OPEN INNOVATION PROJECTS WITHIN REGIONAL CLUSTERS: RECONSIDERING THE HUMAN DIMENSION THROUGH DYNAMIC CAPABILITIES THEORY

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Abstract

This paper focuses on the human dimension of open innovation, by mobilising the dynamic capabilities view and by focusing on regional clusters as an empirical field. Our main issue is what dynamic capabilities should be developed to overcome the human difficulties of open innovation projects within regional clusters? 22 semi-structured interviews with four open innovation project actors (business leaders, university professors, engineering research labs executives, and cluster managers) within three Moroccan clusters were conducted. The thematic analysis of data collected was realised via Nvivo 10 software. To overcome the main human difficulties of open innovation, it seems necessary for an organisation to develop four dynamic capabilities, namely team sensemaking capability, absorptive capacity, capacity to renew its competences and capacity to transform its organisational culture. The results could be useful for managers of organisations participating in open innovation projects within regional clusters during the development and implementation of HRM practices.

Keywords: open innovation; collaborative project; regional cluster; dynamic capabilities; human resources; team sensemaking capability; absorptive capacity; competence; organisational culture

JEL Codes: O32, O36, M20

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Introduction

In the context of a knowledge-based economy, the concept of open innovation, which is based on collaborative practices, poses new challenges for organisations. Since it was introduced in 2003 by Henry Chesbrough, over the past 20 years numerous researchers have analysed the phenomenon from different perspectives. Nevertheless, the scientific community underlines that the human dimension of open innovation is still under-studied, and this field of research is highlighted as a promising area (Hossain & Anees-ur-Rehman, 2016; Randhawa et al., 2016; Lopes & de Carvalho, 2018).

On the other hand, regional clusters are the ideal terrain to study open innovation since they foster collaboration between external partners, mainly due to geographical proximity. Thus, several authors advocate the need to explore the concept of open innovation at the inter-organisational level in the context of regional networks of innovation systems (BodasFreitas et al., 2013; Michelfelder & Kratzer, 2013).

Additionally, the theoretical framework mobilised so far by open innovation researchers is mostly around knowledge-based theories (KBV) and resource-based view (RBV). Other promising theoretical fields have been applied to a minor extent. At the same time, many authors highlight that the theory of dynamic capabilities provides an interesting perspective on open innovation (Randhawa et al., 2016).

To respond to these three scientific gaps, we focus on the « human side » of open innovation at the inter-organisational level and in the context of regional innovation networks, namely the Moroccan innovation clusters, by mobilising the dynamic capabilities framework. In this context, our research problem is as follows: What dynamic capabilities has to be developed to overcome the human difficulties of open innovation projects within regional clusters?

This paper is structured as follows. First, a brief literature review on the concept of open innovation in relation to regional clusters will be developed. Then, the methodology and design of our research will be described. Thirdly, the findings of our empirical study will be presented and discussed. It will be concluded with an emphasis on the theoretical and practical implications of our study, as well as research limitations and perspectives.

Open Innovation Within the Regional Cluster from The Perspective of Dynamic Capabilities Framework.

Theories of open innovation suggest that innovations are not always inspired and developed entirely within a single company and that the production of innovative results is facilitated by greater openness to external sources of knowledge (Elmquist et al., 2009). In this paper, the most recent definition of Henry Chesbrough has been adopted: "Open

innovation is a distributed innovation process that relies on purposively managed knowledge flows across organisational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organisation's business model to guide and motivate knowledge sharing". (Chesbrough, 2017, p. 35).

While cluster can be defined as "" process of firms and other actors co-locating within a concentrated geographical area, cooperating around a certain functional niche, and establishing close linkages and working alliances to improve their collective competitiveness". (Andersson et al., 2004, p. 7).

The examination of the literature at the intersection of open innovation and regional clusters revealed some similarities and complementarities between the two. These similarities include collaboration between companies and other institutions (and, thus, the presence of inter-organisational network effects), knowledge flows across organisational boundaries and their externalities, as well as a positive impact of geographic proximity (Cooke, 2005; Simard & West, 2006; Vanhaverbeke, 2006; Huang & Rice, 2013).

Thus, Vanhaverbeke (2006) noted that regional clusters are more likely to use open innovation strategies, while Simard and West (2006) recognised that regional clusters are an ideal framework for open innovation analysis. Furthermore, several research studies have been conducted previously to analyse how and to what extent cluster initiatives foster and promote open innovation practices: Omta and Fortuin (2013), Santos and Mendonça (2017), Yström and Aspenberg (2017), Nestle et al. (2019), Vlaisavljevic et al. (2020).

The theoretical framework of dynamic capabilities was proposed by Teece, Pisano and Shuen in 1997 and provides some comprehension of how an organisation can achieve new forms of competitive advantage by reconfiguring its internal and external resources to adapt to the changes of the environment (Teece, 2007). Since open innovation is a relatively new phenomenon, the shift from the closed innovation paradigm to open innovation causes many changes in the organisation's environment. In this sense, dynamic capabilities theory can provide the required perspective for open innovation (Teece, 2014). Indeed, open innovation may seem easy in theory, but in reality, it is quite difficult to implement (Teece, 2019). Only organisations with strong dynamic capabilities will be able to take full advantage of open innovation practices (Bogers et al., 2019).

Teece (2020) makes a distinction between ordinary dynamic capabilities and high-level dynamic capabilities, while high-level dynamic capabilities can be divided into three categories: sensing, seizing and transformating capabilities. All these three dynamic capabilities reinforce open innovation (Bogers et al., 2019). These three high-level

capabilities will be further developed when discussing the results in the third part of this paper.

Methodological Choices and Research Design.

This research positions in the *epistemological interpretative paradigm*. Therefore, it is considered that social reality is subjective and that it is constructed through the mix of the actors' intentions who build the meaning of this reality through the sharing and confrontation of their interpretations. Thus, the *qualitative approach* is adopted. This approach is well adapted to the needs of our research because it is consistent with the study of invisible, not directly observable objects, such as the actors' feelings, thoughts, intentions, motivations and fears, and which allows approaching the personal mental perceptions of the actors interviewed.

