaders control the financial and technical support they receive beyond their organizational boundary (Gumusluoğlu & Ilsev, 2009).

Both transformational and transactional leadership styles influence the learning processes of AC (Sun & Anderson, 2012; Waddell & Pio, 2015; Darwish et al., 2020), as organizational activities are different for each learning process (Lane et al., 2006; Cepeda-Carrion et al., 2012). Leaders should clearly encourage flexibility and creativity and consider ordering, controlling, and stabilizing the learning processes (Waddell & Pio, 2015). Leadership is a component of organizational management because organizational performance relies on its effectiveness (Bedeian & Hunt, 2006). The terms leadership style and management style can be used interchangeably (Berson et al., 2006). For example, the transactional leadership style can be considered a management approach because this leadership style emphasizes control, planning, and guiding followers. Accordingly, we consider the overlap between leadership and management in our model. This has enabled us to investigate both transformational and transactional leadership styles at top and middle management levels.

The transformational leadership style influences AC and innovation (Darwish et al., 2020; Flatten et al., 2015; García-Morales et al., 2008a; Méndez et al., 2018; Sun & Anderson, 2012; Waddell & Pio, 2015). However, prior studies have paid little attention to AC processes (Easterby-Smith et al., 2008a), namely its learning processes. There are a few exceptional studies that have researched its processes. For example, Jones (2006) shows that newly hired middle managers act as change agents for facilitating AC learning processes. Easterby-Smith et al. (2008a) report that gatekeepers and boundary spanners evolve AC processes. They argue that allocating tasks, monitoring employees, and

communicating knowledge facilitate knowledge transfer and assimilation through the people who collaborate in a network (Müller-Seitz & Güttel, 2014). However, as noted, previous studies have not investigated the influence of both top and middle managers on the learning processes of AC. Investigating this issue is important as learning is essential for innovation adoption (Weerawardena et al., 2006).

Sun and Anderson (2012) demonstrate the influence of both top and middle managers on the learning processes of AC. They show that a transformational leadership style from top and middle managers facilitates the exploratory learning process; a transformational leadership style from top managers facilitates the transformative learning process, when middle managers display a transactional leadership style; and a transactional leadership style from top and middle managers facilitates the exploitative learning process.

The weakness of Sun and Anderson's model is their limited empirical evidence as their results come from a single case study. Findings from a case study may not be applied to similar cases as this method is suitable for investigating rare cases only (Yin, 2009). Moreover, Sun and Anderson do not consider the influence of the organizational context on the learning processes of AC on organizational ends such as innovation.

Innovation-adopting organizations have not received much attention in the AC research stream. Most studies do not identify the type of innovation, or they focus on innovation-generating organizations (Easterby-Smith et al., 2008a). For example, Sun and Anderson (2012) explore the role of leadership in AC for innovation but they do not mention which type of organizational innovation they are researching. Because innovation adoption involves different processes from those of innovation generation, we focus on the innovation-adopting context, aiming to understand the roles of top and middle managers and their influence on AC learning processes. Such an approach may address the criticism voiced by other scholars (Felin & Hesterly, 2007; Nag & Gioia, 2012) who claim that the study of knowledge-based capabilities in organizations is overly collective in its treatment. Specifically, they call for more process-oriented investigation of how individual drivers of knowledge based value, "Thus opening up the proverbial black box of the firm by explicating the underlying a priori capabilities and knowledge of the individuals involved provides a natural starting point and micro-foundation for explaining the creation of new value" (Felin & Hesterly, 2007, p. 213).

In order to address this research gap, we aim to ask the following question: *How do top and middle managers facilitate the learning processes of AC in innovation-adopting organizations?*

RESEARCH METHOD

The literature review revealed that methodological problems have prevented existing studies from fully investigating the influence of both transformational and transactional leadership styles on the learning processes of AC. Most AC studies have followed a quantitative research strategy, which has prohibited the development of AC theory because it is more appropriate for testing than for improving a theory (Darwish et al., 2020: Easterby-Smith et al., 2008a). Easterby-Smith et al. (2008a) suggest that the dominance of qualitative research causes "reification" observation. Lane et al. (2006) have noticed reification in AC due to their focus on technological aspects, particularly on R&D activities. The reification aspect of AC studies hinders the researcher in focusing on its process aspects, such as leadership, as suggested by Easterby-Smith et al. (2008a). Following Easterby-Smith et al.'s (2008b) recommendation, and to increase the external validity of the research, we adopted a multiple case study research design (Eisenhardt, 1989) that is more robust, generalizable, and parsimonious than a single case study approach (Eisenhardt & Graebner, 2007).

The research setting is pharmaceutical companies in Iran. Innovation occurs in forms of adoption in Iran due to government (Ministry of Health and Medical Education) policy that compels pharmaceutical companies to develop medicines from its drug list (World Health Organization, 2014). Obviously, the government has implemented the policy in order to ensure national and public health at an affordable price. The pharmaceutical industry was established in 1920 and dominated by European and American companies for decades (Cheraghali, 2006). After the Iranian Revolution in 1979, most of the pharmaceutical companies were nationalized and the government took ownership. After European and American medicine producers left Iran, pharmaceutical companies faced the challenge of updating their manufacturing technology (Cheraghali, 2006). In this situation, the government began subsidizing the pharmaceutical industry and focusing on the production of generic medicines rather than developing high-tech medicines. After 1984, Iran started privatizing industries such as the pharmaceutical industry. As a result of this privatization policy, Iranian pharmaceutical companies embarked on the development of new medicines through cooperation with international pharmaceutical companies (World Health Organization, 2014). However, due to the lack of intellectual property rights, the advantages of developing new medicines fade quickly and it is not clear how the government plans to enhance competition between firms (Cheraghali, 2006).

On the other hand, the lack of intellectual property rights allows the pharmaceutical companies to produce

medicines without concerns about financial sanctions. Nonetheless, they can only stay competitive by continually launching new medicines to the market (continuous innovation). Moreover, the level of cooperation between Iranian pharmaceutical companies and the global pharmaceutical industry has increased in recent years (World Health Organization, 2014). This highlights the importance of acquiring and using external knowledge. Accordingly, investigation of the influence of leadership styles on the learning processes for innovation augments valuable insights into AC theory.

We conducted a multiple case analysis across three research sites, namely, Phar-X, Drg-Y, and Med-Z, all of which are long-established organizations in the pharmaceutical sector. We considered the number of innovation adoptions when selecting these companies to ensure comparability among them. Companies that are innovative are more capable of acquiring and using external knowledge (Lane et al., 2006; Zahra & George, 2002). Moreover, the scope of our study is about understanding the leadership style behaviours in successful innovative adopting organizations. Innovation adoption can be assessed based on the number of new products that a company adopts and introduces to its market on a yearly basis (Cepeda-Carrion et al., 2012; Daghfous, 2004).

BACKGROUND TO THE CASES

Phar-X was established 50 years ago as a joint venture with one of the largest Western pharmaceutical companies. This company produces solid, liquid, and pre-field syringe medicines. It focuses on developing new generic medicines, especially high-tech medicines. The company has modern technology and highly trained and educated employees, leading to this company's strength in improving current formulations and productions, and developing new medicines under the current management. The CEO has a PhD in pharmacology and is also a university professor. He joined Phar-X five years ago. The middle managers have worked there for an average of seven years.

