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Title

LEARNING TO BE LEAN. AN EXPLORATION OF THE DRIVERS TOWARD SUCCESSFUL LEAN MANAGEMENT ADOPTION

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INTRODUCTION

1. Aim and structure of the thesis

This doctoral research is carried out in close cooperation with Lean Experience Factory, the training centre on lean management and Industry 4.0 established by Unindustria Pordenone and McKinsey&Company with partners such the University of Udine.

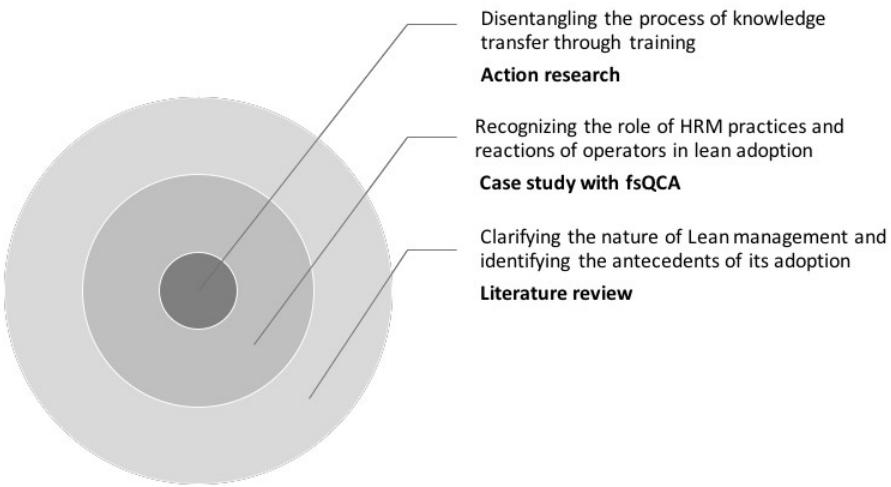
The main goal of this study is to put people –with their knowledge, their ability to learn and change, and their attitudes and motivations– at the centre of the processes of change towards a lean organisation. The literature shows an underdevelopment of the topic, as it has been focusing mainly into the technical side of lean transformation – e.g. which tools use and how to adapt them in the firm – neglecting or paying less attention to the role of people during lean adoption programs.

Specifically, this thesis aims at filling this gap by disentangling the role of people in the process of adoption and implementation of a lean transformation. The thesis is structured in three distinct studies that share this common goal but investigate different topics with different methodologies. The first one is a review and conceptualization of the scientific literature on the antecedents of the adoption of lean management practices. The other two papers are qualitative studies that focus on a specific antecedent, namely training. The second paper conducts an individual-level examination of the interplay between human resource management (HRM) practices – with the remarkable role of training – and reaction to change – specifically, pro-change and anti-change behaviour – on lean management. The third paper takes a different perspective and presents an action research aiming at transferring practices from a functioning training centre on lean management to a newly established one. The paper offers a detailed examination of the process of knowledge transfer when training practices are involved.

In Figure 1 the three papers are represented in the shape of three concentric circles aiming at displaying the kind of interconnection described in this section. The first paper is the outer circle as it is a collection of all the drivers impacting toward

successful lean management adoption. The second paper is the intermediate circle as it deepens two main drivers of lean management adoption – human resource management practices and reactions to change. Among the HRM practices, training plays a remarkable role toward successful lean transformation. Finally, the third paper is the inner circle and it focuses on the specific role of training studied from a different angle – the role played by training methodologies during the process of knowledge transfer by means of international assignee.

Figure 1. Representation of the relationships between the three papers of this thesis.



The first paper of this study consists in a review of the literature on lean management and management innovation. The two notions are compared to study the contact and break-off points of the two topics. The studies on management innovation build on four different theoretical perspectives:

- Institutional perspective (Guillén 1994) takes a macro-level analysis aiming at explaining Management Innovation through institutional and socio-economic conditions. It takes the industry level and tries to define the preconditions that spur toward innovation emersion;
- Fashion perspective (Abrahamson 1991; 1996) focuses on how Management Innovation emerge through the interplay between actors that produce new

managerial ideas and actors that spread them; this perspective opens the issue of Management Fashion;

- Cultural perspective (Knights & McCabe 2000) is addressed to the detection of the potential relationship between organizational culture and Management Innovation; this perspective is interested in the understanding of how Management Innovation shapes and get shaped by the culture of the adopting firm;
- Rational perspective (Chandler 1994) is set on the premise that Management Innovations are introduced by organizations with the goal of reaching an improvement in term of efficiency; it takes that Management Innovation is introduced when a specific problem need to be solved through an innovative solution, that is sustain until it is implemented and adopted.

This study refers to the rational perspective to interpret the organisational outcomes coming from the adoption of management innovation and lean management toward better competitive advantage.

As already stated in literature, lean management is considered a good example of management innovation, but it is poorly defined especially in terms of antecedents. The first paper interprets the phenomenon of lean management according to the management innovation framework thanks to which, lean management antecedents were discerned into five main categories – organisational, managerial, individual, environmental and innovation attributes drivers. Among these five major categories, lean management drivers have taken different relevance among scholars – knowledge management and training are recognized to be two of the most remarkable drivers toward successful lean management adoption.

Training has been scrutinized by the second paper as a possible driver toward successful adoption of lean practices together with pro-change and anti-change behaviour. The analytical model tries to clarify the relationship between human resource practices and people attitude, and lean transformation. Organisational change can be interpreted according to four main perspectives (van de Ven & Poole 1995):

- Life-cycle perspective interprets organisations like biological systems that undergo a predefined sequence of stages of growth and

development; thus, this perspective identifies precise stages of organisational development where change is imminent and necessary;

- Dialectical perspective explains organisations as entities influenced by internal and external colliding forces that encourage change of the status quo; the conflict of the forces produces a new creative synthesis usually treated like a win-lose outcome;
- Evolutionary perspective focuses on the cumulative changes in cycles of variation, selection and retention that organisations face during their evolution;
- Teleological perspective sustains that organisations generally proceed and develop when specific goals are set and they are mainly prone to accomplish to specific purposes and adapt accordingly; in this perspective, environmental and resource-related factors could impact on the achievement of organisational goals.

The teleological perspective assumes the equifinality of organisations toward their goals. This means that they can reach the same targets but with different trajectory and ways. This theoretical approach is particularly consistent with the assumptions of this second paper that examines the equifinal combinations of factors during lean transformation initiatives.

The analytical model has been explored by means of a case study analysed with the tools offered by Qualitative Comparative Analysis (QCA). The results support the outstanding role played by training among the HRM practices; people attitude - pro-change behaviour, has also found support as a driver toward successful lean transformation and open the road to a more systemic analysis of lean management drivers.

Furthermore, knowledge management is the focus of the third paper that studied the role of an “expatriate manager” as a knowledge transfer mechanism within a network-based multinational consultancy company. The epistemological choice is drawn on the Resource-based view (RBV) and Dynamic capabilities perspectives. Barney (1991) cites knowledge as part of the firm resources – i.e. assets, capabilities, organizational processes, firm attributes, information, knowledge – that enable

organisational strategy toward greater effectiveness and efficiency. Consistent with the RBV perspective, scholars like Polanyi (1966) started questioning the difference between tacit and explicit knowledge in terms of competitive advantage, as different kinds of knowledge can lead to different outcomes. A further development of the RBV perspective has risen with the dynamic capabilities framework (Winter 2003; Teece 2007) that assume a dynamic perspective – extension, modification, and creation – of those firm resources that sustain and enhance competitive advantage. In this perspective, knowledge processes like knowledge creation and knowledge transfer are considered fundamental elements and they have gained more and more importance among knowledge management scholars (Nonaka & Takeuchi 1995).

The methodology selected for this topic is the action research, as the researcher was actively involved in the analysis. The researcher has covered the role of the trainer for the launch of a new training centre in America. The results of the study provide support to the argument that expatriate management is an efficient and effective mechanism when the international assignment is carefully designed.

2. Purpose and findings of the three papers

2.1 Adoption of lean practices as management innovation. A review and conceptualization

The first pillar of this study is a literature review that aims at conceptualizing lean management as a form of management innovation (Damanpour 2014) and stressing existing literature gaps.

Lean management is a set of guiding principles, management tools and techniques (Shah & Ward 2003) that define a managerial philosophy aimed at meeting customers' quality expectations by using less of everything compared to mass production (Womack et al. 1990). On the other side, management innovation can be defined as a radical change from traditional managerial principles, processes and practices (Hamel 2006) aiming at further organisational goals (Birkinshaw et al. 2008).

Lean production is cited among the "new business practices" of management innovation in the Oslo Manual and in the Community Innovation Survey. Nevertheless, extant scholarship has not provided yet a clear interpretation of lean management according to the field of management innovation. Moreover, lean management suffers of poor theorization and fragmentation that could be solved by interpreting this phenomenon in the light of management innovation field.

The paper focuses on the antecedents of both management innovation and lean management emphasizing the commonalities. Especially, the study has tried to categorise lean management antecedents according to the five major categories of management innovation antecedents – organisational, managerial, individual, environmental and innovation attributes (Volberda et al. 2013; Damanpour 2014).

From the interpretation of lean management by management innovation framework, two main issues drew the attention to the scholars:

1. From the comparison between lean management and management innovation antecedents there is a remarkable gap in terms of innovation attributes – indeed there are scant contributions (Martínez-Jurado & Moyano-Fuentes 2014) on the impact of innovation attributes toward successful lean management adoption;
2. Scholars who focused on lean management antecedents have mainly focused on the technical side of lean management adoption, while neglecting the human side who play a remarkable and critical role toward successful lean management adoption (Power & Sohal 2000); nevertheless, extant literature does not consider the chance to systemically study how different configurations of lean management antecedents impact on the results of lean management adoption (Pakdil & Leonard 2014).

This literature review offers scholars a systemic analysis of lean management antecedents in the light of the five main categories of management innovation adoption. This study also identifies some open questions that can be further developed by future research effort. Practitioners, on the other side, can better understand the nature on lean

management and better manage the antecedents that can lead to successful lean management adoption.

2.2 The impact of attitude to change and human resource practices on successful lean transformation: a case study

The second paper answers to the call made by the first paper – namely, the underdevelopment of the human side of the lean transformation and lack of systemic analysis on lean management antecedents. It brings together the lean management and change management literatures to study how the perception of HRM practices and the reaction to change can impact on the successful lean transformation disentangled in two main dimensions – implementation of lean practices and organisational performances. The process of introduction of lean transformation can be considered an example of management innovation, but at the same time, it requires organisational changes (Birkinshaw et al. 2008) – e.g. how to perform working activities, how to behave and think during worktime. Innovation and change can be considered "partners" and parts of a more complex theory toward organisational excellence (Poole 2004).

This analytical model has been explored by means of case study through the fuzzy-set Qualitative Comparative Analysis (fsQCA) (Fiss 2011) in an Italian SME working in the food processing industry.

Human resource management (HRM) has gained strategic importance as it is a mean through which organisations can create alignment between human resources and organisational goals (Baird & Meshoulam 1988) such as organisational innovation (Fu et al. 2015). Extant literature has collected a set of practices belonging to HRM field – e.g. training, performance management, communication, and job design (Posthuma et al. 2013) that are also important antecedents for successful lean transformations. These practices are all included in the analytical model explored in the study.

Linked to HRM practices, reactions to change are another important topic to understand the attitude and the perception of people toward the organisational changes brought by lean transformation (Hasle et al. 2012; Tortorella & Fogliatto 2014). Reactions to change have been theorized with multi-level conceptualization – the focus

of the paper is on the dichotomy between pro-change and anti-change behaviour (Peccei et al. 2011). Pro-change reactions are defined as all the extra efforts done by people to accomplish the change (Armenakis & Bedeian 1999) while anti-change reactions are mainly related to non-cooperative behaviours (Herscovitch & Meyer 2002).

In order to explore the analytical model, a survey was designed to capture the perceptions of HRM practices applied in the firm during the transformation process and understand the reactions to change of the people involved in the lean transformation project while analysing social-demographical variables of the involved operators, the degree of lean practice implementation and the organisational performance obtained.

Empirical data were collected through multiple sources, among which a survey, administered to all the employees involved in the transformation, was the main one. These data were analysed by using fsQCA. The outcome of the analysis is four meaningful and equifinal configurations leading toward successful lean transformation. The four configurations were made by a different mix of presence and absence of four sufficient conditions – training, pro-change, anti-change and experience of operators.

The main outcomes form the fsQCA are the following:

1. In order to reach increased organisational performance and lean practices adoption, is it enough to have a critical mass of people with pro-change behaviour;
2. Different configurations of conditions can lead to successful lean transformation;
3. Training is the most impactful HRM practice among the ones considered in the study;
4. The experience gained by the employees in the workplace is a favourable driver toward successful lean transformation.

This paper opens the doors to a systemic view of lean management antecedents by rising how different configurations of antecedents can lead to successful lean transformation. Scholars could take into account this first attempt toward a more comprehensive analytical model considering the entire set of lean management antecedents. Practitioners can design HRM practices, consistent with the conditions

existing in the firm, to create conditions resembling the configurations that are conducive to successful lean transformation.

2.3 Expatriate assignees as knowledge carriers. An action research on the transfer of lean management training capabilities in a multinational consultancy company

Knowledge management is an important lean management antecedent as it is a precondition to improve the workforce's skills and to enable a continuous improvement strategy.

The third paper takes as empirical setting a training centre devoted to building competencies on lean management and Industry 4.0 for managers and operators of industrial and service firms. However, the paper does not focus on the training practices performed by this centre. Instead, it examines the training process that enabled the trainers of a newly established centre to successfully offer their service. The training process is characterized by the transfer of formal and tacit knowledge from a well-established centre, that operates within the framework of a multinational consultancy firm, by means of an "expatriate assignee". Empirically, the study consists in an action research (Davison et al. 2004).

This paper therefore brings together the literatures on knowledge management, human resource management (specifically on training program design), and international business (specifically on expatriate management), to define a novel model of knowledge transfer practices through expatriate assignees in networked firms.

Extant literature has proven how the use of expatriate assignees is able to provide Multinational Enterprises (MNEs) with better knowledge transfer (KT) processes compared to MNEs that do not used this mechanism (Harzing et al. 2016). Maybe this is the reason why the process of knowledge transfer and expatriate management are becoming salient topics in the international business literature. Nevertheless, a detailed analysis is still missing (Harzing et al., 2016) and it is scant in terms of empirical research spanning the factors that impact on the relationship between expatriates and knowledge transfer (Chang & Smale 2013).

Starting from these premises, the goal of the paper is to study how expatriate management could be an effective and efficient knowledge transfer mechanism among units belonging to a network-based MNE (Hedlund 1994) with poor guidelines on knowledge management flows.

The process of knowledge transfer includes different elements that together concur to the effective and efficient transfer of knowledge – the context in which the transfer occurs, the source, the receiver, the mechanisms and the characteristics of the knowledge itself.

In this specific paper, the context is a multinational consultancy company with scant relations between the headquarter and the subsidiaries in terms of knowledge management (Ditillo 2012) – indeed, the headquarter has a role at more strategic level, while knowledge transfer and sharing is left to voluntary actions among units. The units under analysis are five training centres around the world that use model factories and offices to train their clients on lean and digital principles. Model factories are small-scaled production lines and office environments operated by "actors" that enact specific role plays for training purposes. During the experiential workshops, attendees can leverage the model factory and office to learn how to implement lean and digital principles in a "safe" environment.

So far, the training centres have shared best practices through repositories, weekly and monthly calls, and email chains. The limit of these mechanisms became clear when a training centre was launched in America in 2017.

The researcher personally took part in the launch of the American training centre, by transferring the practices for the training of operators that she had learnt thanks a two-year-long experience in an analogous training centre located in the EMEA[1] area. The personal involvement in the project allowed the researcher to perform an action research to exploit the direct involvement and the richness of the interactions (Labaree 2002) to solve a specific problem striking the firm – i.e. enabling the American team to launch the new centre, in a setting characterized by strict deadlines and high performance expectations.

1 Europe, Middle East and Africa.

The knowledge transfer mechanism adopted in this experience can be conceptualized as the "expatriate assignee". An expatriate manager or assignee is a home-country assignee for temporarily staffing key positions in a foreign-owned subsidiary (Fang et al. 2010) and is a powerful device to spread multidirectional knowledge flows. The researcher exactly covered this role by leveraging two years of experience in the EMEA sister training centre. The main task as expatriate assignee was the on-boarding of the operators' crew in charge of performing the shop-floor activities in the model factory.

The kind of knowledge involved in the process of knowledge transfer is a mix of explicit and tacit knowledge (Zander & Kogut 1995) – lean and digital principles, how to perform the shop-floor activities, consistent mind-sets and behaviour in respect to company's values and culture, and how to interact with the client. In order to transfer the main content in these four main concepts, the researcher as expatriate manager and culture carrier (Chang & Smale, 2013) has started a training program where training modes were tailored according to the specific content – e.g. plenary lessons for lean and digital principles, while role modelling to inspire operators toward the right mind-sets and behaviours. This effort was made to maximize the effectiveness and the efficiency of knowledge transfer.

The receiver of the transferred knowledge was the American training centre and especially, the operators that would have run the model factory used for training purposes, keeping in mind the effort of sharing best practices from the EMEA training centre and fostering common standards among the training centres around the world.

From the researcher reflections and the answers given to the qualitative questionnaire submitted to the American training centre team, the following insights can be reported:

1. Expatriate assignment is an effective and efficient knowledge transfer mechanism; it is effective as the operators have included the transferred knowledge in their daily routines, and it is efficient as it is economically sustainable;
2. Expatriate assignment is not sustainable per se but it needs some enablers to work properly – infrastructural, interpersonal and individual variables.

Infrastructural variables deal with the management of international assignment process and the mechanisms used to foster coordination and cooperation while keeping the specialization. Interpersonal variables are linked to the social relationship side of the international assignment and deal with the in-person presence and connection between the researcher, the project team and the operators. The individual variables are mainly linked to the fit between the researcher capabilities and the covered role, and, of course, the motivation to reach the final goal of successfully launching the American training centre.

The research highlights how expatriate assignments could be better exploited within a multinational consultancy company to foster alignment among units and it gives some insights on how to successfully lead the international assignment. This is impactful for practitioners as well who want to better plan and manage a process of international assignment with the main goal of knowledge transfer.

3. Main contribution of the thesis.

These three papers have been designed in order to fill in some underdeveloped topics in the field of lean management:

1. Fragmentation of the literature and underdevelopment of the analysis about the drivers leading to successful lean management adoption;
2. Limited theoretical linkage between the literature on lean management and change management – in specific, the reaction to change and the role of human resource management as an antecedent for successful lean transformation;
3. The transfer of knowledge for the design of innovative models of training on lean management; training is one of the main antecedents of successful lean implementation and firms may substantially benefit from experiential learning.

The thesis intends to contributes to the conceptualization of the antecedents impacting on lean management adoption. The analysis is suffering of different levels of attention on lean management drivers and the lack of a systemic viewpoint of the set of antecedents.

Nevertheless, scholars and practitioners could benefit from a more in-depth understanding of lean drivers as they could better prepare the organisation toward lean management adoption and/or fix the missing antecedents to reach successful results during and after lean management adoption.

The thesis gives also more light to the role of people during lean transformation projects – indeed their attitude toward change and the perception of being trained enough to cope with lean challenges play a remarkable role to reach the planned goals in terms of lean transformation. Especially training was proved to cover a remarkable role also in terms of knowledge transfer – a fundamental element for lean enterprises that sustain common standards and continuous improvement.

These insights strengthen even more the important role played by lean management antecedents and how organisations can benefit from a good management of the same. They also support the contribution of the thesis to the extant literature.

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ADOPTION OF LEAN PRACTICES AS MANAGEMENT INNOVATION. A REVIEW AND CONCEPTUALISATION

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Abstract

An increasing number of manufacturing and service firms considers lean management as a strategy to improve organisational performance. However, lean management adoption is prone to high failure rate.

This study develops a conceptual framework on the adoption of lean management practices, which builds on the review and systematisation of 66 scientific articles on the topic. The definition of the theoretical categories is guided by an analysis of the antecedents of management innovation, of which lean management is a part.

The drivers of lean management adoption resemble those of management innovation and refer to five areas: organisation, management, individuals, environment and the attributes of the innovation itself.

This study finds that the scholarship has not considered the attributes of innovation as a driver of lean management adoption. The analysis of lean management from this perspective represents an opportunity for future research. Finally, this study offers practitioners a reference model to assess the preconditions of the adoption of a lean transformation.

1. Introduction

Since the publication of Womack and Jones' (1990) "*The Machine that Changed the World*", Lean Management has become one of the managerial frameworks of reference for manufacturing and service firms and public sector organisations that aim at achieving both customer satisfaction and cost efficiency (Liker, 2004; Shah & Ward, 2003; Arlbjørn & Freytag, 2013 Holweg, 2007; Stone, 2012; Voss, 1995). Generation, refinement, and diffusion of lean management practices had taken place along the whole second half of the 20th Century, therefore preceding its conceptualisation. Indeed, this philosophy finds its roots in the approach that Toyota implemented to offer increasing levels of product variety despite the limited resources available in the post-WWII Japanese economy.

A considerable body of literature offers evidence that lean practices can improve various dimensions of firm performance, such as inventories and work in progress reduction, quality, productivity, lead time, on-time delivery, batch size, turnover and absenteeism, and so establishing long-lasting competitive advantage (Bonavia & Marin-Garcia 2011; Womack et al. 1990; White et al. 1999; Davy 1992; Bhasin & Burcher 2006; Sisson & Elshennawy 2015). Furthermore, due to its origins, this approach is particularly suitable to achieve competitive advantage in turbulent and adverse industrial conditions (Achanga et al. 2006; Singh et al. 2009). On the other hand, some studies question the efficacy of lean management, emphasising its downsides in terms of individual creativity, organisational learning, working conditions (Mintzberg et al. 2002; Mehri 2006) and suggesting that it resembles more a "managerial fad" than a substantive managerial philosophy (Benders & Bijsterveld 2000; Näslund 2008; Langstrand & Drotz 2015). Non-conclusiveness of the studies on the phenomenon may be due to the poor measurement of its core concepts (Bhamu & Sangwan 2014; Yadav et al. 2017) and to the prevalence of studies describing specific techniques or implementation cases over those taking a theory-building stance, that, for instance, account for only 1% of the scholarly work reviewed by Jasti & Kodali (2015).

Arlbjørn & Freytag (2013) suggest that poor definition of the concept of "lean management" prevents researchers to thoroughly document its impact on business

processes as much as the preconditions that enable or constrain firms to adopt this approach. As Bhamu & Sangwan (2014) point out, there is a lack of consensus and several open issues concerning the stages of lean management adoption process; these range from the absence of a standard framework for adoption to the recognition of the extension and interconnectedness of the factors affecting the process. Indeed, a possible explanation for the high rate of failure of lean initiatives may be found in the fact that organisational, personal, cultural and strategic elements all interact in the various stages of the adoption process. Although lean transformations are often qualified with the metaphor of a journey (Pakdil & Leonard 2014; Dora et al. 2016), our knowledge on the process that underpins lean adoption is scant and poorly integrated, especially with regard to the initial stages of the process (Sisson & Elshennawy 2015) that involve the conditions enabling the activation of the process.

This paper focuses on one of the further developments of this concept – namely, the kind of antecedents that potentially influence the entire lean transformation journey. As the extant literature is fragmented and dispersed among several journals and disciplines, my effort is to systematise all the possible antecedents of lean management adoption in a unified framework. Furthermore, considering the fragmented analysis of the topic, there is the need to organise the set of lean antecedents according to a recognised categorization. The paper proposes to use the one belonging to the management innovation field with the main purpose of providing the practitioners with a clear and structured overview of the critical factors that they should consider when approaching lean transformation.

I rely on an interpretative framework grounded in the literature of management innovation adoption (Damanpour & Aravind 2012) to identify and categorise the factors that impact on the process of lean management adoption. The analysis of the literature on management innovation revealed the existence of five categories of antecedents: organisation, management, individuals, environment and attributes of innovation itself. This approach appears suitable, as the introduction of lean management in a firm can be considered as the adoption of a management innovation. As the literature on lean management has developed in several disciplinary fields adopting heterogeneous theoretical perspectives and methodologies, the identification of a unifying framework

is valuable for the development of this stream of research. The in-depth analysis of 66 articles examining the drivers of lean management adoption revealed that drivers referring to all the five areas, except attributes of the innovation, have been examined, although with different intensity.

This paper offers insights for both scholars and practitioners. First, it tries to make explicit the conceptual connection of the stream of studies on lean management with the one of management innovation. The focus of this connection is on the antecedents of the two phenomena – lean management antecedents can be effectively interpreted through the five major categories of the management innovation field. Secondly, the analysis of lean management antecedents highlights further opportunities for lean management scholars - the investigation of the innovation attributes as a driver of adoption of lean management, the need of a more systemic analysis of the set of antecedents, and the further development of research effort in terms of people-related antecedents.

Moreover, such categorisation is relevant for managers and consultants since it offers an overview of the factors that a change agent needs to acquire or control in order to effectively initiate a successful lean transformation.

The analysis of the antecedents offers other two opportunities for further research efforts. First it suggests researchers to discriminate among antecedents by acknowledging that they may play a different role in lean management adoption process. Secondly, it paves the way to a synergistic investigation on the pool of antecedents to enable a more sophisticated understanding of the phenomenon.

This aspect is of great relevance considering that only the 30% of the organisations succeed during the implementation of lean initiatives (Jadhav et al. 2014). A deep understanding of the main drivers that positively or negatively impact on the likelihood of lean transformations could foster a better understanding and, accordingly, a better adoption and implementation of lean initiatives when organisations look at this kind of programs in order to regain operational performance and competitive advantage.

2. Research design

In order to pursue the goal of this paper – that is to identify the factors underpinning the introduction and implementation of lean management philosophy and practices – I first critically assessed the resemblance of the notions of "lean management" and "management innovation". Once established the relationship between the two, I outlined an interpretative framework on the adoption of lean management practices by drawing on the literature on management innovation. The categories constituting this interpretative framework were based on the thorough analysis of 25 articles examining the drivers of management innovation[2]. Finally, I carried out a review of the literature aimed at identifying the antecedents of adoption of lean philosophy and practices and to systematise them according to the categories emerged from the analysis of management innovation and, if necessary, emerging categories (Straus & Corbin 1998).

The methodology of the review is inspired by the principles of the traditional review and it was carried out according to the eight-step procedure outlined by Jesson, Matheson, & Lacey (2011, p.108):

1. Mapping the field through a scoping review
2. Comprehensive search
3. Quality assessment
4. Data extraction
5. Synthesis
6. Write-up

Considering the main purpose of clarifying the nature and content of lean management antecedents the review was carried out as a conceptual review (Jesson et al. 2011)– a synthesis of a conceptual topic to improve the understanding of the phenomenon.

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2 These articles were identified through a keyword search on EBSCOhost, Scopus, Web of Knowledge and Google Scholar. The search strategy combined terms such as "management innovation" and "administrative innovation", "organizational innovation" and others concerning the antecedents.

The first step was aimed at looking for a literature gap in the lean management field – the scoping review done on the broader topic of lean management let me highlighting the underdevelopment and fragmentation of lean antecedents. This state-of-the-art of the literature spurred me to question what is the entire set of the antecedents that impact on lean transformation, how can be categorized, which kind of impact they have on lean transformation results.

The purpose of the literature review shaped the comprehensive search. The body of literature has been identified by means of a keyword search on the databases EBSCOhost, Scopus, Web of Knowledge and Google Scholar. Searches were performed by combining two sets of keywords: one referred to the object of analysis, i.e. “lean management” and synonymous terms such as “lean production”, “lean manufacturing”, “Toyota Production System”, “lean practices”, “lean thinking”, and “lean transformation”. The other referred to "antecedents" (which included also "adoption", "implementation", "determinants", "success factors").

Starting from a set of 991 papers obtained with the keyword search, I have developed the inclusion and exclusion criteria. I focused on all the papers theoretically or empirically addressing the process of lean transformation – regardless the specific lean technique that was implemented - mentioning the kind of antecedents that influenced the entire process. Further sources were identified by analysing the articles citing and cited by this pool of papers.

The search tested all the possible combinations of keywords, and a quality assessment was performed to decide if the paper should be included or not. The assessment was done reading the abstract and going through the research questions to understand if the paper was consistent with the purpose of the literature review. Not applicable papers as well as not published ones – grey literature – were not considered in the literature review results.

Despite the high numbers of papers coming out from the keywords search, the quality assessment returned 66 peer-reviewed articles about lean management antecedents. Table 1 summarises the journals, authors and publication years of the final set of articles. While the search strategy for this paper focused exclusively on the lean antecedents, the body of literature refers to various academic fields and topics – such as

management, organisation, production/supply chain, public and service – as found in the broader analyses of the topic e.g. the one by Arlbjørn & Freytag (2013).

Table 1 - Description of the body of literature on antecedents of lean adoption.

