National culture and organisational culture in lean organisations: a systematic review

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National culture and organisational culture in lean organisations: a systematic review

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ABSTRACT
Despite the extensive literature suggesting that culture plays a key role in lean implementations, no previous review has focused on the topic. This study is a systematic review of the literature that synthesises over two decades of publications according to the levels of national culture (NC) and organisational culture (OC) and maps which cultural dimensions foster or hinder lean implementation. In terms of NC, this study shows that Japanese cultural traits might hinder lean, such as masculinity and power distance, hence avoiding the over simplification that lean is a country-specific management approach. In terms of OC, the literature review unveils a lack of consensus and underlines two paradoxes, namely the coexistence of both process and result-focused orientations and both normative and pragmatic approaches. This review ultimately offers a relevant agenda for lean research as well as a guide for managers who face the challenge of implementing and sustaining lean in their organisations.

1. Introduction
1.1. The lean system
The lean system was developed on the Toyota shop floor, as the company was trying to recover from the defeat of Japan in World War II. The strategy that resulted focused on waste reduction and increased production flexibility (Ohno 1988), grounded on a focus on customers, continuous improvement and high worker involvement (Likert and Morgan 2006; Womack, Jones, and Ross 1990). Toyota's success reached the West in the 1980s and the Toyota Production System was presented to the world as lean production after the publication of the landmark book The Machine that Changed the World (Womack, Jones, and Ross 1990). Since then, the concept of lean production has evolved to a more holistic perspective, based on lean principles of customer value and waste elimination that could be applied beyond the shop floor and to diverse sectors (Womack and Jones 1996). The authors also emphasise the relevance of a wider perspective over the adoption of some single tool or practice. In the present literature review we will use the term lean system to represent this complex system of interrelated socio-technical practices (Bortolotti, Boscari, and Danese 2015), based on well-defined principles (Likert 2004).

Throughout the years, both academics and practitioners have increasingly focused on understanding the potential of this new production paradigm. Despite the maturity that lean has reached and the increasing list of publications on the topic, such as academic papers, books and how-to guides, most organisations still struggle to achieve the expected results of lean implementation (Martínez-Jurado and Moyano-Fuentes 2014). According to a global survey of more than 2000 executives, organisations face inefficiencies at every step of the implementation process (Pustkowski, Scott, and Tesvic 2014). The barriers to implementing and sustaining lean over time have led to a growing academic interest in the topic (Hines et al. 2008; Lucey, Bateman, and Hines 2005; Taylor and Taylor 2008).

Although previous publications on lean studies did not focus on people-related aspects (Bamber et al. 2014), since the 1980s, culture has increasingly been suggested as key to lean implementation and continuity, being the underlying force that guides managers and workers in successfully implementing and sustaining lean (Alves and Alves 2015; Boscari, Danese, and Romano 2016; Cagliano et al. 2011; Dora, Kumar, and Gellynck 2016; van Dun and Wilderom 2016; Kull et al. 2014; Mathew and Jones 2013; Oudhuis and Olsson 2015; Vest and Gamm 2009).

1.2. Culture definitions
Culture consists of a set of values and beliefs shared by members of a group that determine the way people think and act within the group context (Schein 1984). Thus, organisations will differ from each other because of their culture (Alves and Alves 2015). Recent studies have supported the notion that cultural factors play a crucial role within business and management field (Boscari, Danese, and Romano 2016; Gambi et al. 2015; Hasle et al. 2012; Kull et al. 2014), although this theme had already been addressed by earlier researchers, such as Nakane (1970). In her seminal study of Japanese society, Nakane shows that...
cultural and historical factors are decisive for the success of the Japanese way of managing organisations and that therefore it would not be transferable to other environments.

Taking a different approach, Hofstede (1980) holds that management is culturally dependent once it consists of manipulating intangible symbols that are directly connected with culture. According to Hofstede, Hofstede, and Minkov (1991), aspects of culture are found on different levels, from the national or country to the organisational or departmental level. Hofstede’s studies reveal that cultural differences at the national level relate to values acquired in the early years of a person’s development and are hence already established when the organisation is entered. Conversely, differences in OCs involve corporate practices, which relate to more tangible aspects of culture being learnt at the workplace. Hence, culture is time dependent, that is to say, OC aspects are easier to be adapted than NC aspects because the latter is more deeply rooted. Schein (1984, page 12) corroborates this time dependence, stating that ‘the longer we live in a culture and the older the culture is, the more it will influence our perceptions, thoughts and feelings.’

Although it seems to be feasible to change an OC, it is not an easy task to accomplish (Hofstede, Hofstede, and Minkov 1991; Schein 1984). Recent studies addressing this issue state that OC is a fundamental cause of lean failures (Saurin, Marodon, and Ribeiro 2011) and note that an appropriate OC is vital for achieving the best results in implementing lean (Bortolotti, Boscari, and Danese 2015; Gambi et al. 2015; Pakdil and Leonard 2015). At the same time, considering Toyota to be the model organisation for lean (Womack and Jones 1996), the literature advocates deeply understanding its OC to replicate it in other organisations and contexts, which has increased the interest in ideas such as the Toyota way (Liker 2004) and lean thinking (Womack and Jones 1996). In brief, we are seeking to better understand the role that NC and OC can play in organisations at the various stages of maturity regarding their process of lean implementation, i.e. from initial efforts of implementation to long-term efforts of sustaining lean.

1.3. Research questions

To the best of our knowledge, no previous review has focused on the role of culture in lean organisations (Narayananmurthy and Gurumurthy 2016), despite the existence of literature considering culture as a decisive factor to lean success. To fill this gap, the present review maps how the dimensions of NC and OC have been addressed by the extant literature over the years, as well as opportunities for future research on this topic. Our study is grounded in a systematic review of the literature that addresses the following research questions (RQs):

**RQ1:** How has the literature addressing the role of culture in lean organizations evolved over time, and what are the identifiable trends?