Based on the interview guide developed following the literature review, *22 semi-directive interviews* with the representatives of four categories of actors in open innovation projects (university professors, business leaders, engineering research labs executives and cluster managers) within the three Moroccan clusters were conducted. Each interview lasted from 45 to 90 minutes.

The *interview guide* consisted of two axes. First, the interviewees were asked about their experience of participation in the open innovation projects within the clusters. Then they were asked about the difficulties they went through while participating in these projects. Thereafter, each difficulty detected was the subject of in-depth questioning. All interviews were recorded and then transcribed.

The study is based on the *strategy of multi-site study*, which is considered by many authors to have the advantage of deepening and strengthening understanding, as well as increasing the generalisability of the results, by confirming that the findings observed in such context are not purely idiosyncratic. The cases were selected using the explicit sampling method guided by our research question and theoretical framework. The examination of a series of similar cases at the first site (first regional cluster) allowed us to understand in-depth the findings obtained. Then, we tried to intensify our results and increase the validity and stability of our findings. Thus, the *successive replication strategy* advocated by Yin (1991) was followed, which states that if the finding is true in a context and is also true in a comparable context, then the finding is more robust. Thus, three clusters that all present a similar context and operate in interconnected sectors were selected, namely the Electronics, Microelectronics and Mechatronics Cluster of Morocco (CE3M), the Solar Cluster of Morocco and the Cluster of Moroccan Technical Textiles (C2TM).

Concerning the selection of people to be interviewed within each case study, the *snowball or chain effect sampling method* proposed by Miles and Huberman (2003) was adopted. This method involves identifying good cases through people who know other people who know cases rich in information. Therefore, the iterative approach based on the progressive constitution of the sample by successive iterations was applied. *Theoretical saturation* was achieved to ensure the robustness of our data collection. Theoretical saturation is the point where the redundancy with previously obtained data appears (Glaser & Strauss, 1967). Following Yin (2016), we continued our semi-structured interviews until the data collected no longer provided new information (or incremental learning was minimal), and the marginal information did not challenge our built frameworks. The empirical data was translated into theoretical concepts through the *abstraction method* using *open coding* (Strauss & Corbin, 1990; Thiétart, 2014). Then the data was encoded using the *method of thematic analysis* with *Nvivo 10 software* and the unit of analysis was a paragraph.

Table no. 1 - Justification of methodological choices

Methodological choice	Justification
Abductive approach/Hybrid Exploration	The concepts we have mobilized are sufficiently studied in literature
Qualitative approach	Consistent with the study of objects not directly observable (feelings, thoughts, motivations, attitudes of the actors)
Semi-Directive Individual Interview as a data collection mode	Develops a deep understanding of the phenomenon in its context and the meaning that individuals attribute to it
Multiple case study	Increases the generalizability of the results and deepens the understanding and explanation of the phenomenon
Successive replication strategy as a case sampling method (Yin, 1991)	Verification of results in similar contexts increases the robustness of these results
«Snowball or chain effect» as an intra-site sampling method (Miles and Huberman 2003)	Increases the contextual nature of the knowledge produced
Thematic analysis method (coding unit = paragraph) via Nvivo 10	This facilitates the identification of relationships between nodes
Mixed analysis strategy (case-oriented + variable-oriented; intra-site + inter-site)	Allows analysis of components that do not obscure the study of all sites

Source: Developed by authors

Research findings of empirical study

The results of the lexical analysis revealed the 30 most frequently used words (see Figure 1). As can be noticed, the words the most frequently used by our interviewees are "cluster", „project", „research", „companies" and „problem". Then some other words emerged such as „innovation", „development", „work", „time", „skills", „knowledge", „party", „communication" and „collaborative".
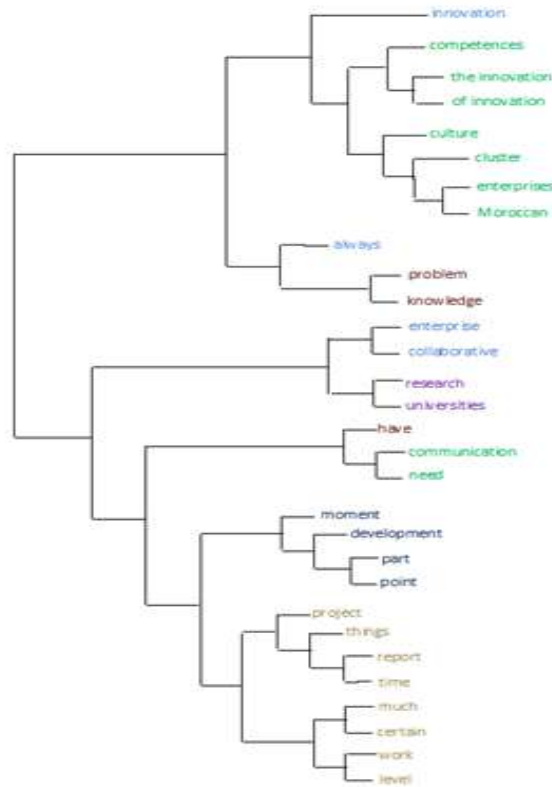
Figure no. 1 „Cloud" of the most frequently used words

collaborative
innovation   enterprise   Moroccan
                            competences
time   **research**
some   **cluster**   part
level   development
much   universities
always   work   **project things**
moment   report   **enterprise**   **innovation**
communication   **problem**   culture
point   knowledge   have innovation
                              need

Source: output of Nvivo 10 software

In addition, a « word tree » were extracted from the discourse of our interviewees. As it is demonstrated in Figure 2, the words « innovation » and « competences » were used by our interviewees in association within the same sentence. The words „enterprise" and „Moroccan" were preceded by the word „cluster" which, in turn, the word „culture" was the pioneer. The word „knowledge" was very often applied in combination with the word „problem", which was preceded by the word „always". The word „enterprise" was frequently used in combination with the word „collaborative". The word „university" was employed in combination with the word „research". The word „communication" was used in combination with the word „need". The word „time" was applied together with the word „report" which was preceded by the word „project".