Journal	n.	Author	n.	Year	n.
International Journal of Operations & Production Management	9	Achanga P.	1	1992	2
International Journal of Production Research	7	Adamides E.D.	1	1996	3
Journal of Manufacturing Technology Management	6	Åhlström P.	1	1997	3
Journal of Operations Management	4	Bhasin S.	3	1998	1
Production Planning and Control	4	Bonavia T.	1	1999	1
Management Decision	3	Bortolotti T.	1	2000	3
International Journal of Production Economics	3	Boscari S.	1	2003	2
Technovation	2	Boyer K. K.	1	2004	2
International Journal of Lean Six Sigma	2	Boyle T.	1	2005	1
International Journal of Business Innovation and research	2	Chay T.	1	2006	6
Human Factors and Ergonomics in Manufacturing	1	Chuang, S-S.	1	2007	1
Journal of Management in Engineering	1	Conti R.	1	2008	5
Knowledge and Process Management	1	Davy J.A.	1	2009	2
European Management Journal	1	Deflorin P.	1	2010	1
International journal of management, accounting and economics	1	Dombrowski U.	1	2011	7
Knowledge Management	1	Dora M.	1	2012	4

research & Practices					
Business Process Management Journal	1	Dubey R.	1	2013	6
Journal of Manufacturing Technology Management	1	Dyer J.H.	1	2014	5
Omega	1	Forghani M.A.		2015	5
Production & Manufacturing Research	1	Forza C.	1	2016	4
Total quality management & Business Excellence	1	Fullerton R.R.	2	2017	2
Procedia CIRP	1	Hallgren M.	1		
Strategic Management Journal	1	Hines P.A.	1		
International Journal of Manpower	1	Ichijo J.R.			
Procedia Engineering	1	Jadhav J.R.	1		
Academy of Management Journal	1	Karim A.	1		
Academy of Management Review	1	Karlsson C.	1		
Academy of Management Perspectives	1	Liker J.K.	1		
The TQM Journal	1	Liu S.			
The International Journal of Human Resources Management	1	Longoni A.	1		
Harvard Business Review	1	Losonci D.	1		
Management Science	1	Marksberry P.	2		
Management Research News	1	Martínez-Jurado P.J.	2		
International Journal of Innovation Management	1	Mason-Jones R.	1		
		Massingham P.	1		
		McLachlin R.	1		
		Mostafa S.	1		
		Mothersell W.M	1		
		Moyano-Fuentes J.	1		
		Netland T.H.	1		
		Pakdil F.	1		
		Papadopoulou T.C	1		
		Power D.	2		
		Ordiz-Fuertes M.	1		
		Saurin T.A.	1		
		Secchi R.	1		
		Seppälä P.	1		
		Shah R.	2		
		Srinivasan J.	1		
		Takeuchi H.	1		

	Taylor A.	1	
	Taylor P.	1	
	Tortorella G.L.	1	
	White R.E.	1	
	Worley J.M.	1	
	Yasin M. M.	1	
	Young S.	1	

3. Conceptual framework

3.1 Defining management innovation

The five types of innovation originally identified by Schumpeter (1911) –new products, new methods of production, new markets, new sources of supply and new ways to organise business– have not received the same amount of attention by scholars. As Damanpour & Aravind (2012) point out, a lot of studies focuses on product and process innovation, leaving non-technical forms of innovation largely unexplored. Such limited interest is surprising since non-technical innovation[3] is credited to be a source of

3 The literature offers a variety of definitions of non-technical innovation, each pinpointing to slightly different aspects of organisational and managerial processes (Daft, 1978; Damanpour, 1987, 1991; Damanpour & Aravind, 2012; Damanpour, Szabat, & Evan, 1989; Hervas-Oliver, Peris-Ortiz, 2014; Volberda et al., 2013; Walker, Damanpour, & Devece, 2011; Richard M. Walker, Chen, & Aravind, 2015). Especially, some authors interpret organisational and management innovation like synonymous (Hervas-Oliver, Peris-Ortiz, 2014; Walker et al., 2015). Other scholars consider management innovation as a combination of managerial, administrative and organisational innovations (e.g. Damanpour, 2014), suggesting that management innovation could be a higher-order concept respect to organisational innovation. Another point of view is that organisational innovation is a set of management, administrative and technological innovation (e.g. Volberda, Van Den Bosch, & Heij, 2013). Again, Mishra & Srinivasan (2008) speak about administrative innovation in a way that recall management innovation and highlight a tight relationship with technological and strategic innovations.

These divergent definitions create ambiguity among scholars and practitioners. Indeed, despite recent advances (Tajeddini & Tajeddini 2012), we still lack a comprehensive framework as the scholarship in the field has produced knowledge that is "*fragmented, poorly grounded theoretically and not fully tested in all areas*" (Crossan & Apaydin, 2010, p.1174).

competitive advantage in itself, to pave the way to the adoption of technical innovation (Birkinshaw, 2006; Damanpour, 2014; Damanpour & Aravind, 2012; Volberda, Van Den Bosch, & Heij, 2013;Abdallah, Phan, & Yoshiki, 2016; Damanpour, 2014; Ganter & Hecker, 2013; Khanagha, Volberda, Sidhu, & Oshri, 2013), and to offer synergies with technical innovation (Abdallah et al., 2016; Armbruster, Bikfalvi, Kinkel, & Lay, 2008; Birkinshaw, Hamel, & Mol, 2008; Damanpour, Walker, & Avellaneda, 2009; Hervas-Oliver, Peris-Ortiz, 2014; Hollen, Van Den Bosch, & Volberda, 2013).

Management innovation is a broad category within non-technical innovation, which has received various definitions, as summarised in Table 2.

Table 2 - Definitions of management innovation.

"Management innovation consists of changing a firm's organisational form, practices and processes in a way that is new to the firm and/or industry, and results in leveraging the firm's technological knowledge base and its performance in terms of innovation, productivity and competitiveness." (Volberda et al., 2013, p.1).
"A management innovation can be defined as a marked departure from traditional management principles, processes, and practices or a department from customary organisational forms that significantly alters the way the work of management is performed. Put simply, management innovation changes how managers do what they do." (Hamel, 2006, p.75).
"Management innovation […] refers to the introduction of new management practices, processes, and structures that are intended at further organisational goals (Volberda, Van Den Bosch, & Mihalache, 2014, p.1246).
"….the invention and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further organisational goals." (Birkinshaw et al., 2008, p.829).

The content of management innovation can be appreciated at two interdependent levels of analysis (Birkinshaw et al., 2008; Sturdy, 2004; Gebauer, 2011). The more abstract level is "management ideas", which refers to a system of assumptions, principles, rules, and procedures about "what managers are ought to do"; "management practices, processes, techniques and organisational structures" represent the operational level and they can be seen as elements combined together to build rules and routines.

The operational level is further explored by Volberda et al. (2013, p.5-6) who define the four concepts as:

1. Management practices: "*what managers do as part of their job on a day-to-day basis and include setting objectives and associated procedures, arranging tasks and functions, developing talent, and meeting various demands from stakeholders*";
2. Management processes: "*the routines that govern the work of managers, drawing from abstract ideas and turning them into actionable tools. These routines include strategic planning, project management, and performance assessment*";
3. Organisational structure: "*how organisations arrange their communication, and how they align and harness the efforts of their members*";
4. Management technique: "*a tool, approach, or technique that is adopted in a business framework*".

Many studies identify performance improvement as the main goal (Damanpour, 2014; Damanpour & Aravind, 2012; Mol & Birkinshaw, 2009; Vaccaro, 2010; Volberda et al., 2013, 2014; Walker et al., 2011, 2015), as they contribute to the creation of a sustainable competitive advantage (Mol & Birkinshaw 2006; Birkinshaw et al. 2008; Volberda et al. 2013; Gebauer 2011; Volberda et al. 2014; Abukhait & Pillai 2017).

3.2 The drivers of management innovation adoption

Within the literature on management innovation – that covers issues such as new management practices, processes, organisational structure and management techniques – this paper focuses on its antecedents, with specific regard to lean management. Lean management can be regarded as a practice that covers all the aforementioned dimensions of management innovation as this philosophy change the way managers work, the organisational structure, the operators' job descriptions, and the tools and

techniques used at operational level. This section introduces the theorisation of management innovation antecedents as reported in Table 3.

The model by Mol & Birkinshaw (2009) distinguishes two kinds of antecedents: the context and the search processes. The context represents a passive approach that hints to isomorphic processes thereby an organisation adopts new management practices to emulate the behaviour of its reference group, i.e. organisations of similar size, market and educational level of the workforce. Search, instead, indicates an active approach: in front of emergent problems, managers actively look for new practices regardless of what their reference group does; three main sources of new knowledge are the organisation itself, the market and professionals. Ganter & Hecker (2013) point out that context and learning are important but not exhaustive in order to explain adoption: they highlight the role the competitive environment, which is qualified by the intensity of competition, the speed of technological change, product homogeneity and brevity of product lifecycle.

Volberda et al. (2013) build upon previous conceptualisations and develop a comprehensive model of the main antecedents, contextual factors and outcomes of management innovation. The antecedents can be divided into two broad categories, depending on the origin within the organisation (managerial and intra-organisational) or between the organisation and its environment (inter-organisational antecedents). Managerial antecedents concern the role played by the higher-level actors of the organisation and the leadership style (transactional or transformational). Intra-organisational antecedents refer to learning routines, resource allocation mechanisms, incentive systems, organisational size, education of the workforce and international scope, and the role of internal change agents at any organisational level. Inter-organisational antecedents include external change agents, involvement with stakeholders –e.g. suppliers, customers, competitors, experts, and universities and public research centres– and interaction with early adopters. These actors stimulate the decision and speed of innovation adoption, by providing complementary resources (Hervas-Oliver & Peris-Ortiz, 2014).

This framework, however, does not consider an antecedent of innovation adoption and modification, namely its attributes (Damanpour 2014). Wolfe (1994)

identified 18 attributes of innovation, that were subsequently summarised by Rogers (1995) into four broader categories: relative advantage, compatibility, trialability, observability, and complexity. The analysis of attributes of management innovation has not been concerned with their impact on adoption, but only with overall performance. Mol & Birkinshaw (2006) assert that radical, systemic and cross-functional, and platform-based innovations offer the greatest potential for performance. Damanpour (2014, p.1272) suggests that the most valuable innovations are those that are "*adaptable, operationally complex (difficult to implement and use), and pervasive (changing administrative structure, authority, and power), and* [whose] *impact is uncertain (clarity of the link between innovation and outcome is low)*".

This analysis suggests that antecedents of management innovation refer to five kinds of factors: organisational, managerial, individual, external/environmental and innovation attributes. Table 3 systematises the most relevant studies that investigated these factors, while the rest of the next section will offer a detailed overview of the most relevant ones.

Table 3 – Antecedents of management innovation.

Organisational factors	• Formalisation (Damanpour & Aravind 2012; Frambach & Schillewaert 2002; Frambach 1993) (-) • Centralisation (Daft, 1978; Damanpour, 1991; Damanpour & Aravind, 2012; Frambach, 1993; Frambach & Schillewaert, 2002; Kimberly & Evanisko, 1981) (-/+) • Organisational complexity (Damanpour & Aravind 2012; Frambach & Schillewaert 2002; Frambach 1993; Damanpour 1996) (-/+) • Organisational size (Damanpour, 1996; Damanpour & Aravind, 2012; Frambach, 1993; Frambach & Schillewaert, 2002; Kimberly & Evanisko, 1981; Mol & Birkinshaw, 2009) (-/+) • Specialisation (Kimberly & Evanisko 1981; Damanpour 1996; Frambach 1993; Damanpour 1991; Baldridge & Burnham 1975) (+) • Functional differentiation (Damanpour, 1996; Kimberly & Evanisko, 1981) (+) • Organisational culture (+/-) (Walker et al., 2015)

	• Diagnostic and implementation capabilities (Harder 2011) (+) • Internal communication richness (Harder 2011) (+) • External integration (Kimberly & Evanisko, 1981) (+) • Organisation-management practice fit (Ansari et al. 2010) (+) • Knowledge sources (Mol & Birkinshaw 2009) (+) • Technological innovation (Ganter & Hecker 2014) (+) • Proactivity (García-Morales et al. 2006) (+) • Prior changes (Wischnevsky et al. 2011) (+/-)
Managerial factors	• Leadership (Volberda et al. 2013; Vaccaro et al. 2012; Humphreys et al. 2005; Vaccaro 2010; Harder 2011) (+) • Managers' tenure (Damanpour & Aravind, 2012; Humphreys et al., 2005; Kimberly & Evanisko, 1981; Vaccaro et al., 2012) (+/-) • Managers' education (Damanpour & Aravind, 2012; Kimberly & Evanisko, 1981) (+) • Management team size (Vaccaro et al. 2012) (+) • Cosmopolitanism (Kimberly & Evanisko, 1981; Mol & Birkinshaw, 2009) (+) • Organisational involvement (Kimberly & Evanisko, 1981) (+) • Shared vision (García-Morales et al. 2006; Vaccaro et al. 2012) (+)
Individual factors	• Internal and external change agents (Volberda et al. 2014; Birkinshaw et al. 2008; Harder 2011) (+) • Employees training and education (Ehigie & McAndrew 2005; Frambach & Schillewaert 2002; Mol & Birkinshaw 2009; Vaccaro 2010) (+) • Employees attitude (Frambach & Schillewaert 2002; Birkinshaw et al. 2008; Humphreys et al. 2005) (+/-) • Occupation of authority position (Kimberly & Evanisko, 1981) (+) • Absorptive capacity (Volberda et al. 2014) (+/-) • Personal mastery (García-Morales et al. 2006) (+)
External/ environmental factors	• Market competition (Damanpour & Aravind, 2012; Damanpour & Schneider, 2006; Frambach & Schillewaert, 2002; Ganter & Hecker, 2014; Kimberly & Evanisko, 1981; Mol & Birkinshaw, 2009) (+) • Size of city (Kimberly & Evanisko, 1981) (+) • Age (Kimberly & Evanisko, 1981) (+) • Social, economic, technological and political forces (Abrahamson, 1996; Volberda et al., 2014) (partial +) • Social network (Frambach & Schillewaert 2002; Frambach 1993) (+)

	• Regulatory regime (Wischnevsky et al. 2011) (+/-) • Market concentration (Wischnevsky et al. 2011) (+) • Marketing capacities of the supplier of innovation (Frambach & Schillewaert 2002; Frambach 1993) (+) • National and cultural conditions (+/-) (Walker et al., 2015)
Innovation attributes factors	• Rogers' innovation attributes (Kapoor et al. 2014; Harder 2011) (+/-)

Note: (+) indicates evidence of a positive effect of the factor, while (-) indicates a negative one.

3.2.1 Organisational factors

The organisational features that influence the adoption of management innovation are formalisation, centralisation, complexity, functional differentiation and size.

Formalisation reflects the degree of specification of procedures, rules and responsibilities for individual employees, and organisational units. Well-established routines can prevent the adoption of new managerial practices. At the same time, resource allocation mechanism can slow down the running of new managerial programs because of the rigidity of the criteria; also, incentive systems offer may enable or constrain learning and experimentation (Khanagha et al. 2013). Centralisation is the measurement of the concentration of decision-making authority within organisations. Formalisation and centralisation are generally negatively related to management innovation initiation (Daft, 1978; Frambach, 1993; Frambach & Schillewaert, 2002; Kimberly & Evanisko, 1981); Damanpour & Aravind (2012) specify that formalisation is positively related to implementation, while centralisation is negatively related to adoption.

Organisational complexity is operationalised in different ways, including the number of locations in which the work is performed, number of jobs or services performed, or number of hierarchical ranks performing different tasks. Organisational complexity has a twofold effect on management innovation: it positively influences initiation but it negatively impacts on implementation (Damanpour & Aravind 2012; Frambach 1993; Frambach & Schillewaert 2002).

Functional differentiation is defined as the number of subunits that constitute the organisation (Damanpour, 1991; 1996) and it is positively related to adoption as well as specialisation (Damanpour, 1991; Frambach, 1993; Kimberly & Evanisko, 1981).

Finally, size is positively related to adoption (Damanpour & Aravind 2012; Frambach 1993; Kimberly & Evanisko 1981; Mol & Birkinshaw 2009). Damanpour (1996) and Frambach & Schillewaert (2002) point out that large firms count on more slack resources, more opportunities for employees growth and more control over the environment but smaller firms are more flexible and innovative than large firms. So, size is not univocally related to adoption.

3.2.2 Managerial factors

Leaders' behaviour allows managers to stress the achievement of organisational goals, to encourage experimentation toward innovation (Volberda et al. 2013) and to overcome the resistances (Humphreys et al., 2005; Burdon et al. 2013). As Tastan & Davoudi (2017) posit, managers' values can moderate the relationship between perceived organizational climate and organizational innovativeness.

Scholars distinguish transactional and transformational leadership styles. Transformational leaders emphasise the communication of a vision and act like change drivers with the main goal of the creation of an environment and culture devoted to change and growth. On the other side, transactional leaders try to work within the existent system instead of changing it (Allen et al. 2013). Effective leadership styles are contingent to the organisational size: in smaller firms, management innovation adoption is enhanced by transactional leadership, while larger firms typically draw on transformational leadership (Vaccaro et al. 2012; Vaccaro 2010; Harder 2011).

Managerial tenure refers to the length of service that managers have within the organisation (Damanpour 1991). The effect of this factor is disputed, with some studies (e.g. Vaccaro et al., 2012) finding a negative relationship between adoption and tenure, and others (Humphreys et al., 2005; Kimberly & Evanisko, 1981) suggesting instead that senior and long-tenured leaders are in the best position to introduce innovation.

Finally, leaders' educational background and vocation toward cosmopolitanism are positively related to adoption-enhancing behaviours (Kimberly & Evanisko, 1981;

Mol & Birkinshaw, 2009; Damanpour & Aravind, 2012).

3.2.3 Individual factors

The role played by individuals during the adoption of management innovation can be articulated into three main aspects: the role of change agents, the education and training of the workforce, and the attitude of people belonging to the organisation.

Internal and external change agents play the role as sponsors and catalysts (Birkinshaw et al., 2008; Harder, 2011). Internal agents are top managers, middle managers, and employees who enable the interest, experimentation and validation of management innovation, while external agents are intellectuals, consultants and academics creating interest, influencing the development and giving legitimation (Birkinshaw et al. 2008; Volberda et al. 2014; Vaccaro 2010). Both kinds of agent influence positively the entire process of management innovation.

Managers and workforce education play a positive effect on adoption. This factor refers to both the personal background (Harder 2011; Mol & Birkinshaw 2009; Frambach & Schillewaert 2002) and the access to internal and external sources of knowledge (Harder 2011). Training concerns the opportunities that the workforce has to learn more on the specific innovation being adopted (Ehigie & McAndrew 2005; Harder 2011; Mol & Birkinshaw 2009; Vaccaro 2010; Frambach & Schillewaert 2002).

Finally, the attitude of the workforce in front of the introduction, implementation, and legitimation of an innovation is highly relevant as management innovation require a cultural fit with the organisation for successful adoption (Humphreys et al., 2005; Birkinshaw et al., 2008).

3.2.4 External/environmental factors

Environmental characteristics refer to the industry in which organisations operates or the set of cultural, social, political and geographical conditions (Damanpour & Schneider 2006).

Relevant industry features include the intensity of competition, the speed of technological change, product homogeneity and brevity of product lifecycle. Competition and market concentration are significant drivers both for technological and

management innovation because they incentivise firms to acquire new knowledge and apply it to a productive use (Damanpour & Schneider 2006; Kimberly & Evanisko 1981; Frambach & Schillewaert 2002; Ganter & Hecker 2014; Damanpour & Aravind 2012). On the other side, cultural, social, political and geographical conditions affect how managers perceive the need for change and the selection and retention processes of management innovation (Abrahamson, 1996; Volberda et al., 2014). Specifically, Damanpour & Schneider (2006) find that community health and population growth are the environmental features that are positively related to management innovation adoption.

4. A systematisation of the literature on the antecedents of lean management adoption

4.1 Lean management as management innovation

Lean management is defined as an exemplary case of management (Mol & Birkinshaw 2006; Gebauer 2011; Damanpour 2014; Mamman 2009; Volberda et al. 2013; Damanpour & Aravind 2012; Mol & Birkinshaw 2009; Birkinshaw et al. 2008; Birkinshaw 2006) or organizational innovation (Boer & During, 2001; Humphreys et al., 2005; Lam, 2004; Lillrank, 1995; Oecd, 2005). Specifically, lean production is cited among the "new business practices" of management innovation in the Oslo Manual and in the Community Innovation Survey, even if this characterisation does not fully capture the broad span definition of this philosophy. Therefore, it seems appropriate to interpret the phenomenon of lean management according to a theoretical framework based on management innovation.

Lean management[4] is a managerial philosophy that has initially been developed by Toyota after World War II, as an answer to the contingent market and economic conditions of Japan (Womack et al., 1990). It can be defined as a set of *"attitudes, decisions and actions"* through which organisations deliver products and services that meet customers' quality expectations by using less of everything compared to mass production (Womack et al. 1990), thereby reaching a sustainable competitive advantage and increasing their value. To use "less of everything", firms pursue a business strategy focused on waste elimination, value creation, and operational efficiency (Shah & Ward 2007): according to Näslund (2008), the extant literature states that manufacturing companies lose from 60% to 70% of their resources in non-value-adding activities. Lean management is the key to reduce the waste of these resources.

Generally speaking, lean management is approached according to two levels of analysis: its guiding principles and the set of management tools and techniques (Shah & Ward 2003; Arlbjørn & Freytag 2013). Womack & Jones (2003) theorised five general principles that embrace the entire philosophy: value, value stream, flow, pull and perfection. The main pillars of lean practices are: Just in Time, Total Quality Management, Human Resource Management, Total Preventive Maintenance (Bortolotti et al. 2015; Marley et al. 2013; Papadopoulou & Özbayrak 2005; Shah & Ward 2003).

4 Lean management has been associated with a model of production since 1988 when Krafcik first characterised it as an alternative approach to mass production. However, despite the assertion that mass production and lean production are poles apart, it is recognised that lean production has been drawn upon rather than away from mass production, and it is the result of the convergence of many new and existing approaches (Parkes, 2015; Arlbjørn & Freytag, 2013; Voss, 1995). Holweg (2007) specifies that lean management is a hybrid system in which novel and imitative elements have been bundled together to create a revolutionary approach.

Even if the early focus of lean management was on shop floor management, its application spreads to other organisational functions, including product development, supply chain management, after-sales (Hinterhuber 1994; Warnecke & Hüser 1995), support activities (Brown & Mitchell 1991), as well as the strategic dimension (Hines et al. 2004) so much that authors emphasise that the application of the principles of "lean thinking" can give rise to a "lean enterprise" (Womack & Jones 2003).

Principles and practices together define the scope of lean management (Bortolotti et al. 2015).

Due to its roots, lean management is particularly suitable to achieve competitive advantage in turbulent and adverse industrial conditions (Achanga et al. 2006; Singh et al. 2009). However, the diffusion of lean principles faces resistances from firms because *"existing companies and workers using older production techniques find it hard to adopt new ways pioneered in other countries"* (Womack et al. 1990).

The literature emphasises rational goals for the implementation of lean initiatives. Indeed, increasing performances (Bonavia & Marin-Garcia 2011; Fullerton et al. 2014; Shah & Ward 2003) understood as *"greater flexibility, reduced lead time, improved speed in order processing, smaller batch sizes and increased profits" (Dubey & Singh 2015)* and long-lasting competitive advantage (Yasin et al. 1997; Hinterhuber 1994; Karim & Arif-Uz-Zaman 2013; Davy 1992) are most cited motivations.

The features of lean philosophy and practices outlined in this section indicate quite clearly that the approach represents a case of management innovation. Indeed, lean management is a philosophical framework that can be translated into strategic and operational principles; this resonates the conceptualisation put forward by Birkinshaw, Hamel, & Mol (2008) who distinguish between management ideas and management practices as forms of management innovation. Lean management is also a body of techniques that entails managerial tasks with regard to objectives, the organisation of others' work and human resource development, as well as the processes of planning and assessment; more importantly, lean management implies a deep rethinking of organisational structure. Therefore, one can find in lean management the features of management practices, processes, techniques and organisational structure that substantiate management innovation according to Volberda et al. (2013), or structure, forms and procedures innovation in Damanpour & Aravind (2012) language.

4.2 The antecedents of lean management adoption

After ascertaining that introduction of lean management represents a kind of management innovation, I interpret the antecedents of lean management adoption in light of the framework outlined for innovation management adoption.

Table 4 systematises the literature on lean management adoption by using the exact same categories characterising innovation management adoption, thus allowing a direct comparison. In the following section, the most cited antecedents are addressed and further explained.

Table 4 – Antecedents of lean management adoption.

Organisational factors	• Lean change strategy (Bhasin, 2012; Hallgren & Olhager, 2009; Hines et al., 2004; Karim & Arif-Uz-Zaman, 2013; Marksberry, 2011; Mothersell, Moore, & Reinerth, 2008) (+/-) • Shared vision and masterplan (Achanga et al., 2006; Bhasin, 2011, 2012; Karim & Arif-Uz-Zaman, 2013; Marksberry, Badurdeen, & Maginnis, 2011) (+/-) • Organisational culture (Bhasin 2012; Karim & Arif-Uz-Zaman 2013; Achanga et al. 2006; Martínez-Jurado & Moyano-Fuentes 2014; Moyano-Fuentes & Sacristán-Díaz 2012; Power & Sohal 1997; Davy 1992; Taylor et al. 2013; Ordiz-Fuertes & Fernández-Sánchez 2003; Jadhav et al. 2014; Sisson & Elshennawy 2015; Dora et al. 2016) (+/-) • Lean organisation structure (Martínez-Jurado & Moyano-Fuentes 2014; Karlsson & Ahlstrom 1996; Power & Sohal 1997; Taylor et al. 2013; Seppälä & Klemola 2004; Fullerton et al. 2014; Mostafa et al. 2013; Dora et al. 2016) (+) • Lean Job design and work organisation (Martínez-Jurado & Moyano-Fuentes 2014; Tortorella & Fogliatto 2014; Power & Sohal 2000; Boyer 1996; Dubey & Singh 2015; Karlsson & Ahlstrom 1996; Jadhav et al. 2014; Power & Sohal 1997) (+) • Performance measures (Bhasin, 2012; Fullerton et al., 2014; Fullerton & Wempe, 2009; Karim & Arif-Uz-Zaman, 2013; Martínez-Jurado & Moyano-Fuentes, 2014; McLachlin, 1997; Mostafa et al., 2013; Netland, Schloetzer, &

	Ferdows, 2015; Pakdil & Leonard, 2014; Parry & Turner, 2006; Saurin, Marodin, & Ribeiro, 2011; Sisson & Elshennawy, 2015; Yasin et al., 1997) (+) • Knowledge management (Adamides, Karacapilidis, Pylarinou, & Koumanakos, 2008; Boscari, Danese, & Romano, 2016; Chuang, Chen, & Tsai, 2015; Dombrowski, Mielke, & Engel, 2012; Dyer, Goldstein, & Nobeoka, 2000; Forghani & Tavasoli, 2017; Ichijo & Kohlbacher, 2008; Knuf, 2000; Liu, Leat, Moizer, Megicks, & Kasturiratne, 2013; Massingham & Al Holaibi, 2017; Secchi & Camuffo, 2016; Tortorella & Fogliatto, 2014; Zhang & Chen, 2016) (+/-) • Organisational communication (Martínez-Jurado & Moyano-Fuentes 2014; Worley & Doolen 2006; Chay et al. 2015; Power & Sohal 1997; Power & Sohal 2000; Papadopoulou & Özbayrak 2005; Takeuchi et al. 2008; Parry & Turner 2006; Losonci et al. 2011; Mostafa et al. 2013; Jadhav et al. 2014; Sisson & Elshennawy 2015) (+/-) • Pilot change (Bhasin 2012; Martínez-Jurado & Moyano-Fuentes 2014) (+) • Unionization (Bhasin 2012; Power & Sohal 1997; Shah & Ward 2003; Dora et al. 2016) (-) • Deep rooted culture of total quality (Bhasin 2012; Power & Sohal 1997; Martínez-Jurado & Moyano-Fuentes 2014) (+) • Problem solving (Karim & Arif-Uz-Zaman, 2013; Marksberry et al., 2011) (+) • Continuous improvement (Karim & Arif-Uz-Zaman 2013; Karlsson & Ahlstrom 1996; Moyano-Fuentes & Sacristán-Díaz 2012; Jadhav et al. 2014; Sisson & Elshennawy 2015) (+) • Financial capabilities (Karim & Arif-Uz-Zaman 2013; Achanga et al. 2006; Moyano-Fuentes & Sacristán-Díaz 2012; Jadhav et al. 2014) (+) • Lean technical innovations (Martínez-Jurado & Moyano-Fuentes 2014; Karlsson & Ahlstrom 1996; Davy 1992; Mostafa et al. 2013; Sisson & Elshennawy 2015) (+) • Lean programs focused on manufacturing and non-manufacturing processes, including supply chain management (Sisson & Elshennawy 2015) (+) • Nature of the plant, process and product (Dora et al. 2016)
Managerial factors	• Top management involvement and commitment (Achanga et al., 2006; Bhasin & Burcher, 2006; Boyer, 1996; Davy, 1992; Dora et al., 2016; Dubey & Singh, 2015; Jadhav et al., 2014; Marksberry et al., 2011; Martínez-Jurado & Moyano-Fuentes, 2014; McLachlin, 1997; Sisson & Elshennawy, 2015; Worley & Doolen, 2006; Yasin et al., 1997) (+)

	• Human Resources management (Martínez-Jurado et al. 2013; Tortorella & Fogliatto 2014; Bonavia & Marin-Garcia 2011; Power & Sohal 1997) (+) • Top management leadership (Karim & Arif-Uz-Zaman 2013; Moyano-Fuentes & Sacristán-Díaz 2012; Power & Sohal 2000) (+) • Top management resistance (Jadhav et al. 2014) (-) • Lack of cooperation and mutual trust with employees (Jadhav et al. 2014) (-)
Individual factors	• Training (Bhasin 2012; Karim & Arif-Uz-Zaman 2013; Martínez-Jurado et al. 2013; Dubey & Singh 2015; Power & Sohal 1997; Power & Sohal 2000; Davy 1992; Boyer 1996; Yasin et al. 1997; Pakdil & Leonard 2014; Taylor et al. 2013; McLachlin 1997; White et al. 1999; Worley & Doolen 2006; Mostafa et al. 2013; Jadhav et al. 2014; Sisson & Elshennawy 2015; Dora et al. 2016) (+/-) • Rewards (Martínez-Jurado et al. 2013; Power & Sohal 1997; Power & Sohal 2000; Bhasin 2012; Young 1992; Netland et al. 2015; Srinivasan 2010; Bonavia & Marin-Garcia 2011; Boyle et al. 2011; Bortolotti et al. 2015; Forza 1996; Jadhav et al. 2014; Sisson & Elshennawy 2015; Dora et al. 2016) (+/-) • Employees involvement (Chay et al. 2015; Power & Sohal 2000; Power & Sohal 1997; Fullerton & Wempe 2009; McLachlin 1997; White et al. 1999; Davy 1992; Longoni et al. 2013; Åhlström 1998; Shah & Ward 2007; Jadhav et al. 2014; Sisson & Elshennawy 2015) (+) • Initial scepticism and resistance (Bhasin 2012; Achanga et al. 2006; Martínez-Jurado et al. 2013; Power & Sohal 1997; Davy 1992; Yasin et al. 1997; Boyle et al. 2011; Conti et al. 2006; Jadhav et al. 2014) (-) • Skills (Karim & Arif-Uz-Zaman 2013; Martínez-Jurado et al. 2013; Moyano-Fuentes & Sacristán-Díaz 2012; Hines et al. 2004; Liker & Morgan 2006; Bhasin & Burcher 2006; Bhasin 2012; Tortorella & Fogliatto 2014; Deflorin & Scherrer-Rathje 2012; Dubey & Singh 2015; Bonavia & Marin-Garcia 2011; Worley & Doolen 2006) and expertise (Achanga et al. 2006; Martínez-Jurado et al. 2013; Moyano-Fuentes & Sacristán-Díaz 2012; Power & Sohal 2000; Boyer 1996) (+) • Feedback (Fullerton & Wempe 2009; Power & Sohal 2000; Worley & Doolen 2006) (+) • Job security (Martínez-Jurado et al., 2013; Mason-Jones and Towill, 2008) (+) • Motivation (Martínez-Jurado et al. 2013) (+) • External change agent (Martínez-Jurado et al. 2013; Jadhav et al. 2014) or sensei (Sisson & Elshennawy 2015; Dora et al. 2016) (+)

	• Lean leader role (Bhasin 2012; Martínez-Jurado & Moyano-Fuentes 2014) (+/-)
External/ environmental factors	• Competitive rivalry (Bhasin 2012; Hallgren & Olhager 2009) (+) • Bargaining power of customers (Bhasin 2012; Davy 1992; Yasin et al. 1997; Jadhav et al. 2014) (+) • Threats of new entrants (Martínez-Jurado & Moyano-Fuentes 2014) (+) • Institutional support (Martínez-Jurado & Moyano-Fuentes 2014) (+) • Management of external relationships (Moyano-Fuentes & Sacristán-Díaz 2012; Davy 1992; McLachlin 1997; Jadhav et al. 2014) (+) • Socio-economic and socio-cultural context (Moyano-Fuentes & Sacristán-Díaz 2012) (+/-)
Innovation attributes factors	• No references

Note: (+) indicates evidence of a positive effect of the factor, while (-) indicates a negative one.

