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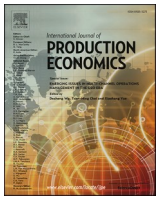

Cultural tensions in lean healthcare implementation: A paradox theory lens

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ABSTRACT

The purpose of this research is to use a paradox theory lens to investigate in greater depth how to manage cultural tensions in a healthcare organisation implementing lean. Conducting an in-depth single case study at a private specialized hospital, we classify cultural tensions according to the four categories proposed by paradox theory – namely learning, organizing, belonging and performing. Our study scrutinizes the role of the dimensions of organisational culture (OC) as antecedents to both defensive mechanisms (i.e. resistance to change) and managerial actions (lean practices). From a theoretical perspective, this research offers key implications. We expose a nuanced view of how different OC traits may act as either drivers or barriers to lean implementation. In addition, we show how lean practices act as managerial actions that can help mitigating defensive mechanisms and thus help managing the four types of paradoxes. We also offer a specific discussion of the paradox of learning, previously missing in prior studies of lean. From a managerial perspective, the study offers a guide to managers dealing with cultural resistance that naturally emerges during lean implementations. To the best of our knowledge, no previous study has explored the interplay of lean implementation and OC using a paradox theory lens.

1. Introduction

Due to the continuous pressures to deliver greater efficiency and enhanced clinical effectiveness, lean has been one of the most popular approaches applied in healthcare organisations (Mazzocato et al., 2010; Papadopoulos et al., 2011). However, empirical evidence shows recurring failures regarding lean implementation in healthcare (Moraros et al., 2016; Mazzocato et al., 2012). Causative to this problem is the fact that lean has not been well interpreted, but often misunderstood. Numerous healthcare organisations attempt to implement lean with a narrow focus on eliminating process variation, waste and advancing financial performance (Dahlgaard and Dahlgaard-Park, 2006). More recent perspectives argue that lean should be approached in a more comprehensive way, as a cultural phenomenon instead of a set of tools and techniques that lead to process improvement. It is shown that, in practice, approaches to lean implementation varies considerably, where some healthcare organisations adopt a system-wide approach, while others hesitantly adopt specific techniques from the lean toolbox (Burgess and Radnor, 2013). Therefore, the broader socio-cultural and organisational context of healthcare can have a considerable impact on how lean is translated from policy to practice. Reinforcing this view, Joosten et al. (2009) suggest that most of the socio-technical research today focuses on evaluating lean implementation in healthcare organisations, but there is still need to move to a more critical and theoretical understanding of how lean interacts with the pre-existing healthcare context (Waring and Bishop, 2010).

A thoroughly incorporation of lean involves radical organisational and process change throughout the whole organisation (Smeds, 1994), which directly clashes with the existing organisational culture (OC) (Bortolotti et al., 2015). OC misfit has appeared as a prevailing barrier to lean implementation in many industries (Alves and Alves, 2015; Kull et al., 2014; Vest and Gamm, 2009), although cultural clashes can be accentuated depending on the industry sector of the organisation. The bigger the differences from the automotive sector, the bigger the cultural misfit (Andersen et al., 2014; D'Andreamatteo et al., 2015). Although healthcare is a major field in publications addressing lean culture (Dorval et al., 2019), in-depth interplay of lean culture and existing OC has received limited attention in healthcare settings (Erthal and Marques, 2018). Healthcare studies recognize the relevance of OC to lean success, although only superficially addressing the establishment of a continuous improvement culture (Zarbo, 2015), or the need to promote a cultural change and to build a cultural capability (Andersen et al.,

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2014; Goodridge et al., 2015; Smith et al., 2012). The study by van Leijen-Zeelenberg et al. (2016) deepens the discussion by analysing the impact of lean to the OC but limited to two cultural aspects – willingness to change and openness. Therefore, there is space to advance knowledge about the interplay between lean culture and the existing OC, enabling successful lean implementations.

To address the gap aforementioned, this paper draws on the paradox theory (Lewis, 2000), grounding this choice on three key elements. Firstly, scholarship in operations management (OM) has increasingly called attention to the need to consider an alternative to the predominant trade-off perspective to explain situations where potentially contradictory priorities may be actually complementary (Pagell et al., 2015). The significant number of articles and special issues concerning the paradox theory in OM (Horak and Long, 2018; Kannothra et al., 2017; Maalouf and Gammelgaard, 2016) and in other management fields (Hahn et al., 2018; Ivory and Brooks, 2018; Lewis and Smith, 2014; Sharma and Bansal, 2017; Waldman et al., 2019) corroborates its popularity and applicability. Secondly, there is a clear recognition that lean has inherent paradoxes that must be managed properly, such as flexibility versus standardization, and employee empowerment versus strict control (Peltokorpi, 2008; Womack et al., 1990; Yoon and Chae, 2012). Likewise, healthcare organisations face their own tensions such as between increasing costs and stringent customers that expect better patient care (Cleland et al., 2018). Thirdly, lean implementation is a cultural phenomenon that produces cultural clashes between lean and the existing OC, which may give rise to additional paradoxes. These three elements all point towards the need for a theoretical lens that can explain such clashes.

A 'paradox' is exactly a clash between opposing forces that should coexist and thus be managed instead of insisting on a decision in favour of one or the other (Lewis, 2000). Paradoxes embraces complexity and ambiguity, instead of avoiding them. This is mostly counterintuitive for organisations and individuals, who naturally seek stability and certainty. The theory proposes that, in order to counterbalance the defensive behaviour, organisations and leaders should manage the tensions by exploring ways to simultaneously comply to the apparently opposing forces (Smith and Lewis, 2011). Examples of managerial actions presented in the literature are reflective practices and open dialogue, where opposing views are respected and promote learning (Putnam et al., 2016), splitting the tensions through temporal or structural separation (Luscher and Lewis, 2008; Smith and Lewis, 2011), involving employees and encouraging experimentation (Adler et al., 1999; Maalouf and Gammelgaard, 2016), to cite a few. A proper management of paradoxes and the achievement of a dynamic equilibrium between the paradoxical tensions and their management can enable long-term success through learning, creativity, flexibility, resilience, and human development (Smith and Lewis, 2011).

Ultimately, the main thrust of this paper is a thorough understanding of how the interaction between lean and OC can contribute to the efforts of healthcare organisations implementing lean. This leads to the research question: *How are cultural paradoxes managed in a healthcare organisation going through lean implementation?* This question is explored in a single-case study at a private specialized hospital currently implementing lean.

Our study adds to the literature by further investigating the interaction between lean implementation and OC, not only in the underexplored context of healthcare, but also by bringing a more granular perspective when compared to previous studies on lean and OC (Bortolotti et al., 2015; Jayamaha et al., 2014). Overall, earlier studies limit their investigation to which OC profile characterizes an "ideal lean culture", i.e., the most suitable OC to lean success. Through the paradox theory perspective, our study scrutinizes *how* specific cultural traits act as either barriers, enabling defensive mechanisms to hinder the lean implementation, or as drivers, fostering lean practices that can counterbalance unfavourable cultural traits.

Despite the fit of the paradox theory as a theoretical lens to study lean implementation, to the best of our knowledge no previous study has adopted this theory to address the interplay of lean and OC dimensions considering the specificities of a healthcare context. This study provides a detailed, comprehensive understanding of the lean implementation in hospitals, therefore contributing to both theory and practice, through a nuanced discussion of how OC traits may act as either barrier or driver to lean implementation as well as a key managerial contribution by addressing how a successful implementation can be achieved, rather than merely prescribing lean as a means to improve performance.

2. Theoretical background

2.1. Lean in healthcare

Lean originates from Toyota Production System and includes a set of guiding principles grounded in total quality management, continuous improvement, and customer relationship management (Mazzocato et al., 2010). However, lean is often perceived by healthcare organisations as a quality improvement method rather than a holistic and integrated management system (Harrison et al., 2016), resulting in lean implemented in a superficial way. The focus on simple tools and techniques (Costa and Godinho Filho, 2016) inhibits the achievement of lean's full potential (D'Andreamatteo et al., 2015; Hung et al., 2015). More recent perspectives claim that lean should be approached comprehensively as a way of thinking (Liker and Morgan, 2006), as a socio-technical system (Bortolotti et al., 2015; Hadid et al., 2016) built upon a set of principles (Womack and Jones, 1996) that should be incorporated into the existing OC.

There is a growing consensus that OC plays fundamental role in lean implementation (Smith et al., 2012), yet healthcare organisations show inability to properly align the exiting OC with their efforts in implementing lean (Bortolotti et al., 2015; Cameron and Quinn, 2006). Moreover, how specific OC traits affect lean implementations and vice-versa is still unclear (Andersen et al., 2014; Harrison et al., 2016).

