

Proposal of a research design for the implementation of new vectors of supply chain transformation: application to the aeronautical industry in Morocco using a knowledge management approach in an ecosystemic context

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Abstract. In the context of the new economy, the new vectors of competitiveness of companies in the aerospace industry organized within efficient ecosystems (EFECO) will be based more on knowledge. These are Industry 4.0 and the decarbonization of production based on knowledge management (KM). These two levers will be the foundations of the transformation of the aeronautical supply chain in the future. For their implementation, we made a case study on a non-probability sample of 17 partners. At the end of this investigation, we propose implementing a new generation of transversal ecosystems within the framework of a new Industrial Acceleration Plan 2.0. This new form of organization will facilitate a collaborative sharing of knowledge between all the ecosystemic components with a view to innovation. Starting from the Industrial Acceleration Plan (IAP) (2014-2020), we will make our proposal based on a knowledge management approach. In this context, our epistemological posture will be interpretative with a constructivism arranged. Our methodological approach will be qualitative. Our study will be in line with a perspective of proactivity and supposition.

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1 Introduction

As part of the development of the Moroccan industry, the Moroccan government has introduced a new industrial strategy as part of the National Industrial Acceleration Plan (NIAP) launched in April 2014 by the Moroccan Minister of Industry and Digital Economy. [1]

This new strategy is based on the organization of companies into industrial ecosystems (IECOS) that aim to establish cooperation between companies by pooling resources and to share knowledge.

In this context, the objectives of the ecosystems set up are to establish cooperation between companies in the aeronautics sector, particularly between large companies (LC) and small and medium-sized enterprises (SME) [2].

The constituent companies of these ecosystems must meet the challenge of competitiveness of the aerospace sector, which is a strategic objective set by the public authorities in the framework of the NIAP [3].

The latter expired at the end of 2020. In order to ensure continuity and safeguard the achievements, the government is preparing a second version of the NIAP (2020-2025) [4]. This second plan aims to establish a second generation of ecosystems called transverse.

It is within this framework that we propose to conduct our research. It is to transpose this new recovery plan to the aerospace industry in Morocco. We will demonstrate how companies in the aeronautics industry can be more competitive by improving the supply chain [5]. It is the transformation of the latter using knowledge management in an ecosystemic context. [6]

The objective of this study is to present this research theme. To this end, i will deal successively with the following points: the context, the emergence of the problem and the research questions, the theories to be mobilized, the interest and the objective of the research, the epistemological and methodological framework. Finally, we will conclude our study with the results. The hypotheses of the conceptual model will be tested at the end of the coronavirus disease.

2 Background of the research

2.1. General context

In an unstable environment, companies adopt strategies to acquire and maintain a competitive advantage. This advantage does not only depend on tangible material products but also intangible products. This is a paradigm shift in the transition from a traditional economy to a new economy. This new management mode consists in creating, capitalizing, transferring and sharing knowledge within organizations. It is therefore clear that competitiveness and organizational performance depend on the requirements of the knowledge economy. [7]

In this new context dominated by the knowledge economy, logistics is a lever of competitiveness. Companies seek to improve their supply chains to gain a more competitive advantage in global markets. To do this, they adopt strategies and actions to achieve their strategic objectives [8].

Thus, knowledge management (KM) is used to improve the supply chain of organizations. To share of knowledge among all stakeholders, the government adopts inter-organizational strategies such as those of business ecosystems [9].

2.2. Specific context

In the context mentioned above, the Moroccan government has put an industrial strategy called the National Industrial Acceleration Plan (NIAP) (2014-2020). This new strategy has enabled Morocco to attract several international investors [10]. The establishment of the latter on Moroccan platforms is encouraged by the logistics strategy implemented by the government.

To safeguard the achievements of this plan and improve the competitiveness of companies, Morocco is preparing a recovery strategy (2021-2025). This is phase 2 of the NIAP. It is a plan organised by the government as confirmed by the Minister of Trade and Industry : "We are already preparing an industrial acceleration plan 2.0 that will take over after 2020. This plan will give a vital part to innovation, R&D, connected objects ... and will further promote the integration into the industrial economic fabric more Moroccan capital." [11] . This new plan, which will have a digital dimension, will give rise to cross-cutting ecosystems (TECOSs)² [12]. These are the transverse digital ecosystem and the transverse innovation ecosystem.