Figure no. 2 „Word tree" of interviewees' discourse

1.1 Human difficulties of open innovation projects within regional clusters

After completing the lexical analysis, the different nodes and sub-nodes were encoded according to the method of thematic analysis with the paragraph as the unit of analysis. The results of this encoding allowed us to construct the rectangular hierarchical diagram of the themes. Thus, Figure 3 demonstrates the human difficulties of open innovation projects discussed by our interviewees. The size of the space given to the theme in the graph corresponds to its importance (the percentage of the discourse given by the interviewee to each difficulty). Thus, the main human difficulties of open innovation projects within Moroccan regional clusters are lack of motivation, lack of a single vision and understanding between partners, cultural barriers, lack of trust, competences problems, lack of absorptive capacity, project management problems and communication issues.

Figure no. 3 Rectangular diagram of human difficulties in open innovation projects

Lack of motivation	Lack of a single vision and understanding between partners	Cultural barriers
	Lack of trust	
Competences problems	Lack of absorptve capacity	Project management problems	Communication problems
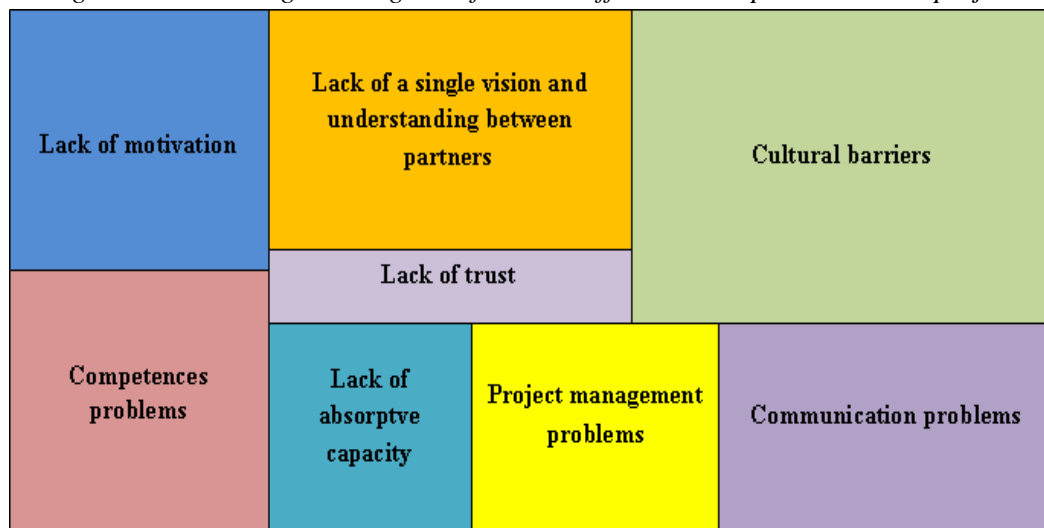
Source: output of Nvivo 10 software

Each theme from the above diagram was explored in depth to better understand the origins and causes of each difficulty. This allowed us to detect which dynamic capabilities should be developed to overcome these difficulties.

1.2 Dynamic capabilities to overcome human difficulties of open innovation projects within regional clusters

The empirical data was translated into theoretical concepts through the *abstraction method* using *open coding.* Also, the abductive approach was applied which is about the iterative back and forth between theory and practice. Thus, by reviewing the literature at the intersection of the human dimension of open innovation and the theory of dynamic capabilities, four theoretical concepts were identified and linked to the dynamic capabilities framework. Therefore, it is proposed that, to overcome human difficulties, and to adapt to the new environment induced by the shift from a closed to open innovation paradigm, four dynamic capabilities should be developed by the organisation, namely team sensemaking capability, absorptive capacity, capacity to renew its competences and capacity to transform its organizational culture. These ideas will be further developed in the following subsections.

1.2.1 Team sensemaking capability

As it has been mentioned above, Teece (2020) makes a distinction between ordinary dynamic capabilities and high-level dynamic capabilities, while high-level dynamic capabilities can be divided into three categories: sensing, seizing and

transformating capabilities. *Sensing capabilities* are abilities to identify and evaluate new business and technology opportunities and relate to activities such as analysing and monitoring changes in the organisation's environments, assessing customer preferences, capturing ideas internally from employees and identifying new business opportunities. According to the findings of our research, sensing capabilities first consist of developing the team sensemaking capability.

The concept of team sensemaking capability comes from Weick's sensemaking theory and focuses on the cognitive processes, using them people develop together mental models and attribute appropriate meaning to new experiences to meet the requirements of the changing environment (Weick et al., 2005). According to the dynamic capabilities theory, sustainable competitive advantage is attributed to companies that can react quickly to the turbulent changing in the environment. Thus, companies with strong team sensemaking capabilities have a competitive advantage, as they are able to develop shared interpretations of changes in the environment (Teece, 2020).

Many authors have mentioned the importance of team sensemaking in open innovation projects: Alasoini (2011), Amaya et al. (2019), Mahdad et al. (2020), Mesgari & Okoli (2019). Sheng (2017) and Teece (2020) also recognise that one of the important dynamic capabilities, especially in the early stages of open innovation, is the sensemaking capability because, in the presence of uncertain factors, it is necessary to be able to assign the same meaning and interpreting the different situations in the same way by all the team members.