4.2.1. Organisational factors

An appropriate change strategy is an important aspect to consider when an organisation wants to improve the likelihood of a successful lean management adoption: an organisation needs to know where it wants to go and how it wants to get there (Bhasin 2012). This is one of the underdeveloped topics in the field of lean management and one of the main reasons why lean transformation lack sustainability over time (Hines et al. 2004). Even worse, lean strategy selection is usually driven by "a common sense of judgment" rather than a rational choice: an inappropriate lean strategy could lead to increased waste, cost and production time (Karim & Arif-Uz-Zaman 2013; Bhasin 2012). Therefore, successful lean adoption need a consistent (Bhasin 2012), clear (Achanga et al. 2006; Bhasin 2011) and holistic (Martínez-Jurado & Moyano-Fuentes 2014) vision.

Another remarkable success factor for lean management adoption is organisational culture, that sustains the adoption of a certain strategy only if it is consistent, otherwise, it becomes an "invisible barrier" (Ordiz-Fuertes & Fernández-Sánchez 2003). A sustaining culture is one that is devoted to sustainable and proactive improvement (Achanga et al. 2006; Taylor et al. 2013), is employee- oriented (Bhasin 2012; Davy 1992; Power & Sohal 1997; Taylor et al. 2013), is customer satisfaction-

oriented (Karim & Arif-Uz-Zaman 2013; Power & Sohal 1997; Taylor et al. 2013) and is rooted to total quality goals (Martínez-Jurado & Moyano-Fuentes 2014; Power & Sohal 2000). Initiatives of continuous improvement, operational efficiency, teamwork and short-term results will promote a culture enabling sustainability of lean transformations over time (Bhasin 2012).

Lean initiatives are influenced by the organisational structure as well. Some pre-existing elements of organisational structure trigger lean adoption such as empowered teams (Fullerton et al., 2014; Power & Sohal, 1997), few hierarchical levels (Hinterhuber 1994; Seppälä & Klemola 2004), functional integration (Boyle et al. 2011), and the prominent role of lean leader and other relevant positions like lean experts and change agents (Martínez-Jurado & Moyano-Fuentes 2014; Mostafa et al. 2013).

Lean organisations are set on team-based work. The role of teams is prominent as they are entrusted with solving problems (Tortorella & Fogliatto 2014; Dubey & Singh 2015; Karlsson & Ahlstrom 1996), developing new production methods (Boyer 1996; Martínez-Jurado & Moyano-Fuentes 2014), and being responsible for day-to-day performance (Power & Sohal 1997). The main requirements for team members are multi-skilling, flexibility, problem-solving capability, self-discipline, cooperativeness and commitment (Power & Sohal 1997; Power & Sohal 2000; Forza 1996). A related feature is job design and content. As the teams are usually multi-functional and independent in their activities, workers are usually subdued to job rotation, job variety and job enlargement (Shah & Ward 2003; Forza 1996) thanks to cross-training initiatives.

Lean practices are effective when accompanied by the collateral use of a performance measurement structure especially because they provide an operational, visual and timely guidance toward company strategy and goals (Fullerton & Wempe, 2009; Netland et al., 2015; Parry & Turner, 2006). Performance measurement is meaningful both before, during and after adoption to compare the as-is and the lean states (Karim & Arif-Uz-Zaman 2013), and to understand the progress of lean adoption (Pakdil & Leonard 2014). Some examples of lean indicators are: lead time, reworks and scraps inventory, overall equipment effectiveness (Saurin et al. 2011), quality,

throughput efficiency and customer service (McLachlin 1997; Netland et al. 2015). Adoption often fails in successful performance management because organisations are not able to set proper and integrated metrics and reporting processes (e.g. daily meeting and visual management of operational and financial performance), that are able to measure the results coming out from lean initiatives (Karim & Arif-Uz-Zaman, 2013; Netland et al., 2015).

Lean initiatives are devoted to continuous improvement and, in order to sustain this effort, they need to accurately transmit the necessary information among the involved employees (Chay et al. 2015). The design of communication channels is crucial to accelerating lean management adoption, so as to assure open, frequent, concise, and visual communication flows throughout the organisation (Martínez-Jurado & Moyano-Fuentes 2014; Papadopoulou & Özbayrak 2005; Parry & Turner 2006; Power & Sohal 2000; Power & Sohal 1997; Takeuchi et al. 2008; Worley & Doolen 2006). Communication is fundamental to maintain the "momentum" during lean transformations and it is particularly useful during the first stages of the transition in order to get the management nearer to the shop-floor and improve the understanding among employees (Martínez-Jurado et al. 2013; Losonci et al. 2011).

According to Nonaka (2007), lean organisations reach their competitive advantage thanks to people skills and expertise in the creation of new knowledge, dissemination of the same throughout the organisation, and its incorporation into products, services and systems. At network-level the kind of knowledge management applied in Toyota and aimed at lean principles adoption is able to cover all the knowledge layers – know-what, know-why, know-how and know-with – and, at the same time reduce the wastes usually hindering knowledge management processes (Liu et al. 2013; Zhang & Chen 2016). The main reason that explains this success in knowledge transfer processes is due to the firm capability of solving for the three knowledge dilemmas linked to people motivation in knowledge transfer, preventing the free rider behaviour, and reduce the cost associated with the management of valuable knowledge (Dyer & Nobeoka, 2000). On the other side, an inter-organisational infrastructure helps to efficiently manage the network-level knowledge management – specifically through supplier association, problem-solving consulting teams, voluntary learning teams and inter-firm employees

transfer. These structures are consistent with the main pillar of transforming tacit knowledge into explicit and organisational knowledge and this is possible only sustaining direct contacts with the employees according to the front-line management principles (Ichijo & Kohlbacher 2008; Staats & Upton 2011). This seems to be the next frontier to leverage the possible benefits from a lean transformation (Knuf 2000), indeed it is proved that knowledge management is positively related to organisational performances in lean organisations (Forghani & Tavasoli 2017).

4.2.2 Managerial factors

The most meaningful managerial factor is top management commitment. A strong commitment from the top management supports the introduction of any new idea within an organisation, especially with regard to productivity-enhancing initiatives (Achanga et al. 2006). More specifically, a strong commitment to top management is positively related to the adoption of lean practices (Davy 1992; Dubey & Singh 2015; Yasin et al. 1997; Martínez-Jurado & Moyano-Fuentes 2014), probably because it induces employees' involvement (McLachlin 1997). When managers fail to demonstrate their commitment toward lean adoption, they would intentionally or unintentionally compromise organisational effort (Worley & Doolen 2006; Power & Sohal 1997). Boyer (1996) tried to quantify managerial commitment by focusing on specific kinds of infrastructural investments: quality leadership, use of small teams for problem-solving training and employees' empowerment.

4.2.3. Individuals factors

Individual factors play an important role during lean management adoption programs. Indeed, it can be said that the difference between a successful and unsuccessful lean management adoption lies in the way the company treats its workers (Jadhav et al. 2014) and manages the work environment (Hasle et al. 2012), as their attitudes toward lean is the most critical issue during the transformation.

Managerial and workforce training is considered one of the main important driving factors needed to implement the right tools and instil the right culture (Bhasin 2012; Boyer 1996; Davy 1992; McLachlin 1997; Taylor et al. 2013; White et al. 1999;

Worley & Doolen 2006). Lean training should provide managers and workforce with knowledge about lean techniques, lean philosophy, and implementation roadmaps (Karim & Arif-Uz-Zaman 2013). The main goal of lean training is the development of multi-skilled workforce who is capable of shouldering the increased responsibility, sustain the continuous improvement effort (Dubey & Singh 2015; Martínez-Jurado et al. 2013; Power & Sohal 1997; Saurin et al. 2011) and change colleagues' attitudes toward this approach (Martínez-Jurado et al. 2013). A proper training drives to increased productivity, quality, and customer satisfaction as well as to improved teamwork (Dubey & Singh 2015; Pakdil & Leonard 2014), that is one of the antecedents explained in the section of organisational factors. What is even more important is that training should be ongoing and planned in a long-term vision (Power & Sohal 1997; McLachlin 1997; Power & Sohal 2000).

Monetary (e.g. bonuses based on operational improvements) and non-monetary rewards (e.g. employees celebration and awards) are important in innovation programs, and specifically in lean ones (Young, 1992; Netland et al., 2015; Srinivasan, 2010). Sometimes, organisational development aspects like the performance reward structure are neglected during lean transformation, despite its importance for holding the project together (Bhasin 2012). It is important to refrain from linking rewards to production volume, since such incentives would create resistance: rewards should be associated with the results obtained by the pilot team, to create commitment and loyalty to the transformation effort (Martínez-Jurado et al. 2013; Ehigie & McAndrew 2005; Forza 1996; Bonavia & Marin-Garcia 2011) and they should reinforce those behaviours sustaining lean values (Power & Sohal 1997; Netland et al. 2015). If properly designed, rewards systems are positively related to the increase of productivity and operational performance, to motivation and to a more extensive lean implementation (Netland et al. 2015; Young 1992; Bortolotti et al. 2015; Boyle et al. 2011). Martínez-Jurado et al. (2013) discuss the effect of monetary and non-monetary rewards on employee behaviour finding that the latter is stronger.

As a consequence of the new organisational structure based on continuous improvement, less hierarchy, and teamwork, employees should be fully involved and engaged in their activities in order to reach the goals of lean transformation. Employees'

involvement refers to their commitment to problem-solving, continuous improvement and decision making (Chay et al. 2015; McLachlin 1997; Power & Sohal 2000; White et al. 1999; Davy 1992; Power & Sohal 1997). People involvement is indeed one of the several lean tools as well as one of the most critical drivers toward successful lean adoption (Åhlström, 1998; Chay et al., 2015; Fullerton & Wempe, 2009; McLachlin, 1997). In summary, employees' involvement is both a prerequisite and an antecedent of lean adoption.

It is recognised that the great part of failure cases during lean initiatives is due to people-related barriers. Opposition coming from employees is mainly due to fear and anxiety that could rise both in the pilot and in the adoption phases. Employees could raise resistance to learn new skills and accepting all the changes that lean transformations require (Power & Sohal 1997; Martínez-Jurado & Moyano-Fuentes 2014; Scherrer-Rathje et al. 2009). Indeed, lean practices and philosophy expose the workforce to new technologies, new working conditions and new expectations in terms of organisational performance (e.g. productivity and quality), and these new conditions can make the employees feel stressed, dissatisfied and unengaged toward lean achievements (Conti et al. 2006).

Skills and expertise are the basis on which organisations can foster innovation (Achanga et al. 2006), and critical also for successful lean management adoption (Karim & Arif-Uz-Zaman 2013; Achanga et al. 2006; Boyer 1996; Power & Sohal 2000; Bhasin & Burcher 2006; Tortorella & Fogliatto 2014). Indeed, fostering the development of new skills in the workforce helps to sustain one of the main goals of lean initiatives, namely, continuous improvement (Boyer 1996; Liker & Morgan 2006). The team leading lean transformation should have technical knowledge (Liker & Morgan 2006; Dubey & Singh 2015; Deflorin & Scherrer-Rathje 2012) accompanied by innovation and problem-solving skills (Deflorin & Scherrer-Rathje 2012). This is to say that people should achieve sufficient expertise in lean strategy and implementation methodology otherwise they could adversely affect the successful adoption (Karim & Arif-Uz-Zaman 2013; Martínez-Jurado et al. 2013). Skills programs are mainly carried out with the goal of creating a multi-skilled workforce able to be versatile and flexible in the shop-floor (Martínez-Jurado et al. 2013; Power & Sohal 2000; Driel & Dolfsma

2009; Bonavia & Marin-Garcia 2011; Dubey & Singh 2015) and who can also handle increased responsibility (Boyer 1996; Power & Sohal 2000; Dubey & Singh 2015). Obviously, these workforce's traits are dependent on recruitment and enhancement of capable workers, the provision of training and innovation, as well as a full support from top management (Achanga et al. 2006; Boyer 1996) and a strong motivation among employees (Bonavia & Marin-Garcia 2011). For these reasons, they should be considered as a long-term asset investment (Power & Sohal 2000). This is particularly meaningful as sometimes employees feel under pressure if the organisation does not let them enough time to develop the skills needed to sustain lean transformation (Worley & Doolen 2006).

However, despite the important role of people, the great part of the literature has focused on the technical side (Power & Sohal 1997; Stone 2012) trying to understand which tools should be included in a lean transformation and with which sequence (Åhlström 1998). This causes great drawbacks in lean adoption, impeding organisations to apply a lean full system (Hasle et al. 2012; Marin-Garcia & Bonavia 2015).

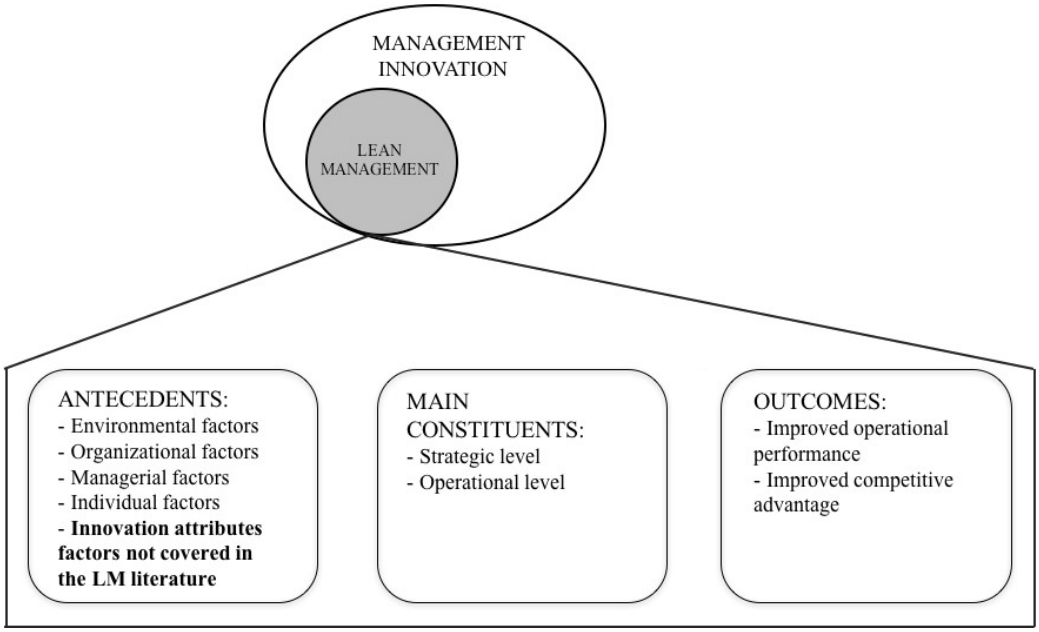
5. Discussion

This study analyses the antecedents of lean management adoption according to a conceptual framework that draws on the process of management innovation adoption. The focus is on lean management antecedents interpreted according to a categorisation building on the literature on management innovation. Therefore, this investigation initially disentangled the notion of management innovation, to which lean management is often associated.

This study made an effort to forward substantiate the deeply rooted assumption that lean management is a kind of management innovation, by applying the categories developed in this latter stream of literature to interpret the phenomenon of lean management. This analytical effort proved to be successful, as it emerged that the constituents of management innovation – i.e. the strategic and operational level of analysis and the antecedents toward the implementation of the two phenomena – overlap those of lean management; furthermore, antecedents of lean management can be

suitably understood according to the exact same categories characterising antecedents of management innovation. Therefore, this study contributes to substantiating from a theoretical point of view the notion that lean management is a form of management innovation. Figure 1 visualises these relationships.

Figure 1 - A visualisation of the relationship between management innovation and lean management adoption.



More in detail, the analysis of lean management antecedents according to the five categories derived from the management innovation framework allows to appreciate what are the issues on which our knowledge is more developed and to identify unexplored, yet theoretically relevant, themes.

Table 5 summarises the topics investigated in this literature, organised according to the kind of antecedents (i.e. organisation, management, individuals, environment, and innovation attributes) and intensity of investigation, measured by the number of publications dealing with that topic. A higher frequency of investigation may indicate that a given topic is more relevant for the understanding of the phenomenon; moreover,

it signals that the literature offers managers a well-developed knowledge base on these issues. The highly-investigated topics are: knowledge management; organisational communication; organisational culture; performance management; organisational structure and lean strategy as organisational drivers; managerial commitment; training; rewards; employees' involvement and skills.

Table 5 – Ranking of lean management antecedents

Driver of adoption	**Number of occurrences**				
	1-3	4-6	7-9	10-12	12+
Environmental	Threats of new entrants; Institutional support; Socio-economic/ cultural context (1) Competitive rivalry (2)	Bargaining power of customers; Management of external relations (4)			
Organisational	Holistic lean programs; Nature of plant, process and product (1) Problem-solving; Pilot change (2) Deep-rooted culture on RCPS (3)	Financial capabilities; Unionisation (4) Lean technical innovations; Continuous improvement; Shared vision and masterplan (5) Lean change strategy (6)	Lean organisation structure; Lean job design (8)	Org. culture; Org. communicatio n (12)	Performance measures; Knowledge management (13)
Managerial	Lack of cooperation;	Human Resource			Top management

	Top management resistance (1) Top management leadership (3)	Management (4)			involvement and commitment (13)
Individual	Motivation (1) Lean leader role; Job security; External change agent (2) Feedback (3)	Expertise (5)	Initial scepticism and resistance (9)	Employees involvement; Skills (12)	Rewards (14) Training (18)
Innovation	N/A	N/A	N/A	N/A	N/A

It is important to notice that the examination of the mere frequency of investigation of a given antecedent does not necessarily relate to its impact on a lean transformation. Indeed, the literature still lacks a systematic appreciation of the relative contribution of the antecedents on the outcomes of a lean transformation. Furthermore, the outcomes of a lean transformation can be conceived in terms of the extent to which work practices are changed towards the principles of lean management, and the extent to which organisational performance improves. Further research could fruitfully analyse the effect of antecedents on these two dimensions of outcomes of a lean transformation.

The literature review and the comparison of the two phenomena gave the chance to make lean management antecedents being interpreted according to the five main categories of management innovation antecedents. Going more in details in terms of contents, the two sets of antecedents have some commonalities and discrepancies.

Management innovation and lean management organisational factors show a consistent picture in terms of content. They both focuses on topic such as organisational structure, organisational culture, organisational communication and knowledge, and prior experience of change. The main difference stands in terms of scholarship focus. Indeed, management innovation scholars have stressed more the role of organisational structure toward management innovation, giving insights mainly on the degree of

formalisation, centralisation and differentiation that are consistent with the lean organizational structure.

As managerial factors are regarded, the great effort of both management innovation and lean management scholars has been on the behaviours of managers during the transformation. How they behave plays a remarkable role to favour both management innovation and lean management initiative while limiting resistances. A discrepancy that should be pointed out is that while management innovation scholars have focused more on the personal traits and past experiences like managers' education, lean management scholars have addressed more the human resource management strategy side of the managers.

Individual factors are mainly linked to the workforce involved in the management innovation and lean management initiative. The touch points between the two literature fields are remarkable – the kind of employee attitude and fit with the organisation is particularly stressed as well as the level of training and job descriptions such as change agents. Lean management literature stressed also the important role of the lean leader who is the main owner and sponsor of the lean transformation.

Finally, environmental factors deal mainly with the external conditions that can impact on the organisational will toward management innovation or lean initiatives. The specific factors impacting in management innovation and lean initiatives are consistent as scholars mentions competitive, socio-economic and socio-cultural forces as the main external drivers for both the literature bodies. Nevertheless, it is evident the more stressed attention from the management innovation scholars than the lean management ones on these factors.

In terms of innovation attributes factors, lean management literature indicates the existence of a gap. Lean scholars mainly neglected this dimension with the very partial exception of some authors asserting that lean initiatives are "complicated" (Martínez-Jurado & Moyano-Fuentes 2014) and need to be "systemic" (Karim & Arif-Uz-Zaman, 2013; Marksberry et al., 2011) in order to produce the expected results. This gap could be filled by management innovation literature that deepen this topic through the 18 traits identified by Wolfe (1994) and further synthesised by Rogers (1995) - advantage, compatibility, trialability, observability and complexity. As this issue is not

systematically explored for lean management initiative it could represents a promising avenue for further research.

Moving from a purely quantitative analysis to the appreciation of the literature, it is possible to identify other additional shortcomings of the existing scholarship that pave the way to future investigations.

First, the extant literature suggests that antecedents are all equivalent in terms of weight toward successful lean management adoption (Sisson & Elshennawy 2015). This shortcoming seems to be highly relevant also for practice, as many of the failure cases in lean transformation can be related to people-related barriers (Bhasin 2012; Martínez-Jurado et al. 2013; Snell & Dean 1992; Sparrow & Otaye-Ebede 2014; Liker 2004). An opportunity for future research is the differentiation among the role of the various factors that might disclose that specific antecedents are more likely to produce specific kinds of outcomes.

Second, existing studies tend to consider antecedents separately from one another, missing the analysis of synergistic effects and without looking at the complete picture of the adoption process (Pakdil & Leonard 2014). While this approach helps to gain a deeper knowledge on each antecedent, it comes at odds with the holistic view characterising lean management. Indeed, scholars put forward that the role of people is underdeveloped or, if addressed, subdue to oversimplification (Power & Sohal 2000) – e.g. simple causal relations among a single individual driver and the success/non-success of the lean program. A promising avenue for future research seems to be the analysis of people-related antecedents according to a systemic perspective that acknowledges the complex interplay among the factors intervening in lean management adoption projects. From an empirical point of view, it seems highly interesting to discover the possible complementary, substitution and trade-off effects among the five kinds of antecedents and their impact on different kinds of outcomes of lean management adoption projects. From a theoretical point of view, this framework discloses great opportunities for speculating on the process of lean management adoption.

6. Concluding remarks and limitations

In conclusion, this paper contributes to the effort of clarifying what lean management is by connecting it to the concept of management innovation, thereby paving the way to future endeavours aiming at reducing the fragmentation of the field by reconnecting the various streams and subfields of lean management literature to a unifying theoretical framework.

The analysis of the copious literature on lean management showed the studies concerning the specific issue of adoption are relatively scarce, as only 66 articles have been published in peer-reviewed international journals in the last 30 years. The limited scholarly attention for this topic does not seem justified, given the relevance of the as-is organisational conditions for the successful adoption of management innovation and lean management in particular.

The comparison of management innovation and lean management antecedents give an overall picture of the lean antecedents as the two literatures share the main elements toward a successful implementation of management innovation and lean management initiatives. This consistency supports the categorisation of lean management antecedents according to the five categories already used in the management innovation framework.

Finally, thanks to this analysis, I have highlighted potential further development in lean management field:

- the lack of investigation of antecedents related to the attributes of innovation
- the limited effort in adopting holistic and systemic conceptual frameworks
- the superficial approach to the analysis of people-related antecedents

As all research, also this paper is prone to limitations. As the lean management literature is fragmented, I identified the relevant articles by means of a keyword search. The effectiveness of such approach could be limited because the researcher does not have the certainty that all relevant papers have been included. Furthermore, the search has focused on journal articles, given their prominence in the academic community.

However, this choice may have neglected quality research published as grey literature, work in progress, and conference proceedings.

Despite these limitations, this paper enriches the literature on lean management, that primarily concerns the development of tools and techniques, by offering a theoretically grounded general framework for the understanding the adoption of such approach. It has also highlighted some possible fruitful avenues for further researchers.

The conceptualisation carried out in this paper is also relevant for practitioners. By identifying and classifying the antecedents, this paper provides practitioners with a guideline on the factors that could foster or hinder successful lean management adoption and, accordingly, anticipate potential obstacles. Thanks to this classification, managers and consultants working on a lean transformation can easily understand which antecedent they are considering and which ones need attention.

A better understanding of the drivers of lean management adoption is of great value for firms that approach this philosophy. Lean management promises great performance improvements – Shah & Ward (2003) sustain that the 23% of the variation in operational performance is explained by the implementation of lean practices bundle– but is also prone to failure (Mostafa et al., 2013; Moyano-Fuentes & Sacristán-Díaz, 2012; Netland et al., 2015) with an estimated of 70% of initiatives that faces a decay in their effort (Jadhav et al. 2014). A deeper understanding of the main drivers influencing lean transformations can foster a more aware adoption of lean management initiatives, ultimately fostering operational performance and competitive advantage.

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THE IMPACT OF ATTITUDE TO CHANGE AND HUMAN RESOURCE PRACTICES ON SUCCESSFUL LEAN TRANSFORMATION: A CASE STUDY

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Abstract

This paper investigates the systemic impact of Human Resource Management (HRM) practices and individual attitude toward change on the success of lean transformations. The investigation concerns specifically how the efficacy of training, pro-change and anti-change behavior and experience of employees combine into configurations leading to the change in the work practices according to the lean principles.

This conceptual model has been empirically explored by means of a fuzzy-set Qualitative Comparative Analysis (fsQCA) conducted on the behaviors and perceptions of operators of an Italian SME in food processing industry that has completed a lean transformation project. The study finds that to improve organisational performance it is sufficient that a critical mass of operators changes their work practices. It also finds four equifinal configurations leading to a change of operators' work practices. Specifically, training emerges as a critical variable for the success of a lean transformation, but its effect may be replaced by pro-change behaviour. Under specific conditions, operators' experience fosters the transformation.

This paper contributes to the literature on the people-related drivers of lean transformation by considering the systemic interplay among its drivers. Furthermore, it brings together the literature of lean management and change management.

1. Introduction

Saying that people are the core of organizations inspired by the principles of lean management may sound like stating the obvious. However, traditionally, the literature on "lean transformation", i.e. the introduction of the lean management principles and techniques in a firm previously organized according to Fordist, or a un-structured, setting (Womack et al. 1990), has focused on the technical dimension of the topic, looking at how to develop techniques to efficiently manage materials, equipment and technology (Ordiz-Fuertes & Fernández-Sánchez, 2003). Although several studies point out the relevance of people and of Human Resource Management (HRM) as core components of an ongoing lean organization (Forza, 1996; Parasuraman & Alutto, 1981; Power & Sohal, 1997; Power & Sohal, 2000; Tortorella & Fogliatto, 2014), they tend to focus on the relationship between implementation of HRM practices and the outcomes of a lean transformation (Martínez-Jurado et al. 2013). Surprisingly, this literature has paid little attention to the process of lean management adoption, i.e. the initial stage of a lean transformation that entails the transition from a "traditional" to a "lean" organization, and to the reactions of the people involved in the various stages of the process.

The lack of attention to the people who take part in a lean transformation seems to resemble a general trend found also in the studies on change management. The bulk of the literature in this field focuses on the planning stage and on change agents; only recently, scholars have paid the due attention to the recipients of change, examining how their attitudes and behaviour affect a change initiative (Oreg et al. 2016; Dievernich et al. 2015).

We suggest that to understand the transformation of a business process according to the Lean principles, researchers should adopt a perspective that acknowledges the role of the people involved in the process.

The primary aim of this paper is to integrate the reactions of recipients of change in a theoretical framework explaining the contribution of the human factor to successful lean transformation.

Our analytical effort entails the appreciation of the interdependence between HRM practices and reactions of recipients to change. Among HRM practices, we focus our attention on training, due to its role in transferring knowledge about the technicalities of lean management as well as on the underlying philosophy. In other words, training emerges as a trigger of the cultural change that is needed for the introduction and sustainability of a lean system.

In our effort to introduce the reactions of recipients of change into the discourse of successful lean transformation, we adopt the lenses offered by the stream of studies that re-conceptualize the phenomenon of "resistance to change" as a feature of organisational systems, rather than an inclination of individuals (e.g. Dent & Goldberg, 1999; Oreg, 2003; Oreg, Vakola, & Armenakis, 2011; Piderit, 2000). Specifically, we focus on two distinct behavioural reactions to change: pro-change and anti-change behaviour (Peccei et al. 2011).

In this vein, we adopt a configurational stance, which acknowledges that organisational outcomes, such as lean transformation, depend on the combined effect of multiple factors; in this study, we focus on people perception of the efficacy of a HRM practice, i.e. training, and their attitude toward organisational change. Therefore, differently, from the outstanding studies, we are not much interested in understanding whether a given factor is, per se, conducive to successful lean transformation, or in its differential contribution vis a vis other factors. Rather, we aim at understanding the trade-offs and complementarities existing among factors in the context of a lean transformation.

Methodologically, we carry out a Qualitative Comparative Analysis (QCA) (Ragin 2000; Ragin 2008) on the personnel of a small firm in the food industry that implemented one lean transformation project concerning part of its production process. Our investigation is carried out at the individual level and addresses the relationship between the perceived impact of HRM practices and the kind of reactions to change, on one side, and the extent to which different aspects of a lean transformation have been accomplished. Thanks to QCA, we identify the *combinations* of conditions – rather than the effect of each factor – that explain the adoption of working behaviours consistent with the lean approach by operators. This approach defines each personnel member as a

configuration of characteristics relative to the aforementioned factors and compares individuals to one another to identify the configuration or configurations of characteristics that cause the adoption of lean practices.

The study of this case of lean transformation offers a threefold contribution to the literature.