**RQ2:** How do specific dimensions of NC and OC influence lean organizations?

In answering the RQs, this systematic literature review offers relevant contributions, indicating that although research on the impact of culture on lean has produced some level of consensus, there are still paradoxes that call for further investigation. At the NC level, our review shows a negative impact of some Japanese cultural traits on lean. In particular, power distance seems an under-researched NC dimension. At the OC level, we unveil a paradox regarding two OC dimensions, namely the dimensions of process vs. result orientation and normative vs. pragmatic approach. Most importantly, we highlight the lack of studies looking at the possible interactions between NC and OC, in particular regarding the service sector, underlining that cultural misinterpretation often culminates in superficial lean adoption.

The remainder of this paper is structured as follows. The next section describes the methodology employed for the systematic review. Section 3 presents the meta-synthesis of the literature. The last section offers concluding remarks, indicating theoretical and managerial contributions as well as the limitations of the study and directions for future research.

2. Methodology

2.1. Systematic review protocol

The methodology employed in this study is a systematic literature review, which adopts ‘a replicable, scientific and transparent process’ (Tranfield, Denyer, and Smart 2003, 209), minimising researcher bias and providing an audit trail of all steps (Cook, Mulrow, and Haynes 1997). The systematic approach has spread significantly in operations management (OM) studies in past years (Thomé, Scavarda, and Scavarda 2016) and it has also been adopted to map the literature regarding other lean-related subjects (Andersen, Rovik, and Ingebrigtsen 2014; Gosling and Naim 2009; Hasle et al. 2012; Holden 2011; Moyano-Fuentes and Sacristán-Díaz 2012; Naim and Gosling 2011; Negrão, Godinho Filho, and Marodin 2017).

The research engine chosen for the present literature search was the ISI Web of Science, which covers the top journals not only in the field of general management but also health studies and engineering, hence avoiding a restrictive review of business studies. Brainstorming was used to select keywords related to lean. Subsequently, snowballing was used to add keywords to the search as they were found in a preliminary screening of the literature, resulting in the following list of search keywords: ‘lean management’, ‘lean manufacturing’, ‘lean system’, ‘lean production’, ‘lean suppl!”, ‘lean distribution’, ‘lean “sigma”,’ ‘lean IT’, ‘lean construction’, ‘lean service’, ‘lean health*care’, ‘lean design’, ‘lean thinking’, ‘lean culture’, ‘lean philosophy’, ‘lean implement”’ and ‘Toyota’. The final research string combined the above keywords list with the term cultur*. We have applied this research string on the topic field and the initial search brought up 359 articles.

The studies were then filtered according to a set of inclusion and exclusion criteria, as shown in the PRISMA flow diagram (Moher et al. 2009) presented in Figure 1. The first inclusion criterion filtered English-language papers published in peer-reviewed journals. Therefore, dissertations, books, unpublished working papers and conference papers were excluded. There was no criterion regarding initial date of publications, but the final date was Dec 2016. This reduced the sample to 235 articles.

The next step consisted of a quality assessment, where papers of journals with no impact factor (based on the Thomson Reuters listing) were also excluded, which downsized the sample to 115 articles. Following this, the in-depth examination of the abstracts
reduced the sample to 73 papers. The articles excluded at this point mentioned lean or Toyota or culture in the abstract as secondary issues (for example, mentioning the Toyota company but not its system) or even in a different meaning, such as one study about the agricultural sector. To avoid researcher bias (Thomé, Scavarda, and Scavarda 2016), the main author conducted in-depth analysis of the abstracts and the second author double-checked all the borderline cases.

The final step before the meta-synthesis was the full assessment of the 73 papers, which was conducted by the main author. First, the full assessment led to the additional exclusion of eight studies, thus leaving the final sample with 65 pertinent to our research topic. The exclusion criteria at this point consisted of articles (a) mentioning lean as a background for other main issues (three articles), such as technology implementation; (b) limiting the scope of lean to one of its techniques (three articles), such as ‘5S organizations’, ‘standardization’ or ‘six sigma’; and (c) articles with a mismatch between research design and data collection, which were excluded to avoid adding questionable empirical findings to the meta-synthesis (two articles). Then, the final sample of 65 articles was classified by the main author in terms of authors, titles, journals, years of publication, methodological and contextual classifications and major contributions (see Appendix 1 for details).

2.2. Data analysis

2.2.1. RQ1 framework

After conducting a longitudinal analysis of the empirical studies, we identified four different streams of lean studies. The first stream, here called lean transplantation, represents the transference of lean from an organisation which has this expertise to another which does not. The second stream consists of studies addressing organisations becoming lean by their own motivations and means and is here identified as the lean implementation stream. Some examples of quotes from the articles used to classification in this stream are ‘lean implementation was only in its beginning during this project’ (van Leijen-Zeeleberget et al. 2016) and ‘both Firms C and V seek to implement company-specific lean production systems in all their factories worldwide’ (Netland 2016). The third stream, here called lean continuity, concerns studies addressing the continuity of the system over time, discussing the challenges of sustaining its benefits across the years. Example of quotes from studies classified in this stream are ‘the introduction of lean production (in the company) in the 1980s…’ (Richardson et al. 2010) and ‘LP is deeply embedded in Scania’s organizational life.’ (Alpenberg and Scabroug 2016). There are also studies addressing both streams, such as van Dun and Wilderom 2016, who state that ‘The 25 teams had, on average, adopted lean for two years and four months. Two teams had practiced lean for more than seven years’. Parallel to the development of lean manufacturing, the fourth and last stream consists of lean service.

2.2.2. RQ2 framework

We have chosen Hofstede’s scales as the analytical framework to answer RQ2. As mentioned in Section 1.2, Hofstede, Hofstede, and Minkov (1991) analyses culture according to two levels, NC and OC. After conducting a large scale cross-national culture study (same company, multiple countries) (Hofstede 1980) and, a decade later, a large cross-organisational culture study (same country, multiple companies) (Hofstede, Hofstede, and Minkov 1991), Hofstede and colleagues propose five dimensions for the NC level and six dimensions for the OC level, as shown in Table 1. Although later versions of the model have added other dimensions, they will not be used in the present review, because they were not tested in Hofstede’s original large-scale studies.