Figure no. 4 Theoretical links between team sensemaking capability, dynamic capabilities framework and open innovation
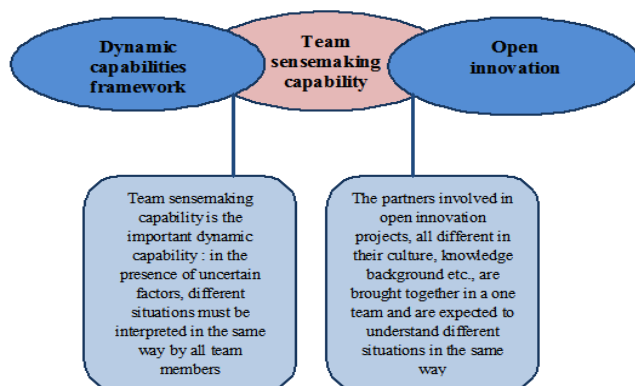
Source: Developed by authors (based on a literature review)

Indeed, the partners involved in open innovation projects are all different in their culture, knowledge background, mode of operation and objectives. Notably, a part of the companies belonging to the clusters is subsidiaries of foreign multinational companies, which implies the difference in objectives between these subsidiaries and the Moroccan national companies belonging to the same cluster. Some verbatims of our interviewees illustrate this point:

> *... the difference between the local Moroccan companies and the subsidiary companies ... there was some friction because we do not have the same objectives ... the Moroccan company wants to go further in its development, and the subsidiary company, for it, must do just the production and not go further. (Company manager)*

On the other hand, it is about the difference in objectives between the company and the university. The company wishes to do practical and applicative research, while the university favors fundamental research :

> *... often we see studies or projects at the level of Universities ... we remain attached to fundamental research in the field of science. And sometimes, we will find subjects that we know that ... even if we find results, they will be useless ... (Cluster Leader)*

> *Morocco ... needs to do applied research concerning the different products ... that are consumed by the local market, and to be able to do ... reverse intelligent engineering ... and that will be much more quickly ... valued than staying in fundamental research ... (Company manager)*

> *I have the impression that our institutions in Morocco remain disconnected... I tend to believe that the two worlds do not understand each other... The company, concerning the University, is ready to hear what the University says, but without expecting much. (Cluster Leader)*

Despite these differences, the members of open innovation are united in one team to collaborate on a project and are therefore expected to create common sense to understand different situations in the same way:

> *... it's this vision of things that is not always the same from one interlocutor to another... the challenges we encounter about the human factor are often about how to share, already build a vision and be able to share it with the other stakeholders, and allow them the same understanding of this vision. And I think that this is the key to the success of all collaborative projects ... (Cluster Leader)*

Akgün et al. (2012) argue that team sensemaking capability is a second-order construct consisting of five elements, namely internal and external communication (Weick et al., 2005), information gathering (Neill et al., 2007), information classification

(Akgün et al., 2006), the building of shared mental model (Neill et al., 2007), and experimental action (Weick et al., 2005). In this sense, the speeches of our interviewees confirm this. In particular, concerning communication :

> *... every day we had physical meetings, so a physical presence. And that doesn't prevent us from using WhatsApp at the time ... when one of us was abroad, we used Skype to discuss, but ... it was mainly physical meetings. Daily and physical. (University Professor)*
>
> *Constructive criticism via brainstorming sessions helps to create a common sense, ... it will be useless to develop something that won't be sold later... That's brainstorming ... focused and directed brainstorming. I am criticising the idea, because ... when you direct a maximum of criticism to an idea, and really you are able to ... argue, to find ... founded answers ... (University Professor)*

Communication is primarily a matter of common language. However, university professors and business leaders of our sample have difficulties understanding each other because they don't use the same language :

> *We don't speak the same language... and there is a feeling that the communication between the two... does not pass ... (Cluster Leader)*
>
> *We always have this difference in language between the university and the entrepreneur. So, it is this difference in language that makes the two entities more and more distant. (University Professor)*

To be able to make sense in common, there is a need to teach the other our language, but also to make the effort to understand the language of the other partner:

> *... we also integrate them through what we call knowledge-sharing meetings ... try to interweave them so that they can learn our language. And then we also communicate so that they can learn each other's language. That's how it works (Research Foundation Manager).*
>
> *At this point, the language, the jargon, I have it, the scientific background, I have it ... That's why I can still speak the same language as an engineer or ... a technician. (University Professor)*
>
> *... we also try to search for information to be able to speak the same language as our partner ... (Head of the Research Foundation)*

Also, communication is the way to understand the exact meaning of the information shared in the transfer of knowledge:

> *... sometimes we ask directly for the exact information... you send me a draft proposal or something, if I don't understand something, one, I look it up on the internet first of course, two, I contact the partner directly, so that I can, one, understand exactly what they mean by such and such information, and two, so*

that I can point out the research that I'm going to do to understand the given information more deeply. (Head of the Research Foundation)

Thus, as it was mentioned above, among the human difficulties in open innovation projects within Moroccan clusters is the lack of a single vision and understanding between partners. To overcome this difficulty, it is proposed that all open innovation project members should make an effort to develop team sensemaking capability.

1.2.2 Absorptive capacity

Still regarding sensing capabilities, the second dynamic capability to develop is the absorptive capacity (according to our empirical findings). The concept of *absorptive capacity* was introduced by Cohen and Levinthal (1990), who defined it as the ability to recognise the value of new information, assimilate it and apply it for business purposes. Zahra and George (2002) redefined the concept by highlighting its multidimensional nature. In particular, the authors distinguish between *potential absorptive capacity*, which includes the capacities to acquire and assimilate, but that does not always lead to the exploitation of knowledge; and *realised absorptive capacity*, which appeals to the capacity to transform and exploit new knowledge.

As it was mentioned above, among human issues of open innovation projects within Morrocan clusters is the lack of absorptive capacity. That is the partners the actors involved in the projects have difficulty understanding the new knowledge coming from the external partners. Some verbatims of our interviewees illustrate this :

Very often, a lot of time has been wasted ... discussing trivia... « And how do you do that? » « Well, no, that's how it goes. » (University Professor)

... He doesn't understand, his capacities are limited, he has no absorptive capacity to understand, and his absorptive capacity is very low ... They can't understand my proposals. (Company manager) ...

... if someone comes to them with a new project, sometimes they are not able to understand it. (University Professor)

And since they can't understand, it follows that they are not able to respond properly, and communication between external partners of the project becomes distorted.