Since gaining new management, this company has improved its production and capabilities. The quality department is based on the guidelines of the World Health Organization (WHO). These guidelines focus on the principle that quality should be checked during the production process. All processes follow the production relating to a Standard Operating Procedures (SOPs) developed by the quality assurance department.

Drg-Y was founded 60 years ago. This company produces over 140 medicines. It has invested heavily in its R&D and training departments. The number of cooperative projects with international pharmaceutical companies has increased because of the company's strategic planning. This planning focuses on developing employees' knowledge and abilities to enhance innovative capabilities. As a result of innovation activities, Drg-Y has become one of the biggest manufacturers of intravenous antibiotics in Iran. This company exports its medicines to several countries in Asia, Africa, and Europe.

Producing new medicines has been part of Drg-Y's strategy since the new CEO joined the organization seven years ago. The new CEO has a PhD in pharmacology, has been a university professor, and has over 40 years' experience in the pharmaceutical industry. He has invested in production, R&D, and training facilities to improve his employees' knowledge, specifically that of middle managers.

Med-Z was established 20 years ago. Although it is younger and smaller than the other two cases, it has become one of the most innovative companies, and it manufactures more than 100 medicines. This company has invested significantly in its technology and R&D facilities. Producing high-quality medicine and being innovative are two core values in this company. It relies on its experts and produces different forms of medicine including tablets, capsules (including softgel capsules), and injections. This company focuses on developing high-tech medicines such as biotechnology and cancer medicines. It exports to several countries in Asia.

The CEO of this company has a solid background in pharmacology including a PhD in pharmacology. He has 20 years' experience in this field. He has managed Med-Z for six years and expanded the R&D and production sites. The average time that middle managers have worked at Med-Z is six years.

DATA COLLECTION AND ANALYSIS

Before collecting data, we conducted five interviews with two CEOs and three middle managers to evaluate the planned interview process. At the end of each interview, the first author asked questions about the interview questions and the overall experiences of the interviewees. Based on the feedback from the interviewees, we revised the interview questions and ambiguous ones were modified. Then, we asked two interviewees for their comments. After the interview questions were finalized, the first author gained access to three companies through a series of negotiations with the senior managers and the CEOs, which were initially facilitated through his personal contacts. These three companies were different from the ones where we conducted our initial five interviewees, because they refused further data collection from them.

We first reviewed public documents, such as annual reports, financial reports, and organizational websites, about the three case companies to understand their backgrounds and their past success. For example, we looked at the R&D investment in financial documents to evaluate AC of each case as suggested by the researchers such as Cohen & Levinthal (1990). This information helped us to connect with the proposed respondents, thus enabling

an understanding of who to interview, and how to approach the interviewees to build trust with them. It also ensured that the target cases were suitable for our research purpose.

During the field work, we reviewed reports and minutes for business meetings documents. These business reports contain valuable information such as marketing plans, feasibility and case studies. This information helped us to identify the role of managers further in facilitating the learning processes of AC. Business reports provided us with the account of organizational planning and further evidence on how they contribute to the AC processes. Business meeting minutes were also particularly important for an evaluation of the role of managers in the exploratory learning process of AC. This approach allowed us to understand how organizations identify external knowledge sources and how they plan to obtain it.

We then conducted semi-structured interviews and used the same interview protocol for both top and middle managers in order to compare their comments. Interviews were conducted with top and middle managers who were directly involved in innovation activities, such as CEOs and R&D, production, and marketing managers. Additional interviews were conducted with supervisors and other middle managers to understand the influence of top and middle managers' behaviours on learning and innovation activists (See Table 1).

Our research techniques simulated established qualitative research practice. We focused on the "chain of evidence" that would allow others to "follow the derivation of any evidence from initial research questions to ultimate case study conclusions" (Langley, 1999). We also created an event listing to provide insights into "what led to what, and when" (Miles & Huberman, 1994, p. 110), depicting the sequences in which knowledge was managed by the top and middle managers. Data were analysed through NVivo 11. To ground our process study firmly in the phenomenon, we started our analysis by adopting an open coding approach and coded the interviews sentence by sentence in order to identify the themes across informants. Codes that were similar were grouped into first-order categories. The initial codes covered a range of topics including efforts for searching, and interaction among different departments. We then consolidated the first-order categories into the second-order themes. This process helped us to compare and contrast differences within and across interviews. Table 2 provides the cross-case comparisons.

We relied on triangulation of our primary and secondary data to ensure construct validity. We continued this process until all the data were accounted for and no new categories were produced. We then looked for dimensions underlying these categories in order to comprehend how these categories linked together. This enabled us to develop a grounded theoretical framework that linked the various concepts emerging from the data. We then analysed how these categories linked with one another and established conceptual frameworks that captured these links. Although our initial unit of analysis was individual managers, such as top managers and middle managers, it soon became apparent that from the interviews that we were capturing the process that spanned beyond the individual level. The process model emerged from our data thus illustrated how different leadership style performed by top and middle managers that eventually attains an organization-level character. During the data analysis process, we continued to evaluate the data and the emergent structure of theoretical arguments (Miles & Huberman, 1994). After data coding, we tabulated our findings to link leadership to AC learning processes and to see what codes were presented in each AC learning process. It enabled us to develop our narrative from our data to understand how leadership styles facilitated the AC learning processes for innovation adoption. At this point, we closely interrogated the temporal trajectory of firms' absorptive capacity and different leadership styles manifested from top and middle managers. Adhere to process research, we engaged in the "replicating" strategy of temporal bracketing to identify how different leadership styles affect sequential stages of absorptive capacity (Hernes, 2014; Langley, 1999; Tsoukas & Chia, 2002) and iterating through possible models until we arrived at a final process model that could explain the underlying mechanisms (Cloutier & Langley, 2020; Langley, 1999). Figure 1 presents the coding process.

TABLE 1 Research interviewees

	Phar-X	**Drg-Y**	**Med-Z**
No. employees	350	500	200
Interviews	9	11	10
Interviewees	CEO, Factory Manager, R&D manager, Quality Manager, Quality Assurance Manager, Marketing Manager, Production Manager, and 2 Production Supervisors	CEO, Factory Manager, Production Manager, R&D Deputy Manager, R&D Manager, Marketing Manager, Quality Control Manager, Quality Assurance Manager, Industrial Engineering Manager, and 2 Production Supervisors	CEO, Factory Manage, Marketing Manager, Sales Manager, R&D Manager, Quality Control Manager, Quality Assurance Manager, Production Manager, 2 Production Supervisors