2.2. The role of OC in lean implementations

As lean implementation promotes significant organisational changes (Bortolotti et al., 2015), it is reasonable to expect that the internalization of lean practices influence and are influenced by beliefs and behaviours previously established within an organisation and that this is a continuous process of managing emerging tensions and cultural clashes. The literature proposes the investigation of culture as an effective way to understand how people reconcile tensions (Trompenaars, 1993).

Culture is a complex concept that has been widely studied by management scholarship (Hofstede, 1998; Schein, 1984; Smith et al., 2011; Song et al., 2018). Despite the divergent definitions of culture available, Detert et al. (2000:851) propose that "there is some consensus that organisational culture is holistic, historically determined, and socially constructed, and it involves beliefs and behaviours, exists at a variety of levels, and manifests itself in a wide range of features of organisational life". In other words, multiple influences build a set of common values within a group, which will consequently influence the behaviour and beliefs of the group's members (Hofstede, 1980; Jarnagin and Slocum, 2007; Schein, 1984). In this study, we use the integrative paradigm to define OC, which focus on manifestations that are consistent among various levels and divisions of an organisation hierarchy (Meyerson and Martin, 1987). Aligned with this paradigm, Schein (1985) proposes that cultural changes are triggered by the acknowledgment of an ambiguity, after which new behaviours and meanings are learnt.

The extant literature offers alternative frameworks to capture the ambiguous perspective of OC, by proposing a bipolar perspective. One example is the Competing Values Framework (CVF) (Cameron and Quinn, 2006; Quinn and Rohrbaugh, 1983), which has been largely adopted to investigate OC influence on various OM practices (Prajogo and McDermott, 2005; Zu et al., 2010). CVF proposes two cultural

dimensions with opposing poles, i.e., flexibility versus stability; and internal focus versus external focus (Cameron and Quinn, 2006). Similarly, bipolar cultural dimensions are also found in Hofstede's, Globe's and Schawrtz's frameworks (Moonen, 2017), although taking into account more than only two cultural dimensions. Regardless of the number of dimensions, such bipolar representations of culture limit the analysis of lean implementations because of the "paradoxical features of lean's nature" (Dorval et al., 2019). In their recent literature review on lean culture, the authors show how divergent findings are on lean studies using bipolar models. As paradox theory proposes an existence and embracement of opposing poles, we have decided to adopt an abductive approach using the paradox theory lens instead of setting out from an established culture framework.

2.3. Paradox theory and lean healthcare

Paradoxes are described as tensions raised by conflicting demands or perspectives inherent to organisations, denoting the complexity, diversity and ambiguity of organisational life (Cameron, 1986; Lewis, 2000; Luscher and Lewis, 2008; Poole and Van de Ven, 1989). The paradox theory suggests that when facing a paradox, organisations tend to choose the side that is more familiar to the group, raising defensive mechanisms that block the other side of the paradox. The defensive mechanisms inhibit the organisation to deal with the ambiguity, restricting its ability to deal with the conflicting demands. To counterbalance these defensive mechanisms, organisations must manage the tensions by exploring ways to simultaneously comply to the apparently opposing forces (Smith and Lewis, 2011). This effort is referred to as managerial actions that can effectively manage the tensions thus allowing long term performance (Lewis, 2000). We use the paradox lens for reviewing the extant lean literature and other implementation efforts in healthcare. We give examples of the four main types of paradoxes, named learning, organizing, belonging and performing, described below.

2.3.1. Paradox of learning

The paradox of learning concerns the tensions between the internalized knowledge and the uncertainty of the future and new challenges. It is the ability to integrate new knowledge, enabling adjustment to variations and change (Smith and Lewis, 2011). Lean emphasizes the learning of more general skills rather than achieving higher levels of specialized knowledge (Womack et al., 1990). However, healthcare organisations were historically structured around professional bureaucracy (Gonçalves et al., 2013). This resulted in processes with high complexity fragmented across multiple departments as they were planned according to medical skills or specialisations instead of based on the process of the patient receiving the care (Lee and Clarke, 1992). Such design creates challenges in promoting organisational learning (Gonçalves et al., 2013).

Another acute difficulty that healthcare organisations have experienced around service improvement is pointed by Nembhard et al. (2009), which is the traditionally risk averse characterisation of healthcare professionals (Papadopoulos et al., 2011). Although many innovations are introduced in healthcare organisations with the promise of reducing uncertainty and enhancing quality of care, lean implementation, like every change process, is accompanied by increased incidences of failure in the short term. In healthcare settings in particular, where short-term failures may cause harm to patients, practitioners do not seek them out, rather, they actively avoid them. Yasin et al. (2002) corroborate this idea, noting that lack of success regarding improvement initiatives is due to the historic resistance of healthcare practitioners to adopt innovations they consider inappropriate for patients and care environment.

2.3.2. Paradox of organizing

The paradox of organizing results from the effort to balance opposing forces that encourage commitment, trust and creativity while maintaining efficiency, discipline and order (Lewis, 2000). Hence, it relates to opposing forces of empowerment and direction, flexibility and control (Smith and Lewis, 2011). In fact, extant literature argue that lean work design entails competing elements such as flexibility versus standardization (Adler et al., 1999; Maalouf and Gammelgaard, 2016; Pereira et al., 2014; Peltokorpi, 2008), some of which propose ways to manage those paradoxes, such as meta-routines, partitioning and switching (Adler et al., 1999; Maalouf and Gammelgaard, 2016).

A controlled and structured professional environment, such the one of healthcare, discourages a culture of flexibility where individuals are empowered. For instance, Tucker et al. (2014) show that nurses are reluctant to express their opinions during consultations or ward rounds, as they do not feel empowered to do so. Additionally, norms and codes can perhaps account for limited success of healthcare practitioners in adopting new practices (Lewis and Brown, 2012) as the innovation may appear inconsistent with their occupational norms.

2.3.3. Paradox of belonging

The paradox of belonging relates to the tensions between the individual and the collective and between competing roles, increased by the conflicts of belonging to multiples groups and subgroups. The challenges here concern respecting individuals at the same time as promoting integration and interconnections within groups. The tensions increase with decisions about how much time/effort to dedicate to the group (Lewis, 2000; Smith and Lewis, 2011).

During lean implementation, human resources are typically shared by their functional departments and lean teams during implementation. Maalouf and Gammelgaard (2016) found that "the implementation of lean flow accentuated the paradox of belonging between two functions and roles cultivating different work identities". The necessity of embracing a new role without letting go of the old role, added to the challenges of cross-functional cooperation, raise significant tensions in this context. Gittell et al. (2008) defines cooperation as shared goals, interests and mutual respect between individuals. When these assets of relationships exist, they encourage people to work together (Feldman and Rafaeli, 2002).

2.3.4. Paradox of performing

The paradox of performing emerges from conflicting demands of different stakeholders that lead to competing measures for assessing managerial success (Smith and Lewis, 2011). In other words, in this type of paradox the organisation and its members are required to achieve multiple goals (Cleland et al., 2018). Researchers state that lean entails pursuing multiple and competing dimensions (Soliman and Saurin, 2017; Womack et al., 1990). Within the context of healthcare, organisations struggle to achieve what seems to be contradictory demands, such as lower costs, short throughput time and high quality of care. Lack of resource and the need to deliver more with less are common issues observed in healthcare organisations (Nembhard et al., 2009).

The existence of multiple stakeholders with different values present additional challenges. In comparison to other industries, defining 'customer value' and 'effective quality' is more complex in healthcare systems (Nembhard et al., 2009; Young and McClean, 2008) as stakeholders include physicians, insurance agencies, government agencies, charities and, in addition to patients themselves and their families as well. All of these may be considered 'customers' yet with different expectations regarding the values of the service (Grove et al., 2010). For example, hospital managers define 'quality' as the provision of efficient and cost-effective services, while physicians often define 'quality' as time spent with patients, developing relationships to influence patient outcomes.

2.3.5. Theoretical framework

In this paper, we explore the four types of paradox. This paradox theory lens not only offers different perspectives to help unveiling

tensions during a lean implementation, but also the unfolding of each paradox into the struggle between defensive mechanisms and managerial actions. We scrutinizethe role of specific traits of the prior OC that act supporting either defensive mechanisms or managerial actions based on lean practices. The underlying support of the prior OC becomes key to ensure a successful lean implementation. Fig. 1 demonstrates this theoretical framework.

3. Research method

3.1. Research design

Our research explores a theory-elaboration strategy as we start with well-stablished literature from both lean and culture, and apply the paradox theory lens to a case study in order to allow the reconciliation of both theories with contextual idiosyncrasies (Ketokivi and Choi, 2014). The unit of analysis of the present study is the organisation, as our subject of analysis is the interplay between OC and lean implementation. We corroborate Denison et al. (2012) argument of a shift from individuals to organisations as the primary unit of analysis in OC studies. Therefore, although tensions and defensive mechanisms manifest at multiple levels (Lewis, 2000), on the present study, we focus on ambiguous messages and contradictory systems at the organisational level.