Hofstede’s work has been criticised, particularly for the fact that its first research may be outdated (Fernandez et al. 1997; Kull et al. 2014). This review uses the framework as a tool for synthesising the literature since most of the studies in our sample mention Hofstede. The GLOBE framework was presented as an updated version of Hofstede’s work (House et al. 2004). Its proponents posit that because it uses the same dimensions to assess both NC and OC, these two dimensions thus become more comparable (Bortolotti, Boscarel, and Danese 2015; Jung et al. 2009). However, we believe that using GLOBE’s framework could restrain the synthesis and make the NC–OC classification ambiguous. Hence, we assume the two levels of culture to be two different phenomena and, supported by the widespread usage of Hofstede’s framework in the OM literature (Cagliano et al. 2011; Oudhuis and Olsson, 2015; Wiengarten et al. 2015), we confirm it as our analytical framework.

3. Meta-synthesis of the literature

This section presents a meta-synthesis (Denyer and Tranfield 2006; Thomé, Scavarda, and Scavarda 2016) of the 65 articles addressing the role of culture in lean organisations, published between 1994 and 2016. We provide a descriptive analysis of the sample, followed by a longitudinal discussion of the evolutionary streams of the empirical studies addressing culture in lean organisations (RQ1), and we finish with a detailed account of how the extant literature discusses NC and OC, and in what ways these levels relate to lean (RQ2).

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Figure 1. Study selection and evaluation.

Source: Based on the PRISMA flow diagram (Moher et al. 2009).
The descriptive analysis of the sample

The descriptive analysis in Table 2 shows the growing number of articles published per year and more specifically the growing number of empirical and quantitative studies. Moreover, there is a clear predominance of studies in the manufacturing sector, and as expected, the automotive sector is the most-studied sector, followed by aerospace and electronics. The service sector is present in 30% of the studies. The first service-focused study was published in 2004, and since then, their number has only increased, covering mainly healthcare, construction and distribution sectors.

The review shows that case study is the dominant research method amongst qualitative studies, including both single and multiple cases. Action research accounts for one-third of the service-sector studies. Within the quantitative studies, the survey is the only method used. The full list of the research method applied by each study is in Appendix 1.

Regarding the research outlets, while the literature seems scattered among journals (i.e. most journals are only represented by one paper and there is a maximum of four papers per journal), the three most representative subject areas are: business and management, engineering and decision sciences, accounting for 70% of the sample (see Figure 2).
3.2. RQ1: how has the literature addressing the role of culture in lean organisations evolved over time, and what are its identifiable trends?

The four different streams in the adoption of lean mentioned in Section 2.2.1 are following discussed. Figure 3 presents the distribution of the empirical articles through the years, in addition to providing information to answer RQ1, such as the culture level (NC, OC or both) and the research strategy (qualitative, quantitative or mixed) adopted by each study.

3.2.1. Stream 1: lean transplantation

We would expect to find that the first paper from the sample address the challenges of the transference of lean from a Japanese lean company to Japanese subsidiaries, acquisitions or joint ventures in the West. In this context, cultural differences, especially in NC, are highlighted as a major barrier for lean transplantation, often experiencing a range of inter-country conflicts. The first three empirical studies (dating from 1994 to 1996), are of Japanese transplants of lean to the US or Western Europe, followed by a transplant from the US to the UK, five years later.

Although recent scholarly attention has been focused on streams 2–4 (as discussed in the following), lean transplantation studies reappeared by 2013. Despite the 10-year gap between such studies, the fact that two longitudinal studies (James and Jones 2014; Mathew and Jones 2013) were followed by additional NC- and OC-focused transplantation studies indicates that this is still an unsettled issue. Two of these studies (Brunet-Thornton, Koža, and Bureš 2016; Oudhuis and Olsson 2015) investigate Japanese lean transplants to the West, as do studies from previous decades. The other two studies (Boscari, Danese, and Romano 2016; Zimmermann and Bollbach 2015) present a new context, where European organisations intend to transplant lean back to East Asia, China in particular. This clearly shows that lean has spread from East to West, and then within global organisations from headquarters to subsidiaries, up to the point that Western organisations now face the challenge of transplanting their adapted versions of lean to their Eastern subsidiaries.

3.2.2. Stream 2: lean implementation

These studies addressed Western organisations that struggle with internal resistance to implement lean. Most studies in the implementation stream are single-country studies and focus on OC aspects to explain success factors and constraints to implementation. Some studies also address both OC and NC levels, and only two focus exclusively on NC level: one of them shows that some dimensions of NC might explain different patterns in the adoption of specific lean practices (Cagliano et al. 2011) and the other study compares the degree of lean implementation in China and the US (Hofer et al. 2011).

3.2.3. Stream 3: lean continuity

Parallel to the implementation stream, the studies of the lean continuity stream initially addressed Japanese and other Eastern companies and focused on OC aspects, as expected, given their nationality proximity to the Japanese origin of lean. Western companies later also began to focus on achieving higher and sustained performance with lean adoption. Some of them addressed the expansion of lean beyond the shop floor (Fullerton, Kennedy, and Widener 2014; Jayamaha et al. 2014), i.e. incorporating other departments such as logistics, marketing, sales and accounting. Despite the predominance of OC-focused studies addressing lean continuity, as in the implementation stream, researchers also investigated the role of both the dimensions of NC and OC, some of them focusing more on the dimensions of OC and mentioning Japanese cultural traits as a background to their studies (Mehri 2006), some addressing the influence on lean of some dimensions of both levels of culture.
and OC (Pohl 2012; Shim and Steers 2012) and some investigating specifically the degree of influence of NC and OC on lean efficacy (Wiengarten et al. 2015). There is only one NC-focused study in this stream (Kull et al. 2014), and it investigates whether variation in NC dimensions influences lean effectiveness.