TABLE 2 Cross-case comparison and illustrated quotes

Company name			Second-order themes	Illustrative quotes
Phar-X	Drg-Y	Med-Z	Scanning jurisdiction	We have a unit called market evaluation and the pharmaceutical market of the world is controlled there by the internet, and it seeks medicines to be accepted in European and American markets, then they are brought into a committee in order to search, test, and produce. (Factory Manager, Phar-X)
A, B	A, B	A, B		In the modern world, we should search on the internet and study current knowledge and match it with the company to see which know-how is useful for the company and can be used. (CEO, Phar-X)
				The managing director is the point of contact between inside and outside the organization. He acts as an entrance door to the organization. If he opens the door, then the knowledge and information flows in. (Industrial Engineering Manager, Drg-Y)
				We have an IT system connected to the internet. We set up these facilities to search for new medicine continually. We purchase all the related publications a month after they are published and make them accessible to our colleagues. (CEO, Drg-Y)
				But from the university scholars who have reached a specific formula, we buy it and make it economical and somehow make use of outsourcing. (Factory Manager, Med-Z)
				Our work starts with making similar things to a foreign good or, with a review article on a subject, take the existing idea, collect articles, and make some conclusions, do research on it, then present the product. (CEO, Med-Z)
A, B	A, B	A, B	Scanning intensity	There is a committee in the company that evaluates the market, considering customer needs (customers are Iranian and sometimes we have registered customers in some countries). The information is available in the pharmaceutical industry. For example, ten products are available in Iran. You can estimate the number of sales in every therapeutic group, then it will be predicted according to future diseases. It is the committee that works on this subject. (Quality Assurance, Phar-X)
				The CEO is present in the committee, where they decide to discuss this issue and whether or not we can produce this medicine, and whether it coincides with our production lines; then we choose that medicine. (Factory Manager, Phar-X)
				Personally, I participated in the new phenomenon of Company Two. I was its initial designer. For example, I made the foundation of section A in Company Two, since I had work experience in Factory F and familiarity with this type of production. (CEO, Drg-Y)
				Even though the decision-making is performed at the top, the information for this decision-making comes from the bottom level: recognition, production problems, market needs and so on. (CEO, Med-Z)
				In some companies, the top managers do not ask for the opinions of other managers because they want to decide individually. But if all the managers give their opinions, they can discuss them and get a result. (Marketing Manager, Med-Z)
A	A	A	Productive dialogue	*The other one is that the middle managers can see training and transfer their knowledge according to the employees' characteristics. They have more knowledge and experience; and these help them to transfer the knowledge*

(Continues)

TABLE 2 (Continued)

Company name			Second-order themes	Illustrative quotes
				that they gained through training more effectively because of the wisdom they have. (R&D Manager, Phar-X) *Maybe the personnel do not understand the importance of new knowledge because they are busy with daily routines. Because the managers are familiar with the work, they can explain to their employees what problems this knowledge can solve. This motivates the employees to value the knowledge quicker*. (Factory Manager, Phar-X) *Next is the flow of information from R&D to production and* vice versa *for the process to progress and be finalized. In fact, this communication is critical for the success of a project. There is much going back and forth for the most detailed issues, either qualitatively or quantitatively, to commission the production successfully*. (Factory Manager, Drg-Y) *Previously, there was a series of managerial layers for doing something in our organization; with new technology, this process is changing rapidly and we have to think about how to manage it. A person sending a simple SMS any time of the day or night could inform us about a new success or new phenomenon*. (CEO, Drg-Y) *To attain the goals, the middle manager must transfer the knowledge correctly for it to be used correctly. They explain new knowledge to the lower forces and they support their employees' learning. If there is no such support, there is no result for the company, even if the top manager has the best ideas*. (Factory Manager, Med-Z)
A, B	A, B	A, B	Collective learning	*The other middle managers have a critical role here. They should cooperate closely with the R&D department in order to understand and learn the know-how that was developed in R&D and transfer it to their departments. They should also explain to the subordinates where we are heading and encourage their followers to coordinate with the R&D department and the top managers*. (R&D Manager, Phar-X) *One of the important things in our strategic plan is learning; we have a slogan in our company – "you must learn and you must teach". It means that we should not be learners, we have to teach what we have learned to others who do not know it and we try to develop this culture among staff*. (CEO, Phar-X) *Because the managers are familiar with the work, they can explain to their employees what problems this knowledge can solve. This motivates the employees to value the knowledge quicker*. (Factory Manager, DrgY) *To attain the goals, the middle manager must transfer the knowledge correctly for it to be used correctly. They explain new knowledge to the lower forces and they support their employees' learning. If there is no such support, there is no result for the company, even if the top manager has the best ideas*. (Factory Manager, Med-Z)
A, B	A, B	A, B	Quality control	*In the quality control sector, we just control the end product, raw materials, and some of the process. But, in order to be sure of maintaining quality control, we should use methods of quality guarantee*. (Quality Assurance Manager, Phar-X) *All the processes are dependent on the SOPs [Standard Operating Procedures]. If there are no SOPs, there will be no quality control, no production, and no quality assurance because all of them need the SOPs*. (Factory Manager, Phar-X)

(Continues)

TABLE 2 (Continued)

Company name			Second-order themes	Illustrative quotes
				These things are related to the quality sections [quality assurance and quality control]. In fact, they are under the control of our quality assistants. They hold some meetings and some evaluations will be done by this section in order to see to what extent these standards are considered in the organization. (Quality Manager, Drg-Y) *I think controlling and checking are very effective. If there is no control, the subordinates may avoid doing the work. So we have to see whether they are doing their work correctly or not*. (Quality Assurance Manager, Med-Z)
A, B	A, B	A, B	CEO knowledge	*As the top manager is a leader, he is very knowledgeable and it is very effective. He provides us with whatever we want. By his thought, he wants to move all sectors of the company in this direction to obtain new information*. (Quality Assurance Manager, Phar-X) *Sometimes he [the CEO] will do some work, even searching on the internet. Then in an ME [market evaluation] meeting, the top manager presents an article to the personnel and when the personnel see that the manager is very interested in this field, they are motivated to create new things*. (Factory Manager, Phar-X) *As he is an educated person, he pays more attention to training and education and we have to work more to attract know-how and use it for innovation*. (Quality Control Manager, Drg-Y) *I trust the knowledge and education of the CEOs. I should say that the CEOs have interesting ideas for product innovation. I always told them that our department works productively on innovating products and my knowledge has been improved under their leadership*. (R&D Manager, Med-Z)
A	A	A	Trust	*I think that the best thing is to trust skilful people and give them authority. This causes middle managers from all sectors to think innovatively, but using innovation is done by the R&D council, by which newly acquired knowledge is modified and transferred*. (CEO, Phar-X) *I think most of the parameters are managerial ones. When you do not use the knowledge of your co-workers, unintentionally you are telling them that you do not need their knowledge. When you do not need their knowledge of today, naturally you do not need their knowledge development*. (Marketing Manager, Phar- X) *I think their [top managers'] view is important so that they should trust me, give me opportunities and equipment to see whether or not I can cope with it*. (Production Manager 1, Drg-Y) *Meetings held between middle and top managers are very effective. They trust our views, which encourages us to share our solutions and ideas in any matters regarding the implementation of acquired knowledge*. (Marketing Manager, Med-Z)
a	a	a	Managers' intention	*As an expert, I feel that I have an opportunity to improve. If the knowledge of this group adds to my knowledge, it can be helpful. The most important element is that I feel increasing my knowledge helps the progression of the system*. (Marketing Manager, Phar-X) *Now, in other words, believe that there are weak points and methods exist for their improvement and that the existing methods are not necessarily the best and have to be inspected and validated continuously. When this is acceptable and there is the commitment to transfer the*

(Continues)

TABLE 2 (Continued)

Company name	Second-order themes	Illustrative quotes
		knowledge, then there will be no problem. (Quality Manager, Med-Z*)*
		The middle managers should believe in documentation in order to share and record information. (Quality Control Manager, Med-Z)

Notes: codes for the evidence categories are as follows: "A", evidence from three + interviews with different informants from the same company; "a", evidence from fewer than three + interviews with different informants from the same company; "B", evidence from three + archival sources; "b", evidence from fewer than three+ archival sources.