I send out deliverables; I don't get any feedback ... because they don't understand ... I send you a deliverable, and you answer me ... with another report. You tell me yes, this part is good, it fits with the specifications, and this part is not ... And this is a problem ... And this is a handicap, the fact of not having a team, a team that is capable of answering you based on a deliverable of a report as to whether you have respected or not, this is a problem. (University Professor)

Figure no. 5 Theoretical links between absorptive capacity, open innovation and dynamic capabilities framework
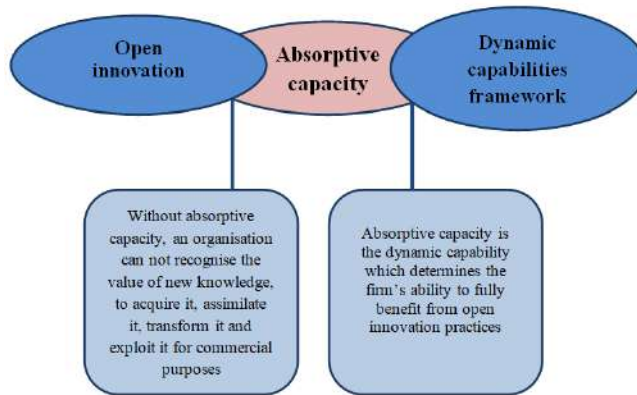
Thus, the second dynamic capability to be developed to adapt to the changing environment of the new open innovation paradigm and to overcome human difficulties is the absorptive capacity. In the context of sensing capabilities, it is about developing the potential absorptive capacity, to be able to identify and recognise the value of new knowledge that may be useful, so as to detect new business and technology opportunity. Once this opportunity is recognised, it is supposed to be exploited and transformed into a new product on the market, which requires seizing capabilities. *Seizing capabilities* refer to the ability to invest in complementary technology and assets and to be able to exploit new opportunities as they arise. Thus, in the case of our research, it is proposed to connect seizing capabilities with realised absorptive capacity.

1.2.3 Capacity to renew individual competences

Concerning seizing capabilities, apart from the realised absorptive capacity that was already mentioned, in order to be able to exploit the newly acquired knowledge, an organisation should be able to adapt its competences to the changing context of the open innovation paradigm. Indeed, the paradigm of open innovation involves the difficulties of collaboration and puts pressure on employees' competences (see Figure 6). In this context, dynamic capabilities focus on the organisation's ability to renew its competences to adapt to changes in turbulent environments (Sheng, 2017).
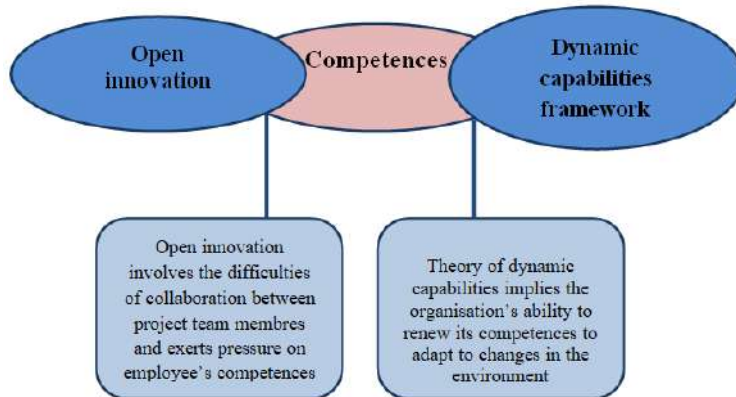
Source: Developed by authors (based on a literature review)

Numerous research studies have investigated what individual competences are important for open innovation projects: Behnam et al. (2018), Bello-Pintado and Bianchi (2019), Hong and Kim (2020), McPhillips and Licznerska (2021). Regarding the results of our study, the important competences for open innovation projects are first of all hard scientific skills, each in their field of specialisation:

> *Now, in this type of work, you need experts, experts by trade who master different technologies. When we think of developing a new product, we need experts in plastics, mechanics, hydraulics and others, electronics and software, so that these experts collaborate together to make projects ... So, we need experts by trade ... (Company manager)*

More importantly, these are the soft skills that are needed as a result of the new open innovation paradigm. In particular, according to the analysis of our interviewees' speech, these are managerial skills, such as project management skills, team management skills, but also communication, leadership capacity, the ability to resolve conflicts, a spirit of sharing, the ability to listen, adaptability and sense of initiative. Some verbatims could illustrate these findings :

> *We need people who have a sense of the organisation because to manage projects involving different organisations, we need to keep track of deadlines, ensure that deliverables are handed in on time and that the deliverables are compliant and validated by all stakeholders. (Cluster Leader)*
>
> *It's very important ... are able to manage the project as a group, you don't find them. (Cluster Leader)*

... first of all, it is the sense of listening. First of all, you have to know how to listen to the company in order to know how to identify its problems... the associative work... it's really... knowing how to listen ... (Cluster manager)

Soft skills are very important in collaborative projects because you have to communicate, you have to understand each other (University Professor)

Communication skills, you have to be able to communicate, to know who to communicate with, you have to be able to look for the right partners, you have to have a minimum of communication tools ... (Cluster manager)

... first of all, it is the sense of listening. First of all, you have to know how to listen to the company in order to know how to identify its problems... the associative work... it's really... knowing how to listen... (Cluster manager)

What we lack is the soft skills ... knowing ... how to guide (orientate) people ... how to really try to federate the members of each team ... (Head of the Research Foundation)

... I think that in the context of open innovation ... it's also everything that is a collaborative project ... there has to be a coordinator or a coordinating committee because effectively to frame the communication ... the management of the group ... (Head of the Research Foundation)

Indeed, our findings are consistent with the results of Petroni et al. (2012), who demonstrated that open innovation reduces the role of senior scientists with only scientific and technical skills, and that with the adoption of open innovation, new professional profiles appear, such as "integration experts" or "T-men", i.e. people with scientific expertise and at the same time a strong capacity for integration and coordination, able of managing complex organisational structures :

We need moderators, facilitators, people who can resolve conflicts easily, give importance to both visions and are capable of finding compromises because often we will be confronted with conflicts, with concerns about understanding ... (Cluster Leader)

When there is a conflict or misunderstanding, it is the leaders and the coordinator who resolve the problem. Every Workpackage... there are the Leaders. So, if there is ever a problem, it's the leader who will resolve it. If the leader can't...or...involved in the problem, it's the project coordinator who manages... (Research Foundation Manager)

... we need people ... who are able to adapt easily to both cultures, who can communicate easily with both, who speak both languages. (Cluster Leader)

Thus, the findings of our study confirm that in order to fully exploit new opportunities once they have been identified, the organisation should be able to adapt its competencies. And this is the third dynamic capability to be developed.