Regarding the method, a single case study approach was most appropriate. A case study has been previously used to investigate organisational paradoxes (Andriopoulos and Lewis, 2009). This single case is an instrumental case. The choice of an instrumental single case allows the researcher to simultaneously explore particular (intrinsic) and general interests, supporting the refinement of existing theoretical lenses (Stake, 1995). As lean is a socio-technical intervention, inherently context-dependent, there are no clear boundaries between the intervention and its context (Andersen et al., 2014; Davidoff, 2011). Hence the instrumental case captures the intrinsic elements of context, while advancing theory elaboration. In selecting a single case study, we could engage insightful analysis because of the opportunity it offers for focus and intensive data gathering (Voss 2010). Data analysis combined both confirmatory, although without formal hypotheses, and exploratory research pursuing to develop original insight, understanding and enhancing the extant theory (Karwan and Markland, 2006).

3.2. Case selection

This case study was conducted at a private specialized hospital with two units in Brazil, here referred as LH. The specific setting chosen was particularly interesting for investigating our research question for three main reasons. First, LH started their lean program in 2013 and by 2018 the lean office had directly involved more than 150 employees of all organisational levels, departments and units. In addition to disseminating lean, the 169 projects conducted in the first six years of the program have achieved savings of about U$2 million and have delivered less tangible results, i.e. improvements in patient and worker experience and healthcare assistance performance. Despite continuously advancing in lean implementation, LH is in a mature stage, especially compared with the majority of hospitals. This enables its members to better identify existing tensions and how the organisation has been managing those tensions. Therefore, studying the process of lean implementation at LH and how they have overcome tensions and challenges will allow us to inform lean implementation in other similar healthcare organisations.

Second, the hospital offers a persuasive example of the interaction between lean implementation and existing organisational culture. The hospital embraces 75% of the market-share, it is a family-owned business, still run by the founders, with strong relational bonds and emotional commitment. Strong bonds and commitment promote loyalty and a sense of belonging among workers, at the same time that inhibits the manifestation of disagreements or questioning (Ainsworth and Cox, 2003) and leads to a less professional management approach (Tanure and Duarte, 2005). This and other OC traits are strongly prevalent in the particular case and undoubtedly impact lean implementation.

Finally, healthcare delivery is a professional service characterized as "complex, customized and reliant upon the knowledge and expertise of the server" (Heineke, 1995, p. 255), which limits managerial influence. This scene is even more interesting and relevant as this hospital experiences pressure to formalize and standardize its activities in order to

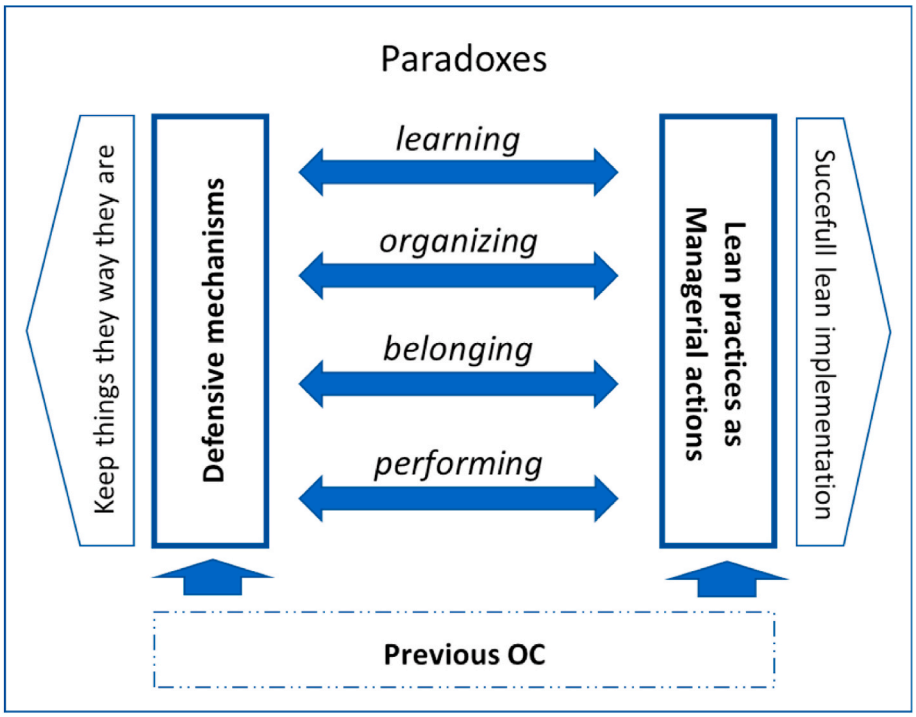

Fig. 1. Theoretical framework.

reduce variation and costs due to increasing financial competition across the country, under a time period of severe economic crisis. This hospital has been facing the additional challenge of introducing lean to its ecosystem as lean is new, not only to Brazilian hospitals and healthcare professionals, but also to patients and suppliers.

3.3. Data collection

Our research has been based on two main data collection methods (Eisenhardt and Graebner, 2007):semi-structured in-depth interviews (15) and participant observation of 9 lean workshops (see Appendix A). The interviews were conducted with a range of LH workers, from top management to staff members of both administrative and assistance functions, capturing common elements among all organisational levels and functions. Some interviewees were directly involved in lean implementation while others have been affected by the changes derived from lean initiatives, therefore minimizing potential bias of hearing exclusively from those aligned with the lean project. The interviewees have been working at LH for an average of 10 years (ranging from two to 32 years), providing both long-term and short-term employees' perspectives.

The interviews had an average duration of 45 min and were transcribed (77,541 words in total). The interview guide included questions regarding (a) the interviewee's experience as an employee at LH and of working with lean; (b) LH's level of adopting lean practices through the leanness framework (Narayanamurthy and Gurumurthy, 2016); (c) tensions and barriers faced during the implementation of such practices; and (d) common behaviours and values that constitute the culture of LH. We have grounded the assessment of the later on Cameron and Quinn (2006)'s framework, questioning and observing elements such as behaviours that the leadership encourages and values on daily basis, "the way things are done" at the hospital and the "glue" that holds the organisation together. The interview guide may be provided upon request.

Additional to the semi-structured in-depth interviews, the main researcher has attended and participated in LH lean workshops. During these workshops, LH members present the lean projects they have conducted throughout the year to be evaluated by the board of directors and external lean healthcare professionals. For two consecutive years (2017 and 2018), the main researcher was invited to join the jury committee for the evaluation of the projects. Attendance to the 9 workshops accounted for 38 h, offering a wider perspective of the lean transformation process at LH, their challenges and accomplishments. A closer contact with LH employees and leadership has contributed to data interpretation, as advocated by Van De Ven and Johnson (2006).

3.4. Data analysis

The data was analysed through qualitative coding supported by NVivo. In the first cycle, we have classified the OC traits and the elements related to lean. The second coding cycle has consisted of grouping the elements into OC dimensions, lean practices as well as the barriers to lean implementation.

As an example of the elaboration of first order codes into second order ones we describe what we have called 'strong tradition'. First, we have identified that LH workers were not used to questioning the status quo. In addition, LH has been recognized for excellence in patients' assistance, intensive presence of founders on daily basis and a significant number of long-term highly experienced employees. Those first order codes were then gathered in the OC dimension called 'strong tradition'.

The next step has been to highlight consensus and identify contradictions both intra and inter each construct, within and across interviews. The contradictions have indicated the existence of organisational tensions, which were further classified into the four categories of paradox. Each paradox was then unfolded into underlying tensions, defensive mechanisms and managerial actions. Finally, we have identified how OC traits impact each paradox in terms of supporting defensive mechanisms or lean practices that act as managerial actions.

As each interview was analysed, the authors went back to the literature in order to adjust the framework of analysis and the interview protocol, as well as to define the next interviewees. Moreover, the definition of constructs to define the OC were supported by the back-and-forth between data analysis and the literature in a constant confrontation between the data and the theory proposed by the abductive approach (Sinkovics and Alfoldi, 2012).