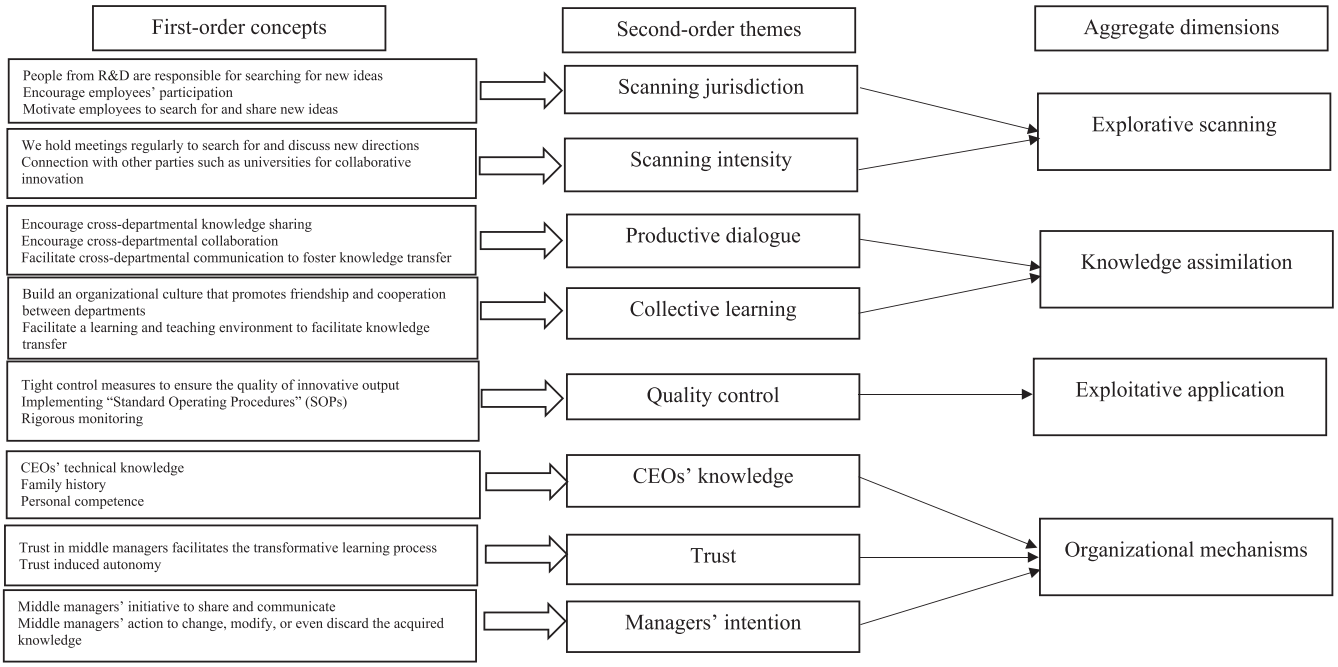


FIGURE 1 Data structure

FINDINGS

The emergent theoretical model comprises four core concepts and their relationships: explorative scanning, knowledge assimilation, exploitative application, and organizational mechanisms that either hinder or stimulate the learning process. We first describe the four main dimensions that constitute the core of the overall process model. This will be followed by a second layer of findings explicating the relationships among these four core dimensions, followed by the complete emergent model.

EXPLORATIVE SCANNING

We found clear patterns of variation in how explorative scanning was conducted among the three firms. Explorative scanning has two main themes: scanning jurisdiction and scanning intensity.

Scanning jurisdiction

This refers to the scope and responsibilities of scanning efforts. The CEO of Phar-X welcomes new ideas for developing new medicines from everyone in the company. He encourages his employees to identify new medicines in two ways. The first is through a suggestion box that allows all employees to communicate their ideas for producing new medicines to the CEO. The CEO also allocates responsibility to the R&D department for working on particular medicines. The CEO not only encourages the participation of employees, especially middle managers, in the search for knowledge and products by increasing cooperation between his middle managers but is also open to new ideas and values employees' knowledge in order to encourage their participation in learning. Similarly, we noticed the importance of the role of the CEO at Drg-Y in identifying and absorbing external knowledge. Since the CEO started work at Drg-Y, he has

invested in the R&D department, IT facilities, and production lines. The R&D managers explained to us that he purchases all new pharmacology reference books as soon as they are published and provides IT facilities that enable middle managers and their employees, especially in the R&D and marketing departments, to search for new medicines. Although the CEO of Med-Z makes most of the decisions and initiates most of the new medicines, he allows other managers to participate in the decision-making. The other top and middle managers provide information to the CEO, who makes the final decision. The final decision to develop a new medicine is made after hearing the other managers' reasoning and opinions: "Even though the decision-making is performed at the top, the information for this decision-making comes from the bottom level: recognition, production problems, market needs and so on" (CEO). The CEO is open to new ideas and he welcomes all new suggestions from all employees. There is a friendly environment in the organizations that allows brainstorming and motivates all employees, including the managers, to share their ideas regarding development of new medicines. The CEO gives the other managers an assignment ahead of time whereby they learn about the new product before sharing their opinions about it.

Scanning intensity

This refers to the amount of time and effort firms invest in recognizing knowledge. At Phar-X, there is a meeting every three months and the CEO explains the strategic planning and reviews its direction with other managers. Middle managers describe the future direction of the company and the importance of innovation. Knowing their direction provides a roadmap for all employees to support the organizational vision. Top managers as well as middle managers value employees' knowledge and enhance employees' participation in learning; they also allow experimentation and avoid public criticism to enhance organizational support in their departments. The CEO of Med-Z has also developed a knowledge network that allows the R&D department, specifically the R&D manager, to facilitate external knowledge valuation and acquisition. He establishes a connection with universities and provides up-to-date reference books, magazines, and training, which enables members of the R&D department to become familiar with new knowledge. This helps the R&D employees and the R&D manager to absorb new knowledge.

Similar examples can be found at Drg-Y. For example, since the CEO started work at Drg-Y, he has invested in the R&D department, IT facilities, and production lines. The R&D managers explained to us that he purchases all new pharmacology reference books as soon as they are published and provides IT facilities that enable middle managers and their employees, especially in the R&D and marketing departments, to search for new medicines. The CEO commented that "We have an IT system connected to the internet. We set up these facilities to search for new medicine continually. We purchase all the related publications a month after they're published and make them accessible to our colleagues" (CEO). The CEO keeps reminding the company's vision for growth through innovation and the importance of teamwork in social gathering meetings, as observed by the first researcher. It was also observed that boards are installed across the organization that remind staff of the organization's values. Sharing organizational values allows Drg-Y to cope with employees' resistance to acquiring and using external knowledge: "I think, if you asked me seven or eight years ago, I would have said that there may be resistance to development. But now our organizational culture accepts change" (Production Manager).

KNOWLEDGE ASSIMILATION

Knowledge assimilation has two main elements: productive dialogue and collective learning.