First, we contribute to the studies on lean management, and specifically to the stream addressing the role of HRM, by introducing the role of reactions to change within the theoretical conceptualization of the phenomenon. Therefore, we acknowledge the nature of lean transformation as organisational change, a notion that is still implicit in the literature, notwithstanding the ongoing shift of the debate from technical to the organisational side of the phenomenon. Our second contribution concerns indeed the studies on change management, as we provide empirical evidence on the role of recipients of change in the process, answering a call for a better understanding of these actors of the process. Our results corroborate an understanding of "resistance to change" as an element of the organisational system, rather than an individual inclination. Third, by bringing together the literature on lean management and change management, we highlight the interdependent nature of the relationship between HRM and individual reactions to change, thus contributing to the advancement of a systemic perspective in organisational studies. Finally, as we address the case of a small firm, we provide empirical evidence to the field of lean management in small and medium firms, that, despite the prevalence in industrial systems, is still under-researched.

The remainder of the paper is structured as follow. We outline the background of our study, focusing on the bodies of literature on the relationship between HRM and lean management and on resistance to change. Then we present the analytical approach and the case study. We present the results and the preliminary discussion.

2. The centrality of people in lean management systems

2.1 An analytical framework

In line with our understanding of lean transformations as projects of organisational change, we adopt an analytical framework that distinguishes the role of HRM as a component of a lean management system and as a mechanism to bring about the transformation. Human Resources Management is one of the most agreed theme between the researchers in the field of Lean Management (Forza 1996; Martínez-Jurado et al. 2013) to the extent that we can speak about the "Total People Involvement" approach as a critical element to achieve Just in Time and Total Quality Management systems (Power & Sohal 2000). Human resources Management practices are one of the main drivers to reach successful lean initiatives (Sisson & Elshennawy 2015).

We also acknowledge that the reactions of those involved in the change affect the outcomes of the transformation. People-related factors as resistance to change can really prevent the firm to successfully adopt Lean (Martínez-Jurado et al. 2013) because acceptance of change is one of the central themes in fostering manufacturing improvement activities as Just in Time (Power & Sohal 1997). On the other side, positive attitudes like involvement and commitment are the main drivers to reach lean initiative success (Forza 1996).

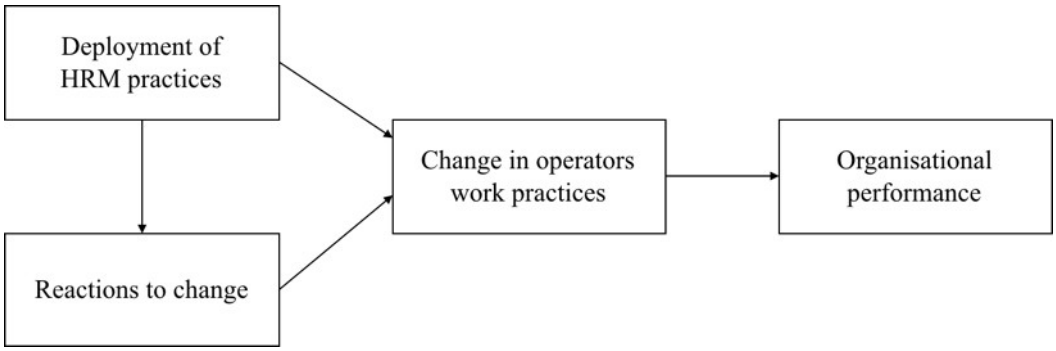
Human resources Management and reactions to change are interrelated as it seems that HRM practices could impact on people behaviour when involved in organisational changes – failure in HRM practices adoption could lead to resistance and scepticism toward lean initiatives (Ordiz-Fuertes & Fernández-Sánchez 2003).

Furthermore, we disentangle the outcomes of the transformation along two levels: the changes of operators' working behaviour and the improvements of organisational performance along the multiple dimensions that are relevant to lean management. The former refers to the extent to which the transformation initiative has produced an alignment of the individuals' work practice with the principles of the lean philosophy – the proper choice and deployment of lean tools and techniques enables the sustainability of lean transformation initiatives (Hines et al. 2004). The latter considers the

performance of the whole production system – i.e. greater flexibility, reduced lead times, improved speed in order processing, smaller batch size, increased profits (Dubey & Singh 2015), reduced inventory, reduced manufacturing times, increased quality, increased customers' satisfaction, improved organizational performances (Worley & Doolen 2006), increased competitiveness (Bhasin 2012).

Through HRM practices, organizations can change organizational arrangements to facilitate organizational innovation (Lin 2011) – such as lean management - through the development of individual competences as well as their willingness to interact and share knowledge (Cabello Medina et al. 2011). However, as Guest (1997) pointed out, the association between HRM and organisational innovation and performance is sustained only under three conditions: employees possess the knowledge and the skills, employees are motivated to apply these skills through discretionary effort, and employees are willing to contribute to organizational performance with that discretionary effort. This argument supports the model proposed in Figure 1.

Figure 1 – Analytical model that guides our literature review



2.2 Features of lean management systems

Lean management is a managerial philosophy aimed at delivering products and services to fully satisfy customers' needs while economizing on the use of resources by eliminating or reducing waste and increasing operational efficiency (Womack et al. 1990; Krafcik 1988). Lean management systems involve a set of *"attitudes, decisions and actions*" that implement a hybrid system in which the bundling of original elements

and principles rooted in Taylorism allow an increase of variety and efficiency compared to mass production (Holweg 2007). According to the concept of a "lean enterprise", lean thinking can be extended from the manufacturing to all business processes (Womack & Jones 2003).

Lean transformation enables the achievement of performance goals such as "greater flexibility, reduced lead time, improved speed in order processing, smaller batch sizes and increased profits" (Dubey & Singh 2015) that strengthen the competitive position of a firm.

In addition to the general principles of customer orientation, continuous improvement, and creation of higher quality and lower cost, lean management consists of a series of design principles for operations.

Specifically, they refer to the features of the process (e.g. pull systems, just-in-time, uniform workload, quick changeover techniques), to quality management (standard operation procedures, continuous improvement, systematic problem solving), to preventive maintenance and to the empowerment of operators, as well as to management practices (e.g. genchi genbutsu, project management) (Bonavia & Marin-Garcia, 2011; Liker, 2004; Shah & Ward, 2003).

The literature on lean management is unanimous in emphasizing its process nature, as suggested by the goals of continuous improvement and systematic problem solving (Pakdil & Leonard 2014; Forza 1996; Yasin et al. 1997). Indeed, the implementation of the general and operational principles of lean management requires operators to change their mind-sets and their behaviour on the floor.

Lean production systems broaden the job in several ways, thus increasing its meaningfulness. For instance, employees have the right/duty of interrupting the production flow whenever they notice anomalies, the possibility of exchanging positions within the team when needed, the opportunity to contribute to continuous improvement by means of problem-solving and to suggestion programs (Forza 1996; Shah & Ward 2007; Fullerton & Wempe 2009).

The notion that the human factor is one of the pillars of Lean Management (Moyano-Fuentes & Sacristán-Díaz 2012) is deeply rooted in the history of the approach, that was originally named "*Respect for Humanity System*" as it emphasized

the goal of humanizing work and advancing society (Jadhav et al. 2014). Virtually all subsequent conceptualizations acknowledge such central role of people: for instance, Liker (2004) argues that their skills endowment and their ability to learn enable the implementation of a production system. Importantly, the definition of "people" includes shop-floor workers, support employees, managers, change leaders and all the partners involved in the production system. It is worth noticing that the centrality of people characterizes not only production systems that operate according to a Lean approach, but also the process of transition towards a Lean organization. The implementation of such process requires change leaders to appreciate how people perceive a transitional environment, as their working conditions are going to be substantially altered (Hasle et al. 2012; Tortorella & Fogliatto 2014).

For this reason, it is relevant to investigate what HRM practices a firm can deploy to facilitate the adoption of a lean management system, and how operators can react to such interventions.

3. The role of HRM in the process of lean management adoption

According to a "strategic" view of HRM, the elements of a HRM system are designed in order to produce outcomes that are relevant for the multiple stakeholders that influence the effectiveness and survival of an organization (Jackson et al. 2013). The literature on HRM has developed an inventory of practices that refer to the areas of compensation and benefits, job, and work design, training and development, recruiting and selection, employee relations, communication, performance management and appraisal, and promotions (Posthuma et al. 2013).

Adoption of specific HRM practices has been related to organisational goals such as productivity, quality, service level, growth and profits (Fu et al. 2015; Zhang et al. 2014); furthermore, the practices proposed by this approach can be related also to the goal of Lean management systems. We argue that the practices referring to the following areas affect the process of Lean transformation: objective performance measures; performance-based compensation; team-based job design and job enlargement; dedicated communication tools; transformation-oriented training. In our

analytical effort, we do not consider one core area of HRM practices, namely recruitment, and selection, because our interest concerns transformations that involve the existing workforce of the organization and do not require initiating a recruitment process.

3.1 Objective performance measures for Lean transformations

A sustainable Lean transformation rests on a long-term strategy that defines the overall aspirations that the organization wants to accomplish and the relationships between specific interventions in which the transformation is structured (Hines et al. 2004; Bhasin 2012). In particular, it helps to disentangle possible trade-off among multiple goals, such as costs, quality, delivery and flexibility (Hallgren & Olhager 2009). Moreover, strategic planning entails the definition of the costs and the duration of the project, which are important parameters to gauge the success of the initiative (Achanga et al. 2006).

Often, instead, organizations outline a transformation project relying on common sense judgment rather than on logical justification. This approach is very risky because the adoption of Lean techniques not supported by a deliberate strategy is likely to reduce employees' confidence in the initiative and therefore to undermine their willingness to support it (Karim & Arif-Uz-Zaman 2013). Indeed, as employees' involvement is one of the internal factors that could support or hinder the lean adoption strategy (Alagaraja & Egan 2013), it is important for the organization to stimulate their alignment to the change goals.

The existence of a performance management system tailored to the specific strategic goals is, therefore, necessary to support the transformation (Pakdil & Leonard 2014). A lean transformation requires an assessment that highlights the starting situation of the organization, the gap between the desired state and the ongoing progress (Martínez-Jurado & Moyano-Fuentes 2014; Pakdil & Leonard 2014).

Fullerton et al. (2009) propose that lean-oriented performance measurement system should integrated financial measures with non-financial ones, that are more suitable to capture information that is relevant for the measurement of strategy

implementation. Features of well-designed performance measurement systems include clarity, simplicity and visual representation of information.

Properly designed measurement systems, positively influence on employees' involvement, arguably because they engender a sense of ownership in the results among the employees, offer a straightforward indication of the targets and reinforce collective responsibilities (Sterling & Boxall 2013; Bou & Beltrán 2005). Fullerton et al. (2009) also found that the adoption of non-financial measures impacts positively on financial performance. By contrast, the lack of a *"clear understanding of lean performance and its measurement"* is a significant reason of failure (Karim & Arif-Uz-Zaman 2013).

3.2 Reward systems for Lean transformations

A formal performance measurement system is a precondition for the introduction of a reward system. Generally speaking, rewards are one of the motivators which can contribute to the development of positive employees attitudes like job involvement (Bessant & Caffyn 1997; Boon et al. 2007; Lawler 1994).

Although a form of extrinsic motivation for the employees, the fairness of rewards are associated with employee involvement (Maden 2015).

Given its importance in influencing employees' behaviour, a lean transformation should critically review the existing reward system of an organization (Power & Sohal, 2000). Bhasin (2012) suggests that the transformation effort is sustained by rewards based on continuous improvement measures, operational efficiency, employees' participation and teamwork, and short-term results. Organizations should implement both monetary and non-monetary rewards, according to the stage of the transformation (Martínez-Jurado et al. 2013).

3.3 Job design for Lean transformations

Lean principles offer guidance about organisational design at micro- and macro-level. Therefore, it is possible to expect that organizations that already embody such principles face fewer constraints during a Lean transformation.

At micro-level, in Lean organizations work is organized in self-directed teams composed of the multi-skilled and multi-functional workforce, characterized by high levels of job rotation within the team. Teams are entrusted with authority over work decisions and problem-solving responsibility (Forza, 1996; Kabst, Holt, & Bramming, 1996; Karlsson & Ahlstrom, 1996; Martínez-Jurado et al., 2013; Moyano-Fuentes & Sacristán-Díaz, 2012; Power & Sohal, 1997; Seppälä & Klemola, 2004; Sterling & Boxall, 2013). Consequences of teamwork are a decrease in the number of job classifications, an increase of flexibility and a reduction of vulnerability in the production system (Karlsson & Ahlstrom 1996). Moreover, enhanced capabilities in problem-solving enable the experimentation of lean principles on the field that foster learning and, accordingly, operational performance (Sterling & Boxall 2013).

Increased teamwork, multi-skilled workforce, enlarged responsibilities and collaborative environment lessen the necessity of supervision, which enable a reduction of hierarchical levels (Forza 1996; Kabst et al. 1996; Ingvaldsen & Benders 2016). In particular, teamwork positively facilitates the meeting of affiliates need with the workplace. This organisational arrangement allows reducing the span-of-control and shifts the job of supervisors from controlling to coaching (Ingvaldsen & Benders 2016).

Managers play the role of enablers, culture setters and supporters (Lawler 1994). In the context of a Lean transformation, managers play a role not only of strategic planning tasks but even in the operational side through *genchi genbutzu* that actively involve them in the shop-floor (Marksberry et al. 2011). Moreover, their attitude towards employees is expected to constantly communicate respect, if they do not want to generate discouragement and the consequent failure of the implementation (Worley & Doolen 2006).

3.4 Communication strategy for Lean transformations

Organisational communication refers to the process of sharing information with other individuals (Boon et al. 2007). Effective communication is one of the success factors in Lean transformations because it can accelerate the speed of the process and contributes to its sustainability (Alagaraja & Egan 2013; Chay et al. 2015).

Communication is considered effective when an organization is capable to transmit accurate, relevant and understandable information among its employees (Worley & Doolen 2006). In the context of a Lean transformation, frequent and open communication is regarded as a success factor (Martínez-Jurado & Moyano-Fuentes, 2014; Power & Sohal, 2000). In particular, the organization should implement both bottom-up and top-down communication channels (Kabst et al. 1996): the first one informs employees about managerial decisions while the second one allows employees to voice their demands, opinion and wishes to the management. The latter channel enables the feedback process that is critical for lean transformations (Fullerton et al., 2009; Power & Sohal, 2000; Worley & Doolen, 2006).

Effective organisational communication fosters trust among employees who are more willing to share information, knowledge, and thoughts; an environment that favours this kind of openness in communication is positively connected with employees' involvement (Thomas et al. 2009).

3.5 Training in Lean transformations

Lean training programs typically pursue two sets of goals: improving and extending employees skills, so that can effectively work in a team; embedding lean management values and principles in employees (Kabst et al. 1996). Training is needed in a transformation because Lean management systems increase employees' responsibilities, including contribution to continuous improvement, and require them to collaborate within teams (Dubey & Singh 2015). Therefore, employees are requested to develop work-related skills as well as a new mind-set (Martínez-Jurado et al. 2013). Indeed, training is a powerful tool to promote an approach towards systematically "learning new things at work" (Lorenz & Valeyre 2005).

Training programs should address all the people involved in a transformation (Kabst et al. 1996), and specific initiative should target supervisors and managers, who are going to redefine their role and their relationship with the workforce (Power & Sohal, 1997).

Lean training reduces the time needed to implement the transformation (Bhasin 2012), facilitates the achievement of the goals (Boyer 1996; Davy 1992; Dubey & Singh 2015; Marin-Garcia & Bonavia 2015; Yasin et al. 1997) and reduces the resistance to change (Power & Sohal, 1997). However, organizations are sometimes reluctant to engage their employees in training programs because of the investment they require (Boyer 1996; Taylor et al. 2013), exposing the transformation to the risk of failure (Bhasin 2012).

Partially distant from this perspective (Ordiz-Fuertes & Fernández-Sánchez, 2003) assert that the less the experience accumulated by workers in the existing practices, the easier will be the implementation of HRM practices.

4. Reactions to change

The literature on change management has long explored the topic of reactions to change according to a perspective that conceptualized the phenomenon as a "resistance" that change agents should overcome (Oreg et al., 2016). This understanding stems from an enduring misinterpretation of the classic Kurt Lewin's (1952) model of force field analysis (Dent & Goldberg 1999): while Lewin's model puts forward the systemic nature of change and the necessity of alignment of all the components of an organization towards the goal of change, subsequent interpretation equated the reactions of those involved in the change to resistance.

This interpretation of Lewin's work is reflected in definitions of resistance to change such as Zaltman & Duncan (1977) who characterize it as '*any conduct that serves to maintain the status quo in the face of pressure to alter the status quo*' (p. 63). Therefore, this point of view blames the individual as the source of resistance and pictured it as the "force" that constrain the adoption of a change program. This view called for a role of change leaders as those entrusted of a reducing or eliminating opposing behaviours of the recipients (Dent & Goldberg 1999; Ford et al. 2002).

Only recently, the literature has acknowledged that resistance to change can be found anywhere in an organisational system and that it is a physiologic phenomenon that may not necessarily be a negative event (Dent & Goldberg 1999). Indeed,

resistance to change may be considered as a source of feedback that ultimately contributes to the success of a change initiative (Marris 1993; King & Anderson 1995).

The individual reactions to change can be understood at the emotional, cognitive and intentional level (Piderit 2000). In particular, the emotional level concerns reactions such as the stress or the pleasantness that the change initiative provokes in the individual; the cognitive reaction entails the beliefs and evaluation towards the change initiative; the intentional level deals with the level of involvement, the intentions and the coping behaviours that the individual performs (Oreg et al., 2011).This analytical framework recognizes that recipients may show apathy or withdraw from the change (Martin et al. 2005), instead of performing explicit behaviours that actively support (Jones, Jimmieson, & Griffiths, 2005; Lam & Schaubroeck, 2000; Oreg, 2003) or resist the change (Bovey & Hede 2003). Typically, this behaviour does not arise because people resist the change per se, but because they are concerned with the way the change process is carried out and/or with the expected outcome of the change (Oreg, 2006).

The factors affecting the process of change include the extent to which recipients are involved in the planning and execution of the initiative, the trust in the change agents, the efficacy of the communication and in particular the existence of a two-way channel, and the perceived procedural fairness of the intervention.

With regard to the content of the change, individual resistance may arise because people fear that the change would bring a loss of status, compensation or comfort (Pugh 1993; Dent & Goldberg 1999). Indeed, a change initiative may alter "*job content, introduce new and unknown tasks, disrupt established ways of working, reshape social work relationships, reduce autonomy and authority, and lower status*" (Giangreco & Peccei, 2005, p.1817).

The multi-level conceptualization of reactions to change highlights the difference between the cognitive and the behavioural dimension of the phenomenon: the former refers to the way in which individuals appreciate the change in terms of alignment with their interests; the latter deals with their involvement in the change initiative. Within this dimension, the distinction between of pro-change and anti-change behaviour (Peccei et al. 2011; Fuchs & Edwards 2012; Giangreco & Peccei 2005) is useful to characterize the active reactions to change. In particular, pro-change behaviour refers to

an effort that a recipient to change makes, beyond their duties and obligations, in order to accomplish the change initiative (Klein & Sorra 1996; Armenakis & Bedeian 1999). Anti-change behaviour entails a lack of cooperation with the vision and the activities outlined in the change project that undermines its implementation (Herscovitch & Meyer 2002). Giangreco & Peccei (2005) appreciate the difference in intensity of forms of anti-change behaviour, distinguishing between explicit forms of opposition at collective (e.g. strikes) or individual level (e.g. speaking out against the change in public) on one side, and covert dissent on the other.

The distinction between pro-change and anti-change behaviour fosters a conceptualization of "resistance to change" as the outcome of the presence of anti-change behaviours and absence of sufficiently strong pro-change behaviours as posited by Herscovitch & Meyer (2002) and by Giangreco & Peccei (2005). We argue that this articulation of the concept is consistent with a configurational view of the change process, according to which the same outcome (support or resistance to change) may derive by different combinations of behaviours along multiple dimensions.

The literature suggests that these reactions to change may have multiple antecedents in terms of characteristics of the change recipient (such as dispositions, motivational needs, and demographics), but also that recipients of change may show multiple, confounded and ambivalent reactions (McLoughlin, Badham, & Palmer, 2005; Oreg, Vakola, & Armenakis, 2011). The holistic view of reactions to change suggested by this stream of literature, allows for the possibility that an individual feels anxious about the loss of status or working conditions, despite acknowledging the benefits of change.

Some studies have examined the effect of negative reactions to change in the context of lean transformations, reiterating the findings of the general literature. For instance, in their study of a case of unsuccessful lean adoption, Turesky & Connell (2010) identified the mistrust between operators and change agents as one of the causes of resistance that eventually compromised the project. Interestingly, they also found that tenure in the firm has a negative relationship with the willingness to change working practices and behaviours.

5. Research design

5.1 Case selection

We conducted a case study with the purpose of building theory on how individual attitudes towards change interact with bundles of HRM practices, and training in particular, in the adoption of lean practices and its overall success. As the literature review in the previous section shows, previous studies have analysed the relationship between HRM practices and successful lean transformation; however, the systemic effect of attitudes toward change, HRM practices and adoption of lean practices that are consistent with the lean philosophy is much less understood and demands a conceptualization effort. In particular, our theoretical effort is to disentangle the patterns leading to success or failure of a transformation assuming that the causal factors may be different. The adoption of a case study methodology appears consistent with the theory building aim of this study (Voss et al., 2002).

We adopted a theoretical sampling strategy (Eisenhardt & Graebner 2007) that is suitable to stimulate theory building as it facilitates pattern recognition in the data, and points toward contrasting or even extreme patterns (Jugdey & LaFramboise 2010). We identified Alpha (a pseudonym used to retain anonymity) as our case study because it operates in the food processing industry, in which Lean Management is difficult to implement. Indeed, the in-process industries, nature of production and unstable demand represent obstacles in implementing lean practices (Panwar et al. 2015) that are exasperated by the limited room for manoeuvre of change agents due to the health regulations. Furthermore, in Alpha, the change team was entirely composed of firm members and did not have a specific background as professional trainer in Lean management.

In such conditions, one may expect that non-professional training could produce only limited impact on the outcomes of the transformation, given the contextual challenge; by contrast, in industries in which lean management is easier to implement, trainers find a much more fertile environment and the impact of their intervention is expected to be more noticeable.

5.2 Data sources and triangulation

We collected data from multiple sources. For the purposes of case selection and for an initial outline of the empirical setting, we examined public sources, including websites, social media, and press releases. Subsequently, we generated primary data through field visits and interviews with members of the top management team of the firms. We administered a questionnaire to all the employees involved in the transformation, investigating a broad range of issues related to the transformation. Triangulation was achieved by interviewing different firm representatives and by verifying information with secondary sources.

5.3 Causal conditions and outcome

Based on the theoretical framework/literature review outlined in the previous section, we identified the following conditions that operationalize the theoretical notions. As the data were collected through our survey at the same point in time, from the same respondent and using the same medium, we adopted the remedies indicated by Podsakoff, MacKenzie, Lee, & Podsakoff (2003) to limit common method bias.

Table 1 presents the item making up the conditions and the original source of the scale. These conditions were measured through the questionnaire with 7-point Likert scales. Furthermore, we considered the Tenure of the operator in the firm, distinguishing four age brackets: less than 3 years, 3 to 5, 6 to 10, more than 10. Tenure or expertise of operators was considered because some studies argue that it is an important driver of successful lean transformation (Karim & Arif-Uz-Zaman 2013; Moyano-Fuentes & Sacristán-Díaz 2012), although its actual role is debated, with other scholars finding opposite results (Ordiz-Fuertes & Fernández-Sánchez 2003).

Table 1 – Conditions and scales

Condition	Items	Reference
Adoption of lean practices	After the lean transformation, my colleagues and I: Stop the process in case of defects. Carry out preventive maintenance. Adopt 5S techniques. Follow standard operating procedures	Padkil & Leonard, 2014
Pro-change behaviour	I am doing more than required from me to help the organization to bring about the change I co-operate actively to realize the change I promote change with enthusiasm I try to convince others of the appropriateness of the change	Giangreco and Peccei (2005)
Anti-change behaviour	I am critical about the change with superiors I am critical about the change with colleagues I support actions of colleagues against the change	Giangreco and Peccei (2005)
Efficacy of training	During the transformation, operators received an appropriate level of training My knowledge of lean techniques is adequate to apply them on the job Thanks to training, I have learned to do new jobs	Mason (2008)
Teamwork	Work in this firm is appointed around groups I am more comfortable working in a team rather than individually When problems emerge, the firm establish teams to solve them My colleagues help me if needed	Boon (2007)
Culture	The firm pays great attention to people Change is natural and necessary in this firm	Ordiz-Furtes (2003); Bhasin

	My supervisor trusts me The firms encourages me to express my ideas and improve my job My supervisor is willing to collaborate with me, if needed	(2011)
Performance indicators	Performance indicators linked to the lean philosophy exist The indicators are connected to the firm strategy The indicators are clear and easy to understand The indicators guide my action	Fullerton (2014); Bhasin (2011)
Rewards	The firm acknowledges the individual and team contribution during the transformation The firm acknowledges the efforts to improve quality during the transformation All the ideas for improvement during the transformation have been acknowledged Rewards have been clearly communicated	Boon (2007)
Support	My supervisor is engaged in continuous improvement during the lean transformation My supervisor devotes enough resources (time; tools) to the lean transformation My supervisor shares with me the information that is relevant for the transformation My supervisor believes that entrusting me responsibility stimulates my team to work better.	Bhasin (2011); Ordiz-Fuertes (2003)

5.4 Analytical strategy

We adopted the technique of QCA for the analysis of the survey data. QCA is a method that builds on set theory with the goal of analysing how configurations of explanatory conditions cause a specific outcome. It focuses on the effect of the

constellation of elements, rather than on the effect of single elements in isolation from others (Furnari & Grandori 2013).

Compared to inferential analysis, QCA presents properties that make it suitable to investigate complex systems. First, it allows equifinality, i.e. the possibility that there are multiple combinations of conditions explaining the same outcome. Second, it does not assume uniformity of causal effects, i.e. a given element may cause or prevent the outcome, depending on the state of the other elements. Third, it does not assume causal symmetry, i.e. it does not assume that if the presence of a condition causes the outcome, the absence of such condition causes the absence of the outcome. Therefore, this method requires distinct analyses to identify the causes, the presence, and the absence of the outcome. Fourth, it distinguishes between necessary and sufficient conditions. A condition is necessary if it is always present when the outcome occurs, while it is sufficient if the outcome always occurs when the condition is present. This notion represents an important improvement from the conventional thinking, in which the two conditions are generally assumed as simultaneous (Ragin & Rihoux 2009; Furnari & Grandori 2013).

5.5 Procedure

QCA assumes that each case - in our study, each operator[5] - is a member of multiple sets (e.g. the set of pro-change individuals; the set of those who received appropriate training) and, by means of an algorithm, it reduces the possible combinations among those sets to provide a parsimonious overview of the conditions that conjecturally cause the outcome (Fiss, 2011; Ragin, 2008). There are two versions of QCA: fuzzy set (fs) assumes that membership in a set is not always binary, as in crisp set QCA, but presents a degree of intensity. Each version uses a different reduction

5 This paper adopts QCA to investigate an individual-level phenomenon, therefore taking individuals as units of observation, consistently with other extant studies such as (Pittino et al. 2017; Cooper 2005; Lowik et al. 2016; Chaparro-Peláez et al. 2016; Ott & Kimura 2016; Muñoz & Kibler 2016).

algorithm. In this study, we adopt fsQCA as it produces a more nuanced picture of the phenomenon.

The first step of fsQCA is the calibration of membership, i.e. the definition of the intensity of membership of each case to a set, in a range from full non-membership (i.e. the case does not present the attribute) to full membership (i.e. the case presents the attribute). As we operationalized the causal conditions and the outcome by using 7-point Likert scales, we defined the thresholds for full membership, full non-membership and the crossover point at the levels 7, 1 and 4.1. These thresholds resemble the wording of the scale and therefore answer to the prescription of using an external benchmark for the definition of thresholds (Ragin 2008; Ragin 2000). Individuals with a tenure of fewer than 3 years were considered fully out, while those with more than 10 years were considered fully in the set of tenure in the firm (crossover being within the categories 3-5 and 5-10 years of tenure). Calibration was carried out through the direct method (Ragin 2008).

After the calibration, we calculated the truth tables. A truth table contains all the logically possible combinations of conditions, either empirically existing or not. Given the small size of our sample, we considered all the configurations with at least one instance for reduction. Each truth table was minimized with the Quine-McCluskey algorithm (Ragin 2008).

6. Case presentation

Alpha produces pre-cooked, vacuum-packaged, high-quality, ready-to-eat fish fillets that are distributed through specialty shops, restaurants and mass market retail chains, mostly at the national level. Founded in the early 1970s, in 2016 it reached a gross revenue of about 4 million Euro, constantly growing in the last decade. At the time of the analysis, the firm employed 16 operators and five sales and administrative staff. Alpha is fully owned by the founder's family, whose members are directly engaged in the management of the firm.

During 2017, the firm planned a pilot lean transformation project addressing a part of the production process as a part of a long-term of change towards a "lean

organization". The firm did not initiate this project to answer a contingent crisis, but as a strategic move to consolidate their competitive advantage and sustain its growth.

Alpha runs its own breeding farm and produces its feed: upstream vertical integration is aimed at assuring the quality of the raw materials the continuity of supply. The transformation plant is located in the proximity of the farm to minimize logistics costs and reduce the risks of bacterial contamination without the need of freezing the raw material. Assuring the product quality and the speed of the process are key success factors for the firm: the former allows meeting customers' expectations, while the latter is important for retailers as it increases the shelf life.

The intervention took place from January to March 2017 and concerned the transformation lines of two fish products, involving nine operators. Concerning the demographic features of the operators, it should be noted that six are male, 4 are between 26 and 40 years old and 5 in the age range 41-55. Tenure in the firm varies, with the presence of one employee with less than 3 years of experience, two between 3 and 5, four between 6 and 10, and one with more than 10 years. It was structured according to the canonical stages of diagnosis, action planning according to a framework for lean transformation in the food industry, and implementation (Dora et al. 2016; Dora & Gellynck 2015).

The change team was composed of an owning family member and a senior employee of the company. Contrary to what Martínez-Jurado, Moyano-Fuentes, & Gómez (2013) indicate as a good practice, no external change agents took part in the project. However, the family member had relatively little previous professional engagement in the firm and took part in a university level course focused on lean transformation. Therefore, the role of this person may be not too distant from the one of an external agent.