Within the framework of this NIAP 2.0, GIMAS³, which represents companies in the aeronautics industry, has launched a call for reflection [13] to make proposals to boost competitiveness. In the same vein, this grouping has decided in its general assembly to launch the strategy of Industry 4.0 and decarbonization [14] of production. This is confirmed by the President of GIMAS which states : "This plan aims to focus more strongly our activities and our strategy towards new businesses with particular emphasis on advanced technologies of Industry 4.0, innovation and R&D" [15] Karim Cheikh (2020), President of the Group of Moroccan Aerospace Industries (GIMAS). The latter adds by confirming these strategic directions [16] : "In this sense, the Group is focusing on decarbonization, digitalization, industry 4. 0 and the conquest of new markets as new strategic directions "in the same vein, the president of GIMAS continues about the decarbonization [17] : "on the process be implemented and the associated device, the preparation of a device

² Transversal ecosystems

³ Group of Moroccan Aeronautical and Space Industries

encompassing environmental and human aspects (CSR) and "support for the green economy" to accompany the industrialists to move to a decarbonated production and use of renewable energies." Reports the same source (Aujourd'hui le Maroc, 2020).

Our research problematic has emerged from the above statements. We deduce that the implementation of industry 4.0 and decarbonization of production are the new vectors of competitiveness of the aviation industry. This means that it is necessary to transform the current supply chain to a supply chain management 4.0 (SCM 4.0).. It is a real problem that requires a managerial solution.

3. Problem and research questions

From the general and specific context, our research problematic emerged. We formulated it as the following general question:

What are the new vectors of the transformation of the supply chain and how to activate them through knowledge management in an ecosystemic context specific to the aeronautical industry in Morocco?

This issue can be broken down into a set of sub-questions constituting the research axes of our topic:

- 1- What are the key success factors (KSF) of the logistics set up under the INAP (2014-2020)?
- 2- How to improve these KSFs by replacing them with Industry 4.0 and decarbonization?
- 3- Which knowledge management approaches to mobilize to activate these new vectors?
- 4- How can we meet the challenge of Industry 4.0 and decarbonization within the framework of a new Industrial Acceleration Plan 2.0 (IAP 2.0)? And what cross-functional ecosystems should be implemented to facilitate knowledge sharing?
- 5- How will these new vectors of KM origin impact the competitiveness of aeronautical companies in Morocco?

4 Theoretical and conceptual framework

To answer the research questions outlined above, we need to conduct a thorough, multidisciplinary literature review. The objective is to build a relevant theoretical and conceptual framework. We will begin by defining the main concepts that make up our research theme, and then we will discuss the theories of strategic management that we will use to address our problem.

4.1 Definition of the concepts

Within the framework of our review of the literature we will start by the definition of the constituent concepts of the wording of our topic. These are the following keywords and concepts: Knowledge management (KM), competitiveness, aeronautical industry, transversal ecosystems (TSE), innovation, industry 4.0, decarbonation, NIAP 2.0.

4.2 Theories to be mobilized

In order to build a theoretical and conceptual framework for our study, we will mobilize some strategic management theories that we have judged adequate to our problem. In addition to this theoretical foundation, the objective is to place our study within the framework of management sciences, which is our overall field of study. This is very interesting because the temptation is great to treat our subject a little far from the management sciences.

The following theories will be used: business ecosystem theory; resource and organizational learning theory; stakeholder theory and evolutionary theory

5 Epistemological and methodological framework of the research.

We specify in this framework that our epistemological paradigm is interpretativism inscribed in a constructivist orientation (Thietart and al (2014 p 24) [18] and that our methodology is qualitative based on a multi-method approach. We will justify the choice of our postures by the complexity of our research object and that of our subject of study. This complexity is accentuated by the prospective character of our study in an ecosystemic context.