Productive dialogue

This refers to the inter-communication connectivity and knowledge exchange between different departments. A good example is Phar-X. The success of its external knowledge implementation relies not only on the hard work of R&D employees but also on cooperation between middle managers, especially between the R&D, production, quality control, and quality assurance managers. As the CEO mentioned, "Look, R&D in the pharmaceutical industry is mainly responsible for scaling up new medicines and training other people and production lines to use knowledge". The top managers, especially the CEO, act as coordinators between the middle managers. The quality assurance manager noted that "The top managers act as coordinators here. They should allocate knowledge to each department based on their needs". Similar to the case at Phar-X, cooperation between managers at Drg-Y is also important for knowledge transfer. The CEO enhances cooperation between middle managers using two approaches. First, he has created an organizational culture that promotes friendship and cooperation between departments in order to engage middle managers in transformative learning so they learn from one another rather than relying only on the knowledge of certain managers:

> Once you start a production process, from the first step of purchasing the raw material to the last step of getting a licence, there are numerous steps that must be taken and all

> require cooperation. If these factors are not performed harmoniously, then a bottleneck will be created, which has a high level of energy and cost. Therefore, our capabilities depend on how much we can cooperate with each other. We have tried to make a good culture at Drg-Y, a culture along with love, interest, and cooperation, and in my belief, I see the company as one of the most successful companies in the country. (CEO)

The other approach is to facilitate communication between different departments to foster knowledge transfer. The organizational structure is less formal than in the past, which allows managers and employees to communicate faster:

> Previously, there was a series of managerial layers for doing something in our organization; with new technology, this process is changing rapidly and we have to think about how to manage it. A person sending a simple SMS any time of the day or night could inform us about a new success or new phenomenon. (CEO)

Collective learning

Collective learning refers to the environment/culture that stimulates learning activities at the firm level. At Phar-X, top managers increase teamwork by creating a learning and teaching environment to facilitate knowledge transfer between R&D and other departments:

> We have a slogan in our company – "you must learn and you must teach". It means that we should not be learners, we have to teach what we have learnt to others who do not know it and we try to develop this culture among staff. (CEO)

On some occasions, the middle managers fail to transfer knowledge correctly. The CEO allows knowledge to be transferred to other departments over three production batches. If other departments fail to learn the knowledge within the first three production batches, the CEO managers will express significant concern: "We want to have a new product and the operative managers need to deliver the know-how from R&D in the first three production batches, and they will be punished if they do not do this based on three batches" (CEO). The preceding quotation reflects the change in the CEO's behaviour after giving other managers the opportunity to transfer the knowledge to their departments. At Med-Z, although middle managers have the authority to solve problems, they report their progress to the CEO. He supports the middle managers, although he may provide feedback on the progress of their projects. He has developed harmonious cooperation between managers and their departments:

> In our factory, group work is very good because it is based on a good view and the results of group work are better than individual work (Factory Manager).

Despite increasing teamwork between middle managers, there are occasions when the CEO is not satisfied with the assimilation and transfer of external knowledge. Therefore, he maintains control over the transformative learning process:

> The culture of teamwork is not yet in place; therefore, the top manager needs to be present … Our role in the middle of all this could be going along with these groups and controlling them and getting to a conclusion as a group. (CEO)

One of the important aspects of teamwork between middle managers is the correct transfer of knowledge. To do this, the middle managers support the collective process of learning:

> To attain the goals, the middle manager must transfer the knowledge correctly for it to be used correctly. They explain new knowledge to the lower forces and they support their employees' learning. If there is no such support, there is no result for the company. (Factory Manager)

Middle managers constantly explain the company's vision and goals. They also communicate the success of the company to increase employees' motivation to learn because it articulates a brighter future:

> Our company has progressed very quickly. This has assured our employees that the company has a good future and they can work here with peace of mind. The middle managers communicate the success of the company to our employees, which encourages them to work harder. (Production Line Supervisor)

EXPLOITATIVE APPLICATION

This approach has one element: quality control. Organizations reuse knowledge in the exploitative learning

process. The case companies ensure the reuse of knowledge by developing documents known as "Standard Operating Procedures" (SOPs). These documents show the production processes and controlling mechanisms in use before new medicines are launched to markets.

Middle managers engage directly in controlling activities in the exploitative learning process. In contrast to their approach in the exploratory and transformative learning processes, top and middle managers provide less freedom for their employees. We observed that in the companies, Drg-Y and Med-Z, the production managers monitor the production line through CCTV. Similarly, quality control and quality assurance managers control the raw materials, processes, and outcomes of the production processes. Imposing such tight control is essential because it assures the organizations that consistent outcomes are achieved.

> There is also a system in which the laboratory will do quality control during the process, then we control the finished product. There is another system called quality assurance, which is superior to all the other controls … All the stages should be controlled to prevent people making mistakes and errors. (Factory Manager: Phar-X)

The top managers indirectly control the reuse of knowledge and receive reports from middle managers. The quality assurance manager at Med-Z mentioned that: "Sometimes the top manager is too busy to engage in lower-level activities and he has to get information from the middle managers in the company". To motivate employees to reuse knowledge, middle managers have requested rewards for their employees from top managers. Normally, top managers show appreciation for the efforts of lower forces to reuse knowledge financially: Monetary rewards are one method that top managers do here for motivating employees to reuse knowledge. I think it is the most effective approach (Production Manager: Drg-Y).

ORGANIZATIONAL MECHANISMS

This element has three themes: CEOs' knowledge, trust, and managers' intention.

CEOs' knowledge

We explored how the CEOs' knowledge influences the exploratory learning process. All of the CEOs were involved in academic research. Moreover, the CEO of Med-Z has a long family history in the pharmaceutical industry. His technical knowledge also helped him to become involved in the exploratory learning process for innovation. All the CEOs proposed some ideas for developing new medicines or production lines as observed: "Our CEO is a university professor and he is knowledgeable and a leading person in pharmacology. So he leads others in this direction in order to produce new medicines or go into new fields" (Quality Assurance Manager: Phar-X).

The engagement of the CEOs increases respect and trust in them. It also inspires their middle managers to participate in exploratory learning:

> Sometimes he [the CEO] will do some work, even searching on the internet. Then in an ME [market evaluation] meeting, the top manager presents an article to the personnel and when the personnel see that the manager is very interested in this field, they are motivated to create new things. (Factory Manager: Phar-X)

The middle managers' knowledge is also important for facilitating the AC learning processes. Their knowledge and expertise enable the organizations to look for external knowledge, acquisition, assimilation, and exploitation of it. However, we did not find the direct influence of their knowledge on employees engagement as the CEOs do.

Trust in middle managers

Trust in middle managers facilitates the transformative learning process. Top managers provide all the necessary equipment and facilities for middle managers as a result. This encourages middle managers to get involved and support their organizations to achieve their objectives. Consequently, it supports collective learning, which is important for facilitating the transformative learning process: "So I think their views are very important so that they trust me, give me opportunities and equipment to see whether or not I can cope with them" (Production Managers 2: Drg-Y).