3.2.4. Stream 4: lean service
With the success in manufacturing, service sectors, such as construction, distribution and healthcare, have tried to implement lean. Some service-focused studies restrict lean implementation to specific divisions (Dickson et al. 2009; Smith et al. 2012; Zarbo et al. 2015). In these studies, lean is often considered a quality improvement tool rather than a holistic system, and is associated with terms such as ‘quality culture’, ‘continuous improvement culture’ and ‘safety culture’ (Harrison et al. 2016; Vest and Gamm 2009). Most service-focused studies highlight the cultural differences between manufacturing and service, emphasising the challenges of adapting lean to the service context (Condel, Sharbaugh, and Raab 2004; Pohl 2012). Consequently, all lean-service studies are OC-focused. Finally, it is important to note the recent growth of studies focused on the service sector, as indicated in Figure 3.

3.3. RQ2: how do specific dimensions of NC and OC influence lean organisations?
This section addresses the role of cultural aspects in lean organisations, in the following order: NC, OC and the interaction between the two.

3.3.1. NC level
The majority of NC-focused papers use Hofstede’s NC framework to some degree, whether making reference to his work (Graen and Hui 1996; Kull et al. 2014), or using some of his NC dimensions (Brunet-Thornton, Koža, and Bureš 2016; Oudhuis and Olsson 2015; Zimmermann and Bollbach 2015) or even adopting his full framework (Cagliano et al. 2011; Hofer et al. 2011; Rafferty and Tapsell 2001). Appendix 1 presents the level of adoption of Hofstede’s work by each study from the sample. We have matched the cultural traits discussed in the studies not based on Hofstede with his NC dimensions, as exemplified by the quotes in Table 3.

Table 3 also summarises the classification of each empirical article into the five NC dimensions, showing which ones are stated as Japanese cultural traits, as well as the studies’ conclusions regarding how each dimension impacts lean organisations. Positive impacts include performance improvements, such as delivery (on time and on demand), lead time, quality, productivity, customer satisfaction, number of workers to hours worked, floor space, takt time, environmental outcomes, inventory, cost, safety, cycle time, return on assets, overall profitability, market share and others. Negative impacts mainly include higher resistance to change and to sustaining changes among leadership and/or employees.

According to Hofstede, Hofstede, and Minkov (1991), Japanese culture shows a high level of collectivism and a low level of individualism, long-term orientation, strong uncertainty avoidance, masculinity and relatively large (boarder line) power distance, which corroborates the studies from the sample, as shown in Table 3. Notwithstanding this consensus, there is literature that presents opposing views on how certain NC dimensions effect on lean success, as will be detailed below.

A widely studied NC dimension is individualism/collectivism. According to most studies (five articles), high collectivism fosters lean, because lean practices are team-based and workers are expected to cooperate across organisational units or groups to maximise return to the company as a whole (Cagliano et al. 2011; Shim and Steers 2012; Wiengarten et al. 2015). Loyalty to the company (Botti 1995; James and Jones 2014) and devotion to work (James and Jones 2014; Mathew and Jones 2013; Oudhuis and Olsson 2015) are well known Japanese cultural traits related to collectivism, also mentioned by the researchers. Only one study, conducted in China, suggests the negative influence of collectivism on lean (Zimmermann and Bollbach 2015). The fact that Chinese collectivism relates to the family and not to the organisation, as in Japan, might explain this controversial finding. Other studies indicate that belonging to an individualistic or to a collectivistic culture does not have a significant impact (Kull et al. 2014; Netland 2016), denoting a divergent view.

Overall, studies addressing long-term orientation position this dimension as a Japanese cultural trait (Botti 1995; Brunet-Thornton, Koža, and Bureš 2016; James and Jones 2014) with a positive impact on lean (Boscari, Danese, and Romano 2016; Hofer et al. 2011; Pohl 2012; Shim and Steers 2012). The willingness to sacrifice short-term results for long-term success is a foundation of lean implementation (Boscari, Danese, and Romano 2016; Hofer et al. 2011). In addition, the long-term orientation benefits long-term relationships (with workers and suppliers), focusing on the long-term planning and development of both people and products (Hofer et al. 2011; Pohl 2012; Shim and Steers 2012). Against those findings and their own initial expectation, Kull et al. (2014) found that countries that value long-term orientation will struggle to achieve lean effectiveness. They suggest that making short incremental improvements and being responsive to current demand might make it harder for lean organisations to adopt a long-term perspective.

The extant literature identifies the Japanese cultural trait of high uncertainty avoidance as positive for lean success (five articles). The researchers emphasise the importance of reducing uncertainty to achieve stability, through advanced and systemic planning (James and Jones 2014; Kull et al. 2014; Mathew and Jones 2013; Shim and Steers 2012). Workers must be alert to potential problems, but new solutions must be tested and approved before being implemented, avoiding drastic changes (Kull et al. 2014; Shim and Steers 2012). Conversely, two groups of researchers found that uncertainty avoidance negatively affects lean, in that it hinders empowerment, as it leads to workers who prefer following order from superiors to making autonomous decisions (Cagliano et al. 2011; Hofer et al. 2011).

Although the extant literature addresses large power distance as a Japanese cultural trait (eight articles), most studies focus on its negative effects on lean success (six articles). According to these studies, restrictions from exposing problems and sharing opinions inhibits workers’ participation in problem solving and continuous improvement, which are two major lean principles. Multi-functional teams are also less likely to work properly since workers assume superiors know better and do not feel comfortable having different hierarchical levels working as a team (Cagliano
et al. 2011). The fear of losing face, which is the fear of bringing shame to their superiors and to their group, is also mentioned as a barrier to worker participation (Li et al. 2015; Oudhuis and Olsson 2015; Rafferty and Tapsell 2001). Opposing views state that hierarchy is part of lean culture and that it acts as a discipline engine, reinforcing compliance with procedures and is also a critical success factor to lean (Mathew and Jones 2013; Mehri 2006; Shim and Steers 2012). Obedience, for example, is specifically mentioned as positive for lean by Cagliano et al. (2011). Although they expected to find power distance as a negative moderator, Kull et al. (2014) found it to be insignificant in survey.