3.5. Research quality

Steps were taken to minimize potential sources of bias within this study, including a triangulation method for data collection that was employed to minimize the effect of the main researcher's insider perspective, and to increase the validity of the findings (Edmondson and Mcmanus, 2007; Stake, 1995). The triangulation of the data source was achieved through the diversity of interviewees in regards to their functional role, department, hierarchical level, and expertise with lean, as well as through observation during the lean workshops. The complementarity of such different perspectives supported the findings by either helping to crystallise constructs or by bringing additional perspectives. The indication of multiple exemplary quotes for the same constructs when presenting the findings further illustrates some of the triangulation adopted. Moreover, the triangulation also revealed the necessity of further investigation of specific constructs throughout the research. That is the case of the sense of gratitude within the 'employee orientation' construct. The discussion about the paradox of learning (section 4.2) shows that the lean workshops revealed that workers not only feel grateful, but they want to give back to the hospital. This led to the exploration of this topic in further interviews, which enabled the identification of how they actually do it. Ultimately, spending a lot of time with the study participants also allowed for the development of close relationships and a consequently greater ability on the part of the researcher to fully capture the meaning of practitioners' responses. The development of these relationships also meant that practitioners were sufficiently comfortable to share important information that may not otherwise have been communicated.

4. Findings

4.1. Case background

After decades of developing an OC of strong tradition and that values a caring and loving environment rather than managerial skills, where leaders are seen as heroes and the organisation is seen as a family (see Appendix B1 for the OC traits identified and exemplary quotes), the founders decide to implement lean philosophy at LH. Lean implementation started in 2013 at this family business, with a training program followed by the implementation of lean projects. Each year a group of professionals was selected to participate, beginning with top management, then expanding to more than 150 employees of all organisational levels, departments and units by 2018. Lean projects and ad-hoc initiatives helped spread lean knowledge and practices, which promoted employees' commitment. LH members first showed resistance to being exposed by the evidence-based approach along with key performance indicators (KPI's), but, then, they recognized that "if they understand what the actual problem is, we can work on the proper solutions together" (I7). Another key lean initiative implemented was having lean department as internal consultant and change agent. Lean professionals have provided technical and emotional support throughout the years of implementation. They promoted a continuous improvement mindset and a flexible approach when implementing new practices, for example by "respecting what is feasible and considering patients as a priority" (I8). Appendix B2 details all thirteen lean practices coded, with

exemplary quotes for each.

Despite the flexible approach, the implementation of lean represented a significant cultural change. Overall, LH faces the challenge of keeping existing cultural traits related to core organisational values (such as a joyful environment and excellence in patients' care) while implementing a lean culture along with lean practices. In the following subsections, we discuss the cultural paradoxes that emerged from the clashes between LH's prior OC and the lean culture. As anticipated and summarized in Fig. 2, our findings reveal some OC traits rooted in LH's culture that support defensive mechanisms, thus hindering lean implementation, while a key OC trait – employee orientation – acts as support to lean practices. In the following sub-sections, we offer a detailed analysis of such dynamics occurring across the four types of paradoxes.

4.2. Paradox of learning

LH strives between a long history of excellence in assistance baked by long-term employees and the need to improve managerial and problem-solving skills to implement lean. Despite the context of an economic crisis and an urge for even better results, leaders resist to change because "they say 'what do I need to do better if I'm already the best'." (I4). The resistance to change is found among other LH members: "people reject some initiatives proposed without even testing them." (I1). The literature identifies this defensive mechanism as 'regression', when old solutions and security from past are desired. Additionally, the decision of disseminating lean through the groups involved in the training acts as a 'splitting' of the two poles of the tension temporally. The adoption of this defensive mechanism means that professionals trained are expected to behave differently from the ones who have not yet been trained.

This resistance to the acquisition of new knowledge is supported by some LH cultural traits. All the elements of a *strong tradition* clearly support the defensive mechanisms aforementioned, inhibiting the efforts to build a new and more complex reference to deal with the new scenario. Along with that, the *hero-leader* dimension also influences the defensive mechanisms, with its cultural traits of firefighting. Physicians and leaders assume they have all the solutions to the problems, and every problem is seen as a failure rather than an opportunity to lean: "I suffered a lot when they started to look for problems in my department. How could I have missed those? I was insecure with the mistakes they were pointing out." (I12). The *parochial/unprofessional* dimension plays additional role in the support of the defensive mechanisms. The absence of a strategic HR and of managerial skills among leaders make it harder to institutionalize the need for the new knowledge acquisition. For example, workers were required to attend trainings without being informed about the necessity and application afterwards: "It was strange for me, everything was new, all the tools … I really did not know how to apply what I was learning." (I11). The lack of efficient measurements to depict processes and results disguises the necessity for change and improvement: "Sometime people do not recognize or see the problem because we don't have a strong culture of measurement. There is no indicator to serve as a reference of what is under or above the expectations." (I5).

The adoption of lean practices counterbalances the defensive mechanisms aforementioned. The continuous improvement mindset promotes the idea that it is always possible to achieve better results. The principle of actions based on evidence through the KPI's outweighs the lack of measurement culture: "With lean, people need measurements and follow up of results to make their point about keeping the current way of doing a specific task/process instead of implementing any change." (I4). LH is intensively promoting recognition and rewards, which bring positive effects to engagement to lean: "At the annual lean workshop this year, they gave each of us (lean residents) a belt, with our names written in gold, so nice … such a recognition that no money pays it off." (I8). The top-leadership support to lean implementation also acts as a managerial action to deal with the paradox of learning: "All the leaders support and participate in lean initiatives. Today our unit's director was here picking up some boxes for a lean project she sponsors. She has more than 20 years here, this is very interesting to see." (I10). In addition, having a lean department working as internal lean consultants and adopting a flexible approach were key to managing this paradox: "The best part is that the lean team is always available to any kind of demand or doubt we might have. (…) They help make our departments

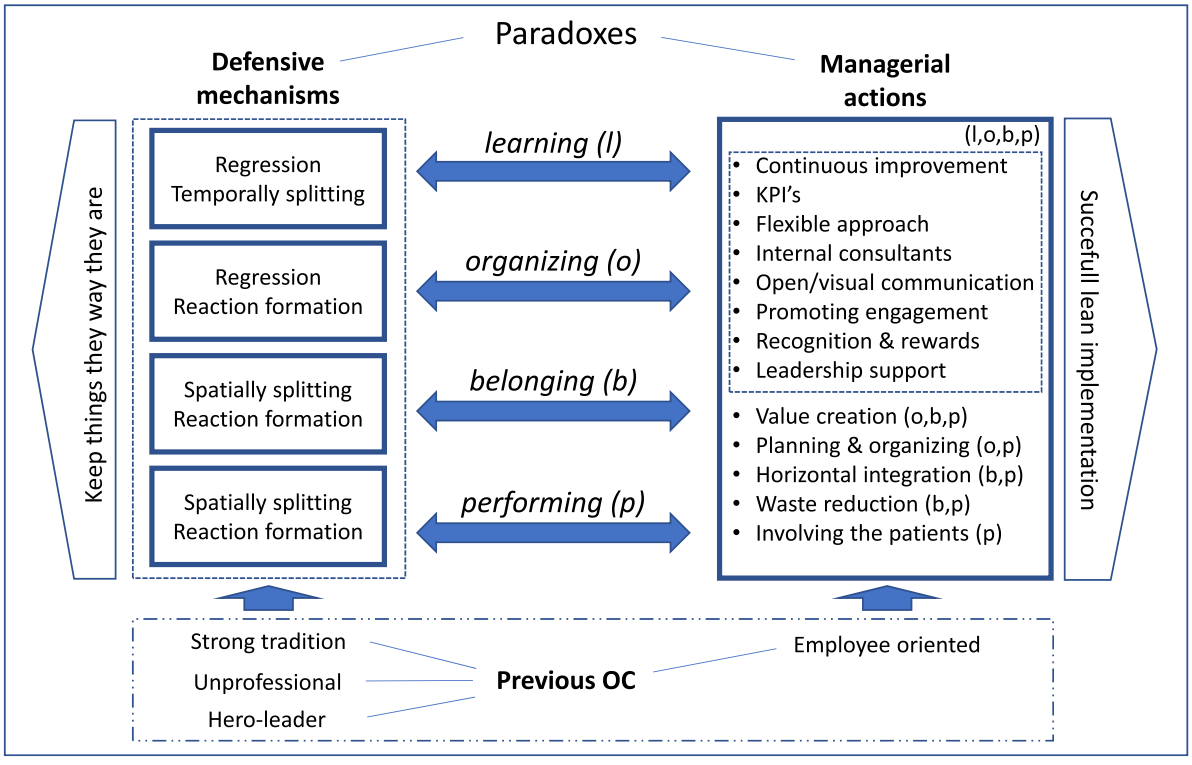

Fig. 2. The interplay between OC and lean implementation through a paradox theory lens.

better and by doing this, they disseminate the lean thinking" (I7).