1.2.4 Capacity to transform its organisational culture

Finally, *transformating capabilities* are about the ability of an organisation to reconfigure itself to adapt to highly dynamic environments. And the first factor that should be reconfigured is organisational culture. The definition of organisational culture mostly accepted by the scientific community is as follows: « a set of values, beliefs, assumptions and symbols that is shared by all members and that directs their decisions and organizational behaviors» (Schein, 1985). Indeed, organisational culture can promote or delay the open innovation process it depends on whether an organisation's culture is favorable or unfavorable to such a process (Naqshbandi et al., 2015). In open innovation literature, organisational culture is often flagged as a key inhibiting force and one of the greatest challenges when companies are moving toward open innovation principles (Van de Vrande et al., 2009; Lichtenthaler, 2011; Cui et al., 2018).

According to the theory of dynamic capabilities, culture cannot be acquired, rather it must be constructed. Thus, to successfully transition from closed to open innovation, companies need dynamic capabilities to adapt their intangible resource « organisational culture » to their innovation strategy (Teece et al., 1997).

Figure no. 7. Theoretical links between organisational culture, open innovation and dynamic capabilities
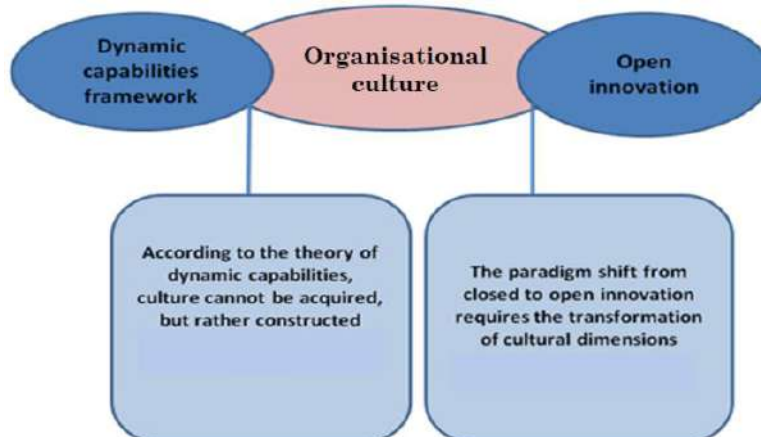
Source: Developed by us (based on a literature review)

The analysis of our data demonstrates that the place of culture is crucial in the context of inter-organisational projects, which involve different partners:

> *It is the cultural shocks, and cultural clashes that make sometimes the advancement of the project hindered by cultural biases. (High-level manager at the Engineering Research Lab)*
>
> *We contrast with intra-company projects where we need to have a minimum of communication because people share already a common culture ... When we bring together people from different cultures ... (Head of the Cluster)*
>
> *Culture is the first factor of success... When we talk about « mindset » ... to be in the same problem ... to really make a good collaborative project succeed, all the actors must have the same culture of sharing, the same sense of challenge, the same sense of success, and especially the concern of information... (Cluster manager)*

The cultural obstacles we have detected through the analysis of our interviewees' speech fall under the two sub-dimensions of organisational culture. The first sub-dimension, which is innovation culture, consists of a lack of ambidexterity, fear of change, lack of patience, no encouragement of the initiative, fear of failure, a culture of ease « turnkey », mimetic behaviors (based on the analysis of our results). For the second sub-dimension, which is open innovation culture, our analysis revealed resistance to collaboration and sharing knowledge, a culture of self-interest and opportunism.

In this sense, our findings reveal that open innovation is a relatively new concept in the Moroccan context, it is always a question of successfully transitioning from the closed approach of innovation to the open innovation paradigm. Therefore, there is a need to transform the organisational culture to develop strong innovation culture, to move from the « turnkey » culture of ease and imitation towards the innovation culture based on risk-taking and controlled fear of failure, to develop a sense of ambidexterity, of patience, encouraging talent and the reason for the initiative, but most of all to promote open innovation culture based on collaboration and knowledge sharing.

Thus, the fourth dynamic capability that should be developed to overcome the human difficulties of open innovation projects is the capacity to transform its organisational culture. The ideas presented here above are summarised in the relational scheme (see Figure 8), which links the four theoretical concepts we identified with the three high-level dynamic capabilities.

Figure no. 8. Relational scheme of high-level dynamic capabilities
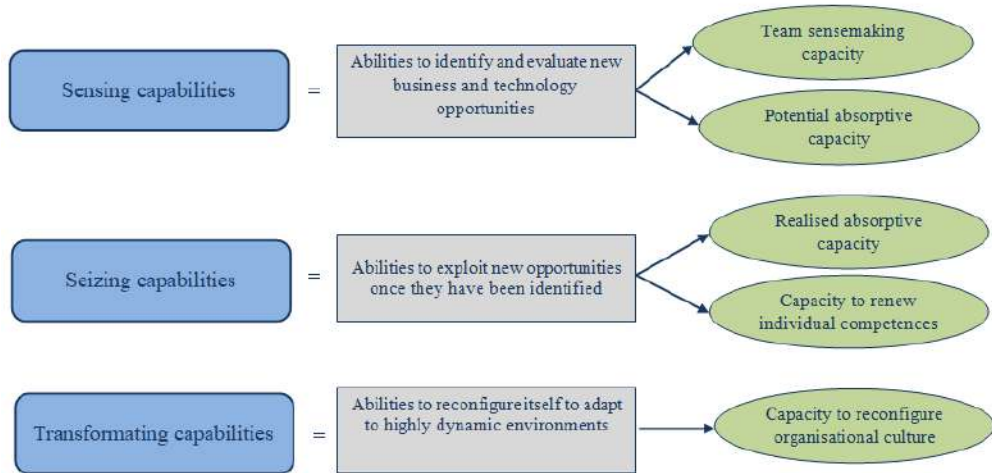
Source: Developed by authors (based on literature review and empirical findings)

Conclusion

This paper focus on the human dimension of open innovation from dynamic capabilities view. Based on a semi-structured guide, 22 interviews were conducted with four categories of open innovation project actors (company managers, university professors, research foundation executives and cluster managers) within three Moroccan clusters: CE3M (Electronics, Microelectronics and Mechatronics Cluster of Morocco), Solar Cluster and C2TM (Moroccan Technical Textiles Cluster).