Some studies address the dimension of masculinity (six articles), another Japanese cultural trait present in lean organisations (Losonci, Demeter, and Jenei 2011; Mehri 2006). It is unanimously identified in its negative impact on lean practices, such as empowerment and functional teams (Cagliano et al. 2011). Feminine cultures seem to better handle autonomy and job rotation, both essential to lean success. Two studies conducted in India (James and Jones 2014; Mathew and Jones 2013) mention the difficulty workers have in dealing with certain tasks considered by them to be women’s work, such as keeping the work area clean, as a result of the different roles for men and women found in masculinity. The aspect of assertiveness in the masculinity dimension also seems to reduce lean effectiveness, because aggressive and confrontational behaviors hinder workers’ cooperation in problem detection and solving and inhibiting the development of cooperative ties among workers and supervisors (Kull et al. 2014).

3.3.2. OC level
In contrast to the wide application of Hofstede’s NC scale amongst our studies, we did not find papers employing Hofstede’s full OC scale, although all studies mention cultural traits that can be considered equivalent to at least one of Hofstede’s dimensions of OC. Only two studies use Hofstede’s exact terms of process orientation (Pereira, Ro, and Liker 2014) and employee orientation (Bhasin 2012). In all other cases, the cultural traits identified in lean organisations were matched to Hofstede’s OC model to synthesise the OC dimensions into one framework. Table 4 synthesise the classification of the empirical articles from the sample, indicating exemplary quotes from the articles.

Table 4 shows there is clear consensus regarding the tight vs. loose control dimension, where strict control is emphasised as a lean trait in 24 articles, with no article suggesting otherwise. These studies underline the relevance of monitoring and controlling quality and practices during lean implementation (12 articles) and continuity (seven articles), where measurement is valued by both leaders and staff (Goodridge et al. 2015). Researchers are also alert to the fact that lean requires an organisation to have specific performance metrics and reward systems in place (Fullerton, Kennedy, and Widener 2014; Martínez-Jurado, Moyano-Fuentes, and Gómez 2014; Netland 2016; Wang 2008). Additionally, the importance of a waste-reduction mindset is highlighted as an element of both lean and a tight control approach (six articles). It should be noted that there some criticisms to the above lean aspects, such as Mulholland and Stewart (2014), who advocate that lean leads to workers being monitored on a full time basis, eventually in an oppressive way.

Employee-oriented elements (26 articles) are characterised as those showing the importance of the corporate value ‘for an organization to prosper, employees must prosper’ (Botti 1995). Examples include fostering leadership and people commitment and participation (16 articles), promoting workers’ belief in the importance of lean implementation (Boscari, Danese, and Romano 2016; Goodridge et al. 2015; Losonci, Demeter, and Jenei 2011; Martínez-Jurado, Moyano-Fuentes, and Gómez 2014), improving the work environment and work-life balance (Alpenberg and Scarbrough 2016; Dora, Kumar, and Gellynck 2016; Martínez-Jurado, Moyano-Fuentes, and Gómez 2013), involving workers in the problem-solving and decision-making process (14 articles) and creating a safe environment for staff member to offer ideas, where workers’ opinions and proposals are taken into consideration (Bortolotti, Boscari, and Danese 2015; Dora, Kumar, and Gellynck 2016; Goodridge et al. 2015; Martínez-Jurado, Moyano-Fuentes, and Gómez 2014). Additionally, respecting employees (Bortolotti, Boscari, and Danese 2015; Dora, Kumar, and Gellynck 2016; Hung et al. 2015; Jayamaha et al. 2014) and supporting opportunities for their personal growth (Pereira, Ro, and Liker 2014; Smith et al. 2012) were also emphasised. Additionally, the extensive literature notes significant training efforts (23 articles) for developing a continuous-learning organisation (six articles). The training concerns both managers and employees and regards

Table 3. NC Dimensions and their impact on lean organisations.

<table>
<thead>
<tr>
<th>Hofstede's NC Dimensions</th>
<th>Japanese cultural traits</th>
<th>Effects on lean success</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Collectivism</strong></td>
<td>3, 7, 13, 29, 46, 48</td>
<td>Positive 23, 29, 33, 40, 48, Negative 45, Insignificant 39, 60</td>
</tr>
<tr>
<td><strong>Exemplary quote:</strong> ‘The concepts of loyalty and identification with the company are stressed in Japanese systems’ – James and Jones (2014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Long-term orientation</strong></td>
<td>3, 40, 56</td>
<td>Positive 25, 28, 29, 57, Negative 39 –</td>
</tr>
<tr>
<td><strong>Strong uncertainty avoidance</strong></td>
<td>7, 29, 46, 56</td>
<td>Positive 29, 33, 39, 40, 45, Negative 23, 25 –</td>
</tr>
<tr>
<td><strong>Large power distance</strong></td>
<td>1, 7, 13, 23, 29, 46, 47, 56</td>
<td>Positive 13, 29, 33, Negative 23, 25, 40, 45, 47, 57, Insignificant 39</td>
</tr>
<tr>
<td><strong>Masculinity</strong></td>
<td>13, 24</td>
<td>Insignificant 23, 33, 39, 40 –</td>
</tr>
<tr>
<td><strong>Exemplary quote:</strong> ‘In observing the role of women… I also saw how women are coerced into traditional gender roles.’ – Mehri (2006)</td>
<td></td>
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both lean culture and tools (17 articles) as well as the development of a multi-skilled flexible workforce (Boscari, Danese, and Romano 2016; Lee–Mortimer 2006, 2008; Losonci, Demeter, and Jenei 2011; Martínez-Jurado, Moyano-Fuentes, and Gómez 2014). Adopting joint and agreed-upon negotiation with unionisation (Dora, Kumar, and Gellynck 2016; Martínez-Jurado and Moyano-Fuentes 2014; Martínez-Jurado, Moyano-Fuentes, and Gómez 2014) may also contribute to the building of a lean environment and characterise an employee-oriented approach.