Additionally, we found that the OC dimension of *employee orientation* supports the managerial actions adopted to counterbalance the defensive mechanisms. Employees are grateful for having acquired new knowledge while working at LH: "I'm very grateful for having worked here for the past 10 years, for being part of the lean projects. All my professional knowledge I've learnt in here." (I10). The observation of the lean workshops showed that LH professionals not only enthusiastically show their gratitude to the hospital, but they also want to give it back. Further interview pointed that one way of giving back is by passing on the knowledge and training they have received to others within the hospital: "I did not know anything when I started working here. Now I'm a manager and I feel compelled to do this for the others" (I9). Internal opportunities to grow and workers seeking development corroborate: "It's nice because the physicians like to acquire new knowledge." (I5); "I see in all the nursing team a movement towards qualification, always attending conferences and specializations." (I9).

All in all, the analysis of the paradox of learning at LH shows that the cultural dimensions of strong tradition, parochial and hero-leader styles support the defensive mechanisms that hold the organisation back to the old knowledge. Conversely, the employee orientation OC dimension supports the lean implementation, thus acting as a managerial action towards simultaneously embracing both old and new knowledge.

4.3. Paradox of organizing

The conflict between empowerment and control is also found at LH. On the one hand, leaders are admired and used to give straight instructions, which are followed by loyal, grateful, and humble workers. Workers are not used to question orders or procedures, as one example given by the lean specialist: "We get so used to some redundancies that we don't even question them". (I1). On the order hand, lean implementation stimulates LH members to questioning the status quo, eliminating waste and continuously improving processes and results. A director recognizes that "the company needs to mature in the sense of delegation and empowerment" (I4) in order to manage this tension.

We found that LH members avoid exposure and are afraid of punishment, so they stick to old and safe solutions, which characterize a 'regression': "I'm on my comfort zone and I will not expose myself." (I7). Therefore, they tend to do whatever they are told to do. *Strong tradition* and the cultural traits of the *hero-leader* dimension - humble attitude among shop floor workers, the straight instructions, low empowerment and problems seen as failures - reinforce this behaviour. Moreover, the feeling of family, present in the *employee orientation* dimension, raises the idea of leaders seen as fathers/mothers, who are expected to "know better" and to have all the answers (I1). They also manifest a reaction formation, as they manifest their opinion and actions opposite to the threatening one, for example by refusing to eliminate re-work activities. From the neonatal nurse to the lean specialist, LH members point out the impossibility of eliminating redundancies, especially in the healthcare sector. This defensive mechanism hinders the establishment of new standard procedures and processes. Along with that, the fact that they are dealing with patients' heterogeneity and unique professionals (i.e. different knowledge, interest, confidence, etc.) is an additional barrier, which is supported by the immediacy and firefighting cultural traits typical of the *hero-leader* dimension. The external consultant corroborates: "physicians are afraid of losing autonomy and flexibility" (I6).

Similarly to the paradox of learning, some lean initiatives function as managerial actions that counterbalance the defensive mechanisms. The adoption of continuous improvement mind-set and evidence-based actions, coupled with the support of lean department using a flexible approach to implement changes, are found effective mechanisms to manage the paradox of organizing. As the billing manager explains "you have to turn off the fire but also work so that it does not flame again" (I9), meaning that LH may need to implement immediate solutions to some problems, but they must identify the root causes of the problems in order to prevent them to reoccur. Moreover, the promotion of engagement through the lean projects, with spaces to discuss problems, and "simple solutions" (I9), coupled with recognition and rewards practices also play a crucial role in the management of this paradox. Furthermore, the "alignment of lean principle and practices with the organisational strategy supports the changes among leaders and focuses the efforts into what generates value" (I10). Transparent, accurate and visual communication as well as proactive planning efforts helped dealing with the fear of exposure and helped differentiate value from waste. Visual management charts are used to discuss processes and results and the "discussions seek solutions rather than guilty parties" (I12). Most aspects of the *employee orientation* dimension corroborate with the managerial actions. For example, grateful and engaged members who recognize the love and loyalty of LH to them are more comfortable to suggest improvements and to follow procedures, as well as the present and closer relationship with the leaders. It is relevant to note, though, that the triangulation of the data through observation during lean workshops revealed that the hospital still has further steps to fully enable and successfully stimulate contribution from lower hierarchical level workers. One example is the fact that physicians led the presentation of the projects, whenever there was a physician within the group, sometimes leaving other group members to a secondary role.

Therefore, the paradox of organizing lens exposes that the cultural dimensions of strong tradition, parochial and hero-leader styles once again supports defensive mechanisms, and the employee orientation supports managerial action. The difference is that the 'feeling of belonging', which is a cultural trait of the employee orientation dimension, may also support defensive mechanism – exposing the possibility that given OC trait may carry a dual nature.

4.4. Paradox of belonging

We have identified conflicts between functional role and team role. The engagement to lean projects fosters horizontal integration and collaboration among different units, departments, and functions although it demands extra effort and time as it raises conflicts when dealing with the diversity and complexity involved.

The actual differences among a variety of subgroups within LH is one of the main barriers to managing the paradox of belonging. At unit level, one unit has a higher level of accreditation and is seen as more professional and less traditional than the other. Such differences recognized by interviewees could also be observed during the lean workshops. For example, when two groups (one of each unit) presented their project on the same theme but one emphasised the numbers (final results) while the other showed personal involvement with the project and accomplishments. At departmental level, "the major differences are between the assistance and administrative departments as the nature of attributions and backgrounds differ significantly" (I15). LH members tent to use those differences to justify the segregation, adopting 'spatially splitting' as opposing elements are located in different units/departments. Poor integration among different professionals is also highlighted by interviewees. For instance, one pharmacist states that "any discussion within this (pharmacists) group is easier to understand than within multifunction-lean groups because everybody here is from the same department and knows what is going on, what are the problems" (I13). This defensive mechanism is supported by the *parochial/unprofessional* cultural style, as they support the belief that each one is supposed to take care of their own tasks, no matter the impact on and of the others. The *strong tradition* OC and the hero-leader style also contribute to the segregation, in that the first refers to not questioning the status quo and to long-term employees highly experienced in their specialization, and the second reinforces the opposite perspective of physicians ("special entities") and shop-floor workers ("humble and shy"). Another barrier within this paradox of belonging is that participating in the lean teams demands extra work, not always related to their own regular functions, and sometimes with long-term results. Consequently, some

members have manifested 'reaction formation', when the old condition is reinforced, by rejecting or abandoning lean projects because of the perception of extra work. The supply manager recalls people saying: "here comes the lean again. I'll have to spend 4 h in training while I have so much work to do" (I8). This defensive mechanism is mainly supported by the immediacy short-term culture found in the *hero-leader* OC dimension.

LH has used the lean initiatives to manage the paradox of belonging by counterbalancing the defensive mechanisms. One major principle in this context is the horizontal integration and the holistic view. LH proposed multifunctional teams for the lean projects, integrating workers and leaders from different department and units, which promoted the viability of the interrelations among them and a sense of unity. On the one hand, the lean specialist highlights that the administrative workers "found a purpose in their function as they come closer to the core functions of the hospital" (I10). On the other hand, "assistance workers, who used to be in the shadow of their leaders, now have the opportunity to step up and show their contribution to LH" (I15). Besides the involvement and recognition of workers directly involved in the lean projects, LH members are encouraged to conduct ad-hoc initiatives in order to disseminate lean principles to the organisation as a whole. The leadership sponsorship of lean projects and constant communication reinforces the unified approach within LH. Another example of lean principle as a managerial action is the evidence-based approach, which uses the KPI's and the root-cause analysis to have solid arguments towards the necessary changes. One nurse describes how "a deeper investigation of the root causes of a problem leads to the collaboration of all the departments and professionals involved in each process" (I11). We have identified that the continuous improvement mindset and the flexible approach supports the management of this paradoxes, likewise the paradoxes of learning and organizing. The waste reduction, simplification of processes and controls, focus on value creation and organisational strategy integrate the set of managerial actions adopted to counterbalances the defensive mechanisms.

The *employee orientation* is the cultural dimension supportive to the adopted managerial actions. The caring and welcoming environment along with a close leadership help LH workers to feel comfortable in belonging to multiple groups and to compromise with each other. Additionally, the fact that workers seek learning and development supports the idea that dealing with workers of different backgrounds and analysing problems from department other than their own may enrich their knowledge and increase their opportunities to develop.

Despite some differences among specific cultural traits of each dimension, LH culture plays a similar role in the paradox of belonging when compared to the paradox of learning. In order words, *strong tradition*, *parochial* and *hero-leader* cultural dimensions support defensive mechanisms and *employee orientation* supports managerial actions. We have also found a higher number of lean practices that contribute to the management of this paradox, when compared to the previous ones.

4.5. Paradox of performing

The core goal of LH being the care of people added to a long history of excellence in assistance may clash with new demands for operational and economic improvements caused by the lean implementation. LH members recognize the urgency to balance both sides: "Although the health of the patient is a value to us, we are a private hospital, so we need to generate profit to the shareholders. Our challenge is to make them converge, because not always this seems possible." (I1).