The choice of the constructivist orientation, which is part of the interpretative theory, is justified by our desire to understand reality but also to participate in its construction in collaboration with the actors. This reality, which is the aeronautical industry, is characterized from the anthological point of view by complexity and sophistication. Before starting the process of building a new reality, we will first have to understand the existing one within the framework of the industrialization strategy in force. To do so, we will analyze the practices of the aeronautical actors from the interpretation of their declarations. Through our understanding of the current state of affairs, we will identify the key points of success which are the levers of competitiveness and performance of aeronautical companies within the framework of ESPs [19]. We will highlight in particular the strong points of the organization in ecosystems, the contributions of logistics and decarbonization. In this context, we will insist on the local achievements that are part of the new policy elaborated according to the principle of "local to local" [20] . Our reasoning will be abductive and our research strategy will be triangulation as it will involve documentary research, non-participant observation and semi-directive interviews according to a multiple case study.

6 Objectives and interests of the research

6.1 Research objectives

Our starting point is to make a diagnosis of the Industrial Acceleration Plan (2014-2020), focusing on aeronautical logistics deployed within successful ecosystems. This diagnosis should highlight the problems and identify areas for improvement in the logistics strategy. It is an internal strategic diagnosis that seeks to make an inventory of resources and logistics skills available in the country. The expected goal is to identify the key success factors (KSF) that are behind the level of competitiveness achieved by the aviation industry in the framework of the IPA. The second step in our reasoning is the phase of transformation of the supply chain diagnosed. It is a transition phase to logistics 4.0. It is a question of conducting a change management by mobilizing knowledge management as a

transformation tool [21]. To do this, we will use two distinct but complementary approaches to knowledge management: information systems and human resources. The choice of these two methods is explained by the need for digitalization and specific skills. The objective of this phase is to detect the specific strategic knowledge for innovation, which is not only understood as disruptive innovation, but also organizational and managerial innovation [22]. The last stage of the study is the improvement phase. This is our fundamental objective. It is our point of arrival. That is to say, succeed in designing a transition strategy to the aerospace industry 4.0. This strategy seeks to implement the new vectors of the transformation of the supply chain. These vectors have been identified: Industry 4.0 and decarbonization of production. To activate these new levers, it is necessary to make organizational and managerial innovations. Our study will be closed by a study on the influence of the supply chain 4.0 on the performance and competitiveness of companies in the aviation industry.

6.2 The interests of the research

Our research has theoretical and managerial interest:

6.2.1. Theoretical contributions

It is a contribution to the conceptualization of the theme related to the knowledge economy. Our review of the literature shows that this issue is not sufficiently addressed in academic research, especially in emerging countries such as Morocco. The verification of our conceptual and theoretical framework by an empirical study contextualized to the case of Morocco in the industrial sector will be a new contribution to our research.

At the methodological level, our research will adopt a multi-method approach, inspired by the methodology of context and contextualization (Doha S. and Louitri A., 2020) [23] The dialogical method (Avenier, 2012) [24] and the "research engineering" (Chanal et al, 1997) [25].

We will justify the choice of our postures by the complexity of the research object and that of the subject of study. This complexity is accentuated by the prospective character of our study in an ecosystemic context.

6.2.2. Scientific and managerial interest

At the managerial level and based on the principle of actionable research in management sciences, our work will generate a managerial interest for the benefit of all the actors of aeronautical industry. The empirical study that we will conduct in the context of the Moroccan industry will focus on the evaluation of the impact of knowledge on performance and organizational competitiveness. This will be a contribution to the provision of managers with some tools to implement for the detection and safeguarding of strategic knowledge. Indeed, the theme that will be addressed will allow managers to understand the relationships that can exist between knowledge management (KM) and competitiveness and organizational performance through innovation and this, in an industrial ecosystemic context [26]. This is not just any industry but the aeronautics industry with all its sophistication and complexity. It is precisely these characteristics, in addition to its novelty, that give our theme its originality and scientific interest.

But the most important interest is the contribution to the call for reflection on the future of the aerospace industry in Morocco. It is a contribution also falling

under the resolutions of the board of directors of GIMAS (see: specific context)

7. Research field

The choice of the aeronautical industry in Morocco as the field of investigation is explained by several reasons. First, it is an industry that is characterized by complexity and sophistication. Second, it is an industry that is based on knowledge and innovation [27].