Before the intervention, the production process consisted of the following stages: 1) machine-assisted fish deboning; 2) manual fish deboning; 3) salting; 4) fish positioning on racks; 5) spicing; 6) cooking; 7) packaging. It is important to point out that even before the intervention, due to the industry regulation, all the production lines of the firm must conform to HACCP mandatory regulation. HACCP is a systematic preventive approach to food safety from biological, chemical, and physical hazards in

production processes that can cause the finished product to be unsafe, and designs measurements to reduce these risks to a safe level. HACCP focuses on the health safety issues of the product and not on the quality aspects, yet its principles are at the basis of most food quality and safety assurance systems.

The change team analysed this process by means of the tool of value stream mapping. Based on the analysis and on an analytical framework that integrated the well-established lean principles with concepts and techniques that are specific to the food industry, the change team identified an array of improvements to the process. These possible interventions involved the application of lean tools such as process layout modification, optimization of process capacity, reduction of process stops, 5S, preventive maintenance, and were designed in accordance with HACCP regulations. The team considered also the purchase of new machinery adopting chill-blasting technology for the quick reduction of the temperature of the fish, that would allow a substantial extension of the shelf life.

After discussing the plan with the owning family, the change team decided to implement two of the proposed interventions, including the purchase of the new technology.

Before entering the field, the change team trained the nine employees, to share the goals of the intervention and a ‘common language’ about key concepts. The change team designed a significant redefinition of the sequence of the phases of the process. The new layout, working practices, and the new machinery were introduced in a three-week period, during which the change team offered training and support to the employees.

7. Findings

7.1 Outcomes of the change project

The lean transformation project carried out by Alpha involved a substantial redefinition of the stages of the process, which led to the reduction of downtime, reduction of changeovers, a more streamlined flow of activities, and the possibility to process bigger quantity of raw material per day. The members of the owning family consider the outcomes as "*fully satisfactory and paving the way to the transformation of other processes, both technical and administrative*". The achievement of the transformation project is corroborated by objective measures of performance, that meet the targets set by the change-team (Table 2). Therefore, the case of Alpha can be considered as a successful case of small-scale lean transformation.

Table 2 – Change of key performance indicators before/after the intervention

	Before	**After**
Total cycle time	593.47	569.17
Uptime	509.17	506.57
C/O time	84.3	62.6
Uptime/cycle time	0.86	0.89
Kg produced/hour	15.54	16.20
Cost/kg		-3.7%
Food safety and quality		Increased by adoption of state-of-the-art technology

However, we find that the change in the work behaviour of the employees is not homogeneous. As already mentioned, lean transformations address multiple dimensions of the technical and organisational sides of the business, and the change project may address one or the other with different strength. Furthermore, operators may be more or less prone to change their work practices in one or the other dimension. To illustrate the heterogeneity of the change, Figure 2 shows the minimum, average and maximum value

of change for each dimension of lean transformation, while Figure 3 presents the distribution of the score of Adoption of lean practices.

Figure 2 – Intensity of adoption of individual lean work practices

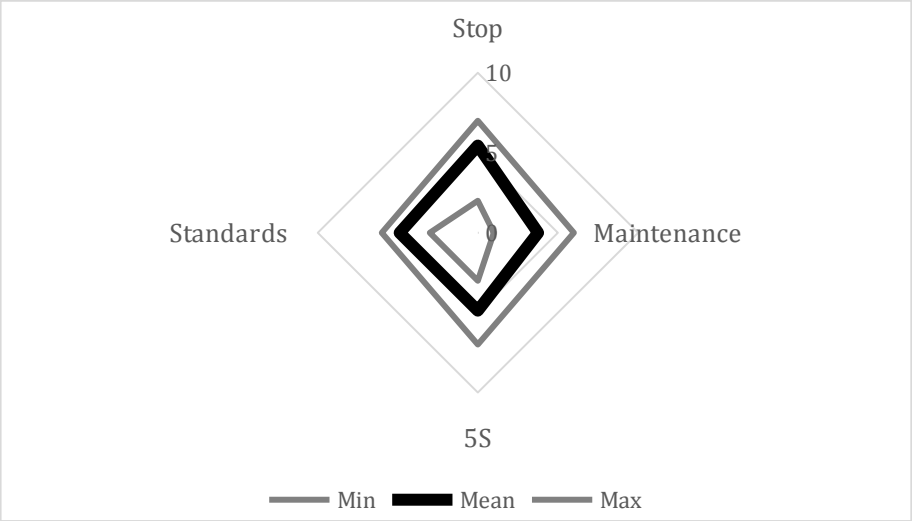


Figure 3 – Distribution of adoption of lean work practices

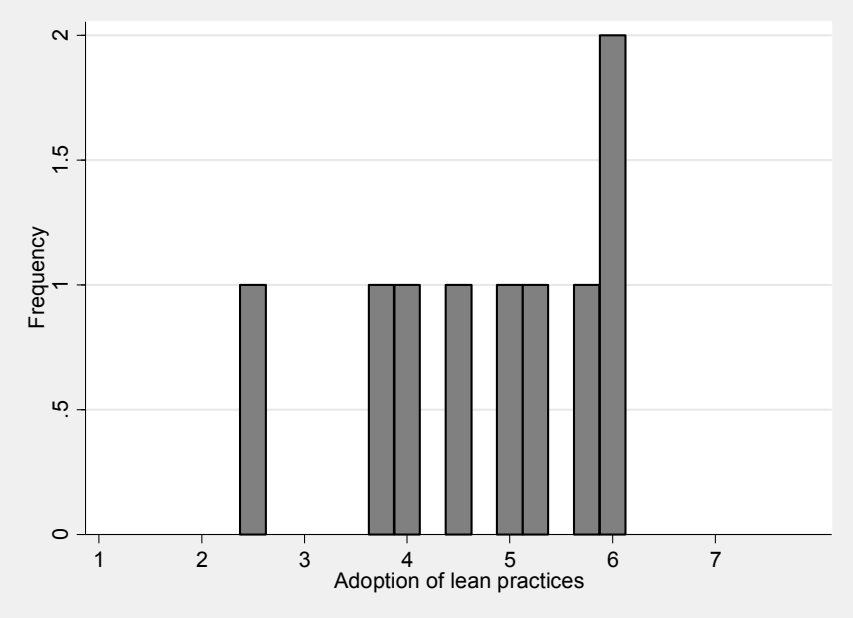


Figure 2 shows that Preventive maintenance is sensitively less performed (mean=3.77, min=1) compared to other practices, especially 5S and the use of standard procedures. Figure 3 offers the important insight that five out of nine operators adopt all the lean practices intensively, but there are some operators who present a very low (Operator E=2.5) or moderate (D=3.75; G=4; B=4.5) lean adoption score.

On the ground of this result, we speculate that a lean transformation project can produce satisfactory outcomes even though a not negligible portion of the operators does not change their work practices, or does so only to a limited extent. It seems that the positive outcomes are brought by the few who conveniently embrace the approach, and act as catalysts for the change to happen.

A closer analysis of the data, reveals some variation in the factors that drive low adoption score: B and D indicate that the operators do not have the right to stop the process (2/7), while G and E consider this feature of lean production as substantially implemented (6/7). However, E is particularly critical about the implementation of the other features of a lean management system, while the other operators focus on especially on the lack of preventive maintenance. This analysis reveals that the appreciation of the implementation of lean management practices is to some degree subjective. However, the analysis of the demographic profile (sex, age, experience in the firm) of these four operators does not reveal any obvious pattern, suggesting to observe operators' organisational behaviour to understand the reasons of lean adoption.

7.2 The drivers of lean transformation

In order to understand the causes of the successful lean transformation implemented by Alpha, and most important, the causes of the different degree of adoption of lean practices by operators, we look at the drivers that the literature suggests as more conducive to a transformation. Specifically, we distinguish between organisational features that are consolidated in the culture of the firm and changes brought by the transformation effort. Consistently with our theoretical framework, we also consider the operators' reactions to change. Figures 4-6 summarize the distribution of answers of operators with regard to the variables considered in the analysis.

Figure 4 – Distribution of Structural features of the firm

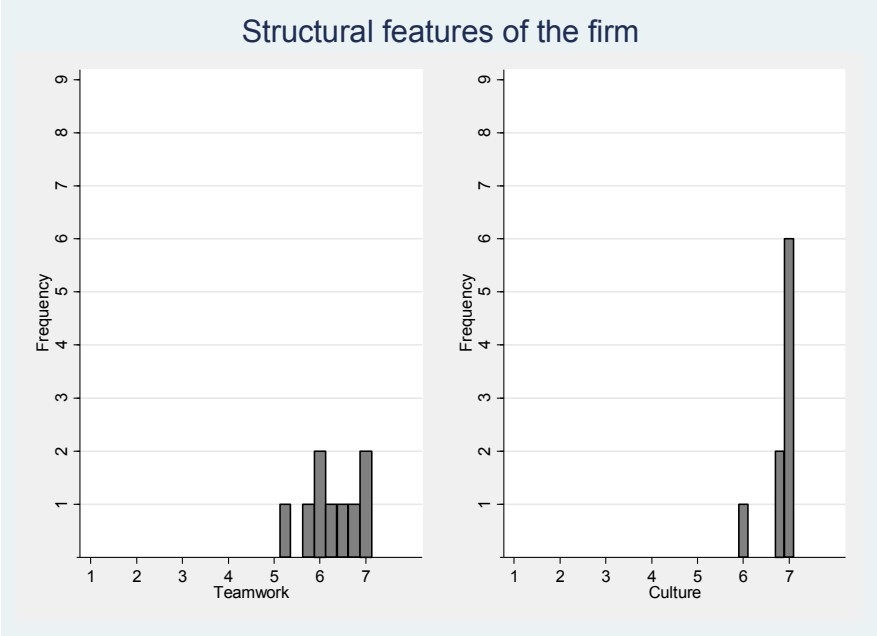


Figure 5 – Distribution of Interventions during the lean transformation

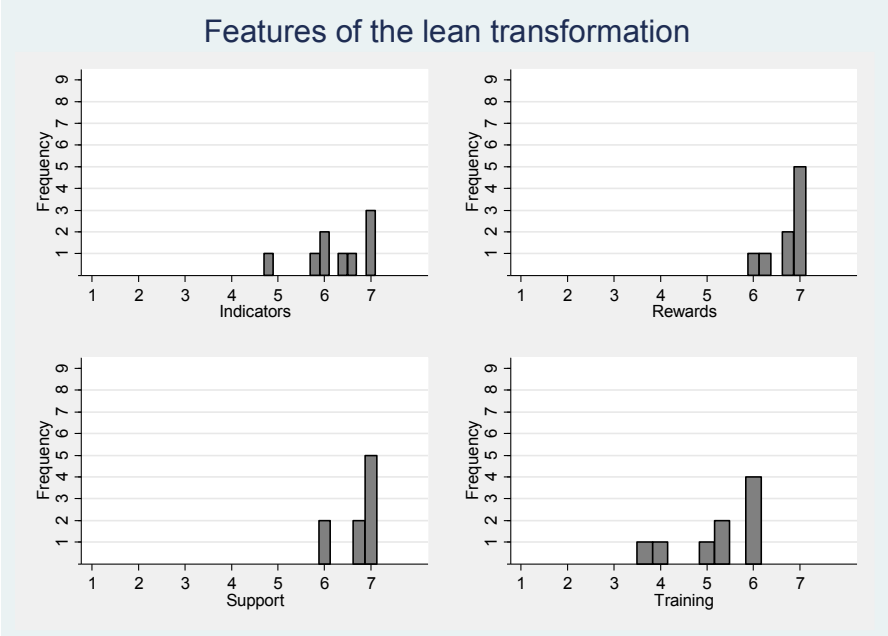
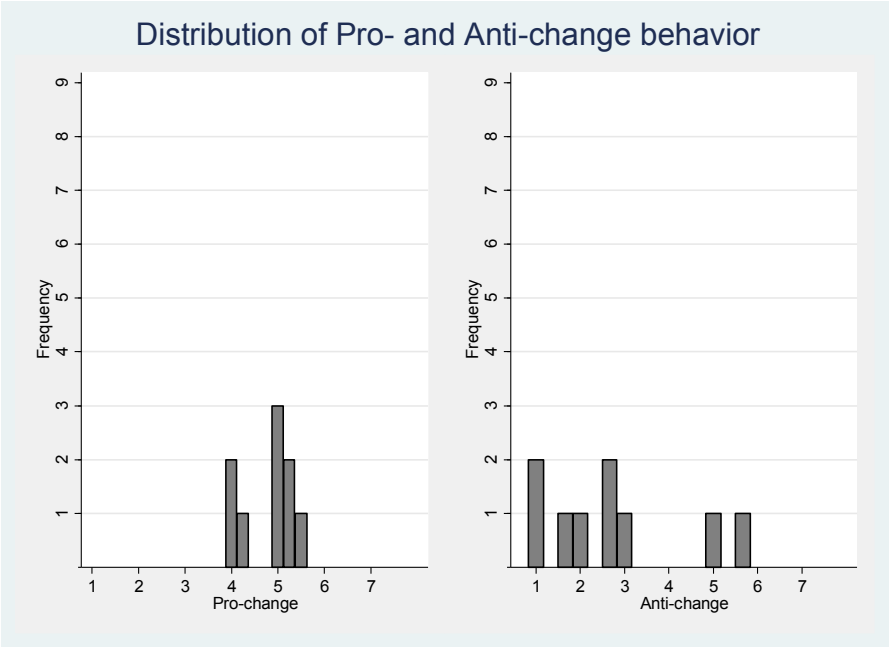


Figure 6 – Distribution of Pro- and Anti-change behaviour



The analysis of the distributions makes it evident that the firm enjoys an environment that is favorable to the introduction of a lean management system, is characterized by a team-based organization and by an organisational culture that appreciates the individual effort, especially in change programs. This evidence is confirmed by a member of the owning family: "*We have always promoted the exploration of new and better ways of doing things. During the firm's history, this resulted in continuously improved procedures and adapted or invented from scratch machinery or instruments. Employees have always been involved in such initiatives and encouraged to share their ideas*. *Communication is informal and promoted at all levels of the organization*."

During the lean transformation, the change team has introduced a series of tools and systems with the aim of supporting the change, namely objective indicators assessing the performance of the process, project-specific rewards, dedicated management support to the operators, and lean training. With the exception of the latter, all the operators indicate that the firm has deployed the tools effectively or very

effectively. Lean training represents an exception, as two operators consider the tool as only sufficiently (H) or less than sufficiently (A) implemented.

Six out of nine operators supported the transformation by adopting a pro-change behaviour, although without reaching a high level of engagement in the initiative. In particular, the intensity of pro-change behaviour of two operators (A and C) is just average (4/7). However, these two operators did not explicitly oppose the change, as their anti-change behaviour has a score of 1/7. The two operators presenting anti-change behaviour are instead B and I. The case of the latter seems interesting because this operator displays also the highest pro-change score; the age and the experience in the firm of this operator (both class 3) both suggest the adoption of a critical and responsible approach to the transformation.

Overall these data indicate that the change team has worked consistently with the best practices indicated by the literature, in a firm that presents a favorable context towards lean transformation. Our case-study offers additional support to the established findings between organisational features and success of a lean transformation. Indeed, these conditions may explain the overall success of the transformation. However, they do not explain why some operators have changed their behaviour and others have not.

As our primary interest lies in the individual organisational behaviour, we adopt the tool of fsQCA to deepen our analysis by investigating the relationship between Adoption of lean practices and Pro-change behaviour, Anti-change behaviour, the effectiveness of lean training and experience in the firm – i.e. the factors that exhibit variation in the population under investigation.

7.3 Results of fsQCA

An important assumption in our investigation is asymmetric causality, i.e. the causes of adoption of lean practices are not necessarily the opposite of the causes of non-adoption of such practices. Therefore, we need to carry out two distinct analyses.

The fsQCA of the causes of non-adoption of lean practices does not identify any necessary nor sufficient configuration. The only, tentative and descriptive, evidence that this case study offers on the topic, is the one presented in the previous section.

This case study, instead, provides richer insights on the causes of adoption. First, we appreciate the existence of causal conditions that are necessary for activating a transformation. A condition is necessary if the occurrence of the outcome is not possible without the presence of that condition; such condition may not be enough to produce the outcome alone and may be found also in cases that do not present the outcome. Conventionally, a condition, or a combination of conditions, is considered "necessary" or "almost always necessary" when its consistency score exceeds the value of 0.90 (Ragin 2008). The results presented in Table 3 reveal that none of the considered conditions meet the requirement.

Table 3 – Analysis of necessity of Necessary Conditions

	Consistency	Coverage
PRO-CHANGE	0.854	0.818
pro-change	0.489	0.981
ANTI-CHANGE	0.398	0.912
anti-change	0.798	0.721
EXPERIENCE	0.763	0.868
experience	0.468	0.707
TRAINING	0.842	0.739
training	0.403	1
training_fs_b+~antichange_fs	1.000000	0.711732
traning_fs_b+experience_fs	0.904207	0.731674

We, therefore, examine what combinations of conditions are sufficient for the existence of the outcome, i.e. those that when are present always present also the occurrence of the outcome, although also other conditions may produce the outcome. In other terms, a sufficient condition is a subset of the outcome. We considered as sufficient the conditions presenting a consistency score higher than 0.90. Such threshold is higher than the value of 0.85 recommended by Ragin (2008) and is also consistent with the rule of thumb suggesting of choosing a threshold corresponding to a break in the distribution of consistency. Consequently, we assigned value 1 in the Truth table to the combinations of conditions exceeding the threshold and 0 to those with a lower score. Table 4 reports the truth table.

Table 4 – Truth table

n.	Pro-change	Anti-change	Training	Experience	Outcome	Frequency	Raw consist.	PRI consist.	SYM consist
1	1	0	1	1	1	2	0.953	0.897	1
2	1	1	1	1	1	2	0.915	0.814	0.990
3	1	0	1	0	0	2	0.768	0.484	0.484
4	1	0	0	1	1	1	1	1	1
5	0	0	1	0	1	1	0.975	0.899	0.899
6	0	0	0	1	1	1	1	1	1
7	1	1	1	0		0			
8	1	1	0	1		0			
9	1	1	0	0		0			
10	1	0	0	0		0			
11	0	1	1	1		0			
12	0	1	1	0		0			
13	0	1	0	1		0			
14	0	1	0	0		0			
15	0	0	1	1		0			
16	0	0	0	0		0			

The inspection of the truth table offers an important insight. Configuration n.3 expresses the organisational setting that, according to the extant literature, is expected to be conducive to successful transformation, referring to an individual high level of training, presence of pro-change behaviour and absence of anti-change behaviour, as well as with limited experience in the firm – a feature that may suggest low firm-specific inertia. Surprisingly, some of those individuals have maintained much of the existing working practice to a much higher degree than other individuals characterized by less conducive configurations.

This finding corroborates our choice of a configurational approach for the analysis of this phenomenon. Indeed, the conventional analytical approach would suggest an

additive effect among the drivers of a transformation, i.e. the presence of an increasing number of drivers should strengthen the chances of occurrence of the outcome. Our analysis, instead, suggests that appropriate combinations of factors that singularly have a poorer ability to lead to a change may be more effective than combining "powerful" factors.

The truth table also shows that our empirical setting presents six of the 16 possible combinations of conditions. As all of the 16 possible combinations represent plausible situations, we suggest that the limited diversity is due to the small size of the population under investigation; in other words, being the size of the firm small, we cannot find enough employees to identify all the possible combinations of individual and organisational factors.

The fsQCA methodology offers a remedy to the issue of limited diversity, which is the specification of the theoretical expectations about the direction of the effect of each condition on the outcome. The reduction algorithm uses this piece of information to calculate the "intermediate solution", which Ragin (2008) recommends for interpretation. Consistent with theory, we assumed that the presence of pro-change behaviour and training, and the absence of anti-change behaviour should be conducive to the outcome. We do not formulate any assumption regarding the experience, as, in extant literature, is not clear the direction of the relationship between employees' experience and successful lean transformation.

Table 5 illustrates the intermediate solution. Presenting four distinct causal pathways, the intermediate solution makes evident the equifinality of the process of organisational change.

Table 5 – Sufficient combinations of conditions for change of working behaviour

Intermediate solution	Raw coverage	Unique coverage	Consistency	Cases
EXPERIENCE * TRAINING * PRO-CHANGE	0.687	0.169	0.911	4 (I, G, B, F)
EXPERIENCE * anti-change	0.582	0.050	0.911	3 (A, G, F)
TRAINING * anti-change * pro-change	0.453	0.040	0.979	1 (C)
training * anti-change * PRO-CHANGE	0.377	0.020	1	1 (H)
Solution coverage: 0.873				
Solution consistency: 0.911				

Note: Capital letters stand for "presence of the condition" while lowercase letters stand for "absence of the condition".

First, we notice the four causal paths are composed of combinations of conditions, i.e. no condition alone is sufficient to lead to the outcome.

The coverage and consistency scores indicate that all the paths are empirically meaningful. Together, these paths cover most of the outcome (solution coverage score of 0.872) and, overall, consistently present the outcome. Indeed, the solution consistency (a measure that resembles significance in statistical models) exceeds the threshold of 0.800 indicated by Ragin (2008), although this is expected given the small number of cases. The raw coverage of each path – which expresses the extent to which that path can explain the outcome, i.e. the overlap between the path and the outcome – varies from 0.377 to 0.687. Since single cases are typically covered by more than one causal path, the unique coverage indicates the share of cases that are explained exclusively by that path. The coverage measure offers an indication of the relative importance of the paths.

The first two causal paths to changed behaviour, with a unique coverage of 0.169 and 0.050, concern experienced employees. The first one requires the presence of both Pro-change behaviour and Training to lead to the outcome, while the second one the absence of Anti-change behaviour. Taken together, these two causal paths suggest that experienced employees can effectively change their work practices according to the lean principles, and therefore, the accumulation of firm-specific knowledge and the development of routines is not, per se, an inhibitor of change. This result supports the viewpoint that employees experience positively impact on successful lean transformation (Karim & Arif-Uz-Zaman 2013), in contrast to what Ordiz-Fuertes & Fernández-Sánchez (2003) found.

However, for experienced workers to bring about change, some facilitating mechanisms need to be in place, to break the status quo. Specifically, we find two alternative mechanisms: the absence of Anti-change behaviour, and the simultaneous presence of Training and Pro-change behaviour. Each of these conditions is expected to contribute to change, according to existing studies. Furthermore, this finding suggests that pro-change behaviour is less strong than the absence of anti-change behaviour in leading to a change, as the former needs to be accompanied by training in order to cause the outcome. This indicates that the presence of Pro-change behaviour is not symmetric to the absence of Anti-change behaviour, supporting the conceptual distinction between the two notions.

In the two other paths, Experience neither is a present nor absent condition, meaning that they refer to all employees. These paths are characterized by anti-change behaviour as an absent condition which is not, per se, sufficient to lead to a change, but needs to be accompanied by other factors. In particular, Training and Pro-change behaviour play the role of substitutes: in the third path, the former compensates for the absence of the latter, while the opposite occurs in the fourth. It is important to notice that they do not need to be present simultaneously in order to lead to the outcome, as in configuration n.1. This suggests that the absence of anti-change behaviour (configurations n. 3 and 4) is a more favorable condition for the occurrence of the outcome than the presence of experience workers possibly accompanied by anti-change behaviour (configuration n.1). In other words, the case firm benefits, to some extent and

under specific conditions, from the experience of its employees to introduce the change. The possible presence of anti-change behaviour demands a much higher organisational effort to generate the change than the possible inertia associated with experienced workers, as configuration n.2 makes evident.

8. Concluding remarks and limitations

The research effort of this paper was aimed at deepening the knowledge about the people-related drivers of successful lean management adoption by means of a case study explored with the fuzzy-set Qualitative Comparative Analysis (fsQCA) methodology. The case study under analysis was an Italian SME in the food processing industry that started a pilot lean transformation.

The analytical model sustains that the deployment of HRM practices together with the reaction to change – pro-change and anti-change behaviours – have an impact on successful lean transformation, disentangled as a change in work practices and organisational performance.

The study further highlights that adoption of HRM practices and reactions to change need to be considered systemically in order to understand the patterns of adoption of working behaviour during a lean transformation

The first important outcome is that there is no one-best-way to the adoption of lean practices, while multiple patterns are conducive to the same outcome. The fsQCA highlights four meaningful and equifinal configurations leading toward successful lean transformation. The four configurations are made by different expressions of four sufficient conditions - pro-change and anti-change behaviors, training and operator experience.

A second important outcome is the role of training during a lean transformation. The perception of being trained enough to cope with the transformation seems to play a crucial role as:

1. It seems more difficult for a change agent to offer an adequate level of training, compared to other HRM practices;

2. Variations in the efficacy of training seem to explain differences in the adoption of lean practices.

Moreover, from the four configurations, training and pro-change behaviours play the role as substitutes – this means that, in absence of anti-change behaviour, training or pro-change behaviour alone is enough to guarantee successful lean transformation.

The third outcome is linked to the role of operators' experience during a lean transformation. The role of experience is contested among scholars, some arguing that experience has a positive impact on lean transformation, while others sustain exactly the opposite. This paper provides evidence to the first perspective by showing that experienced operators involved in the lean transformation fostered successful adoption of lean tools and performance improvement. This result is a first step toward the resolution of the literature debate on the role covered by experience during lean transformations, and, more in general, on the role of employee tenure in change processes.

The operators involved in the transformation expressed both pro-change and anti-change attitudes toward lean transformation. Nevertheless, the lean transformation led the company to the adoption of lean tools – e.g. 5S and standardization, and a remarkable improvement of several dimensions of organisational performance in terms of cycle times, changeover times, and production costs. Despite the presence of some anti-change behaviours, the lean transformation has led to results that largely met the management's expectations and so it seems that the success of a lean transformation does not require the engagement of the whole workforce, but of a critical mass. This result resonates the concept of "tipping point" in the change management literature, i.e. the condition of a system that enables the passage from the status of stasis to change.

As all research, the study is affected by limitations. First of all, this case study addresses a firm in which standardization was already in place due to industry regulations, and a culture of change was well rooted in the firm history. Nonetheless, we found that some HRM practices (i.e. training), did not deliver the highest possible results.

Another limitation is that the survey was conducted only after the lean transformation and there are not any data collected before the starting of the lean

transformation project. From this limitation, scholars can take the good practice of collecting information both before and after the execution of a lean transformation project.

Finally, the results were collected after a short amount of time after the adoption of the lean tools and the first results obtained from the transformation. It could be meaningful consider a longer term of analysis to take into consideration the results of lean transformation that may not be perceived or recordable in the short term of action.

Despite these limitations, the study brings together the literature on change management and lean management and introduces a configurational approach to the phenomenon of lean transformation, that promises to overcome the fragmentation and contraction of existing studies.

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EXPATRIATE ASSIGNEES AS KNOWLEDGE CARRIERS. AN ACTION RESEARCH ON THE TRANSFER OF LEAN MANAGEMENT TRAINING CAPABILITIES IN A MULTINATIONAL CONSULTANCY COMPANY

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Abstract

This paper explores the role of expatriate assignees as a knowledge transfer mechanism in a network-based, knowledge-intensive, multinational firm.

By bringing together the literature on knowledge management, international business, and human resource management (HRM), this paper examines the individual, interpersonal and infrastructural conditions that enable knowledge transfer in a multinational firm where the headquarter has a very weak role.

A model of knowledge transfer is applied in a canonical action research focused on the start-up of a new training centre within a multinational consultancy company. The researcher transferred the knowledge on the training of a specific category of personnel from a centre that had developed best practices on the topic to a new one.

The action research reveals that the expatriate assignee is a more effective and efficient mechanism than those employed by the company for the purpose. It also highlights the risks of loosely coupled, networked organizations in establishing adequate knowledge flows. Finally, it offers indications about how companies might overcome the barriers in the use of expatriate assignees.

1. Introduction

The capability to change and pursue at the same time customer satisfaction and efficiency is an important source of competitive advantage in contemporary business (Womack & Jones 2003; Womack et al. 1990). An agile and adaptive business system supports the deployment of such capability and offers greater opportunities for performance improvement than the sole manufacturing excellence. In this context, knowledge management (KM) is a core business process (Alavi, Kayworth, & Leidner, 2005).

The literature on KM has examined in depth the strategies, approaches, tools and contextual conditions that allow an organization to exploit knowledge for business purposes (Argote & Ingram, 2000; Chang & Lee, 2008; Chen & Lovvorn, 2011; Gonzalez & Martins, 2014; Gupta & Govindarajan, 2000; Liu, Leat, Moizer, Megicks, & Kasturiratne, 2013; I. Nonaka & Takeuchi, 1995). The relevance of KM as a business process is even more evident in firms operating in the high-technology industries and, within these, in the service sector, i.e. in knowledge-intensive business services (Bettiol et al. 2012).

KM has been examined in various forms of firms, and a rich stream, at the boundaries of the field of international business, examines the case of Multinational Enterprises (MNEs) (Rabbiosi et al. 2012; Raudberget 2014; Soosay & Hyland 2008). The studies on KM in MNEs focused in particular on the knowledge exchanges between the headquarters and the subsidiaries, often assuming a hierarchical relationship between the two kinds of organisational units. However, networked models of MNEs, such as the heterarchic one, that is characterized by loose relationships among the nodes subsidiaries and headquarter (Hedlund 1986; Hedlund 1993), demand specific approaches to knowledge transfer (KT) (Hedlund 1994; Bhatti et al. 2016; Tell et al. 2016).

In this paper, building on the recent stream of studies in the field of human resource management on expatriate assignees (Harzing, Pudelko, & Reiche, 2016; Minbaeva & Michailova, 2004; Werner, 2002), I argue that an expatriate assignee can be a mechanism to transfer knowledge from previously disconnected units of a large,

networked MNE operating in a knowledge-intensive industry, such as business consultancy. Seminal studies (e.g. Harzing, Pudelko, & Reiche, 2016) have found that the use of expatriate managers improves KT in MNEs. However, the process through with expatriates generate value by transferring knowledge is still largely unexplored (Mäkelä 2007; Harzing et al. 2016; Colakoglu & Caligiuri 2008; Chang & Smale 2013). Among the factors that impact on the relationship between expatriates and KT, expatriates' behavioral traits are still poorly analysed (Minbaeva & Michailova, 2004); likewise, the analysis of the transfer mechanisms linking expatriates and subsidiary performance is rare (Chang et al., 2012; McEvoy & Buller, 2007; Shih et al., 2005).