Middle managers' intention

The intention of middle managers regarding using and transferring knowledge. Middle managers may change, modify, or even discard the acquired knowledge. Therefore, the intention of the middle managers to share this knowledge with their employees and transfer knowledge to other departments influences the transformative learning process. For example, Drg-Y's success in the transformative learning process depends on its middle managers' agreement in supporting the top managers for sharing knowledge:

> But the middle managers are usually enforcing managers and supervise most of the operation; sometimes they do not want to use newly acquired knowledge. What I mean is, the role of the middle manager is sometimes much more important than that of the top manager. (Industrial Manager: Drg-Y)

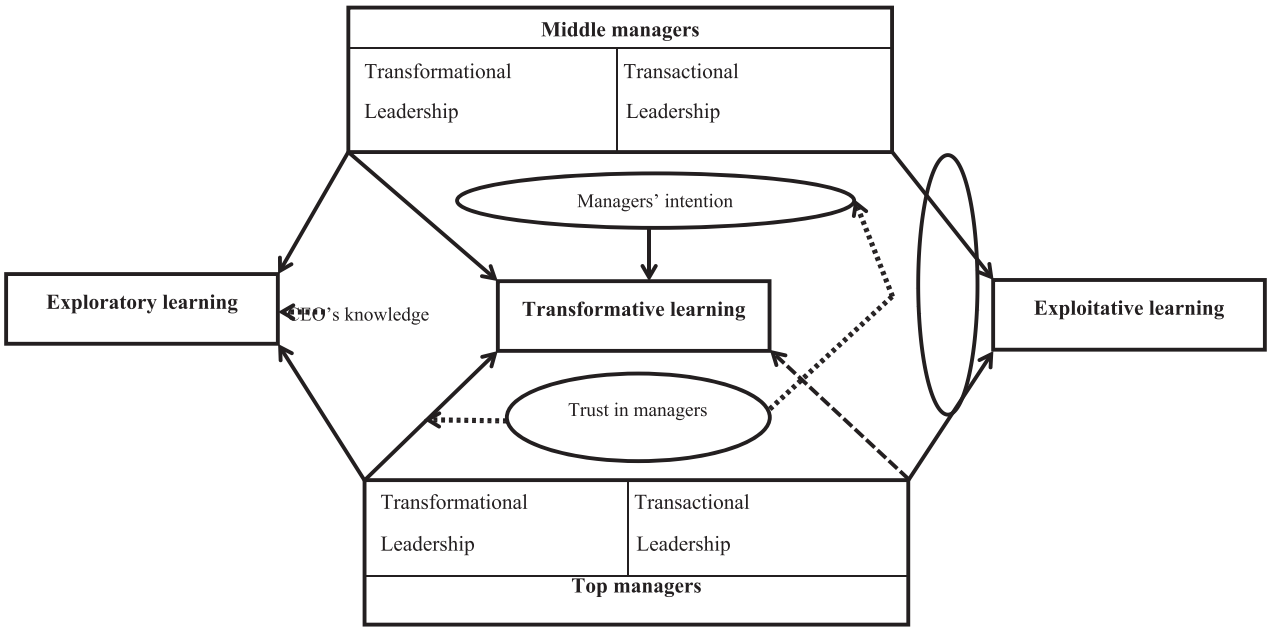
In the discussion above, we have extrapolated the transformational and transactional leadership styles as well as exploring three factors that have not previously been studied. In the following discussion, we compare our findings with those of past research in order to build on existing AC studies by suggesting a model for innovation adoption.

DISCUSSION

Our research explores different leadership styles and their impact on firms' ability to recognize, assimilate, and apply external knowledge. Four main constructs emerged from the data. A developing grounded process model must articulate not only constituent concepts but also the linkages or relationships among these concepts in describing or explaining a phenomenon (Langley, 1999). Through the iteration of data and the existing theoretical discussion, we developed a model shown in Figure 2, presenting a process framework that depicts the dynamic relationship among the emergent concepts underlying absorptive capacity. We will next present another layer of findings illustrate how these specific elements of model are linked.

Figure 2 illustrated the influence of both transformational and transactional leadership styles on the AC learning processes. Our data revealed that top managers' leadership style changed from transformational to transactional one in the transformative learning process and we indicated such changes by thick dotted line in Figure 2. Also, there were leadership mechanisms which influence directly and indirectly the transformative learning process. We explain these relationships in more details in the following paragraphs.

Our findings revealed that particular managers at each stage of the AC learning processes play more important roles than others. The reason is that their expertise, knowledge, and roles are different. We also explored how middle managers are more influential in the exploitative learning process. This is due to their role in directly controlling daily activities as part of their job. Therefore, the engagement of top managers is reduced as the learning process moves towards the exploitative learning process. Here, it should be noted that our findings do not ignore the importance of other managers as the success of the innovation



Notes: arrows description are as follows: ——→ Leadership effects on AC; – – ▸ Transactional leadership behaviours during transformational learning; - - - ▸ Emergent themes effects on AC.

FIGURE 2 Managerial model of the learning processes of ACI: Arrows description are as follows: ——→leadership effects on AC; – – ▸transactional leadership behaviours during transformational learning; - - - ▸emergent themes effects on AC

process relies on cooperation between different departments.

We showed that a transformational leadership style facilitates the exploratory and transformative learning processes. Our data revealed some differences where top managers promoted intellectual activities. For example, while the CEO gives intellectual assignments to middle managers to encourage them to search for new knowledge, Med-Z focuses more on brainstorming which stimulate both scanning jurisdiction and scanning intensity. Similarly, there is a difference between the middle managers in this regard. The middle managers at Phar-X refrain from criticizing employees and this allow the employees to communicate their ideas to the middle managers. On the other hand, middle managers at Drg-Y are open to new ideas and encourage their employees to be more creative, therefore employees became more proactive (scanning jurisdiction) and took more responsibilities (scanning intensify) in searching external knowledge. This reflects the fact that top and middle managers follow different approaches to develop the learning environment in their organizations. Scholars generally agree that transformational leadership has a role in influencing followers' self-identity, self-construal, self-efficacy, self-esteem, and self-consistency at multiple levels (Awamleh et al., 2005). As exploratory learning often starts with individual intuitive insights, where they can see novel connections (Behling & Eckel, 1991), this leadership style enhances the search for and the acquisition, modification, and transfer of external knowledge by developing a learning environment. In this sense, their intellectual stimulation behaviours increase individuals' learning (Gong et al., 2009). Organizations can benefit more from the learning environment when they engage employees directly in learning. Moreover, individualized consideration (being close to employees) allows transformational leaders, by showing empathy, consideration, and support, to increase followers' creativity through overcoming their fear of questioning the status quo (Gong et al., 2009) and their existing knowledge, particularly at the middle management level.

The engagement of top managers, particularly CEOs, in the search for external knowledge inspires their followers to also look for external knowledge where the responsibility of searching for new knowledge is not restricted to the top management and middle management team, but across different hierarchical level of organization. This insight, emerged from our data, indicate that such leadership style has a great impact on both scanning jurisdiction and explorative intensity. The CEOs become role models for their employees when employees see people at the top of the hierarchy valuing knowledge acquisition tasks, specifically when they have technical knowledge. This also directly increases the exploratory learning process. It is suggested that strategic leaders such as CEOs foster learning and innovation. CEOs enhance innovation more effectively if they have technical knowledge and demonstrate professional knowledge as well as having the motivation to exercise their skills (Mumford et al., 2002). This leads to our first proposition:

> **Proposition 1** A transformational leadership style at both top management and middle management levels is positively associated with the explorative scanning process of AC.

A transformational leadership style by top and middle managers facilitates the transformative learning process. Our findings revealed that intellectual stimulation behaviours by managers increase engagement of R&D employees in external knowledge assimilation. In all three cases, to increase the speed of knowledge transfer, the middle managers considered individuals' differences and abilities to learn and implement knowledge. We also noticed that the middle managers at Drg-Y explain the importance of knowledge to facilitate transformative learning, while the middle managers at Med-Z highlight the brighter direction of the company as a tool to encourage their employees to acquire new knowledge. This reflects the importance of communicating a company's vision and motivation in order to enhance transfer of knowledge between departments, which is crucial to form productive dialogue and create a collective learning environment at the firm level.