However, despite the significant requirement for workers’ development and participation and any effort towards its achievement, Richardson et al. (2010) identify a relevant gap between what workers want and what they get. Three studies put forward opposing views, suggesting that lean organisations produce high pressure to perform at the expense of the workers’ wellbeing, which implies a job-oriented culture. These latter studies find that lean reduces worker autonomy, creativity, innovation and professional skills, allowing exposure to dangerous conditions, accident cover-ups, excessive overtime and poor quality of life for the workers (Cutcher-Gershfenfeld et al. 1994; Mehri 2006; Mulholland and Stewart 2014).

Studies suggest that lean organisations adopt a professional, not a parochial approach (eight studies), covering mainly elements of a long-term view, such as long-term corrective actions (Bhasin 2012; Lee–Mortimer 2006; Shim and Steers 2012) and the practice of elimination of root causes (Condel, Sharbaugh, and Raab 2004; Goodridge et al. 2015; Jayamaha et al. 2014; Smith et al. 2012). In the opposition, Mehri (2006) suggests that there is social control within lean organisations and a competitive environment between divisions, both typical elements of a parochial culture. Surprisingly, no study refers to hiring criteria or discussion of the identity of an employee being determined by his profession, both important elements of the professional vs. parochial dimension of OC, according to Hofstede (1998).

Most studies highlight the benefits of adopting an open system approach (32 articles) and discuss the importance of a wide-shared vision and corporate goals (Goodridge et al. 2015; Netland 2016; Zarbo et al. 2015), intensive training for socialising workers into the new culture (Boscari, Danese, and Romano 2016; Goodridge et al. 2015; Harrison et al. 2016; Martínez-Jurado, Moyano-Fuentes, and Gómez 2014; Rothenberg 2003) and transparency and integration within and outside the organisation (18 articles). The importance of having tools, jobs and processes clearly understood (Glover et al. 2015; Goodridge et al. 2015; Jayamaha et al. 2014; Martínez-Jurado, Moyano-Fuentes, and Gómez 2013) as well as an overall mindset of making things simple (Pereira, Ro, and Liker 2014) is also noted. A hands-on management style is emphasised, leading to the proximity of management to day-to-day activities (Goodridge et al. 2015; Jayamaha et al. 2014; Losonci, Demeter, and Jenei 2011; Martínez-Jurado, Moyano-Fuentes, and Gómez 2014; Rothenberg 2003; Zarbo et al. 2015) and knowledge and information sharing (Boscari, Danese, and Romano 2016; van Dun and Wilderom 2016; Hung et al. 2015; Jayamaha et al. 2014). Visual management (nine articles), another well-known lean principle, and effective communication (14 articles), also widely addressed in the lean literature, are closely related to the open system culture and are indicated as critical to lean success. Similarly to the previous dimension of professional vs. parochial, the only antagonistic view regarding lean as an open system is put forward by Mehri (2006). He suggests that...
management refusal to share information and a posture among production engineers of always remaining guarded are elements of a lean culture, which would denote a closed-system approach.

It is important to notice that conflicting views on the above OC dimensions are raised solely by three studies (Cutcher-Gershenfeld et al. 1994; Mehri 2006; Mulholland and Stewart 2014), which criticise not only these dimensions, but the lean system as a whole. In the following, we will discuss the two dimensions where there is less consensus on how they correlate with lean.

The literature offers conflicting evidence on the dimension process vs. result orientation. Half of the articles find lean closely related to a process-oriented approach (14 articles), while the other half indicate a result orientation in lean organisations (13 articles). Pereira, Ro, and Liker (2014) and Shim and Steers (2012) associate lean with an active risk-reduction strategy, denoting a process-oriented culture, while for Bhasin (2012), lean puts people in maximal levels of effort, which is a trace of a result-oriented approach. Various studies indicate that process standardisation is a key element of lean (14 articles), but Lee-Mortimer (2008) and Hung et al. (2015) hold that, despite standardisation, routines within lean organisations bring new challenges each day (a result-oriented element). Therefore, process innovation and flexibility are key to adapting to these unforeseen challenges. Moreover, flexibility relates to the logic of continuous improvement, a core lean principle, often mentioned by the studies examined in this review (12 articles). The conflicting view is also present within certain studies, which identify both aspects in lean organisations (eight articles). In such studies, workers follow narrow plans and standard practices but are also pushed to reach higher levels of productivity in short periods of time without the establishment of new procedures. Hence, there are conflicting findings regarding on whether standardisation or flexibility should be adopted to maximise lean success.

The fifth and last dimension is the normative vs. pragmatic. Some studies highlight cultural traits that point to a normative approach (11 articles), such as valuing correctly following organisational procedures more highly than results (Pereira, Ro, and Liker 2014), emphasis on strong discipline (Mulholland and Stewart 2014; Netland 2016; Zarbo et al. 2015) and standardisation or control (Leijen-Zeeleem berg et al., 2016; Sage, Dainty, and Brookes 2012). Ethics, justice, honesty and trust, additional elements of the normative approach, were as well mentioned as critical factors within the OC to ensure lean readiness (Botti 1995; van Dun and Wilderom 2016; Li et al. 2015; Pereira, Ro, and Liker 2014; Rothenberg 2003; Sage, Dainty, and Brookes 2012; Shokri, Waring, and Nabhani 2016). By contrast, customer orientation (five articles) suggests that the pragmatic approach is preferable, especially because of the major emphasis on satisfying customer needs. Therefore, the extant literature shows divergent views on these last two dimensions, i.e. normative vs. pragmatic and process vs. result orientation.

The papers we reviewed also indicate other success factors, such as teamwork, leadership support and the adoption of a change management strategy to overcome resistance and sustain results, but we see these as best practices for any strategy implementation, such as balanced scorecard and customer relationship management, not particularly for lean.