The aim of this paper is to identify the activities that enable an effective KT and those that allow overcoming barriers that hinder the effectiveness of the expatriate assignee in the international setting.

To this purpose, this study presents an action research in which the researcher facilitated the transfer of knowledge about a key business process from an established unit to a green-field unit of the same MNE. The personnel working in the two units had little or non-existing previous interaction, and could not rely on day-by-day support from the headquarters of the organization.

The outcomes of the action research have both theoretical and operative relevance.

From a theoretical point of view, this study brings together the literature on knowledge management, human resource management and international business by conceptualizing the role of the expatriate assignee as a carrier of knowledge. Second, it disentangles the process of expatriate-driven knowledge transfer by proposing a model that identifies the activities and constraints characterizing the exchange.

From a practitioner point of view, it points out that loosely connected MNEs may benefit from the adoption of expatriate assignees as mechanisms of knowledge transfer, as they seem to outperform other mechanisms in terms of efficacy and efficiency (Harzing et al., 2016). Therefore, this study addresses the call by Werner (2002) who points out that the examination of expatriate assignees as KT mechanism is a fruitful avenue for future research, that however has received insufficient interest in the recent decades.

The remainder of the paper is structured as follows. After the introduction, in the second section, I review the relevant literature on the topics of KT in MNEs and on expatriate assignees, in order to outline the conceptual framework that is applied in the action research. The third section presents the methodology of the intervention. Section four outlines the action research and its outcome, while the final section presents the limitations and concludes.

2.The role of expatriate assignees in the knowledge transfer process

2.1 Knowledge transfer as a value creation process

KM is a source of competitive advantage as it allows companies to expand, disseminate and exploit internal organisational knowledge, to protect proprietary knowledge from imitation, and to effectively share, transfer and receive knowledge from business partners even if they are set in distant locations (Schulz & Jobe 2001). Especially in dynamic and uncertain environments, the adoption of KM systems allows firms to improve critical performance measures, such as customers service, efficacy of decision-making, new product development (Alavi et al., 2005; Argote & Ingram, 2000; Chang & Lee, 2008; Chen & Lovvorn, 2011; Gonzalez & Martins, 2014; Gupta & Govindarajan, 2000; Liu et al., 2013; Ikujiro Nonaka & Takeuchi, 1995; Rabbiosi et al., 2012; Raudberget, 2014; Soosay & Hyland, 2008).

Knowledge can be defined as *"a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information"* (Davenport & Prusak, 1998, p.5). From this definition, it can be said that knowledge deals with a human process of interpretation to give meanings to information toward an action (Nonaka, 2007, p.58). It is recognized that much of the knowledge needed to compete is endowed within the organization, but decision-makers often ignore the existence of such knowledge, where to find it and how to leverage it (Alavi & Leidner, 2001). KM systems help on this task, by offering the technical infrastructure – consisting in IT-enabled repositories – and the organisational processes – strategies, routines and people – (Alavi & Leidner, 2001;

Gonzalez & Martins, 2014; Parise, 2007), that, together, enable "*the generation, representation, storage, transfer, transformation, application, embedding, and protection of organisational knowledge*" for organisational goals (Alavi, Kayworth, & Leidner, 2005, p.192). Put in other words, successful KM depends on the individuals' ability to create, retain and transfer knowledge, the proper context to build motivation and provide incentives to take part in knowledge management and give the opportunity to create, retain and transfer knowledge (Argote et al. 2003).

The process of KM is typically conceptualized in stages. At a broad level, Liu et al. (2013) distinguish between knowledge exploration and exploitation; these stages are further detailed in knowledge acquisition, knowledge documentation, knowledge transfer, knowledge creation and knowledge application (Yahya & Goh 2002). Knowledge transfer (KT) is an activity at the core of KM systems, and it is concerned with the movement of knowledge from one place, person, owner to another. It involves the approaches, rules, and principles that enable the communication and the consultation of the receiver to know what he/she knows (Liyanage et al. 2009; Shen et al. 2015).

Although the effects of KT affect the team and organisational level, the actual creation and exchange of knowledge happen mainly at the individual level (Argote & Ingram, 2000; Murray & Peyrefitte, 2007; Nonaka, 2007). In this sense, human resource management (HRM) operates as a facilitator in the connection between the individual and the organisational level of analysis (Rabbiosi et al., 2012), especially to overcome the constraints that inhibit effective KT.

Indeed, cognitive and organisational factors may enhance or hinder KT (Murray & Peyrefitte 2007; Soosay & Hyland 2008). With regard to the cognitive factors, a well-established distinction is the one between codified and tacit knowledge[6] (Polanyi 1966).

The ability of the organization to appropriately manage different transfer approaches according to the kind of knowledge is fundamental to the effectiveness of the transfer (Shen et al. 2015).

6 Codified knowledge is the knowledge that is transmittable in formal, systematic language while tacit knowledge is personal, context-specific, and therefore hard to formalize and communicate (Nonaka, 2007,p.59)

2.2 KT in MNEs environments: actors, processes and tools

The stream of the literature on MNEs as a "knowledge integrating institution" (Kogut & Zander 2003) acknowledges that KM, and KT in particular, are critical processes for this kind of organizations, due to their networked nature and the specificity of the relationship between headquarters and subsidiaries (Tallman & Chacar 2011; Gupta & Govindarajan 2000). Indeed, classic definitions of MNEs emphasizes their diversity in terms of geographic location as well as the presence of headquarters and different national subsidiaries with different roles and goals (Ghoshal & Bartlett 1990; Persson 2006). From a cognitive point of view, the differentiation of the strategic goals and the embeddedness in a different national environment implies that each unit develops a different knowledge base. Therefore, MNEs can be conceived as "*differentiated networks of globally dispersed knowledge resources*" (Harzing, Pudelko, & Reiche, 2016, p.680) in which KT among units with different positions in the network, under the constraint of geographical distance, allows the development of a competitive advantage (Ambos, Ambos, & Schlegelmilch, 2006; Schlegelmilch & Chini, 2003).

KT in MNEs is typically conceived in terms of integration of internal knowledge from the headquarter to the subsidiaries (Rabbiosi et al. 2012), from the subsidiaries to the headquarter (Song et al. 2015; Ambos et al. 2006), among subsidiaries (Persson 2006; Lin et al. 2013) and from location to subsidiary (Mudambi 2002). In this process, MNEs need to deal with differences in time, space and culture that set significant barriers in KT (Pérez-Nordtvedt et al. 2008). Nevertheless, these same challenges could define a great opportunity when MNEs are able to exploit existing repositories and combine them in knowledge creation (Björkman et al. 2004).

Nevertheless, knowledge flows are strategically important for at least three reasons: localized know-how transmission, support in the coordination of multiple geographically dispersed subunits, capitalization of business opportunities that require collaboration (Schulz & Jobe 2001). As the level of analysis is regarded, Gupta & Govindarajan (2000) report three main levels: nodal – focused on the behaviours of

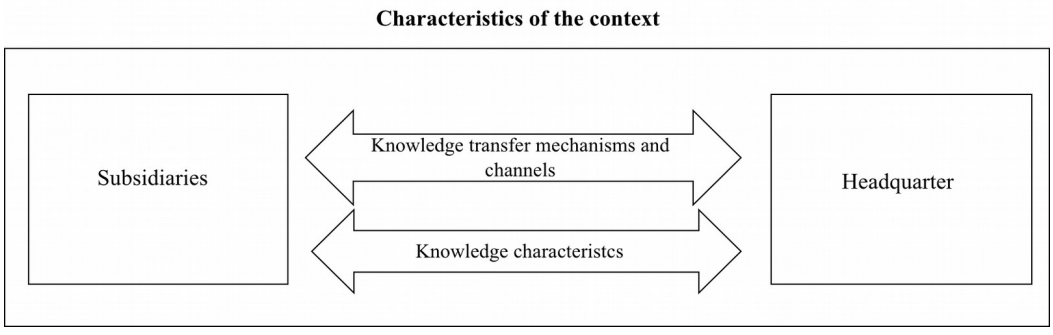
individual units; dyadic – focused on the joined behaviour of unit pairs; and systemic – focused on the behaviours of the entire network.

The conceptualization of the MNE as a network – characterized by the combination (rather than division) of work in temporary constellations of people and unit, and in which coordination is assured by lateral communication and the facilitator role of the management (Hedlund 1986; 1993) – paves the way for the investigation of the KT relationships among the actors in the network. To this purpose, Hedlund (1994) puts forward a KM model that recognizes four carriers of knowledge within an MNE – individuals, small groups, organizations, the inter-organisational domain – and six knowledge production activities: articulation and internalization; extension and appropriation, the interaction of which is dialogue; assimilation and dissemination.

There are several factors that affect the successful KT within MNEs that deal with the context in which the knowledge transfer happens, the actors enacting the transfer, the knowledge content itself, and the means through which knowledge is transferred – mechanisms and channels.

Figure 1 below shows the main elements that can influence knowledge transfer in an MNE and it frames all the factors together in relation to each other. Contextual variables shape the environment in which the relationship between subsidiaries and headquarter takes place. The two arrows represented by mechanisms, channels and knowledge characteristics mediate the relationship between the two.

Figure 1. Knowledge transfer process within MNEs



2.2.1 The contextual level

With regard to the contextual level, knowledge transfer is inserted in an intra-organisational context. Organisational formal structure and systems, sources of coordination and expertise, and behavior-framing characteristics strongly affect the process of knowledge transfer (Szulanski 1996). Björkman et al. (2004) highlight the importance of control mechanisms and incentives from the headquarter to support knowledge transfer among subsidiaries like a strong sense of shared mission and long-term vision, performance evaluation criteria focused on knowledge transfer, financial compensation and the use of expatriate subsidiary managers. Ditillo (2012) puts forward that the efficacy of control mechanisms varies according to the kind of transferred knowledge: process related KT needs that the headquarters assures the application of the knowledge in daily activities; outcome related KT is positively influenced by scalability control mechanisms, as refers to the number of review and approvals needed to finalize target and make decision; technology-related KT can count on mobility control mechanisms to move experts to several divisions and projects; opportunities related KT is positively linked to the multiplicity of roles and responsibilities to foster horizontal knowledge transfer.

In particular, the use of control mechanisms should be preferred to rules and orders, as it makes more acceptable for subsidiaries to engage in a time-consuming activity like KT; in case incentives are not aligned, the subsidiary may not see the value of KT and it could endanger the relationship with the headquarter (Andersson et al. 2015). Actually, the greater the intimacy between headquarters and subsidiaries, the easier the ease of communication and transfer will be (Szulanski 1996; Pérez-Nordtvedt et al. 2008). Indeed, the social ties between the sender and the receiver and the duration of the relationship increase the likelihood of success of KT thanks to trust, knowledge transparency, learning, cooperation and individuals' engagement (Andersson et al., 2015; Minbaeva, Makela, & Rabbiosi, 2012; Pérez-Nordtvedt et al., 2008). The success of the KT is tied to the reciprocity of the relationship – social obligation when an individual receives a benefit from another individual and there is an expectation of future return (Watson & Hewett 2006).

Moreover, relationships can be direct when involving face-to-face interactions, or indirect when some intermediaries exist, and can be supported by strong or weak ties: these two traits influence the effectiveness of KT especially when linked to the kind of knowledge that needs to be transferred (Ditillo 2012). Of course, MNEs are inserted in and share information with an external environment, that change accordingly to the location in which they are located. Andersson et al. (2015) and Schulz & Jobe (2001) highlight as well how different geographic locations and culture may hinder the knowledge transfer especially because they require adaptation to local conditions – the more geographically dispersed the firm is the more dissimilar the activities are and the more difficult KT is. In fact, different geographic locations lead to a different understanding of the relevant world and make knowledge transfer more difficult (Tallman & Chacar 2011). Finally, Zander & Kogut (1995) cite how the accumulation of experience of both the source and the recipient of the transferred knowledge could impact on the communication and the understanding of the same; especially the impact can be quantified in terms of cost and frequency of KT.

The main struggle will be linked to the capability of the MNE to manage the trade-off between the heterogeneity of knowledge sources with knowledge creation potential and the difficulty to adapt and integrate them.

2.2.2 The subsidiaries' role in the knowledge transfer process

For subsidiaries, KT entails the understanding of the content of the knowledge and its application in their daily activities. These capabilities are strongly dependent on the absorptive capacity of the subsidiary, the causal ambiguity, and the relationship between the subsidiary and the headquarter (Chen & Lovvorn, 2011). Absorptive capacity is mainly driven by two sources, namely the extent of prior related knowledge and the extent of inter-unit homophily (Gupta & Govindarajan 2000). Other important aspects linked to the subsidiary's traits are the motivation toward knowledge transfer, the perceived value given to the transferred knowledge, and the retentive capacity (Szulanski 1996). The motivation is needed to avoid the "not invented here" syndrome fed by ego-defence mechanisms and power struggles within the organization (Gupta & Govindarajan 2000). This list of aspects is further enriched by Pérez-Nordtvedt et al.

(2008) that add the "recipient learning intent" that explicate the desire of the recipient to learn from the source.

2.2.3 Knowledge characteristics

The nature of the knowledge affects the ease of the process of knowledge transfer. In particular, the literature highlights two dimensions of knowledge: its value and transferability. The likelihood of transfer and reuse of knowledge is positively associated with its value, which depends on the non-duplicability and relevance for both the source and the receiver (Watson & Hewett 2006; Gupta & Govindarajan 2000; Pérez-Nordtvedt et al. 2008). For what concerns the nature, Winter's taxonomy reported by Zander & Kogut (1995), distinguishes the dimensions of tacit/articulable, observable/not observable in use, complex/simple, and dependent/independent of a system. Among these dimensions, the distinction between tacit and explicit knowledge explains the capability of MNEs to properly manage KT from headquarter to subsidiaries and vice versa. A related feature is knowledge stickiness (Szulanski 1996), that is usually linked to causal ambiguity – incapability of determining ex-post the main reasons why KT has been successful or not - and unproveness – incapability of proving the usefulness of a transferred knowledge.

Codification is a good strategy to manage knowledge transfer because it combines the knowledge in a way that facilitates knowledge transmission – both explicit and tacit knowledge can be codified but with different amount of effort, resources and costs. On the other side, codification could escalate to information overload and easy replication of the transferred knowledge by competitors (Schulz & Jobe 2001).

2.2.4 Knowledge transfer mechanisms and channels

Knowledge channels are the media through which knowledge is transmitted throughout the firm and they assume different shapes according to the specific content of the knowledge that needs to be transferred (Tallman & Chacar 2011). They are considered one of the major dimensions that influence the process of knowledge transfer in the network created by the MNEs – indeed, they can overcome poor communication

and lack of incentives fostering knowledge flows among the members (Song et al. 2015).

Knowledge transfer channels can be informal, formal, personal or impersonal (Alavi & Leidner, 2001). Informal mechanisms include unscheduled meetings, informal seminars, coffee break conversations and sustain socialization; formal transfer mechanisms involve training sessions and plant tours and assure greater distribution of knowledge; personal channels include apprenticeship and personal transfer and are more effective in context-specific knowledge; impersonal channels as knowledge repositories are more effective in readily generalizable knowledge.

Schulz & Jobe (2001) argue for the necessity to pair the nature of knowledge – tacit versus explicit knowledge – with the proper mechanism of knowledge transfer to get the full potential of knowledge transfer. There are several mechanisms that are suitable to transfer tacit knowledge – active learning including the use of mentors, apprenticeship, intuition, and learning-by-doing, brainstorming camps, use of metaphors and analogies, social networks – that foster the action and the participation (Krishnaveni & Sujatha 2012). Communities of practice are considered important knowledge transfer mechanisms especially for knowledge that has some tacit components that are difficult to codify and need personal contact, indeed they provide the social interactions needed toward knowledge transfer (Krishnaveni & Sujatha 2012). Communities of practice develop common operational, technological or component knowledge and foster common repositories of behaviours, perspective, and understanding of the system of knowledge (Tallman & Chacar 2011). On the other opposite, explicit knowledge is sustained by data, documents, manuals, and databases (Krishnaveni & Sujatha 2012). Knowledge repositories or databases are becoming more and more important for the knowledge creating companies because they help to support knowledge access and reuse, but simply having a knowledge repository does not mean have a successful knowledge management – a company should fill in the repository with valuable knowledge and people should use the repository to leverage the existing knowledge (Watson & Hewett 2006).

Gupta & Govindarajan (2000) highlight how the richness of transmission channels is another remarkable factor when considering knowledge channels and for MNEs

inflows and outflows among headquarters and subsidiaries. The choice of the knowledge channel is really important as media change in richness and impact on the efficiency and effectiveness of the knowledge transfer (Murray & Peyrefitte 2007). Low-media richness channels – rules, forms, procedures, database, e-mail, seminars/conferences, instructional lectures, and videotapes - are more likely to be chosen when explicit knowledge need to be transferred, while high-media richness ones – face-to-face contacts, technology-assisted communication, meeting, social events, mentoring, simulations, games, job rotation and role-playing - are better suited to tacit knowledge transfer (Murray & Peyrefitte 2007). This point of view is sustained by Tallman & Chacar (2011) as well, who state that the standard model for explicit knowledge transfer is done through the codification process, while for complex and tacit knowledge rich communication media like face-to-face communications or the movement of individuals to other locations is better not to lose the integrity of tacit knowledge. The extant literature supports the importance of face-to-face contacts in knowledge sharing; however, online social media environments seem to offer the same experience of relationship and interaction even without the physical presence of people in the same geographical location (Krishnaveni & Sujatha 2012; Murray & Peyrefitte 2007).

2.2.5 Headquarter role in knowledge transfer process

The headquarter plays an important role in KT, indeed it has a strategic responsibility in KT processes (Andersson et al. 2015). Motivation is one of the first element to take into consideration as the fear of losing ownership and the lack of will in dedicating time and resources in KT could hinder the transfer of crucial knowledge (Szulanski 1996). Another important aspect is linked to the reputation that subsidiaries perceive respect to the headquarter – if the source unit is not perceived as reliable and attractive, it is not seen as a trustful source of knowledge and subsidiaries will not be motivated in engaging in KT (Szulanski 1996; Pérez-Nordtvedt et al. 2008; Watson & Hewett 2006). Other important aspects deal with the involvement of the headquarter in the subsidiary-level activities, formal monitoring and evaluation criteria should be linked to the success of knowledge transfer among MNE's members (Andersson et al.

2015). More in detail, the involvement of the headquarter is a powerful signal of the headquarter commitment in KT; while, formal monitoring and evaluation criteria can discourage subsidiaries in undertaking knowledge transfer because it could be seen as mandatory instead of valuable.

2.2.6 The outcomes of knowledge transfer

Pérez-Nordtvedt et al. (2008) speak about successful knowledge transfer considering four main dimensions: comprehension, usefulness, speed, and economy. Comprehension refers to the extent to which the transferred knowledge is understood by the recipient. The usefulness measures how much the transferred knowledge is relevant and salient to organisational success. The speed of knowledge transfer is related to how rapidly the recipient acquires the new insights and skills coming from the knowledge and it is strictly connected to the capability of maintaining a competitive advantage against imitation from competitors (Zander & Kogut 1995). The economy is linked to the cost and resources used to transfer knowledge from the source to the recipient. In a higher level of analysis, we can state that the first two dimensions reflect the effectiveness of knowledge transfer, while the last two reflect the efficiency of the same (Pérez-Nordtvedt et al. 2008). Andersson et al. (2015) point out how the effectiveness should be intended foremost as the extent of receiver's knowledge implementation and usage because it is only when that knowledge transfer can pursue competitive advantage.

2.3 The role of expatriate managers in MNEs' knowledge transfer process.

2.3.1 Expatriate managers as KT mechanism

An increasingly widespread feature of the organization of work in MNEs is the international assignment of employees (Bonache & Brewster, 2001; Chen, Kirkman, Kim, Farh, & Tangirala, 2010; Harzing et al., 2016; Werner, 2002). Expatriates managers are home-country assignees for temporarily staffing key positions in a foreign-owned subsidiary (Fang, Jiang, Makino, & Beamish, 2010; McEvoy & Buller, 2007; Minbaeva & Michailova, 2004; Tan & Mahoney, 2006). They are usually

employed in key roles where their managerial and technical capabilities can impact to subsidiary's performance (Gonzalez & Chakraborty, 2014). Specifically, a recent study suggests that MNEs that rely on expatriate managers feature more effective KT processes compared to MNEs that do not use this mechanism (Harzing et al., 2016).

In the context of an MNE, the role of expatriates can be disentangled as in-patriates, parent-country national expatriates and third-country national expatriates (Harzing et al., 2016). The focus of this paper is on the third-country national expatriates.

Three are the reasons why MNEs rely on expatriates: to fill positions where and when qualified local nationals are not available; to develop international managerial competencies and prepare him/her to future tasks in abroad subsidiaries; and to develop the organisational structure to sustain socialization and networking (Galbraith & Edströnn, 1977; Harzing, 2001). As Black & Gregersen (1999) pointed out, the latter two reasons are at the base of successful international assignments – indeed, employing expatriates just to fill in a business need is not enough.

Each of the aforementioned reasons deals with some dimension of KT. In fact, expatriate assignees are considered a KT mechanism (Chang et al., 2012; Ditillo, 2012; Gonzalez & Chakraborty, 2014; Harzing et al., 2016; Kane, Argote, & Levine, 2005; Mäkelä, 2007; Murray & Peyrefitte, 2007; Song et al., 2015) because they are a mean through which subsidiaries get in contact not only with personal knowledge but also with organisational knowledge from other units (Fang et al. 2010). In other words, expatriate assignees' rotation is a mean to reach a multidirectional flow of knowledge between all global units of a MNEs (Hocking et al. 2007) – form headquarter to subsidiaries, and vice versa (Chang et al., 2012; Harzing et al., 2016). This means that expatriates can influence subsidiaries as well as their home units (Harzing et al., 2016; Mäkelä, 2007) - that is to say that expatriates can play a role for the whole MNE network, and this is why scholars refer to expatriates as the main actor of the expatriation-repatriation cycle (Gonzalez & Chakraborty, 2014). The proper management of both the international assignment and the repatriation program is fundamental to get successful results from expatriates (Black & Gregersen 1999).

The main purpose behind the use of this mechanism is the need of control, coordination and know-how transfer from the headquarter to subsidiaries (Chang & Smale 2013; Gonzalez & Chakraborty 2014; Minbaeva & Michailova 2004), aimed at sustainable competitive advantage fostered by a circle of knowledge transfer and learning (Gonzalez & Chakraborty, 2014). Expatriates can foster the cultural control – through shared values, norms and behaviour – needed by the headquarter especially where cultural distance is particularly felt (Colakoglu & Caligiuri 2008). The "cultural carriers" role (Chang & Smale 2013) is meaningful because it is recognized that sharing a superordinate social identity is a prerequisite to foster successful KT (Kane et al. 2005). Nowadays, the headquarters have moved their attention from the control purposes to knowledge-related ones (Bonache & Brewster, 2001; Minbaeva & Michailova, 2004), such as the development of talent, improvement of trust and commitment for subsidiaries, scaling team skills through training, implementation and sharing of best practices, and development of international leadership (Minbaeva & Michailova, 2004). Indeed, the great potential of expatriate management is given to the fact that they are the vehicle for knowledge transfer from the headquarter to the subsidiaries, but they are the mean through which the expatriates and, accordingly, the headquarter can learn from the subsidiaries – reverse KT process (Gonzalez & Chakraborty, 2014).

As expatriate management is regarded, KT is defined as the transfer of specific knowledge of skills owned by the expatriates into the assigned subunit or the transfer of newly learned knowledge and skills back to the home unit (Mäkelä 2007). The significance of the expatriates' role is given by their capability of transferring tacit knowledge at local and global contexts in a way that is not replicable by other knowledge transfer mechanisms (Hocking et al. 2007; Bonache & Brewster 2001; Kane et al. 2005).

In the knowledge transfer process through expatriates' activity, there are two main activities enabling the transfer: knowledge access from the expatriate, and knowledge communication to share the content of the knowledge with the receivers (Hocking et al. 2007).

At a more tactical level, extant literature has recognized four main roles to expatriates: the management of the entire foreign operations as a CEO; emulation of formal and informal structure of other MNEs units as structure reproducer; implementation of primary service or production function as operational expert; and support to problem-solving as troubleshooter (Gonzalez & Chakraborty, 2014).

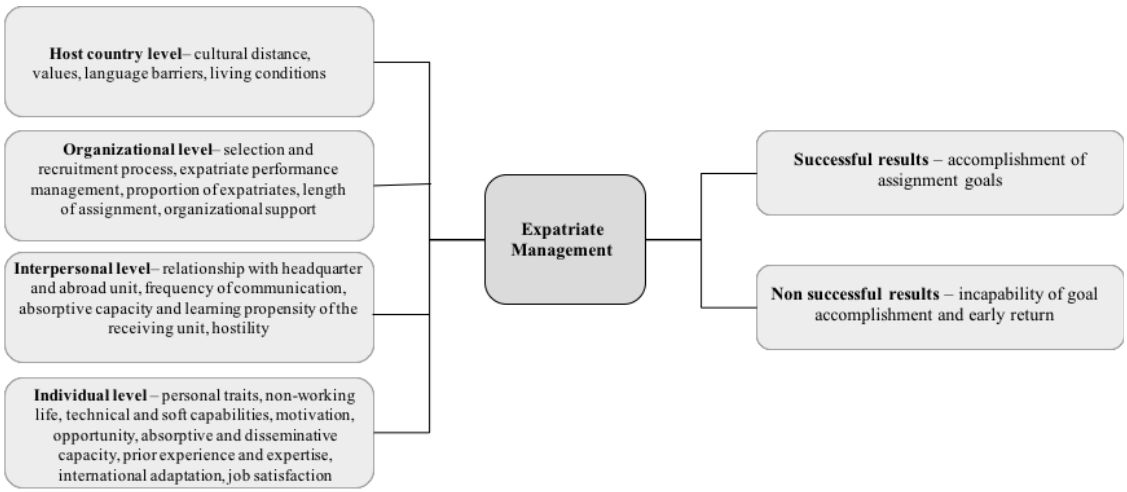
Traditionally, expatriates were engaged in long-term assignments – more than one year – but recently, alternative assignments forms have been rising like short-term assignments, international commuters, and frequent flyers (Minbaeva & Michailova, 2004). The duration of the international assignment is tied to the kind of role: troubleshooter, problem solver, and career-advancement are all required a short-term assignment (Minbaeva & Michailova, 2004; Shih et al., 2005). However, expatriates roles are often stricken by dysfunctional role characteristics like role ambiguity, conflict and overload (Wang 2002) that undermine the psychological well-being of the expatriate.

2.3.2 Enabling factors and barriers of expatriate management as KT mechanism

The relationship between expatriate assignees and KT success is not straightforward. In fact, there are several factors that can positively and negatively affect this relationship. As Tan & Mahoney (2006) say, on one side extant literature clearly depicts the advantages of the employment of expatriates but on the other side, there is the evidence of several business problems led by expatriate management. Given the fact that expatriate management mechanism is expensive and KT is a costly and long process as well (Black & Gregersen, 1999; Chang et al., 2012; Gonzalez & Chakraborty, 2014; Harzing, 2001), the understanding of which factors can enhance or slow down the dissemination of knowledge from the headquarter to the subsidiaries is really important.

Figure 2 summarizes the main drivers and outcomes of an expatriate assignment. The drivers are systematized according to four main levels – host country, organisational, interpersonal and individual level. As the outcome is regarded, the main difference is in terms of successful or non-successful fulfillment of the international assignment.

Figure 2. Determinants and outcomes of expatriate management.



The first scholarship effort in understanding the relationship between expatriate management and KT concerned the nationality and the number/proportion of expatriates in the subsidiary (Chang et al., 2012): the greater the cultural distance the higher the number of expatriates needed to exert cultural control and favour knowledge flows, even if the results reported in the extant literature are discordant in this sense (Colakoglu & Caligiuri 2008). Chang & Smale 2013) and Fang et al. (2010) posit that the nature of knowledge, the timing of the transfer and local specificity play a remarkable effect on the relationship.

Chang & Smale (2013) further add that expatriates' ability – expressed as experience and expertise, and absorptive and disseminative capacity - and motivation are critical in the proper assimilation and usage of transferred knowledge especially if the knowledge content deals with stickiness. The disseminative side of expatriates' capabilities is particularly important to motivate subsidiaries toward knowledge application and has a remarkable impact on the speed of knowledge transfer (Gonzalez & Chakraborty, 2014; Minbaeva & Michailova, 2004).

Chang et al. (2012) highlight how the ability, motivation, and opportunity enacted by the expatriate can help in overcoming with the internal stickiness in knowledge transfer.

Speaking about ability, Black & Gregersen (1999) and Chang et al. (2012) highlight how an expatriate manager should possess not only the technical experience and expertise to successfully transfer the knowledge but also the soft skills to effectively manage the process. Being able to deal with cultural differences, cope with different languages, values and learning style, learn to be empathetic and agile toward knowledge adaptation, and having prior international experience is really important for expatriates that want to reach successful knowledge transfer (Chang et al., 2012; Gonzalez & Chakraborty, 2014; Harzing, 2001; McEvoy & Buller, 2007; Wang, 2002). However, as Black & Gregersen (1999, p.57) say, "*they (MNEs) send people who are capable but culturally illiterate*" and this is one of the pitfalls that MNEs could fall into when managing international assignments. Cultural differences could be an inhibitor both for the willingness of undertaking the international assignment and for the successful fulfillment of the task abroad (Aryee, 1996; Chen et al., 2010).

Gonzalez & Chakraborty (2014) state a consistent viewpoint to the one provided by Chang et al. (2012) – even if, in the paper, they speak about task-related and intercultural capabilities instead of experience/expertise and soft skills. They further give a more in-depth view of the kind of knowledge that expatriates should possess to manage their role: the authors speak about cognitive, relational, attitudinal and behavioural knowledge that are able to provide, respectively, the know-what, know-how, know-when, know-why and know-who needed to reach a successful knowledge transfer. These competencies can be enforced through cross-cultural training that is proved to have a positive impact on the success of expatriates' assignment (McEvoy & Buller 2007). Also, expatriates' ability is positively influenced by short-term assignments that provide global knowledge, improved communication and training capabilities, and better language abilities (Minbaeva & Michailova, 2004). Of course, having the right expatriate in the host-country unit should be the outcome of a structured and formal recruitment and selection plan, aspects that are not always developed in MNEs organization (McEvoy & Buller 2007; Black & Gregersen 1999). In the management of expatriates, also relocation policy after the fulfillment of the international assign plays an important role (Aryee 1996).