Top managers develop a learning environment to enhance the transformative learning process by promoting intellectual activities. Our data showed that they do it differently in terms of creating a learning environment. For example, top managers at Med-Z focus on developing a teamwork culture to enhance cooperation between middle managers in order to transfer knowledge. On the other hand, at Drg-Y top managers facilitate the communication structure between different departments. At Phar-X, managers focus on developing a culture that promotes learning and teaching. Top managers remove communication barriers. It is found that reducing formality and decentralization increases organizational AC (Schleimer & Pedersen, 2013; Rangus & Slavec, 2017).

However, we explored a challenge that top managers face in facilitating the transformative learning process. There were occasions when middle managers resisted transferring knowledge or failed to do it properly. In such situations, top managers adopted a transactional leadership style. This result contrasts with the results of Sun & Anderson (2012). They found that top managers display a transformational leadership style while middle managers display a transactional leadership style for facilitation of the transformative learning process. We argue that the transformational leadership style of middle managers is more influential than the transactional leadership style in facilitating the transformative learning process

for innovation adoption for the following reasons. Managers' leadership style increases individual AC (Cohen & Levinthal, 1990; Van den Bosch et al., 1999) by increasing openness towards others (Rangus & Černe, 2019), which is instrumental to stimulate knowledge connectivity between different department. As a result, such connectivity encourages individual to interact with each other which is conductive to productive dialogue and collective learning. Knowledge transferred from the R&D department to other departments needs to be understood and used by individuals and specifically by middle managers in other departments. Therefore, by displaying a transformational leadership style, middle managers improve individuals' AC, which not only facilitates knowledge transfer between and across different departments to build productive dialogue, but also create a collective learning environment. This leads to our next proposition:

> **Proposition 2** A transformational leadership style at both top management and middle management levels is positively associated with the knowledge assimilation process of AC.

We also noted that transactional leadership facilitates the exploitative application process. Both top managers and middle managers are rigorous in monitoring the materials, processes, and outcomes of the production process.

In order to exploit acquired knowledge to deliver innovative output, firms need to combine existing knowledge with newly acquired knowledge. The emphasis of transactional leadership is to motivate employees to reach agreed objectives by communicating expectations and rewarding people when they have met those objectives. This is reflected by our case material, where managers have a monitoring and maintenance role in the quality control process. While top managers play a key role in exploratory learning, we noted that the role of middle managers becomes more dominant in transformative and exploitative learning. They often focus on rule-based ways of getting things done, accentuating the importance of efficiency and consistency, which is crucial for the quality control. This task-focused leadership style can stimulate dissemination of existing knowledge to guide future actions. This is consistent with scholars who champion the importance of the transactional leadership style in driving incremental change, efficiency, and continuity (Waddell & Pio, 2015). This leads to our next proposition:

> **Proposition 3** A transactional leadership style at both top management and middle management levels is positively associated with the exploitative application process of AC.

We also explored how three factors – trust, CEOs' knowledge, and managers' intention – mediate the effect of a top management transformational leadership style. These factors enable transformational leaders to be more productive and to facilitate exploratory and transformative learning processes. Trust is often defined as one's assumption or belief that another person's future actions will be favourable, or at least not detrimental to one's interests (Robinson, 1996). We argue that trust can stimulate communications with an organization, enable organizational autonomy, and instil a sense of confidence in employees to share their opinions and concerns with each other and with the management team. Intentionality is perceived as the crucial feature of human agency, as "to be an agent is to intentionally to make things happen by one's action" (Bandura, 2001, p. 2). According to Teece (2007), managerial intention is key for capability building. Astley and Van de Ven (1983, p. 249) describe managers as having "a proactive role; their choices are viewed as autonomous, and their acts are viewed as energizing forces that shape the organizational world". There is also good evidence in the literature that managerial cognition and knowledge structure are consequential in a firm's strategic context (Tripsas & Gavetti, 2000). Our finding is consistent with the literature in that both managers' intention and CEOs' knowledge play an important role in mediating the effect of a top management transformational leadership style. This leads to our last proposition:

> **Proposition 4** Trust, CEOs' knowledge, and managerial intention mediate the effect of a transformational leadership style on the learning processes of AC.

Despite the differences between the three case companies, according to Figure 2 transformational leadership facilitates the exploratory; and some leadership elements, such as CEOs' knowledge, can enhance the influence of transformational leadership. Similar to Sun and Anderson's (2012) results, our data revealed that managers' leadership styles are transactional in the exploitative learning process. This contradicted the finding of a recent study conducted by Darwish et al. (2020). They found that there is no mediating relationship between transactional leadership and exploitative learning. In considering Darwish et al.'s findings, we argue that organizations aim to use knowledge constantly in launching products to their markets. Therefore, identifying tasks and controlling the production process ensure the reuse of knowledge accordingly, an argument supported by our data. In this sense, managers should identify tasks and control their employees' behaviours.

Some middle managers play more roles during this learning stage. Controls imposed by quality control and quality assurance during the exploitative learning process

ensure the end products' quality and the reuse of knowledge. Production managers also directly control production activities. Therefore, unlike with transformative learning, quality control and quality assurance managers have more influence on exploratory learning than do R&D managers and top managers.

It is also worth mentioning that the traits of the middle managers are facilitating the exploitative learning processes of AC, specifically experience, motivation, and personal dispositions. The exploitative learning resided in the organizational processes, systems, and structure (Sun & Anderson, 2010). Middle managers experience, motivation, and personal dispositions facilitates the mental mode to share and understand institutional knowledge. As the extant literature suggested, individual with higher motivation and experience learn faster and they are more open to learn and adopt new knowledge (Cohen & Levinthal, 1990). Our argument supported further by Sun and Anderson (2010); they suggested that exploitative learning process involves institutionalizing knowledge where leaders influence organizational knowledge by developing organizational memory.

THEORETICAL CONTRIBUTION

We set out to explore how top and middle managers facilitate the learning processes of AC in innovation-adopting organizations. To do so, we conducted qualitative process study of pharmaceutical companies in Iran. Based on multiple cases, we offer a process model of how different leadership styles affect learning processes of AC. This research provides convergent evidence of the relationships between different leadership styles and the learning processes of AC. This work extends and bridges in several ways various prior studies that comprise the literature on AC and leadership.

The main contribution of our research is an inductive process model that not only captures the learning processes of AC and different leadership style, but also shows how different organization mechanisms facilitate the knowledge management within the firms. Although scholars have called for the need to recognize the influence of individuals such as the CEO and middle managers on strategic decisions, actions, and organizational outcomes (e.g., Salvato & Vassolo, 2018), investigation of the specific processes by which managers affect how knowledge is identified, transformed and exploited has been inadequate. In the same vein, while there is a growing literature accentuating the crucial role that leadership styles play, as they directly decide specific goals and encourage innovation initiatives (e.g., Chen & Hou, 2016; Flatten et al., 2015; Rosing et al., 2011), limited attention has been directed towards connecting leadership with AC, with a few exceptions (e.g., Darwish et al., 2020). In this paper, we have provided insights into how transformational and transactional leadership impact on the different learning processes of AC. Our findings suggest that a transformational leadership style at both top management and middle management levels is positively associated with exploratory and transformative learning processes, and a transactional leadership style at both top management and middle management levels is positively associated with the exploitative application process of AC. We have therefore advanced existing research by empirically exploring the role of leadership styles in the learning processes of AC. Overall call, the grounded, emergent process model illustrated in Figure 2 presents a process view of how different management style is linked to subsequent knowledge searching, transforming and exploiting activities that constitute microprocesses underlying organizational competence.