For the purposes of the exploratory study, which will be conducted in amant within the framework of the context and contextualization methodology; our research field will be composed of the constituent elements of ecosystems. These are the public actors represented by the MICEVN⁴, the private actors representing the companies of the aeronautical industry in Morocco and more precisely the GIMAS and the actors in charge of training: universities that do research in aeronautics and vocational training centers such as the IMA⁵ and the ISMALA

For the purposes of the qualitative study, based on the study of multiple cases semi-structured, our field of study will consist mainly of companies in the aerospace industry located on Moroccan platforms.

8. Results of the study: proposal of a research design and a conceptual model.

Our thesis will be structured around three main parts. The first two will be theoretical. They will focus on a review of the literature on the subject studied. They will be closed by the definition of a theoretical and conceptual model of the research. The last part is an empirical part. Its purpose is to verify the validity of our research model in light of the results obtained in the field of study. It also aims to explain the methodological approach followed, to analyze the data collected and to discuss the results obtained.

8.1 Conceptual model according to the knowledge management(KM) approach and its impact on organizational competitiveness (ORCO)

⁴ Ministry of Industry, Trade, Green and Digital Economy

⁵ Institute of Aeronautical Professions and Specialized Institute of Aeronautical Professions and Airport Logistics)

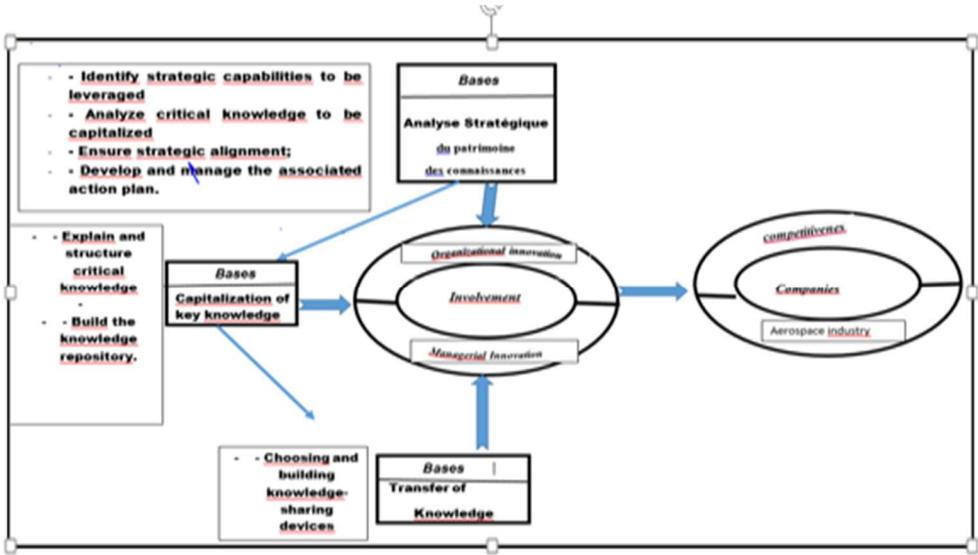


Diagram 1: Diagram of the conceptual model according to the KM

Source: personal design by adaptation from J.L.Ermine (2018) Meyer and Hercovitch 2001

8.2 Conceptual Model for the Implementation of New Supply Chain Transformation Vectors in the Moroccan Aerospace Industry