Once again, LH members resort to spatially splitting as a defensive mechanism, as they believe that "they are here to save lives; operational performance is not their problem" (I4). An administrative manager corroborates: "Assistance workers are concerned about solving the patients' necessities instead of with how much it will cost, if the insurance will cover, if the patient will pay" (I12). In addition, the refusal to incorporate operational demands to their function indicates a 'reaction formation' by assistance workers. One example is the struggle to convince physicians, and sometimes nurses, to change to digital information or to be aware of and act upon actual performance results.

These defensive mechanisms are supported by different OC dimensions, such as *strong tradition* (professionals do not question the status quo, excellence in assistance, intensive presence of founders and long-term highly experienced employees) and the *hero-leader style* (immediacy, physicians seen as special entities, problems seen as failures, straight instructions and low empowerment). The *parochial/unprofessional* style also plays its role. The horizontal segregation, an element of this OC dimension, hinders a holistic perspective with unified goals, as the concern is on the immediate care. An unstructured HR is incapable of linking the functions to the strategy, promoting effective training of the missing managerial skills and providing a career plan that encompasses assistance and operational demands. The culture of waste and re-work, justified as safety procedures, added to the lack of effective measurement systems prevent LH members from seeing the organisational results are a whole. The cultural trait of loyalty, engagement, gratitude and love between LH and its members also supports the resistance to improving performance because "when it's time to evaluate low performance, relationships make it harder" (I4).

We have identified that all lean practices adopted by LH contribute to manage the paradox of performing, some of which are common to the four types of paradoxes. One example is how an effective monitoring, with no redundancies, releases the assistance professionals to dedicate more time to actually supporting the patient (I11). Focusing on value creation aligned with the organisational strategy; horizontal integration and holistic view; leadership support; open communication; proactive planning; and waste reduction acts as actions towards effective managing opposing demands. The patients' involvement and closeness is a lean practice successfully adopted as a managerial action to identify customers' value and to integrate them into LH care processes. Among the few initiatives in this direction undertaken so far, one example is to inform the patients about the safety procedures and to have them helping control the accomplishment of the tasks. Overall, the managerial actions have contributed to the idea that the goal it "to make the client have the perception of being well-assisted while, internally, we have to make sure this happens at the best cost-benefit possible." (I8).

Overall, LH cultural aspect of employee orientation supports the managerial actions of the performing paradox, as present and close leadership shows they are aware of the small details and that the final results matter, and as the workers are willing to learn new skills. But we have identified that the cultural trait of 'loyalty and gratitude' both supportive to defensive mechanisms and to managerial actions, as LH member are grateful and consequently willing to give it back to the hospital. We have also found some controversial cultural traits within *strong tradition* and *hero-leader* style. The first controversy is the excellence in assistance and the market leadership. On the one hand, LH maintains the assistance as a top priority in detriment to the operational results (i.e. supports defensive mechanisms). On the other hand, LH has invested on innovation, research and infrastructure focused on the assistance in order to keep the market leadership. This could be broadened from the assistance to the management as well, balancing both sides of the paradox. The second controversy relates to the straight instructions and low empowerment. Although part of the hero-leader dimension, which supports the defensive mechanisms, the fact that LH members are used to follow the founders requests means "they tend to embrace the changes supported by the founders, such as incorporating lean practices towards achieving operational improvements" (I5).

The analysis of this fourth paradox not only shows most controversial aspects regarding the OC traits, but also covers the largest number of lean practices as managerial actions. We have identified that all 13 coded lean practices may influence the management of the paradox of performing.

5. Discussion & conclusions

5.1. Answering the RQ

This study takes a paradox-theory lens to investigate the interplay of OC and lean implementation. To the best of our knowledge, previous studies have either explored lean implementation using the paradox theory without specifically addressing OC, or they have investigated the interplay of lean and OC with a different theoretical lens. By answering the research question *"How are cultural tensions managed in a healthcare organisation going through a lean implementation?"* we offer an in-depth analysis of four OC traits that act as support to either defensive mechanisms (resistance to change) or lean practices acting as managerial actions (in paradox theory terms) during lean implementation. We also show how each of 13 lean practices interact with defensive mechanisms and the underlying OC traits via the analysis of the four types of paradoxes, namely: learning, organizing, belonging and performing.

5.2. Original OC as both barrier and driver

In the studied case of an organisation with a family business origin, we have identified four main OC traits: *strong tradition*, *parochial/unprofessional style*, *hero-leader style* and *employee orientation*. The first three dimensions support the identified defensive mechanisms, such as regression and temporally splitting. Combined, these three dimensions represent a major negative force for family businesses implementing lean. Conversely to the first three OC dimensions, the fourth dimension, that is *employee orientation*, is supportive of lean practices (i.e. managerial actions in paradox theory terms). This corroborates with a prior literature review on the role of OC in lean implementation (Erthal and Marques, 2018) as well as with family business literature. Studies emphasize the leadership closeness (Seah et al., 2014), founder centrality (Tipu, 2018), feeling of belonging (Ainsworth and Cox, 2003) and employees' commitment (Ainsworth and Cox, 2003; Tipu, 2018) as common traits of family businesses cultures. These cultural traits are highly related to those identified in our study. Therefore, this study shows that family businesses will often carry both barriers and drivers of lean implementation within its original OC, and thus lean implementation should carefully manage both sides of the coin. We summarise this discussion in our first proposition and a sub-proposition:

Proposition 1: The organisational culture (OC) prior to lean implementation may act as both barrier, supporting defensive mechanisms, and driver, supporting lean practices.

Proposition 1a: In family businesses, traditional OC traits such as hero-leader, strong traditions and lack of professionalization support defensive mechanisms and thus hinder lean.

5.3. Lean practices support the management of paradoxes

The extensive literature has discussed the intrinsic paradoxical principles of lean. In this study we advance the knowledge by proposing that lean practices can be used in order to manage the cultural tensions originated by lean implementation. We have scrutinized which lean practices may counterbalance each cultural trait, as shown in Table 1, thus avoiding defensive mechanisms to persist. Regardless of the type of paradox, lean practices such as a continuous improvement mindset, leadership support, evidence-based and flexible approaches, promoting engagement, reward and recognition through internal consultants are key factors to successfully manage cultural tensions derived from a lean implementation. Moreover, the findings reinforce the notion of a holistic perspective instead of the implementation of isolated lean tools, as they complementarily counterbalance OC traits negative to lean implementation.

Another relevant contribution is the fact that all 13 lean practices identified relate to soft practices. Corroborating with Bortolotti et al. (2015), those "lean practices concerning people and relations" are more extensively adopted in successful lean plants than in the unsuccessful ones. The healthcare literature corroborates that professionals' relations are a key success factor when implementing quality improvement initiatives (Nembhard et al., 2009; Tucker et al., 2014). Therefore, we offer a second proposition:

Proposition 2: Lean soft practices act as managerial actions helping manage the tensions between the prior organisational culture (OC) and the lean culture during implementation.

A previous assessment of the OC may better prepare managers before starting a lean implementation. The identification of the existing OC traits and development of structural (e.g. knowledge development and interdependencies) and cognitive (e.g. shared knowledge and goals) conditions will facilitate and motivate lean adoption. We offer a guide to

Table 1
The interplay between OC and lean practices.

OC dimensions	Lean practices	
1. Strong Tradition		
Do not question the status quo[a]	**Continuous improvement mindset**[b]	**Leadership support**[b]
Excellence in assistance/market leader		Focus on value creation aligned with the organisational strategy
Intensive presence of founders	**Evidence based & KPI's**[b]	
Long-term employees, highly experienced		**Flexible and paradoxical approach**[b]
2. Parochial, unprofessional		
Horizontal segregation	Horizontal integration & holistic view	**Leadership support**[b]
Unstructured HR department[a]	Focus on value creation aligned with the organisational strategy	**Recognition & rewards**[b]
Internal promotion without prior knowhow	**Evidence based & KPI's**[b]	
Lack of effective measurement systems		Open, visual communication
Poor managerial skills and processes[a]		Proactive planning and organizing
Waste, re-work	Waste reduction, simplification	Patients' involvement/ closeness
3. Hero-leader		
Humble, shy attitude among workers	**Recognition & rewards**[b]	Open, visual communication
Immediacy, firefighting[a]	Proactive planning and organizing	**Leadership support**[b]
Physicians seen special entities	**Promotion of commitment**[b]	**Flexible and paradoxical approach**[b]
Problems seen as failures	**Continuous improvement mindset**[b]	Open, visual communication
Straight instructions, low empowerment	**Evidence based & KPI's**[b]	**Promotion of commitment**[b]
4. Employee orientation		
Caring, receiving, welcoming environment		
Feeling of belonging, of family, of union	**Evidence based & KPI's**[b]	
Loyalty, Engagement, gratitude - both ways		
Opportunities to grow internally		
Present & close relationship with leaders		
Workers seek learning and development		

[a] Defensive mechanisms present in the four types of paradox.
[b] Managerial actions present in the four types of paradox.

manager dealing with the means to overcome resistance when implementing the cultural transformation necessary for a successful lean implementation in a healthcare organisation. Building the essential resources and capabilities – in terms of internal consultants, knowledge and information sharing infrastructure, performance measurement and rewarding system, provision of feedback on employees' performance and the creation of an evidence based care, patients' and employee engagement, as well as leadership support– would be vital in achieving the lean implementation strategy.