Our approach to AC learning processes also breaks away considerably from prior conceptualizations by emphasizing their processual nature. There is a preponderance of cross-sectional, quantitative studies on AC that tend to take a snapshot and do not trace the path of the organizational mechanisms that affect the learning process of the AC. Emphasizing the static fit approach has limited our theorizing and prevented full understanding of the process by which AC is developed over time, despite the calls for such theorizing (Darwish et al., 2020). The processual view we have provided here perceives AC as a journey; although it is underrepresented and under-theorized in AC research, it is essential to understanding how firms recognize, assimilate, and transform external knowledge.

We have also contributed to the literature by considering top managers and middle managers at the centre of our investigation into AC development. Prior literature has tended to treat AC that is part of dynamic capability as collective entities or black boxes embedded in firms (Salvato & Rerup, 2011), and has overlooked how individuals, such as top and middle managers, contribute to firm-level AC. Salvato and Vassolo (2018) suggested that studying the individual levels and exploring the interaction between employees allows the researcher to understand how dynamic capabilities such as AC enables organizations to maintain their competitiveness and innovation, particularly when employees engage in productive dialogue through participation and mutual learning. Augier and Teece (2009) have explicitly highlighted how managers play a distinct role in continuous organizational learning processes. We have confirmed this insight but, more importantly, advanced it. We approached it from top managers' and middle managers' perspectives to understand how the different leadership styles the management team display impact on the different stages of organizational learning processes. While top managers play a key role in exploratory learning, the role of middle managers becomes more dominant in transformative and

exploitative learning. This is the first study that has not only shown the importance of the combined role of top and middle managers but also distinguished between their influences on AC. Organizations can benefit from these findings by adopting a flexible structure to facilitate learning. To foster exploratory and transformative learning, top managers should encourage discussions and brainstorming by adopting a generic and open structure. On the other hand, they should impose proper control mechanisms to ensure the reuse of knowledge during the exploitative learning process. We have therefore not only built on the relevance and applicability of AC in understanding top and middle managers' strategic behaviours but also refined and partly reoriented the growing body of work on AC from top and middle managers' perspectives.

We have also advanced existing literature by introducing trust, CEOs' knowledge, and managerial intention as important mediators of the impact of leadership styles on AC. These factors enable transformational leaders to be more productive and to facilitate exploratory and transformative learning processes. Therefore, the influence of top management leadership styles may vary between and within organizations. This finding, therefore, can explain why not all transformational leaders can achieve the same results in term of facilitating learning processes. Although evidence has accumulated that both transformational and transactional leadership can motivate employees to perform more innovatively and effectively, little research has examined the interplay between these two approaches and organizational learning processes. In identifying these moderating factors as enhancers of firms' AC, our theoretical perspective and empirical findings represent a departure from traditional approaches to understanding AC and organizational mechanisms. We have also shown that both transformational and transactional leadership styles facilitate AC learning processes, particularly transformative learning. During transformative learning managers may exhibit both leadership styles to facilitate organizational learning, depending on the organizational situation, as our research has proposed. Therefore, we suggest that managers should consider organizational situations and actors' behaviours when selecting a leadership style. This is because learning involves a dynamic process where individuals play a determinant role. Managers can benefit from these findings. According to the findings of this study, managers need to adopt a leadership style that they feel is appropriate for their particular situation, particularly for facilitating transformative learning processes. Therefore, effective management of AC goes beyond the transformational leadership style.

Our research further suggests that the microfoundations of the individual actions on which AC is premised are not a product of cognition in isolation, as existing contributions suggest instead, they are an integration of interconnectivity between different actors and the flow of knowledge and information between the actors at a firm. In relation to the transformation process, we propose that relationships between employees, and between employees and management teams, created through productive dialogue, can lead to collective learning, which is the missing aggregation principle in explaining how individual actions congeal into firm-level AC. These findings enable us to build a coherent theory of AC.

MANAGERIAL IMPLICATIONS

Top managers, especially CEOs, have an important role in facilitating the exploratory learning process. To enhance exploratory learning, they need to develop their own knowledge so they can be role models for their employees. They should also expand their organizational knowledge networks with research institutions, universities, and other organizations. To benefit from these knowledge networks, they need to invest not only in R&D departments but also in learning facilities such as internet access, reference books, and scientific magazines.

Providing such facilities allows organizations to explore new opportunities beyond their past experiences. Learning facilities enable employees to search for new knowledge and products. They also help employees to absorb and utilize knowledge for innovation more effectively. Third, improving knowledge facilities facilitates the transfer of knowledge between departments as employees have some degree of shared understanding beforehand.

Managers should create a learning environment to enhance the exploratory and transformative learning processes. They should encourage learning by searching for new knowledge and motivate employees to become involved by being open to new ideas, allowing experimentation, and facilitating employees' participation in decision-making.

Harmony between departments is also important for increasing AC learning processes. Managers should foster two-way communication to effectively transfer new ideas and knowledge. In this regard, promoting teamwork enhances cooperation between and among departments. One way to achieve teamwork is to create a common vision, which helps top managers to overcome middle managers' resistance to sharing and transferring knowledge.

RESEARCH LIMITATIONS

The first limitation of this research is that we collected data from the pharmaceutical industry, where R&D

plays a key role in innovation (Pavitt, 1984). The determinants of AC in low- and medium-technology industries are different because these industries rely less on R&D activities (Santamaría et al., 2009): innovation has less to do with R&D departments in low- and medium-technology industries (Spithoven et al., 2011). Consequently, the learning processes of AC for innovation may be different in these industries, and differences in the learning processes of AC may necessitate different managerial practices from those in high-tech industries. Therefore, we suggest that future studies revise the influence of leadership styles on the learning processes of AC in low- and medium- technology industries.

The second limitation is that we considered a single learning project and proposed a linear conceptual model. This model is acceptable if organizations carry out a single project at a time (Sun & Anderson, 2012). However, in reality organizations conduct multiple learning projects and these projects may be at different stages of learning. Future research could identify organizational conditions and mechanisms in order to understand how organizations manage their multiple learning projects successfully.

The third limitation is that this study falls short in exploring why some of the transformational leadership style behaviours of top and middle managers are different. It is suggested that the behaviours of leaders who display a leadership transformational leadership style vary (Vera & Crossan, 2004). We urge researchers to explore the personal characteristics that influence top and middle managers to display certain behaviours during AC learning processes.

Finally, we noticed in our data that there are other leadership styles that facilitate the exploratory and transformative AC learning processes. For example, the CEO of Med-Z gives employees freedom in their responsibilities. This reflects a delegated leadership style. Therefore, we recommend that researchers consider studying other leadership styles and explore the influence of these leadership styles on AC learning processes.

CONCLUSION

Our research formulated a unique process-based approach to study the AC for innovation adoption. It is evident of the importance of top and middle managers in enabling the AC learning processes in this respect. Although the role of managers differs during the AC learning processes, we demonstrated that organizations can still benefit from the interaction between different agents engage in exploratory, transformative, and exploitative learning. Our study also showed that leaders can perform both transformational and transactional leadership styles to facilitate the AC, particularly for transformative learning. Finally, it is important to emphasize organizational mechanisms such as CEO's knowledge, managers intention to engage and share knowledge, and in the trust of top managers in the process as key facilitators of the AC learning processes.

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