The *findings* of our study reveal that the main human difficulties of open innovation projects within Moroccan regional clusters are lack of motivation, lack of a single vision and understanding between partners, cultural barriers, lack of trust, competences problems, lack of absorptive capacity, project management problems and communication issues. To overcome these difficulties, and to adapt to the new environment induced by the shift from a closed to open innovation paradigm, four dynamic capabilities should be developed by the organisation, namely team sensemaking capability, absorptive capacity, capacity to renew its competences and capacity to transform its organisational culture.

As *managerial implications*, the results of our research could be useful for managers of organisations participating in open innovation projects within regional clusters in the development and implementation of human resource management practices.

As each research study has its *limitations*, ours is no exception. First, the theoretical concepts studied are not static but evolve. Thus, it could be more interesting to conduct longitudinal research. Also, our analysis was based only on the speech of people during the interviews. An immersion on the site to carry out a deep observation of the actors has not been realised.

Future research perspectives are directly derived from the above-mentioned limitations. Furthermore, the results of our study, which were obtained by mobilising the qualitative approach and the abductive one, could in the future be the subject of a quantitative study through the testing of the various hypotheses to find out whether our results are confirmed or refuted on a representative sample of actors. Additionally, it would be worth conducting another research to see which HRM practices are best adapted to meet the human challenges identified in our research. Finally, it would be interesting to explore inter-organisational HRM practices, aligned at the level of all the partners in the collaborative innovation project.

REFERENCES

Alasoini, T. (2011). Linking theory and practice. Learning networks at the service of workplace innovation. *Helsinki: TYKES Reports*, *75*, 13-30.

Amaya, A. A., Liao, Y. K., & Chang, S. (2019). The effects of innovation implementation and speed to market on the relationship between team sense-making, trust, and NPD success. *International Journal of Innovation Management, 23*(4), 1950029-1-1950029-29. https://doi.org/10.1142/S1363919619500294

Andersson, T., Schwaag Serger, S., Sörvik, J., & Wise Hansson, E. (2004). The cluster policies whitebook. *Journal of Finance, 49*, 371-402.

Behnam, S., Cagliano, R., & Grijalvo, M. (2018). How should firms reconcile their open Innovation capabilities for incorporating external actors in innovations aimed at sustainable development? *Journal of Cleaner Production, 170*, 950–965. https://doi.org/10.1016/j.jclepro.2017.09.168

Bello-Pintado, A., & Bianchi, C. (2019). Consequences of open innovation: effects on skill-driven recruitment. *Journal of Knowledge Management, 24* (2), 258-278. https://doi.org/10.1108/JKM-08-2019-0437

Bodas Freitas, I. M., Geuna, A., & Rossi, F. (2013). Finding the right partners: Institutional and personal modes of governance of university-industry interactions. *Research Policy, 42* (1), 50-62. https://doi.org/10.1016/j.respol.2012.06.007

Bogers, M., Chesbrough, H., Heaton, S., & Teece, D. (2019). Strategic Management of Open Innovation: A Dynamic Capabilities Perspective. *California Management Review, 62*(1), 77–94. https://doi.org/10.1177/0008125619885150

Chesbrough, H. (2017). The Future of Open Innovation: The future of open innovation is more extensive, more collaborative, and more engaged with a wider variety of participants. *Research Technology Management, 60*(1), 35–38. https://doi.org/10.1080/08956308.2017.1255054

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative science quarterly, 35*(1), 128-152. https://doi.org/10.2307/2393553

Cooke, P. (2005). Regional knowledge capabilities and open innovation: Regional innovation systems and clusters in the asymmetric knowledge economy. in S. Breschi & F. Malerba (Eds.), *Clusters, networks and innovation*, (pp. 80-109). Oxford University Press.

Cui, Y., Liu, Y., & Mou, J. (2018). Bibliometric analysis of organisational culture using CiteSpace. *South African Journal of Economic and Management Sciences, 21*(1), 1-12. https://hdl.handle.net/10520/EJC-de9222786

Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory, Strategies for Qualitative Research.* Aldine Publishing Company.

Hong, K., Kim, B. (2020). Open Innovation Competency of Design Enterprises to Outsourcing Service. *Journal of Open Innovation: Technology, Market, and Complexity, 6* (2), 36. https://doi.org/10.3390/joitmc6020036

Hossain, M., & Anees-ur-Rehman, M. (2016). Open innovation: an analysis of twelve years of research. *Strategic Outsourcing: An International Journal, 9*(1), 22–37. https://doi.org/10.1108/SO-09-2015-0022

Huang, F., & Rice, R. (2013). Does open innovation work better in regional clusters? *The Australian Journal of Regional Studies, 19*(1), 85-120. https://doi/10.3316/ielapa.356283599442918

Lichtenthaler, U. (2011). Open innovation: Past research, current debates, and future directions. *Academy of management perspectives, 25*(1), 75-93. https://doi.org/10.5465/amp.25.1.75

Lopes, A. P., & de Carvalho, M. M. (2018). Evolution of the open innovation paradigm: Towards a contingent conceptual model. *Technological Forecasting and Social Change, 132*, 284-298. https://doi.org/10.1016/j.techfore.2018.02.014

Mahdad, M., De Marco, C. E., Piccaluga, A., & Di Minin, A. (2020). Why Open Innovation is Easier Said Than Done: An Organizational Identity Perspective. *Journal of Innovation Management, 8*(2), 47-67. https://doi.org/10.24840/2183-0606_008.002_0005

McPhillips, M. & Licznerska, M. (2021). Open Innovation Competence for a Future-Proof Workforce: A Comparative Study from Four European Universities. *Journal of Theoretical and Applied Electronic Commerce Research, 16*(6), 2442–2457. https://doi.org/10.3390/jtaer16060134

Mesgari, M., & Okoli, C. (2019). Critical review of organisation-technology sensemaking: towards technology materiality, discovery, and action. *European Journal of Information Systems, 28*(2), 205-232. https://doi.org/10.1080/0960085X.2018.1524420

Michelfelder, I., & Kratzer, J. (2013). Why and how combining strong and weak ties within a single interorganizational R&D collaboration outperforms other collaboration structures.