5.4. The missing piece: the paradox of learning

The paradox theory has shown to be a valuable lens to investigate the challenges of managing the tensions between the OC and the lean culture, represented in the four types of paradox: learning, organizing, belonging and performing. The organisational tensions we have analysed are underexplored by the literature, in particular the paradox of learning. Previous studies were not able to identify this type of paradox in lean implementations (Maalouf and Gammelgaard, 2016) or in other contexts of organisational change (Jarzabkowski et al., 2013). Those researchers argue that "the paradox of learning underpins tensions sustaining the other three types of paradoxes" (Maalouf and Gammelgaard, 2016, p. 696). Conversely, we propose the four types of paradoxes are inter-related and complementary, although each of them has specific tensions to manage and, as shown, are influenced by OC dimensions and lean practices in their own way.

The granular discussion of the conflicting tensions according to the typology of four inter-related paradoxes provide evidence that some OC traits support lean practices that in turn are capable of managing tensions across all four types of paradoxes. We suggest that managers could start lean implementation through these practices to accelerate resistance mitigation and implementation. In a healthcare context, lean interventions require a well-laid roadmap and a rigorous comprehensive effort to harmonise OC traits and achieve change. Ultimately, our study offers a framework for the analysis of cultural tensions that may benefit organisations implementing lean in other sectors as well as organisations going through cultural clashes provoked by the implementation of management systems other than lean. We characterize the paradoxical nature of lean in our third proposition:

Proposition 3: A successful lean implementation is dependent on the effective management of the four inter-related and complementary types of paradox: learning, organizing, belonging and performing.

5.5. Limitations and future research

The empirical setting of a healthcare organisation implementing lean has offered an invaluable opportunity to investigate the interplay between OC and lean implementation, but the single-case approach carries its limitations (Eisenhardt and Graebner, 2007; Yin, 2009). Although this research has employed formal protocols for data collection (triangulation, coding, etc.), inter-personal influences, such as educational background, between the researchers and the participants can never be fully eliminated. As much as it has allowed an in-depth discussion of paradoxes, future research should expand the empirical base in order to map contextual conditions in varying organisational and cultural contexts. In addition, our study focuses on the influence of the prior OC on adherence to lean practices. Future studies could broaden the scope to include the assessment of outcomes thus completing the full cycle of antecedents, practices and outcomes (Narayanamurthy and Gurumurthy, 2016).

The complexity of culture relies on the fact that a culture of a group is not an average of the individual reactions. Rather it is the most common reaction in the same group of people (Hofstede et al., 2010). We have tried to overcome this limitation by interviewing multi-level and multi-function workers, gathering and comparing the different perceptions. Furthermore, we recognize the complexity of investigating culture considering its multi-layered nature. Future studies could take a step further towards investigating the impact of culture, not only at the organisational level, but also at a national level, thus exploring a multilayer perspective to cultural tensions.

Although not the focus of this paper, the multi-level nature of healthcare organisations and the role of professionals' autonomy in creating or hindering organisational change could be explored by future research on organisational implications of OM and SCM. Organisational theories such as organisational routines (Feldman, 2004) could be used to study the complexity of healthcare processes, exploring how micro (i.e. professionals), meso (i.e. organisation) and macro (i.e. governmental) processes interact, supporting the creation and resolutions of conflicts. Moreover, the scrutiny of the interaction between the idealized routines and the routines actually performed can provide important insights on existing conflicts, their causes and resolution mechanisms. Similarly, the Theory of Constraints (Goldratt, 1994; Taylor and Nayak, 2012), through the idea of a constructive resolution process, could be employed to manage or 'evaporate' paradoxes through systematic processes. The evaporating clouds (Gupta et al., 2011), as a conflict resolution tool, can enable researchers to capture cause and effect relationships, understand what triggers change, what needs to be changed and how to promote such changes.

Finally, future research could delve deeper into the defensive mechanisms of family businesses in other healthcare organisations as well as from other sectors. The fact that we have identified all four paradoxes proposed by paradox theory within a lean implementation suggests a good fit between theory and context. As exploring paradoxes is an ongoing and cyclical journey (Lewis, 2000), we claim for future exploration of cultural paradoxes present in lean implementation as well as their interconnections.

CRediT authorship contribution statement

Alice Erthal: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing - original draft, Writing - review & editing, Visualization, Project administration. **Marianna Frangeskou:** Writing - review & editing, Visualization. **Leonardo Marques:** Methodology, Resources, Validation, Writing - review & editing, Supervision, Funding acquisition.

Declaration of competing interest

None.

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Appendix A. List of interviews and workshops

Data collection	Unit	Id #	Years at LHC	Date	Duration	Words
Lean specialist	U1&2	I1	5yrs	Ago 21st 2017	67′	6660
Neonatal nurse and le a resident	U1	I2	8yrs	Sep 1st, 2017	50′	6162
Quality specialist	U1	I3	6yrs	Sep 1st, 2017	45′	6097
Lean director	U1&2	I4	6yrs	Sep 1st, 2017	32′	4463
Lean analyst	U1&2	I5	2yrs	Sep 1st, 2017	45′	2919
Lean consultant	–	I6	(external)	Oct 9th, 2017	46′	5551
Workshop -lean projects presentation	U2		–	Oct 10th & 11th	3 h	–
Workshop - lean projects presentation	U1		–	Oct 16th & 20th	3 h	–
Workshop - lean projects presentation	U2		–	Dec 13th, 2017	4 h	–
Workshop - lean projects presentation	U1		–	Dec 14th, 2017	4 h	–
Workshop - lean projects presentation	U1&2		–	Dec 21st, 2017	3 h	–
Nurse manager	U1	I7	14 yrs	Oct 11th, 2013	56′	6671
Supply manager	U1&2	I8	9 yrs	Oct 11th, 2013	60′	6349
Billing man ager	U1&2	I9	32 yrs	Oct 11th, 2013	32′	3312
Financial analyst	U1&2	I10	10 yrs	Oct 11th, 2013	33′	5435
Nurse	U2	I11	8 yrs	Oct 30th, 2013	52′	6327
Reception manager	U2	I12	20 yrs	Oct 30th, 2013	53′	7611
Pharmacist & Inventory supervisor	U2	I13	6 yrs	Oct 31st, 2013	42′	4913
Nurse Technician	U2	I14	5 yrs	Oct 31st, 2013	30′	2367
Workshop - lean projects presentation	U2		–	Dec 5th, 2013	4 h	–
Workshop - lean projects presentation	U1		–	Dec 6th, 2013	4 h	–
Workshop - lean projects presentation	U1&2		–	Dec 13th, 2013	3 h	–
Lean specialist	U1&2	I15	5 yrs	Dec 13th, 2013	21′	2194
Total			**Average**	**Period**	**Total**	**Total**
Number of interviews	15		10 yrs	From Jul 6th, 2017 to Dec 13th, 2013	11 h	77,541
Number of workshops	10				33 h	–