3.3.3 Interaction between NC and OC dimensions

Eleven articles from the sample mention aspects of both NC and OC, but only one study specifically investigates the relationship between the two cultural levels. Wiengarten et al. (2015) compare the dimension of national collectivism (individualism index [IDV]) proposed by Hofstede, Hofstede, and Minkov (1991) with organisational collectivism, which was based on the sub-dimensions of widely shared vision, employee involvement and employee training and education. Taking for granted that Japanese culture ranks high in collectivism, Wiengarten et al. (2015) investigate whether low collectivism at the national level can be compensated for at the organisational level. They propose national collectivism as the dominant force moderating performance and, therefore, posit that its potential disadvantages cannot be fully counterbalanced by high levels of organisational collectivism. It is important to note that the low IDV range amongst the participant countries in this study may compromise its conclusions. While Hofstede’s rank ranges from index numbers 6–91 (Hofstede, Hofstede, and Minkov 1991), their survey considers only countries ranging from 70 to 91. Additionally, the fact that their study was focused on small to medium-sized enterprises might have also influenced the results.

4. Conclusions

Overall, our review classifies research on lean and culture according to (i) four identified streams, namely lean transplanation, lean implementation, lean continuity and lean expansion to non-manufacturing organisations, (ii) methodological approaches (qualitative or quantitative; single- or multi-country studies) and (iii) cultural levels (NC, OC or both).

4.1. Theoretical contributions

Despite the extant research on lean, while this review indicates some level of consensus, there still remain unanswered questions. On the one hand, recent studies examine the success of lean in different countries and industry sectors, leaving no doubt about its transferability. On the other hand, researchers still seem to be struggling to understand the impact on lean of specific dimensions of cultural levels (NC and OC). Surprisingly, our review shows no difference between dimensions across all streams, as presented in Table 5 below.

Our review highlights some relevant cultural idiosyncrasies regarding the impact of NC onto lean organisations. Although the extant literature has identified strong uncertainty avoidance, high collectivism and long-term orientation as positive for lean among dimensions of NC, it is intriguing that other Japanese cultural traits are found to inhibit lean implementation and continuity. One example is the consensus among the studies from the sample about the negative impact of masculinity on lean. The fact that only three studies have addressed this dimension and none of them deeply discussed how organisations can cope with a high masculinity culture indicates a significant gap in the literature that needs further investigation.

Another NC dimension identified as somewhat contradictory to Japanese culture is large power distance. In this case, the researchers referred to different aspects of the same dimension. On the one hand, some studies found high power distance as positive to lean.
focused on the fact that the leadership is highly respected and represents a symbol of security and stability. On the other hand, the majority of studies highlight the negative impact of a large power distance culture considering it might hinder willingness of workers to express disagreement with their leaders, therefore restricting workers’ participation in problem solving and continuous improvement. Therefore, it seems that this particular dimension combines sub-dimensions that can both foster and hinder lean, leading to another paradox regarding culture and lean.

Another significant research gap is the lack of service-focused studies exploring the NC level. The fact that all service-focused studies from the sample are single-country studies restricts the discussion of the NC level. Furthermore, service organisations are rarely global hence it is difficult to conduct NC-focused studies in the service industry.

Regarding the OC level, we show that tight control, employee-oriented, professional and open system approaches seem to align with lean. Exceptions relate to a few articles that present a more critical view of the impact of lean onto workers’ well-being. Interestingly, such articles are mostly from subject areas other than OM. Moreover, the lack of consensus regarding the dimensions of process vs. result orientation and normative vs. pragmatic approach seems to reflect a paradox. It is important to note that most studies ‘pick one side’ of this two OC dimension and few acknowledge an actual paradox, i.e. a system that is simultaneously standardised but flexible and that focuses on both procedures and customers.

In terms of the NC and OC interactions, only one study analyses their joint influence (Wiengarten et al. 2015), suggesting a predominance of NC over OC, but restricted to collectivism traits, such as integration into cohesive groups, widely shared vision, employee involvement and employee training and education. Moreover, the fact that that study is conducted in countries with a similar degree of collectivism can be questioned. Most importantly, it is surprising to note the lack of lean studies studying NC and OC interactions, despite the fact that the broader literature on culture emphasises the importance of these two levels, as well as their differences.

**4.2. Managerial contributions**

Regarding the NC level, organisations located in countries culturally similar to Japan should not assume that it will be easy to implement lean, just as organisations in countries different from Japan should not relinquish the idea of implementing it. Organisations in regions such as North and Northeast Europe and Anglo countries will face higher barriers in implementing and sustaining lean because their culture present high individualism and low uncertainty avoidance. Latin America, African and Arabic speaking countries might face barriers was well, considering a predominant culture of high power distance, low uncertainty avoidance and a short-term orientation. Conversely, organisations located in regions such South and Central Europe, the former Soviet Union countries and part of Asia will find a fertile soil for lean. They tend to have a culture of high uncertainty avoidance and relatively low masculinity and low individualism. Although no single region or country represents full alignment with the NC traits identified as positive to lean, countries such as Spain and Slovenia are surprisingly fit for lean, as well as South Korea, which has a culture similar to Japan but with much lower masculinity. Figure 4 shows those countries’ scores in each NC dimension, according to Hofstede updated survey (Hofstede 2017).

Regarding the OC level, our review shows a clear orientation for three dimensions and a paradox for the remaining two. To cope with such paradoxes is challenging, hence the high number of unsuccessful lean implementation cases. Nevertheless, managers should recognise pre-existing cultural influences and be perseverant in adopting practices that will slowly (re)shape the organisation’s culture.

Hence, it is fair to conclude that, although organisations should recognise which NC traits support lean adoption, they should also understand that there is limited room for managerial action in NC. However, there are also dimensions of OC that can be positive for the success of lean, and OC is dependent on a set of decisions at managerial discretion. In other words, an adequate mix of dimensions of OC may eventually counterbalance the negative effects of NC dimensions that could hinder lean adoption.

**4.3. Limitations**

There are three limitations in this study worth discussing. First, one may argue that the distinction between NC and OC may be hard to define. Nevertheless, we believe the decision to maintain this distinction allowed us to be more inclusive than exclusive,
4.4. Future research

This review underlines a number of paradoxes regarding the relationship of culture and lean, which deserve further investigation. Firstly, as the extant literature acknowledges that two major traces of the Japanese culture hinder lean implementation, namely high masculinity and high power distance, future studies could clarify how successful lean organisations in Japan have can outweigh such cultural traits, that is to say, what other cultural traits at both NC and OC levels can counterbalance the negative impact of high masculinity and high power distance onto lean. Additionally, the dimension of power distance deserves further attention, as it seems that one its sub-dimensions may actually drive lean: respected leadership as a symbol of security and stability, representing a paradox in itself.