Motivation, i.e. the extent to which expatriates intend to engage in their task, is a crucial factor for successful KT (Chang et al., 2012). Several barriers hinder expatriates' motivation, such as role ambiguity, conflict in the expectations between subsidiaries and headquarter, expatriates' reluctance in knowledge transfer, lack of expatriates' commitment toward the subsidiary, and hostility to the subsidiary's country (Gonzalez & Chakraborty, 2014). Furthermore, factors related to the non-working life – spouse and relative variables – and personality variables – locus of control and extraversion (Aryee 1996) also affect motivation.

Motivation can influence expatriates' adjustments during the international assignment and, as a consequence, the resulting performance (Chen et al., 2010). Other personal traits linked to the successful fulfillment of the assignment are broad-based sociability, cultural flexibility, cosmopolitan orientation, and collaborative negotiation style (Black & Gregersen 1999). One way to cope with expatriates' inner motivation is provided by performance management tools like performance appraisal and feedback linked to the specific mission given to the expatriates, training, and development before during and after the expatriation, and performance-related pay linked to the obtained results, albeit these tools are not so commonly used among MNEs (Shih et al. 2005). Nevertheless, performance management is the main indicator of expatriates effectiveness during their assignment (Chen et al., 2010). This viewpoint is supported by McEvoy & Buller (2007) that highlight how the evaluation of the expatriate at the end of the assignees is not easy to perform, and this is detrimental for expatriate's motivation. Wang (2002) specifies four dimensions of expatriate' performance: technical, contextual/prosocial, contextual/managerial, and expatriate-specific. Another way to improve expatriates' willingness is providing them with the role autonomy and discretion able to feed the commitment in the assignment (Minbaeva & Michailova, 2004) – this is feasible especially for long-term assignments.

Finally, Chang et al. (2012) point at the opportunity, i.e. the expatriates' capability of looking for resources and opportunities that can foster KT – one of the greatest are social ties. In other words, social relationships - between the expatriates and the subsidiary, but also among expatriates and between expatriates and the headquarter - positively impact toward successful KT (Chang et al., 2012). In support of this

viewpoint, Wang (2002) sustains that social networks – providing social resources like social instrumental and/or emotional support – matter to sustain the psychological well-being of the expatriates, that is an indicator of the expatriates' adjustment, and as a consequence, expatriates' performance during their overseas assignments.

The frequency of communication between subsidiary managers and headquarters manager is important and favors inter-unit knowledge transfer, especially if it is lead through social interaction that increases the quantity of knowledge transfer and the support from the provider of the knowledge (Song et al. 2015). Communication among MNEs members is not always frequent enough to share best practices, that is why Song et al. (2015) suggest some mechanisms that can sustain vertical and horizontal communications – international training programs, international task forces and committees, visits across MNE's units. As mentioned, expatriates usually create social interaction and this further lead to trust and cooperation among the expatriate and the subsidiaries' members – factor that is able to reduce the geographical, cultural, and linguistic barriers hindering the success of KT (Mäkelä 2007).

Another important trait other than expatriates' ability, motivation, and opportunity, is the international adaptation of expatriates to the foreign job requirements, living conditions, and interacting and socialization – the capability of managing the adaptation can influence the efficiency and the effectiveness of knowledge transfer (Gonzalez & Chakraborty, 2014; Vianen, Pater, Kristof-brown, & Johnson, 2004; Wang, 2002). Indeed, international adjustment act on the level of satisfaction/dissatisfaction that influences the well-being of the expatriate and, accordingly his/her results during the assignment (Vianen et al. 2004; Wang 2002).

The absorptive capacity and the learning propensity of the receiver – the subsidiary – also play an important role as these subsidiary's capabilities are connected with the chance to retain, implement and sustain the transmitted knowledge even after the repatriation of the expatriates (Chang et al., 2012; Gonzalez & Chakraborty, 2014). Next to the absorptive capacity of the subsidiaries, extant literature reports that subsidiary's organisational support - articulated into adjustment, career, and financial support - are directly linked to the level of expatriate's adjustment and commitment (Chen et al., 2010).

In summary, all the factors analysed potentially impact on the successful or unsuccessful results of the expatriate's assignee, where successful results are defined as the accomplishment of the expatriation goals as defined prior to the departure, and unsuccessful results are generally intended as the early return of the expatriate in the home-division (McEvoy & Buller 2007). Early returns of expatriates seem to be linked mainly to job dissatisfaction and difficulties in adjusting to the foreign country (Black & Gregersen 1999). As reported by Minbaeva & Michailova (2004), about the 40% of the expatriate assignments are aborted due to several barriers encountered by the expatriates.

3. Research design

The extant literature has focused on the management, the determinants, the challenges and the potential results of international assignees in the specific context of the MNEs where the common denominator seems to be the coordination and/or control role from the headquarter. It is the centre of knowledge flows among the MNEs members, it is the decision maker of who, when, where and what an expatriate will do, and it is the auditor that declare the success or the failure of the assignment.

This study addresses three open issues in the studies on KT in MNEs:

- Is expatriate assignment a sustainable mechanism to foster KT in network-based MNEs, with weak headquarters?
- Which are the infrastructural, interpersonal and individual variables that can foster or hinder a successful expatriate assignment?
- What are the roles that an expatriate assignee plays in a team in order to transfer a bundle of tacit and codified knowledge?

This study addresses these issues by carrying out an action research in a project managed by a multinational consultancy company and aimed at the launch of a new training centre. This company resembles the archetype of the "knowledge-intensive company" – i.e. an organization whose primary value is on the accumulation, creation and/or dissemination of knowledge to serve their clients (Millar et al. 2016).

Specifically, in this company, the transfer of experiences and knowledge among different clients' projects is the main principle to sustain competitive advantage but it opens new challenges in terms of KT (Ajmal & Koskinen 2008; Robertson & O'Malley Hammersley 2000). As Millar et al. (2016) point out, for knowledge-intensive organizations, knowledge is an on-going component where people are their core asset. People are one of the main enablers to foster knowledge management within knowledge-intensive firms – knowledge broker role, networking and personal relationships are considered the most critical element when a consultancy company wants its employees to transfer and share both explicit and tacit knowledge (Weiss 2000).

As the author played the dual role of researcher and practitioner during the company project, canonical action research – that can combine research and practice (Avison et al. 2001; Zhang et al. 2015; Ottosson 2003; Puhakainen & Siponen 2010; Walsham 2006) seems an appropriate methodology. Action research increases the access to those organizations that are the subject of management research enriching the insights for literature development while providing organizations with a rigorous and valid solution to specific problems (Zhang et al. 2015). In summary, it is a way to changing the system while generating significant knowledge (Duffield 2017).

Davison, Martinsons, & Kock (2004) advance that, among the ten categories of action research, the canonical action research (CAR) can count on more rigor and relevance when five major principles are applied as summarised by Table 1.

Table 1 – Five main principles of rigorous and relevant action research

CAR PRINCIPLES	DESCRIPTION
Principle of the researcher-client agreement	Mutual trust and understanding of the main contribution from the researcher.
Principle of the cyclical process model	CAR is driven by five phases – diagnosis, action planning, intervention, evaluation and reflection led through single or multiple cycles of action.
Principle of theory	CAT is supported by the theory either during the diagnostic phase or during the intervention phase to guide and focus the researcher's activities.
Principle of change through action	The core of CAT is to cope with an unsatisfactory current situation toward personal and/or organisational change to reach an improved "future state".
Principle of learning through reflection	Reflection can provide the advancement of the client and the enlargement of the theory base.

The following sections will describe the content of the CAR disentangling the five main principles toward rigorous results and insightful theoretical results.

4. Outcomes of action research

4.1 The principle of the researcher-client agreement

4.1.1 Introduction to the "client": the core business and the structure of the case company.

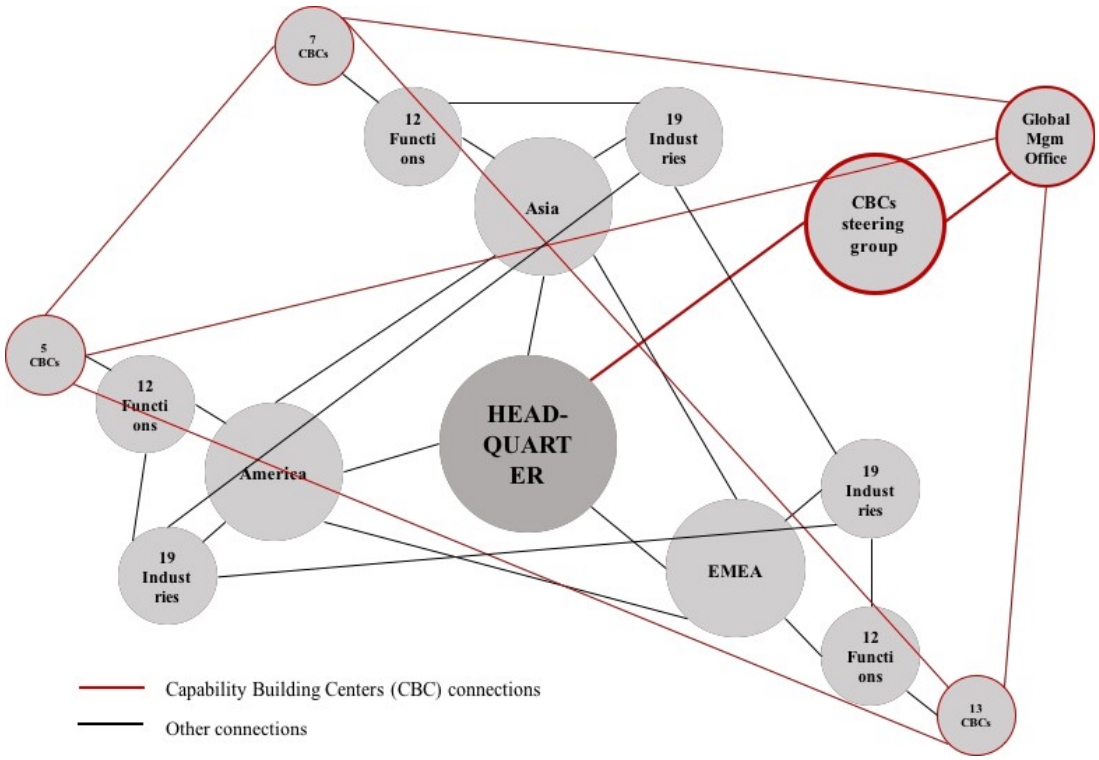
The company under analysis is a multinational consultancy company, established more than fifty years ago. It is considered as one the most important consulting companies in the world, counting more than 5000 consultants and 2000 research and information professionals, serving private, public, and social-sectors organizations. The company's 12 business functions[7] and 19 served industries are aimed at sustaining the

7 The business Units are the company practices divided in Advanced Analytics, Design, Industry 4.0, Implementation, Learning programs, Marketing & Sales, Operations, Organization, Transformation Services, Risk, Strategy, Sustainability.

clients to reach the expertise and capabilities to boost their performances in the long-term while guiding them during all the phases of a successful transformation.

Figure 3 offers a simplified view of the company network relationships. In the actual network, every node of the network is connected to all the others.

Figure 3. Simplified company network structure. Nodes and networks relationships among units and headquarter



One of the traits that clearly distinguishes this company from the competitors is its core business, as it serves the clients not only by providing the support to regain and improve their competitiveness but also by providing the capability-building needed to sustain the change toward operational excellence. In fact, the company invests, every year, more than $ 500 million to foster knowledge development, learning and capability building.

With the purpose of building the clients' capabilities to foster and sustain organisational transformation, the company has been developing a network of capability

centres – highlighted in dark red in Figure 3 - where consultants take clients to set aspirations, practice new skills and achieve their learning goals.

In these centres, clients can experience a "learning-by-doing" training thanks to realistic production and office processes where real operators perform the activities. Thanks to this pre-engineered environment, the client can learn how to implement what they learned during plenary training and understand how their attitudes and behaviours can foster or erode on-site relationships within their peers and collaborators. The topics of interest of the model factories network are mainly Lean Management and Digital Transformation.

The focus of this study is on the way the company has been managing knowledge among the different model factories. The company's network is made of 25 model factories – five are in America, thirteen in the Europe, Middle East and Africa (EMEA) area, and seven in Asia. Among these 25 model factories, five of them include digital learning – from now on Digital Capability Building Centres (DCBC) - and they are located in America, EMEA, and Asia.

The American DCBC has been launched in 2017, with the help of the researcher.

4.1.2 The content of the agreement between the researcher and the company

As already mentioned, the DCBCs offer their training services by exploiting model factories run by real operators. The training of operators covers technical issues on lean and digital concepts, the job content they need to perform in the model factory, and the company's culture – to learn how to interact and approach the client.

The broad content of their training asks for a tailoring of the knowledge transfer mechanism used, including traditional lecturers, learning-by-doing, mentorship, coaching and role modelling. At the EMEA DCBC, the researcher was in charge of managing the on-boarding of the operators, looking after their selection, training, and provision of coaching and feedback on their performance during client's workshops. The researcher would cover the same task at the American DCBC – except for the selection process - leveraging the experience done at the sister EMEA DCBC.

Considering these premises, the consultancy company chose the researcher as an expatriate assignee for a two-month period - from April to June 2017 - with the main

goal of sustaining the launch of the new American DCBC. Specifically, the researcher was tasked with the transfer of the technical and cultural knowledge from the EMEA DCBC to the American DCBC's operators.

The company and the researcher agreed on the content of the job covered by the researcher, the duration of the assignment, the condition for accessing confidential information, the financial conditions and accommodation to cope with the assignment.

The researcher had spent the abroad period carrying out the following tasks:

- Fixing the milestones of the training program with the other team members during the check-in meetings where the researcher proposes the weekly programs, problem solve potential constraints and issues;
- Providing continuous support to the operators – around five hours per day for the two months until the opening - both in a conference room as well as in the model factory;
- Defining the main activities to sustain the follow up after the DCBC launch and the repatriation of the researcher.

The duration of the assignment was set at two months where the great part of the time was allocated to the preparation of the operators before the opening. One week was allocated after the launch for the follow-up activities. The American team provided the researcher with all the financial resources to cope with her abroad period - e.g. flight and meal refund, hotel accommodation.

Also, they agreed on the way of treating and managing company files, information and research outcomes – the researcher signed a confidentiality form and the company agreed on how the researcher could have cited the company in his research paper. The full transparency of the action research has fostered trust and internal validity of the research (Davison et al. 2004).

4.2 The principle of theory - the KT process for the establishment of a new training centre

4.2.1 KT among the DCBCs around the world

The framework used to interpret the way the company manages knowledge flows belongs to three different streams of research – knowledge management, human resources management, and international business. These research streams were important specially to support the implementation phase where the tactical decisions were compared to what the theory suggests in order to find the best solution for the success of the launch and the action research. The contribution of this paper is also the chance to put together three different streams of research thanks to this action research.

The model outlined in Figure 1 helps to analyse the process of KT among DCBCs. As per the contextual variables, the kind of control mechanism and the relationship between the provider and the receiver of the knowledge are initially taken into account. As displayed in Figure 3, the DCBCs network includes five centres located in America, EMEA, and Asia, and other two decision-making bodies: the Global Management Office (GMO) and the CBCs steering group that is directly linked to the headquarter. The kind of knowledge that flows among the DCBCs and the GMO is mainly focused on strategical guidelines, e.g. target and decision making (Ditillo 2012). In other words, the DCBC refer to the GMO especially for the budgeting, results controls, and major projects approvals. The kind of mechanisms mentioned does not ask for direct relationships – indeed the contacts between the DCBCs and the GMO are set at specific timing consonant to the fiscal year.

The situation among the DCBCs, on the other side, is really different. It is not a headquarter-subsidiary relationship, but something closer to the knowledge transfer among subsidiaries. The kind of network created by the company has a multi-focal structure where the headquarter is barely involved at the operational level, while it is directly involved at the strategical and the accounting one. In fact, all the daily control and coordination mechanisms do not come from a headquarter but it is a voluntary action coming from an agreement of the DCBCs managers. This is the reason why the

attention of the researcher is focused on the knowledge transfer among the DCBCs rather than between the DCBCs and the GMO.

As the relationship and the control mechanisms among the DCBCs are regarded, they are led at more operational level – the kind of knowledge that is shared is closer to the process related, technology related and opportunities related knowledge (Ditillo 2012). The control and coordination mechanisms used to support the transfer of that knowledge is delivered through weekly and monthly calls in which every manager explains the status quo of the DCBC and the on-going projects in order to acknowledge all the other managers. This kind of calls is also used to share a common knowledge base and foster network homophily (Gupta & Govindarajan 2000) – both necessary to sustain absorptive capacity. They are also important to highlight common issues and problems to be solved together, and, most of all, the create alignment among the DCBCs. Besides the weekly and monthly calls, every DBCD manager is free to lead one-to-one calls and emails to share specific content with another manager.

The relationship between the DCBCs' managers and the staff is mostly based on these communication channels. Face-to-face meetings are quite rare as the model factories are dispersed all around the world. These rare moments are international conferences that twice per year collect all the DCBC managers to share the blueprint and next steps for the network.

Trying to go more into detail on the kind of knowledge that is shared among DCBCs through conference calls and emails, the next section will address the content of the mentioned process related, technology related and opportunities related knowledge where tacit and explicit components are a continuum rather than a dichotomy (Pereira et al. 2012).

Among the DCBCs, one of the most important knowledge that needs to be transferred and shared is about the theoretical training modules for the client's workshops (technology-related knowledge). Developing client's workshop means, first of all, to have the theoretical knowledge at hands – this is particularly true for the DCBCs as they are focused on the digital transformation where training materials are still in a development phase. A specific branch of the company is dedicated to the development and adjustment of knowledge to answering to the newest best practices

like the lean and digital transformation. The training material is usually shared through the website and the repositories to which all the employees have access to. However, even in this kind of codified knowledge, there is a tacit component – this is the capability to find out the experts that could support the training at the DCBC and/or deepen specific topics (opportunities related knowledge). This is the "know-who and know-where" side of the knowledge (Persson 2006; Ditillo 2012; Hocking et al. 2007) that cannot be directly codified.

Once the theoretical modules are developed, the next step is the definition of the experiential exercises in the model factories. Usually, the company provides the tools that the client will implement on their sites, the same tools that they will experience at first hand in the DCBCs' production lines. The DCBC team of every model factory is in charge of thinking about the case to show in the model factory and implement it. The great part of this task is tacit – is done by the experience of the team, the know-how linked to how the model factory usually run and which kind of aspects are appreciated by the client during the training.

So far, the majority part of knowledge sources is managed through impersonal mechanisms – namely, repositories for the training modules, and email exchange or calls when further information needed to be requested.

4.2.2 KT within the DCBC – how knowledge is transferred to the operators

Partially different is the KT process about the way the model factories manage the operator's team (process related knowledge). The way the operators behave and answer the client's questions is critical to the success of the training – this represents the distinctiveness of the company and it is the reason why the training done on the operators is so important and matter of discussion. The content of the operators' training covers three macro areas – lean and digital principles, exercises and work content, mind-sets and behaviours. Operators are trained to be fully prepared in terms of theoretical knowledge – lean management and digital transformation – but also to perform their tasks in the model factories like real operators. Also, they need to be trained in terms of mind-sets and behaviours to interact with the clients and approach them according to the company's culture. They are the main players of the model

factories and they need to enact specific personas – role play – to deliver key learning about lean and digital principles to the client. The mechanism through which operators are trained is a mix of paper-based instructions and modules, mentorship, learning-by-doing, coaching and feedback, and past experience in dealing with the clients.

Operators management is actually a topic discussed during the DCBCs calls but, as it requires a direct and personal relationship, it is quite difficult transferring this kind of knowledge by calls or email. That is the reason why the researcher moved abroad to transfer the knowledge needed to start up the operators' team in the American DCBC.

Notably, the focus of the action research will be the analysis of the role of the expatriate assignee in the delivery of the technical and cultural knowledge to the operators' team in the American DCBC whose launch was planned on 2017.

4.3 The start-up a new DCBC in North-America – The principle of cyclical model process

4.3.1 Diagnosis – the company current situation at the starting of the project

The expatriate assignment of the researcher was part of the start-up strategy of the American DCBC. The company took the decision to launch this DCBC in 2017 and provided the human and financial resources for the purpose. The people staffed in the launch project were hierarchically organized in three levels: four project leaders, one project manager, and the project team made by three full-time employed people and a pool of flexible resources –around four people with high turnover. The project leaders were company's partners and senior managers sponsoring the American DCBC launch and providing the strategic guidelines. They took the decision to open a new DCBC in America and to emulate the same facility that the EMEA DCBC has – same model factory configuration and core business in order to exploit the existing knowledge. The project manager was a manager who translated the strategic guideline at the operational level by delegating the tasks to the project team. The project team included company's consultants with three main specialisations – digital implementation, technical and process development, launch and communication organization – entrusted with specific tasks. The flexible resources were company's consultants not employed in other projects

and called in by the project manager to support the launch when the workload of the team needed extra capacity.

Despite the original plan of leveraging the EMEA facility, the project team encountered some issues that required time-consuming adjustments. Specifically, the team had to look for new suppliers able to provide all the equipment for the model factory, because of the ones working with the EMEA DCBC were not able to provide the equipment overseas. The equipment includes machinery, tools, raw materials, product parts, and all the other instruments needed to run the model factory.

This cycle of refinements has led to copious email exchanges between the American and EMEA DCBC teams – sometimes with little success because of the geographical distance – emails were usually delayed by time zone; language barriers and misunderstanding caused the incapability to capture questions and problems without personally seeing it. Communication was smoother when the teams adopted a video conference call, but this tool was very time consuming and it did not solve the issues linked to the time zone and language barriers. Sometimes, the support from the EMEA DCBC team seemed not to be enough to solve the problems and help the American DCBC team to respect the deadlines for the DCBC launch.

Once set the main issues on the model factory, the project leaders started planning the on-boarding of the operators – selection, training, and preparation for the launch.

The current situation was constraining – the time available was short, just two months without the chance to delay the opening; the shop-floor had still some issues to cope with part of the equipment and Industry 4.0 technologies; the staffed resources could not fully allocate their time to the on-boarding of the operators; the lead of the operators should be independent enough to manage the full training and the preparation of the operators. As the position was vacant, and considering the strict connection with the EMEA DCBC, they asked the EMEA DCBC manager the chance to move the researcher for an international assignment with the main goal of transferring her experience and knowledge on the operators' training. This solution seemed to fit the constraints of the actual situation and the chance to speed up the on-boarding of the operators through an alternative solution respect to the usual ones considered by the company.

4.3.2 Action planning – the plan for the operators' training

Once defined the likelihood of the administrative part of the international assignment, the project leaders and manager helped the researcher a lot in the planning of the abroad period and gave her all the financial support needed to cope with the assignment.

The first step toward the successful on-boarding of the operators was the definition of the training program. For this purpose, the researcher and the project team aligned on the milestones of the training programs – the content of the training, the timing of the training, the training mode and the resources needed to carry on the program. An excel file collected all the information that was constantly updated by the researcher and shared every week with the team through a dedicated email to which all the receivers were called to provide feedback or further updates.

The excel file was not sufficient to foster the needed coordination and unexpected events and adjustments further complicate the situation. The researcher had to cope with communication and coordination issues as she had to coordinate the operators, together with the other team members involved in the training program, and matching the agendas of all the team with proper communications and reminders.

In order to face these drawbacks, the entire team started to include the researcher and the operators' planning as a topic of the daily check-in meeting so that she was aware of everyone's commitments and reschedule in real-time the operators' training planning. Moreover, project manager and leaders have helped the researcher by providing the guidelines for effective and efficient communication – e.g. effective email writing when an urgent topic needed to be promptly solved – and by stressing the priority of the operators' training among the project members who started giving the right priority to that program. This intervention supported the researcher by improving her capabilities in communication and urgency prioritization, as well as giving her a more stressed and recognized role among the team members. Both the two mechanisms help the team to avoid further miscommunication and adjustments loops.

4.3.3 Intervention - the fulfilment of operator's training

During the two months spent in the American DCBC, the researcher covered a fusion of the "structure reproducer" and "cultural carrier" role (Gonzalez & Chakraborty, 2014). According to the "structure reproducer" definition, the researcher has tried to sustain socialization and networking by spreading and transferring best practices in the management of operators from the EMEA to the American DCBC. As "cultural carrier", the researcher has tried to foster alignment in terms of company values and culture to the American DCBC operators. Both the two roles asked for a strong reliance on the previous experience developed by the researcher at the EMEA DCBC (Ajmal & Koskinen 2008) and this is the main reason why the researcher and the DCBC team find a good fit between the researcher and the vacant role for the launch of the American DCBC. This is particularly important as the appropriate definition of roles among the researcher and the other team members affect the action research effectiveness (Davison et al. 2004). This fit could be further analysed according to the ability-motivation-opportunity framework (Chang et al., 2012).

In terms of ability, the extant literature highlights how technical and soft skills should be equally developed in an expatriate, as he has to deal with the "hard" side of knowledge transfer – being able to transmit the content of the knowledge, but also with the "soft" side of the same – being able to convince the receiver about the importance of that knowledge and the reason why he should adopt it.

The hard and soft skills of KT seem to correspond to the absorptive and disseminative capacity of the expatriate manager (Chang & Smale 2013). Previous experience at the EMEA DCBC positively affected both the two capacities – absorptive capacity was fostered by the ongoing participation in training workshops and projects at the EMEA DCBC, and disseminative capacity has been grown during the two-year-long experience in on-boarding the EMEA DCBC operators and listening to the operators' feedback after the training. More in details, the disseminative capacity was partially affected by the content of the transferred knowledge and the infrastructural variables encountered at the start of the international assignment.

In terms of knowledge content, the researcher had to deal with different kinds of knowledge to transfer – on one side technical knowledge linked to understanding of lean and digital principles, and properly performing the shop-floor activities, on the other side the cultural side linked to the consistency of operators' behaviour to the company culture and the proper approach during the interaction with the company's clients. The different content to transfer has led the researcher to follow different approaches and channels to maximize the effectiveness and efficiency of the transferred knowledge (Schulz & Jobe 2001).

The technical knowledge linked to the understanding of lean and digital principles was easily accessible and selected by the company repository that contains training modules shared among all the company units. Having at hands full repositories of accepted and universal training content is really important, as rationalized and universal knowledge plays a remarkable role in knowledge management systems among knowledge-intensive organizations (Weiss 2000). The main mechanism used was plenary sessions where the main theoretical modules were explained to the operators. Every theoretical module was selected because it was directly (e.g. digital wastes) or indirectly linked to the shop-floor activities (e.g. how to rapidly do a set-up). The technical knowledge linked to the correct performing of the shop-floor activities was transferred through paper-based standard operating procedures and shadowing of the operators until they got the sufficient fluency and confidence on that. Of course, the main KT mechanism used was the learning-by-doing on the shop-floor with the shadowing and supervision of the researcher who has prior experience from the EMEA DCBC.

The transfer of technical knowledge was not hit by pitfalls in terms of disseminative capacity, except for some initial language barriers that were overcome easily after two weeks. The absorptive capacity of the researcher and the operators were significantly improved thanks to the on-going exchange of Questions and Answer to test the understanding of the operators or to ask clarification from the researcher.

On the other side, the cultural side of the knowledge – consonant behaviours and approach with the clients, could not be incorporated into lecturers. The approach followed by the researcher was based on a set of soft skills methodologies to positively

influences operators' mind-sets and behaviours. The influence model – a model developed by the company - has the main goal to influence the mind-sets and behaviours in order to reach specific organisational goals. There are four main levers to make it happen: explain the main reason why of the requested mind-sets/behaviours, provide the reinforcing mechanisms to sustain what is requested, pursue the training to reach the skills and the competencies needed, and foster the role modelling to make others behaving the same. The researcher was the main responsible of three out of four levers – providing the needed training and explaining why behaving according to the role modelling to inspire them in doing the same. In order to be credible and considered as a role modelling to follow, the researcher had to create social relationships – an accomplishment reached mainly through the creation of mutual trust and intimacy in the relationship with the operators. This required a strong effort to overcome with the initial distance due to the fact that the researcher and the operators never met before the starting of the project to launch the DCBC – team building events, coffee break, lunches and informal events helped to create connection and unify the team in terms of behaviours, goals, and teamwork. Personal relationships fostered the positive attitude of the operators who started to proactively participate in the training program and offering help and support toward the goals.

As the reinforcing mechanisms are regarded, the entire team has worked together to make the operators having all the tools and instruments they need to perform their tasks in a safe and proactive environment. The other team members support the researcher also with feedback moments and problem-solving when some operators seemed not committed or not aligned in their attitudes and behaviours. Indeed, next to the influence model, the feedback technique helped to reinforce the positive attitudes and try to readjust and understand misleading behaviours – e.g. lack of commitment, complaints, detrimental team dynamics like lack of cooperation with colleagues.

The disseminative capacity of the researcher faced initial constraints not just because of language barriers but also because there was not any kind of relationship and the researcher has tried to build it from scratch. On the other side, the influence model and the feedback loops, have strengthened the absorptive capacity and the learning propensity from the operators as well as the absorptive capacity of the researcher who

started understanding the operators' characters and delivering the messages according to specific levers.

As the motivation is regarded, it has to be broken down it into two main components – cross-cultural self-efficacy and cross-cultural intrinsic motivation (Chen et al., 2010). As intrinsic motivation is regarded, the researcher was strongly committed to the task because the positive outcomes from the international assignment would have led to benefits both for the American and EMEA DCBC. On one side, it would help in the launch of a new DCBC with common standards in terms of operators training and, accordingly, client experience. On the other side, it would favour knowledge transfer and sharing among two units belonging to the same network – thing that was particularly difficult to manage because of the current KT mechanisms and the near miss role of the headquarter in knowledge dissemination. As for the self-efficacy, the researcher could count on a two-year-long experience but within a challenging context – different country, different language, tight deadlines and completely new team members. The project owners and the team members had helped the researcher to cope with this challenging situation by providing frequent feedback and performance appraisal that had increased the researchers' self-efficacy and, as a consequence, and increased the commitment toward the success of the researcher's international assignment.

Finally, as the opportunity is regarded, the entire team has proactively supported the researcher in the provision of all the resources for the training program – training modules, tools for the operators e.g. laptop, and so on. Moreover, the collaborative teamwork and the social relationship created among the researcher, the project team and the operators had provided the researcher with the emotional, instrumental, informational and feedback support (Wang 2002) that positively impacted on her well-being. As a consequence, the stable well-being impacted on the researcher's autonomy in the task fulfillment and capability of environmental mastery – even in the face of last-minute readjustments or unexpected events.