Appendix B1. OC traits and exemplary quotes

OC traits	Total	Exemplary quotes
1. Strong Tradition		
Do not question the status quo	5 quotes	"It's that thing when people ask 'why are you doing this?', and the answer is 'it has been like this since I got here." (I4); "We always think there is no other way of doing something we are used to do." (I14)
Excellence in assistance and market leadership	23 quotes	"LH is the market leader, practically with no competitors at the same level, and very succefull in what it does." (I1); "We are a center of reference in our specialty, and this is a fact because we have the professionals and we have results that show this. It's not just saying, we have actual results."(I9)
Intensive presence of founders on daily basis	6 quotes	"The hospital founders work directly in here. They are two physicians who are extremely involved with daily routines and with the results."(I3); "Sometime the owner (of LH) calls me to say he is seeing that some printer is not working properly. I mean, he talks about the minimum details concerning everything that hapens in here." (I8)
Long-term employees, highly experienced	8 quotes	"Our history of success was build by those leaders who have been here since the beginning, the ones who haven't changed." (I12); "We have many long-term employees and all the deparments' leaders have been working here for tweny years." (I2)
2. Parochial, unprofessional Horizontal segregation	8 quotes	"There was no union of all the departments to know that the necessity of an expensive medication must be previously informed so that we can receive it in time."(I12); "Most of the departments have one manager for each unit and each one is focused on his/her own issues." (I8)
Unstructured HR department	7 quotes	"People develop themselves more when they get involved with the lean department than from the HR initiatives." (I7); "We used to have a personnel department instead of a strategic human resources department, which should aim in developing people through a carreer plan and everything."(I4)
Internal promotion without prior knowhow	10 quotes	"The managers do not have the abilities to manage. The managers used to be the ones who perform well in their prior funcions." (I7). "A lot of promotions here happen without management knowhow because the leadership intend to have more people like that one being promoted in the sector." (I15)
Lack of effective measurement systems	11 quotes	"All the information is in the system. Yet, the technicians make the same registration many times, and the physicians also register the monitor's information in the paper when their shift ends. This rework is unnecessary." (I11); "We had a culture of registering the information, more related to the assistance of patients. But each one had their own information, there was no universal language for that." (I13)
Poor managerial skills and processes	19 quotes	"Management is a challenge in Healthcare, everything is new to us, specially for our current leaders. They have an older and more traditional formation." (I2); "They are not used to follow the schedule and everything." (I5); "It's a lack of skills among those leaders who think they just need to lead the daily activities. But they also need to think how to do their work better in the future."(I1)
Waste, re-work	12 quotes	"Each member of the team had his own file with the same information than the others but with different standards. So we used to hear 'get his file, his is a more complete file.'" (I12); "The phisiotherapists always complain that there was something missing when they were ready to settle the procedure." (I14)
3. Hero-leader Humble, shy attitude among shop floor workers	7 quotes	"We used to ask 'why don't you show this to other people?', but they were afraid the other would think they are showing off." (I5); "I'm apprehensive about presenting information to the other. Forme the data may be clear, but what if the others do not think so." (I11)
Immediacy, firefighting	8 quotes	"I think, humanly speaking, that it is much easier to directly think about a solution, which could not be the best one, than to work on the problem, unveil the issues involved and compromise with the others about the actions." (I13); "We still put out fires a lot."(I2); "I recognize sometimes I end up not thinking about the real problems because I'm always putting out fire." (I9)
Physicians seen special entities	5 quotes	"Physician is God. Before God, the physician is the last door. After that, only God." (I6); "I'm used to joking that physicians are special entities. But we need to understand them, because they live a more rough and competitive life." (I4)
Problems seen as failures	9 quotes	"When we were in training and someone came up with the problem, everybody got desperate." (I10); "It's hard to make a mistake. It used to raised insecurity, because they were looking for who to blame." (I12)

(*continued on next page*)

(*continued*)

OC traits	Total	Exemplary quotes
Straight instructions, low empowerment	15 quotes	"We have a very centralized culture." (I9); "People may use the name of the founders to get something done. Sometimes they are not even aware of it." (I5); "They love and fear the owners at the same time." (I6)
4. Employee orientation Caring, receiving, welcoming environment	9 quotes	"I have always had great leaders and I think everybody here is very humanized and caring with each other." (I10); "People fell that somehow they are taken care in here" (I2); "Once you enter LH, you feel welcomed and cared, and this is true in all the departments." (I14)
Feeling of belonging, of family, of union	9 quotes	"Our staff here is like a family, the workers know each other, it is a joyful environment." (I1); "Despite our growth, we didn't lose the idea of being a family. We have this idei an of a warm family." (I3)
Loyalty, Engagement, gratitude, love - both ways	31 quotes	"LH started as a dream of two (people) and today it's the dream of I don't even know how many. (…) I once told the directors, 'you are responsible for the smile in my child's face, for our food and our shelter' ". (I7); "I notice people are proud to work here. (I9); "The company is grateful to the employees, to the years they have dedicated to LH." (I4)
Opportunities to grow internally	12 quotes	"I believe the company gives opportunities to workers. I've seen workers from a variety of sectors start as a technician or assistant and then grown in here. LH stimulates usto grow." (I9); "Here someone is promoted because he/she has done a good job." (I2)
Present and close relationship with leaders	12 quotes	"The founders try to keep that warm contact with the employees." (I10); "The leaders are present and available on daily basis to talk to and hear the workers." (I15).
Workers seek learning and development	5 quotes	"I have always wanted to be included in new challenges because I don't see it as more work, I see it as a learning opportunity."(I7); "We are always searching for training, for new knowledge." (I10)

Appendix B2. Lean practices and exemplary quotes

Lean practices	Total	Exemplary quotes
Continuous improvement mindset	20 quotes	"We think somethings cannot be fixed. But with lean we learn to see them in different ways and to find opportunities to improve our daily activities. And this helps a lot." (I14); "We have been questioning some paradigms. For example, for certain procedure, we say we need 10compresses. When was this measured? Does it make sense? Are we taking the highest quantity ever needed as our standard?" (I1)
Evidence based & KPI's	29 quotes	"We demand evidences in numbers when someone asks for anything now. They already know this is the only way to justify their need." (I7); "There are lean tools such as 'current reality tree', for example, that show us we really need to analyze the problem through measurements, identify the root causes and solve them."(I10)
Flexible and paradoxical approach	20 quotes	"We adapt the practices to our reality, off course. It does not have to be too restrained." (I5); "Sometimes we can do great and sometimes we can only do good. We keep trying and we know we need to have flexibility and common sense." (I4)
Focusing on value creation aligned with the organisational strategy	10 quotes	"I have to tell you. I was worried the lean initiatives would find some serious barriers. But lean implementation was so strong as our new strategy that people felt they didn't have much of a choice. They understood this was a new vision of the company and people need to follow it."(I8); "The lean projects have saved us time to do what really matters." (I11)
Horizontal integration & holistic view	35 quotes	"Today we can see LH as a wrapped-up process." (I7); "We have achieved an integration with the quality department, IT, marketing, HR … I mean, we were able to take lean thinking as a systemic work, more and more integrated." (I4); "The lean teams are a mix of hierarchical levels and functions, so that it allows the understanding of daily routines and problems of the others." (I9).
Patients' involvement and closeness	3 quotes	"We have involved the patients in the safety process, for example. (…) For the next year, we'll have patients' committees so that we can co-create processes and redesign them with the direct contribution of the patients."(I1); "We have improved our understanding about the patients' needs with a project called the patient's experience. We want to go deeper in their experience in each stage they go through here." (I2)
Leadership support	14 quotes	"In the first lean training, the owner spoke and shone. He gave the right message to promote the engagement." (I6); "The multifunctional projects work because of the leadership support. Our manager is present in the major decisions and she is always there to make things happen." (I13)
Open, clear and visual communication	11 quotes	"I used to be stressed out because my team was not able to give me the updated information on the waiting line, for instance. They didn't communicate with each other. Now we have a board the receptionists feed and it's all organized and visible to everyone." (I12); "We now have the visual management boards that we use to celebrate the good results, which used to be hidden, and also to identify the problems and involve the workers in the solutions. " (I7)
Proactive planning and organizing	13 quotes	"With lean, we have organized and standardized somethings, and this improved a lot our work. Now we know what we have, what and when we need to purchase the materials … It helped a lot." (I14); "From the second year on of the lean implementation it was easier to work because we know we had to plan the initiatives, indetifying the problems first, then following the further steps." (I11).
Lean department as internal consultants and change agents	23 quotes	"It's only three in the lean department to deal with more than sixteen hundred employees. Such a huge challenge. I see them as fundamental in here, their department must exist forever." (I8); "I'm not saying that the lean team came as life saver, but to me they did. (I12)
Promoting commitment	55 quotes	"We work as a team, so people give their opinions, agree, disagree, interact, build on each other's comments … we build the projects together." (I3); "We have changed our implementation strategy in two ways related to promoting commitment. The first was to receive internal demands for projects, instead of only having them established by the leadership. The other was to train our workers so that they could lead the lean projects as well." (I1)
Recognition & rewards	16 quotes	"The residency program, that we copied from Medicine, consists of a dedication of 40% of their time to lean. This program motivated and raised the self-steam of the lean residents, who had high capabilities but were not seen or recognized." (I4); "We started working with rewards. (…) We always give something to the ones who stand out. (I11); "We are always reinforcing in our department that if we win a prize with the project, we will share it with everybody involved."(I14)
Waste reduction, simplification	18 quotes	"I see in my work that we can strongly minimize the waste of time. Sometimes we get around to reach a goal and we could do it in a much smaller period of time, as we find out using the VSM (value stream mapping), for example." (I10); "We didn't have this way of thinking about simplifying everything. Make things simpler and more consistent as possible." (I11)

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