Journal of Product Innovation Management, 30 (6), 1159-1177. https://doi.org/10.1111/jpim.12052

Miles, M. B., & Huberman, A. M. (2003). Analyse des données qualitatives, De Boeck supérieur. Analysis of qualitative data, De Boeck supérieur.

Naqshbandi, M. M., Kaur, S., & Ma, P. (2015). What organizational culture types enable and retard open innovation? *Quality & Quantity, 49*(5), 2123–2144. https://doi.org/10.1007/s11135-014-0097-5

Nestle, V., Täube, F. A., Heidenreich, S., & Bogers, M. (2019). Establishing open innovation culture in cluster initiatives: The role of trust and information asymmetry. *Technological Forecasting and Social Change*, 146, 563-572. https://doi.org/10.1016/j.techfore.2018.06.022

Omta, S. W. F. & Fortuin, F. T. J. M. (2013). Effectiveness of cluster organizations in facilitating open innovation in regional innovation systems: the case of Food Valley in the Netherlands. *Open Innovation in the Food and Beverage Industry*, *10*, 174-188. https://doi.org/10.1533/9780857097248.2.174

Petroni, G., Venturini, K., & Verbano, C. (2012). Open innovation and new issues in R&D organization and personnel management. *The International Journal of Human Resource Management*, *23*(1), 147-173. https://doi.org/10.1080/09585192.2011.561250

Randhawa, K., Wilden, R., & Hohberger, J. (2016). A Bibliometric Review of Open Innovation: Setting a Research Agenda. *Journal of Product Innovation Management, 33*(6), 750–772. https://doi.org/10.1111/jpim.12312

Santos, A. B. & Mendonça S. (2017). Open Innovation Adoption in Clusters: the Portuguese Case. In *The Quadruple Innovation Helix Nexus*, 245-264. https://doi.org/10.1057/978-1-137-55577-9_9

Schein, E. H. (1985). *Organizational culture and leadership*. San Francisco Josey-Bass.

Sheng, M. L. (2017). A dynamic capabilities-based framework of organizational sensemaking combinative capabilities towards exploratory and exploitative product innovation in turbulent environments. *Industrial Marketing Management, 65*, 28-38. https://doi.org/10.1016/j.indmarman.2017.06.001

Simard, C., & West, J. (2006). Knowledge networks and the geographic locus of innovation, in H. Chesbrough, W. Vanhaverbeke & J. West (Eds.), *Open innovation: researching a new paradigm* (pp. 220-240). Oxford University press.

Strauss, A. L., Corbin, J. (1990). *Basics of Qualitative Research: Grounded Theory Procedures and Technics.* Newbury Park Sage.

Teece, D. (2007). Explicating dynamic capabilities : the nature and microfoundations of (sustainable) enterprise performance. *Strategic management journal, 28*(13), 1319-1350. https://doi.org/10.1002/smj.640

Teece, D. (2019). A capability theory of the firm: an economics and (Strategic) management perspective. *New Zealand Economic Papers*, *53*(1), 1-43. https://doi.org/10.1080/00779954.2017.1371208

Teece, D. (2020). Hand in Glove: Open Innovation and the Dynamic Capabilities Framework. *Strategic Management Review, 1*(2), 233–253.

Teece, D. J. (2014). The Foundations of Enterprise Performance: Dynamic and Ordinary Capabilities in an (Economic) Theory of Firms. *Academy of Management Perspectives, 28*(4), 328–52. https://doi.org/10.5465/amp.2013.0116

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509-533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

Thietart, R. A. (2014). *Méthodes de recherche en management*, Dunod Paris. *Management research methods,* Dunod Paris.

Van de Vrande, V., De Jong, J. P. J., Vanhaverbeke, W., & De Rochemont, M. (2009). Open innovation in SMEs: Trends, motives and management challenges. *Technovation, 29*(6-7), 423-437. https://doi.org/10.1016/j.technovation.2008.10.001

Vanhaverbeke, W. (2006). The interorganizational context of open innovation. in H. Chesbrough, W. Vanhaverbeke & J. West (Eds.), *Open innovation : researching a new paradigm* (pp. 205-219). Oxford University Press.

Vlaisavljevic, V., Medina, C. C., & Van Looy, B. (2020). The role of policies and the contribution of cluster agency in the development of biotech open innovation ecosystem Running title: Policies in biotech clusters and OI ecosystem. *Technological Forecasting and Social Change*, *155*, 119987. https://doi.org/10.1016/j.techfore.2020.119987

Weick, K.E., Sutcliffe, K.M., & Obstfeld, D. (2005). Organizing and the process of sensemaking . *Organization science, 16*(4), 409-421. https://doi.org/10.1287/orsc.1050.0133

Yin, K. (2016). *Qualitative Research from Start to Finish.* The Guilford Press.

Yin, R. K. (1991). *Applications of case study research*. Washington DC Cosmos Corp.

Yström, A. & Aspenberg, H. (2017). Open for innovation ? Practices supporting collaboration in Swedish regional clusters. *International Journal of Innovation Management*, *21*(5), 1740008. https://doi.org/10.1142/S1363919617400084

Zahra, S. A., & George, G. (2002). Absorptive Capacity: A Review, Reconceptualization, and Extension. *Academy of management review, 27*(2), 185–203. https://doi.org/10.5465/amr.2002.6587995