All the details described so far have led to the launch event on 2017 with a lean and digital model factory run by the operator team who demonstrated ownership in

performing the task in the model factory and interacting with the clients according to the guidelines provided during the training program.

After the launch event, the researcher, the project team, and the operators started the follow-up stage of the project done to sustain the good results obtained even after the repatriation of the researcher and the transfer of some of the team members. The follow-up phase lasted one week when the entire team started to collect all the pending issues and improvement ideas to be delivered to the newcomer team members. All the information was organized together in a shared repository coupled with a high-level planning for the next stages of the operators' training program. The follow-up stages stopped without having the chance to make the "old" project team meeting the "new" one.

This has created a little bit of mismatch between the two DCBC teams and, of course, a little bit of discouragement among the operators. In order to cope with this issue, the new DCBC team has started some conference calls with the researcher who tried to clarify the main content and purposes of the information included in the repository. Moreover, the researcher got in contact with the operators through a video call where they aligned on the main improvements done. The calls helped to fill in the gap between the two teams without losing all the effort done with the operators in the previous two months and to find again the right mind-sets and behaviours learned before the repatriation of the researcher.

In conclusion, the international assignment has provided with the planned goals thanks to a set of infrastructural, interpersonal, and individual variables:

- Infrastructural variables are linked to the environment and overall management of the international assignment process – made by three main phases: planning, fulfilment and follow-up – that foster clear role definition, full alignment and collaboration among the team members;
- Interpersonal variables among the researcher, the project team, and the operators – e.g. feedback sessions, coffee breaks, team building events - have fostered the creation of trust and mutual respect that created a virtual circle of knowledge;

- Individual variables from the researcher have eased the task of knowledge transfer, as the capability-motivation-opportunity model perfectly suited the need of the project.

For sure, the three dimensions have positively impacted in the effectiveness and efficiency of knowledge transfer process. As one of the project leaders stated: *"The results that you have reached here with the operators after two months, were comparable to the ones we reached after five years in the other American model factory"*.

4.3.4 Evaluation – main insights from a semi-structured questionnaire

Action research can use different sources of quantitative and qualitative data (Puhakainen & Siponen 2010; Walsham 2006). In this work, the researcher has collected background information from internal company documents, field notes during her engagement at the company, and has designed a semi-structured questionnaire submitted by email to those involved in the project. The choice of the email questionnaire was done in order to obtain quality data, reduce the cost of questionnaire submission (Shermis & Lombard 1999) and, moreover, to push respondent to answer to the questionnaire knowing that it would ask them short amount of time. Furthermore, it has been proved to be a good channel to push the reflections of both the researcher and the company under analysis (Davison et al. 2004). The choice demonstrated to be effective as all the respondents answered, despite the researcher had to send three reminders.

The assessment involved the eight people with whom the researcher interacted: two project leaders, the project manager, three full-time members, and two flexible resources.

The assessment tool is a set of open and closed questions focused on understanding the extent of effectiveness and efficiency of KT through the expatriate assignee, compared to the other mechanisms used during the project.

The questionnaire is focused on the researcher's role during the project in order to compare her reflections with the project team opinions. The questions were open and

close-ended, and were developed grounding on the insights from the literature and the empirical analysis, embracing a deductive questionnaire strategy (Hinkin 1998). The purpose is understanding the perception of the respondents about the introduction of an expatriate assignee in one of their projects.

The first question was aimed at understanding the main expectations about the researcher's international assignment – this is particularly important when paired with the results in order to see if the assignments were successful or not (McEvoy & Buller 2007). Looking at the results of the questionnaire, the answers expresses twofold opinions.

Project leaders and the project manager had clear expectations on the researcher's role and tasks, as expected because they were the main decision-makers of the assignment:

"I expected [the researcher] to help transfer knowledge between the EMEA DCBC and the American DCBC since we had similar processes. I also expected [the researcher] to be able to train the operator team better than anyone else on my team since she understood the role of the operators from her time at the EMEA DCBC"

On the other side, some other team project members state the following:

"To be honest, I did not have any expectations about [the researcher] role in the study because I was not aware that [the researcher] was coming to help us until shortly before her arrival"

The fact that the researcher's role was not clear among the team members maybe is due to a lack of communication between the project owner and the team members. Nevertheless, despite the initial mismatch the team members further declare:

"Within a few weeks of my experience, [the researcher] role became clear: to ensure that the on-the-floor experience for participants was as good as or better than the experience at other existing DCBC's"

The awareness of the researcher's role and the clear understanding of the tasks expected by the researcher were fostered by the daily check-in meeting where all the team members share their plan for the day and the resources needed to accomplish it. Moreover, the creation of social relations feeding trust, reciprocity and team building, was able to make the team members be fully aligned and aware of everyone's roles.

The questions linked directly to the expatriate role deal with the effectiveness and the efficiency of the researcher's assignment during the project. In order to assess the effectiveness of the role, the researcher asked the American DCBC team to rate the level of the ability, motivation, and opportunity (Chang et al., 2012) on a scale from 1 to 7. The three variables were rated from 6 to 7 from all the respondents.

The team highlighted how the experience gained in the EMEA DCBC has positively influenced the level of ability, motivation, and opportunity put in the success of knowledge transfer:

"I think [the researcher's] ability, motivation, and opportunity are EXTREMELY high. The only thing I would say about opportunity is that we could have spent more time as a team before [the researcher] arrival to set the expectation for what [the researcher] would bring to us and how we could best work with [the researcher] right away when she arrived."

"...I immediately could see that [the researcher] had a wealth of experience to support the unique facility we were building"

The high rate in terms of capability and motivation highlights how the international assignment was well suited to the researcher experience, capabilities and individual attitude – an important determinant already mentioned both in the literature review and in the action research description. This is a clear signal of the importance of the selection phase done by the American DCBC leaders and the EMEA DCBC managers. As the opportunity side is regarded, one of the team members raises the voice by saying that the team could have managed better the support provided to the researcher during the assignment. Again, the check-in meetings and the problem-solving sessions have been the main conveyor of cross-team alignment.

Furthermore, the researcher asked respondents to rate the different knowledge transfer mechanisms employed during the project – weekly calls, emails, video conference, database/repositories, and expatriate managers. The results show how the effectiveness of the expatriate assignee is considered as one of the richest ways – 7 out of 8 questionnaires put the expatriate at highest rate to get knowledge transfer as the comments reported below explain:

"[The researcher] assignment to [the American DCBC] was by far the most useful knowledge transfer mechanisms employed" also rephrased as *"Having [the researcher] at the [DCBC] in person was by far the most effective method of knowledge transfer because we could ask her questions as they arose and didn't have to wait for an e-mail, call or another method"*

The main insight coming out from the answers is that personal contact and relationship with the researcher who has previous experience on the assignment tasks, and who had a good match in terms of ability, motivation, and opportunity, was the most important element that made the expatriate management the most effective mechanism among the ones used by the company. The richness of this channel makes the expatriate assignment gather the highest score.

As the efficiency is regarded two main questions are considered, the one asking for the appropriateness of the assignment length (Gonzalez & Chakraborty, 2014), and the other asking for the payoff from the investment (Pérez-Nordtvedt et al. 2008; Andersson et al. 2015).

The answers about the duration of the assignment show contrasting opinions:

"The timeline to on-board the operators was too short… We didn't spend adequate time on mind-sets and behaviours"

"I think we would all have benefited if we had [the researcher] join us an extra 2 weeks in advance – to give operators more time to absorb their tasks."

".. The operators definitely learned company values and lean methodology. That being said, you should have received more support from the DCBC team to support knowledge transfer and make sure that people staying around the [American DCBC] longer could be prioritized"

Beyond the two dichotomy answers where the team members agree or do not agree on the length of the assignment, another important factor is raised by the team members.

One of the team member highlights the chance to improve the cooperation among team members – as all of the members had a specialization, sometimes the team fell in the wrong habit of working by silos instead of fostering communication and integration.

This issue has been recalled twice, so it seems to be a critical improvement idea for next projects.

As the payoff is regarded, all the DCBC's members agreed on saying that the researcher presence as an expatriate manager overseas was beneficial with the following motivations:

"Yes…Of course, there is the financial, but there is also the time. I think it took [the researcher] less than two weeks to fully on-board and being a "full" member of the team… Personally, I didn't have to spend much time explaining to [the researcher] our purpose, project, etc. since she was already informed. We were able to jump straight to the problems and the specific context of the [American DCBC] within a few hours."

Especially, this comment highlights a double side of the efficiency – on one side the financial aspects, and, on the other side, the time spent. This is a really interesting point of view, that is further enforced by the fact that the same DCBC member stresses how one of the weaknesses of the expatriate management is that it is an expensive mechanism.

The questions are linked to the level of comprehension and usage of the knowledge transferred to operators, and how much relevant (Andersson et al. 2015; Pérez-Nordtvedt et al. 2008) was that knowledge in order to make the operators work according to the company's values. In this sense, the comments from the DCBC members who spent time with the operators also after the researcher repatriation are really meaningful:

"Their understanding gets deeper every day. The operators use this knowledge every day and continue to add to it as they learn more"

"I only spent a couple weeks with the operators after our opening, but in that time, I believe they continued to demonstrate professionalism during workshop days in interacting with clients"

The main observations done by the DCBC members that stayed after the researcher's repatriation are meaningful to capture the level of understanding of the transferred knowledge and how much of that is actually implemented in a daily base routine and mind-set. This can be considered the real successful element of the entire assignment – the fact that operators are still behaving according to what the researcher

has taught them during the months spent at the American DCBC is a clear signal of the acceptance of the transferred knowledge and the consequent usage of the same.

Finally, the researcher asked the respondents about their opinion on the strengths and weaknesses of the role of expatriate manager, and what they think about the possibility to include this mechanism as part of the knowledge management system of the company.

Table 2. Summary of the perceived strengths and weaknesses of the expatriate assignment from the American DCBC team point of view

Strengths	**#quotations**	**Weaknesses**	**#quotations**
Immediate discussions and answers to questions	2	Larger investment required	3
Teaching content in person	3	Initial cultural barriers	1
Being on the ground to adapt to changing conditions	1	None	1
Receive advice from someone who has experience	3	Force the assignee to spend significant time away from home	1
Have an "advocate/liaison" for the operators	2	Correct time management to maximize the contribution	1
Leverage to execute tasks and coordination activities	1	Discontinuity when the assignee leave the project	1
Fostering team building and camaraderie	2		
Immediate response to problem-solving and issues	2		
Provide extra capacity to support the local team	1		
Provide quick and effective knowledge transfer	1		

Among the most cited strengths, there is the personal presence of the expatriate – social ties are considered really important for the success of the assignment and foster knowledge transfer. The past experience has been highly rated among the DCBCs

members as well. All of these insights fully support the ability-motivation-possibility model discussed in the literature review.

As the chance to include the expatriate management as a knowledge transfer mechanism, the respondents exhibit an overall agreement:

"Given my experience with [the researcher], I think that we should leverage even more the concept of sharing capability centre resources like [the researcher] across the capability centre network – it was extremely useful"

4.3.5 Reflections – pulling together the team members' and the researcher's main insights

The comments of the members about the efficacy of the intervention display a consistent picture between the expectations from the outstanding literature, the researcher assumptions, and the project team opinions. Moreover, it offers evidence that, as expected, expatriate assignment is an effective KT mechanism, and offers the opportunity to implement this mechanism in other company projects, leveraging all the enabling factors that positively impacted during this international assignment. Table 3, that reports the clients' perspectives about the interaction with the operators, reiterates these findings.

Table 3 reports the clients' average evaluations of the time spent with the operators during the workshop. Collected data are disaggregated by DCBC facility and refers to a limited amount of time (4 months) as it considers the American DCBC facility that has been recently launched. Accordingly, the number of clients served that provides the feedback is also limited. The comparison is not intended in statistical terms but as a starting discussion about the perceptions of the clients. Moreover, the comparability of the evaluation of the clients' satisfaction for their interaction is limited because each DCBC adopts a different measurement scale.

There are different elements that can be compared among the DCCs:

- American and EMEA 1 DCBC share the same training model of operators;
- American, EMEA 1 and EMEA 2 share the similar levels of implemented digital solutions;

- Asian 1 and 2 share a higher level of implemented digital solutions respect to the other DCBDs but a lower interaction between clients and operators.

Looking at the feedback given by clients, two are the drivers that explain the higher scores:

1. Operators capabilities in client's engagement – for the American and EMEA 1 DCBCs;
2. High technological and digital solutions implemented – for the Asian 1 and Asian 2 DCBCs.

These assumptions seem to be particularly supported by the EMEA 2 DCBC score that plays the role of the outsider – it cannot count on shared standards in terms of operators' capability in client engagement and it cannot count on outstanding digital and technological solutions. These two drivers together explain why the relative score is lower than all the others.

Table 3. Client feedback from the interaction with the operators during the workshops, in the five DCBC around the world.

EFFECTIVENESS	American DCBC	EMEA DCBC 1 [8]	EMEA DCBC 2	Asian DCBC 1	Asian DCBC 2
Satisfaction for the interaction with the operators	6.70/7	8.49/10	4.18/5	6.70/7	4.72/5

As the efficiency is regarded, both the literature and the team members emphasize that expatriate assignments are expensive mechanisms if compared with other already employed in the company, however, Table 4 gives a slightly different picture. The Table compares the main cost items for the international assignee next to the costs for a staffed company consultant allocated to the same job.

8 This is the facility where the researcher has spent more than two years focused on the on-boarding of the operators.

The time span considered is two months for the researcher and six months for the consultant – corresponding to the time spent by the international assignee and the average length of the staffed consultants engaged in the American DBDC launch. It should be noted that the typical assignment of domestic personnel is longer than an international assignment, that is characterized by an intensive approach.

The salary is the average salary for a junior consultant employed in the launch of the American DBDC. In order to sterilize the effect of the differences in the labour market of the country of residence of the researcher and the company consultants, the same salary has been assumed for the two. The only factor that is different is the amount of allocated days that is proportional to the length of the engagement of the international assignee and the staffed consultant.

Subsistence and accommodation items consider refunds for flights, hotels, and meals. The model takes the same prices for the hotel fees and the meals budget. The only difference is due to the flight fee – the international assignee had a more expensive flight due to intercontinental travel. Usually, company consultants are selected nearby the project – 350$ is the average cost for a flight ticket considering the North America regions. However, staffed consultants used to go back home during the weekends and that is the reason why their flight tickets have a multiplication factor of 24 (the average number of weekends for six months of assignment). Meals refunds are estimated around 50$ per day, even if the company guarantee up to 100$ per day for staffed consultants. Finally, Visa expense is an item strictly linked to the international assignment.

Table 4 – Expense report for the comparison of expense items of the international assignee and Company's staffed consultants

EXPENSE ITEMS	International assignee (2 months)	Traditional company staff (6 months)
Salary	$ 6,700 * 2= $ 13,400	$ 6,700 * 6 = $ 40,200
Hotel accommodation	$200 * 60 nights = $ 12,000	$ 200 * 96 nights = $ 19,200
Flight ticket	$ 1000 * 2 flight = $ 2,000	$ 350 * 24 flights = $ 8,400
Meals	$ 50 * 65 days = $ 3,250	$ 50 * 195 days = $ 9,750
Visa expenses	$ 500	0
Salary of operators	15$/h * 5h/day * 28 days = $ 2,100	15$/h * 5h/day * 80days = $ 6,000
TOTAL INVESTMENT	**$ 33,250**	**$ 83,550**

Despite the team members' perceptions, the international assignment is not more expensive than the traditional expenses the company faces when it staffs a consultant into a similar project. Indeed, the past experience of the researcher has shortened the start-up period and speeded up the training program for the operators while reaching the expected outcome for the launch event.

This demonstrates how expatriate assignments is not only an effective knowledge transfer mechanism but also an efficient and sustainable way to transfer the needed knowledge in different units of the company. Of course, this comparison is true only when the infrastructural, interpersonal and individual variables are respected during the whole planning, fulfillment and follow-up phases of the international assignment.

4.4 Principle of change through action – key learning and likely organisational change for the multinational consultancy company under study

The paper discloses how expatriate assignees could be an effective and efficient knowledge transfer mechanism among units belonging to a multinational consultancy company. As a consultancy company, it belongs to the category of knowledge-intensive organisations where knowledge management is considered the central but likewise critical resource to sustain the competitive advantage.

Another remarkable trait linked to this multinational company is the organisational structure that it assumes – the network model. The study has highlighted

that the lack of a strong central driver of knowledge exchanges (i.e. weak headquarters) significantly endangers the knowledge flows among subsidiaries and peripheral units. While a networked form is beneficial for flexibility and seems particularly suitable for knowledge-intensive organizations, it does not assure, per se, adequate knowledge flows.

In the light of these conditions, the researcher's role as expatriate assignee helped the team in the management of knowledge transfer of best practices by providing the operators with the needed training to properly perform the shop-floor activities, to learn the main principles of lean and digital transformation, to interact with the company clients during the workshops, and to align their attitude toward company values.

Overall, the assignment has been helpful for the company at least for four reasons:

- for the American DCBC, the researcher covered the role of operators' trainer aiming at having them ready for the launch and beyond. This goal was pursued in constraining situations – e.g. strict deadlines, that were overcome thanks to the fit between the researcher's capabilities and past experience and the vacant role in the American DCBC. The fit speeded up the planning and the fulfillment of the training even in front of setbacks;
- for the EMEA DCBC, the researcher developed further competences in the management of the operators that can be used also in the EMEA model factory – e.g. improvement of language capabilities, better use of soft skills methodologies, the introduction of teamwork tools like daily check-ins;
- for the company in general, the researcher has transferred explicit and tacit knowledge among model factories fostering alignment and sharing of best practices among DCBCs;
- for future company development, the researcher has experimented a possible new knowledge transfer mechanism – the expatriate assignee, who fill in the gap in the company knowledge transfer mechanisms that did not take into consideration informal and personal mechanisms – like the expatriates – to foster knowledge transfer.

This action research exemplifies a success case where the company knowledge management system and organisational structure, together with a good expatriate assignment management can provide successful results in knowledge transfer. The list of strengths versus weaknesses, emerging from the questionnaire, shows how the benefits coming from the expatriate assignment were by far better than all the other mechanisms employed. Moreover, the physical presence of the expatriate has replaced the email chains supporting the start-up of the model factory and it has reduced the time spent in remote problem solving and calls. Moreover, the expense report highlights how, despite the perceptions, expatriate assignments are sustainable investments because they can count on a higher effectiveness – the expatriate assignment is ranked as the best KT mechanism among the questionnaire respondents and it is one of the potential drivers toward clients satisfaction, and efficiency rate – the time needed to on-boarding the operators was shorter than the one needed if the company would have staffed a consultant without the experience on how to train the operators.

The company, and generally, practitioners, can take this research to:

- Consider the chance to include expatriate assignment management as a mechanism for knowledge transfer processes, especially when the practitioners' company look like a network-based MNE;
- Acknowledge the main infrastructural, interpersonal, and individual variables that play a remarkable role during the assignment and the main mechanisms used to maximize the positive influences while downsizing the negative ones.

In conclusion, considering the benefits that the employment of the expatriate assignee has led, the company should consider the chance to introduce the expatriate assignment mechanism as a good practice to speed up projects and effectively manage knowledge flows among different units.

4.5 Principle of learning through reflection – main insights from the action research analysis

This paper has brought together the literature on knowledge management, international business, and human resource management to explore the emerging theme of the role of the expatriate assignee as a driver of knowledge transfer.

Albeit the great potential of the expatriates, many potential barriers should be carefully evaluated and managed by practitioners. The literature shows that sometimes the potential barriers are underestimated causing early retirements, no achievement of the expected goals or, even worse, expatriate's resignation. The poor management of expatriate assignment could transform an investment into a pure expense.

The action research suggests how it is not the expatriate role per se that foster the effective and efficient knowledge transfer, but the entire organization around this role – the infrastructural, interpersonal and individual variables that played a remarkable role toward the goal of the project and in providing corrective mechanisms in front of setbacks. The main conclusion is that expatriate assignment needs a well-organized infrastructure to give successful results and cope with potential barriers. The mentioned infrastructure includes several elements that should work consistently. These elements have been classified and split into three main categories – infrastructural, interpersonal and individual variables.

4.5.1 Infrastructural variables

The infrastructural variables include the management of the entire process of the international assignment split into three main sub-phases – planning, fulfillment, and follow-up phase.

The planning phase has dealt with the researcher selection and the high-level definition of the operators training program. Project leaders and the project manager paid careful attention to the consistency of the role with the researcher past experience. Moreover, they took the responsibility for managing the administrative side of the assignment – Visa, hotel accommodation, and role description, that foster the researcher well-being abroad. Once defined the main tactical steps to move the researcher abroad,

the researcher and the project leaders define together a high-level of the operators training program where they established the main pillars of the training – lean and digital principles, the content of the shop-floor activities, company values, and approach with the clients.

Despite the clear definition of the researcher role and training milestones, a team member, who submitted the questionnaire, highlights an improvement point. Indeed, the researcher role was not clearly communicated to the team members as only the project leaders and the project manager were aware of her. Nevertheless, the in-person presence of the researcher and the clarification of her role have helped to cope with this initial misalignment.

The fulfillment of the assignment was done within a teamwork environment where every team member had specific job content - digital implementation, technical and process development, launch and communication organization. This has fostered focused attention on clear and quite independent goals from the team members who, anyway, sometimes encountered coordination issues where some interdependences existed among the different stream of work. Actually, the researcher had some concerns in matching the errands of all the team members and adjust them to pursue the needed training to the operators. In order to face the limit of the high specialization, some coordination mechanisms were put in place – e.g. weekly and daily reviews of operators' training and problem-solving sessions.

The organization of the three specific work streams paired with coordination mechanisms has provided the right level of teamwork and independence that made the researcher develop his self-efficacy and autonomy in the fulfillment of the tasks.

The follow-up phase was managed to collect all the needed information and plans to effectively and efficiently manage the handover of the American DCBC to the new team. The repository was filled in with the main pending issues and improvement ideas, as well as with a high-level plan for the next training programs. As the researcher and the newcomer team never met each other, this created some misalignment and demotivation especially among the operators as clearly reported by some respondents of the questionnaire. However, a cycle of calls/video calls, as well as a support phase where few old members shadowed the new team members had encouraged alignment

between the old and the new DCBC team, as well as, a new equilibrium between the operators and the new DCBC team.

4.5.2 Interpersonal variables

Next to the "hard" and organisational side of the international assignment, another important role was played by the interactions between the researcher and the American DCBC team.

Personal contact and the amount of time spent with the team and the operators have fostered social relationship - in-person presence was ranked as one of the most important strengths linked to the expatriate assignment mechanism.

The social relationship between the researcher and the DCBC members was encouraged by both formal and informal events – e.g. daily meeting and team working dinners. These events nurtured mutual respect and trust that further fostered open communication. The researcher had gone through several moments of feedback sessions and performance appraisals that sustained her effort toward a common goal – the American DCBC launch, and her well-being during the international assignment.

The relationship between the researcher and the operators was even tighter considering the high amount of time spent together – 5 hours per day. Thanks to the personal experience, the researcher was able to pair the specific knowledge content with the right training method to maximize the understanding from the operators who were spurred to ask for clarifications of further explanations. This loop of learning started creating more and more engagement among the operators. The engagement was further sustained thanks to the role modelling enacted by the researcher and the one-to-one feedback sessions between the researcher and the operators. These two techniques were really important to cope with divergent attitudes and behaviours that were hindering the team mood.

Of course, the rest of the DCBC team surrounded the researcher and the operators with all the resources – e.g. training modules, laptops, tools for the model factory, and the psychologic support toward the launch of the American DCBC.

4.5.3 Individual variables

As individual variables are regarded, the good fit between the researcher and the role covered abroad is undoubtedly remarkable. The role was designed to take advantage of the researcher's previous experience and expertise. The two-year-long experience in the EMEA DCBC let the researcher be skilled enough to manage the training of the operators even if surrounded by challenging conditions – e.g. different culture, language and location, new colleagues, and tight deadlines.

Moreover, this consistency helped the researcher to reach a high level of self-efficacy and to easily adjust to the requirements coming from the international assignment. A good adjustment of the researcher during the international assignment reduce the barriers toward the goals and it is an enabler toward good performances. Finally, the clear job description avoided job ambiguity that is a potential inhibitor of the motivation. Indeed, the researcher's motivation had paid an important role in the accomplishment of the tasks and the successful launch of the American DCBC.

Disseminative and absorptive capacity helped the researcher to effectively and efficiently transfer the needed knowledge to the operators that demonstrated to have embraced it.

5. Concluding remarks and limitations

The action research discussed in this paper had the goal to study the role of an expatriate assignee as a knowledge transfer mechanism within a multinational consultancy company that was launching a new training centre.

The role of the international assignee was covered by the researcher who spent two months in the American training centre to support the team during the launch. The researcher had covered a similar position in the sister EMEA training centre belonging to the same company, and fulfilled the specific job of training the operators who were in charge of running the shop-floor activities and interact with the client. Considering this main goal, the research structured different training methodologies according to the different content of knowledge transferred to the operators.

From the action research reflections and the evaluation of the stakeholders of the project, the expatriate assignment was proved an effective and efficient knowledge transfer mechanism when sustained by infrastructural, interpersonal and individual variables.

Infrastructural variables have dealt with a carefully planned process in terms of expatriate management – declined into three sub phases of selection, implementation and follow-up. The selection phase has been important in order to provide clearness in the content of the role of expatriate assignee and full coordination from the two training centres fostering a clear plan for expatriation-repatriation cycle. The fact that team members shared the content of their work helped to set mutual expectations, avoid ambiguity and, as a consequence, to prevent the erosion of expatriate assignee's motivation. In the implementation phase the teamwork environment has been the most beneficial element thanks to the balance of specialization and coordination. This helped to reach a high level of focalisation and autonomy while not losing alignment among team members. Balance has been obtained improving the teamwork organisation by means of daily check-in meetings that helped to align members' agendas and solve coordination and shared resources concerns. The fact that the team has offered both independence and support has increased the self-efficacy of the expatriate toward the common goals. The follow –up phase has been more critical as the team members never met all together again. This suggests more in-person interaction to assure continuity when a project is carried out by different owners.

The interpersonal variables are mainly focused on the kind of relationship between the researcher and the operators, and the team members. The researcher has experienced the kind of relationship before moving to the American DCBC, during the two months abroad and after her repatriation. Comparing the three situations the in-person presence of the researcher let to reduce the amount of email chain and calls, as well as, increasing the level knowledge transfer among the American and EMEA DCBC. Despite the supporting technology such as video calls, the in-presence relationship has been fundamental to speed up the project and increase the transfer of best practices from the EMEA to the American DCBC. Also, the trustfulness created and the selection of different training methods according to the content that needed to be

transmitted – plenary sessions for lean and digital principles, versus learning by doing for operational activities to run the model factory - created high commitment from the operators and a common goal toward the grand opening of the centre. That is to say how the selection of channel of knowledge transfer can play a remarkable role on receivers understanding and, accordingly, on knowledge transfer effectiveness over time. Finally, the chance to spend time as a team during working and non-working time increased the openness and the mutual understanding toward the resolution of misaligning behaviours and misunderstandings. The socialisation of the team members sustained the effort in the delivery of the training to the operators.

As individual variables are regarded, the work position fitted well the researcher's capabilities; this seems to be fundamental to assure the goals of the expatriate assignment. In order to assure this fit, the ability-motivation-opportunity model appears effective to identify the right person for the expatriate assignee position. The abilities required include both technical and soft skills, that means being capable as job content is regarded, but, most of all, being able to transfer that knowledge and convince the receiver in using it. The knowledge about the content – technical skills - that need to be transferred was important to create credibility on the expatriate assignee and support the disseminative capacity. On the other side, the mastery of soft skills such as influence model, feedback, coaching and problem solving demonstrated to be useful to motivate the operators that were the main receivers of the knowledge transfer process. Researcher's motivation has been another important element as well to instil the right attitude among the operators and guide the entire process toward the successful opening of the American DCBC. Finally, in terms of opportunity, the researcher was able to integrate into the team to create social ties and favouring knowledge transfer. This aspect of the ability-motivation-opportunity model posits the chance for further research in terms of individual traits upon the expatriate to optimize the assignment results.

Next to the pure qualitative discussion of the results obtained, three surveys provide further insights. The questionnaire submitted to the American team members supported the value provided by the researcher, sustaining the effectiveness of her intervention in comparison with the other knowledge transfer channels used by the DCC. Moreover, the comparison of the costs for the international assignment and a

traditional staffed consultant give support to the efficiency and sustainability of the international assignment mechanism suggesting to the company the chance to use this mechanism when knowledge transfer is under constrained conditions – e.g. tight deadlines.

Finally, a comparison of company clients' perception about the training experience among the five DCBCs suggest how operators' preparation and interaction is a potential driver toward higher client satisfaction. In conclusion, expatriate assignment in terms of knowledge transfer mechanism could be seen as a strategic lever to sustain client satisfaction and so, organisational competitive advantage.

The case analysed could be useful for scholars to advance the research effort at the boundaries of knowledge management, human resource management and international business framework, but it is useful for the company and the practitioners as it suggests some potential drawbacks and good practices to manage knowledge transfer by means of expatriate assignee.

As all research, this study is affected by some limitations. Action research is a methodology that encourages the collaboration between scholars and practitioners and fosters the relationship between the two – in particular it tries to make research contributions being applied in the organisational context by practitioners. The strengths of this methodology are linked to the direct contact with the context under study – deeper understanding and clarity, cultural interpretation, greater access to information and experiences (Labaree 2002). Nevertheless, action research has some limitations as well. A first limitation is that the results obtained cannot easily be generalised and validated because they are deeply rooted in the specific and unique infrastructural variables of the case (Avison et al. 2001). A second limitation is that the insider viewpoint given to the researcher and the duality of the role could posit some problem like dual conflict, potential ethical constraints, and biased interpretation of information and facts (Kanuha 2000). A third and last limitation is that this action research has been developed with a single cycle of intervention that could lead to a less detailed picture of the problem respect to the picture achievable with iterative cycles of intervention and activities (Davison et al. 2004).

Further research could first focus on a more iterative action research including several cycles of action. Furthermore, to validate the insights offered by this study, scholars could deepen the analysis with larger quantitative or qualitative analysis taking into consideration more cases of expatriate assignees in the same company and comparing the results obtained in different cultural, infrastructural, interpersonal and individual variables. It could be interesting as well, the analysis on other knowledge-intensive MNEs performing in the same or different industry with the same peculiar trait of the network-based organization.

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