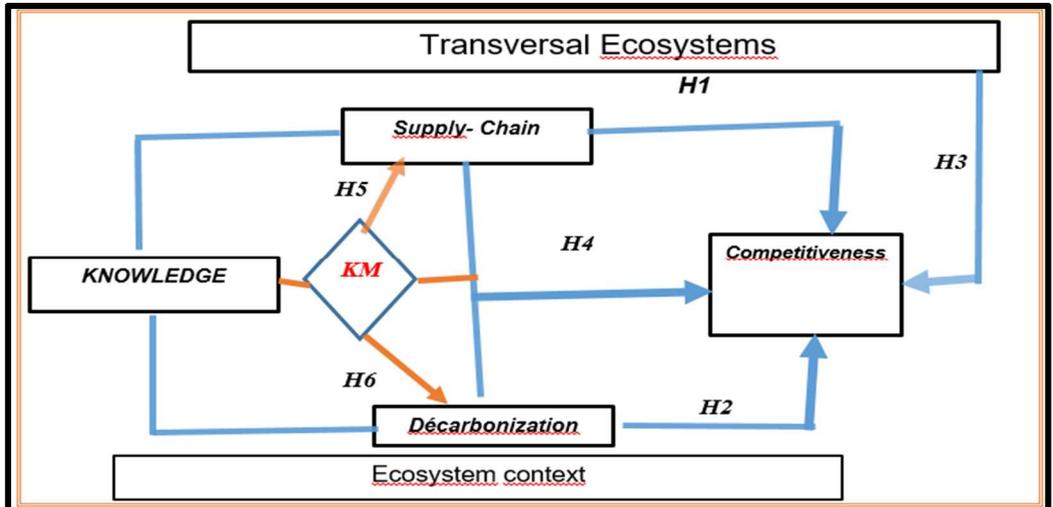


Diagram 2: Diagram of the conceptual model of the study.

Source: personal conception

8.2.1 Definition of variables

- Organizational competitiveness is the dependent variable to be explained ;
- Supply Chain Management is the independent explanatory variable ;
- Decarbonation is the independent explanatory variable ;
- Cross-cutting ecosystems are intermediate variables between the explanatory variables and the variable to be explained ;
- Supply chain and decarbonation together are an independent explanatory variable.
- Knowledge management strategy (SKM) is an intermediate explanatory variable of the direct explanatory variables .

8.2.2 Formulation of hypotheses

- H1 Knowledge-based SCA improvement has a positive impact on the competitiveness of aerospace companies
- H2 Decarbonization of production has an impact on the competitiveness of companies in the aeronautics industry
- H3 Cross-cutting ecosystems indirectly contribute to the improvement of the competitiveness of companies in the aeronautics industry.
- H4 The improvement of the supply chain accompanied by the decarbonization of production has a direct and intense impact on the competitiveness of companies in the aeronautics industry.
- H5 Knowledge selection by SKM will allow the improvement of the SCA (industry 4.0)
- H6 The Choice of knowledge by a SKM will allow a better decarbonization of the aeronautical industry .

9. CONCLUSION

By espousing an interpretativist epistemological posture of constructivist orientation (Thietart and al (2014 p 24), our doctoral research will try to contribute to the ongoing reflection to succeed the program "Morocco aeronautics 4.0". This is the transition from aeronautical logistics to Supply chain management 4.0. The latter is based on the operationalization of transformation vectors that are industry 4.0 and decarbonization of production. The expected contribution of the thesis is to mobilize the knowledge management in its approach to operate the new levers of the transformation of the supply chain. It will attempt to propose a methodology for the implementation of these vectors within companies of the aeronautical industry in Morocco based on knowledge management. Our proposal is a response to the call for reflection launched by the GIMAS on the future of the aeronautical industry. It is also in line with the resolutions of the last meeting of the general assembly of this group representing the companies of the sector. It is also in line with the perspective of collaborative research between the academic world and the world of practitioners according to a "dialogical" model (Marie-Josie Avenier, 2012).

By taking a "local to local" perspective, we are convinced that the challenge of Morocco's aeronautics 4.0 can be met, despite the complexity of this sovereignty industry. Our contribution is to show how to develop it for its simplicity by own and endogenous resources in the Moroccan context despite its sophistication. This is the reason why we will

propose an integrative strategy that integrates, in addition to digitization, other resources based on dynamic and organizational capacities (Teece et al., 1997) and that takes into account the context and contextualization (DOHA.S. and Louitri.A., 2020).

Our doctoral research project is original by its new and innovative character. Innovative because it will propose an organizational innovation by a new strategy which will be conceived within a sovereign sector likely to be pilot of all the national industry. The strength of our contribution is that it will be developed based on theories and methodologies of strategic management. This gives it a conceptual and theoretical foundation giving it the strength to be accepted by the academic world and to be a managerial research actionable on the ground (Chafik Bentaleb, 2020). [28].

The hypotheses formulated in this article presenting our doctoral research will be tested in the near future and we will conduct a quantitative survey in our research field.

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