Secondly, expanding on the previous research gap, as no country possess the perfect match of NC dimensions that are positive to lean, all organisation will face NC barriers to some extent when implementing lean. As the OC is portrayed as the level where there is managerial discretion, a broader investigation of the interactions between NC and OC in different countries could clarify the extent to which the latter can actually overcome the former. Such a study would help organisations to (a) identify the NC dimensions that hinder lean and (b) explore the OC dimensions that can counter-balance NC barriers.

Thirdly, the fact that all studies looking at the service sector were restricted to the OC level constitutes another significant research gap. A multi-country study looking at the impact of NC on lean service organisations could unveil the idiosyncrasies of this relationship when lean is applied to services.

Finally, the contradictory views regarding two specific OC dimensions (namely process vs. results & normative vs. pragmatic orientations) highlight a relevant research gap. More specifically, although these dimensions seem to represent a paradox rather than a trade-off, i.e. organisations should excel in both sides simultaneously, instead of making a choice; the extant literature does not yet recognise such paradox, meaning that most studies indicate either one side or the other as fit for lean. Besides investigating whether organisations that master the paradox are able to out-perform others regarding lean, future research should also help managers to understand how such balance can actually be achieved.

Note

1. ‘GLOBE is a research project developed by a group of social scientists and management scholars worldwide to define a culture measurement model’ (House et al. 2004).

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References
# Appendix 1. Classification of papers in the systematic literature review

<table>
<thead>
<tr>
<th>Id #</th>
<th>Authors</th>
<th>Year</th>
<th>Research method</th>
<th>Industry sector</th>
<th>Country</th>
<th>NC/OC</th>
<th>Culture framework</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cutcher-gershenfeld, J. et al.</td>
<td>1994</td>
<td>Multi-Case Study</td>
<td>Manuf – Multi-sector</td>
<td>USA</td>
<td>Both</td>
<td>Other/no framework reference</td>
<td>A large-scale study of the cross-cultural diffusion of U.S. and Japanese work practices shows the mixing of transplanted best in class work practices with host country’s practices. Type of product, technology, layout, organisational structure and culture are critical in the choosing a system and there are trade-offs involved</td>
</tr>
<tr>
<td>2</td>
<td>Hoogvelt, A.; Yuasa, M.</td>
<td>1994</td>
<td>Theoretical</td>
<td>Not specified</td>
<td>–</td>
<td>NC</td>
<td>Other/no framework reference</td>
<td>Lean included a variety of Japanese cultural and social values, such as 'loyalty', 'collectivism' and most importantly, the Japanese sense of self and the fear of losing face. Lean only works with long-term commercial relationships and implicit contracts based on mutual trust and unspoken understandings, as in Japan</td>
</tr>
<tr>
<td>3</td>
<td>Botti, H. F.</td>
<td>1995</td>
<td>Single Case Study</td>
<td>Manuf – Clothing</td>
<td>Italy</td>
<td>Both</td>
<td>Other/no framework reference</td>
<td>The study about a Japanese company struggling to implement the Japanese model in Italy denotes that differences in NC and OC might lead to asymmetric expectations and compromise implementation. A change strategy helps to overcome the barriers and the success of implementation is measured by examining the trust relations</td>
</tr>
<tr>
<td>4</td>
<td>Graen, G.; Hui, C.</td>
<td>1996</td>
<td>Action Research</td>
<td>Manuf – others</td>
<td>Japan</td>
<td>NC</td>
<td>Reference to Hofstede's work</td>
<td>In cross-cultural partnership building, parties from both cultures need to work together to create a third culture which a new way of thinking about and doing things which are compatible with each of the original cultures and works effectively with the technology of the organisation</td>
</tr>
<tr>
<td>5</td>
<td>Whiston, T. G.</td>
<td>1997</td>
<td>Theoretical</td>
<td>Manuf &amp; Service</td>
<td>USA</td>
<td>–</td>
<td>OC</td>
<td>Other/no framework reference</td>
</tr>
<tr>
<td>6</td>
<td>Power, D. J.; Sohal, A. S.</td>
<td>1997</td>
<td>Literature Review</td>
<td>Not specified</td>
<td>–</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>The central role of the human variable to the success of a lean operation, coupled with the stresses that are created within the organisation for changes in management style and structure, emphasise that these are issues that are of critical importance when implementing and operating lean</td>
</tr>
<tr>
<td>7</td>
<td>Rafferty, J.; Tapsell, J.</td>
<td>2001</td>
<td>Single Case Study</td>
<td>Manuf – others</td>
<td>UK</td>
<td>NC</td>
<td>Hofstede's model</td>
<td>Cultural influences are a significant constraint in the successful implementation of teams; the adoption of both lean production and self-managed team conjoint implementation has proved less successful. Lean reflects the hierarchical nature of Japanese culture, while self-managed work teams emphasises autonomy and independence in decision-making</td>
</tr>
<tr>
<td>8</td>
<td>Green, S. A.; May, S. C.</td>
<td>2003</td>
<td>Theoretical</td>
<td>Service – Construction</td>
<td>–</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Lean construction, as other management ideas embraced by re-engineering, are attractive to this industry because it reflects and reinforces the existing dominant competitive thinking. But it serves only to justify the shift towards bogus labor-only subcontracting and the associated reduction of employment rights</td>
</tr>
<tr>
<td>9</td>
<td>Rothenberg, S.</td>
<td>2003</td>
<td>Single Case Study</td>
<td>Manuf – Automotive</td>
<td>USA</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>The no lay-off policy and other cultural artifacts supported an environment of greater trust. The culture of collaboration and trust increased the social capital in the organisation, which supported worker participation in environmental initiatives and other performance areas</td>
</tr>
<tr>
<td>No.</td>
<td>Authors</td>
<td>Year</td>
<td>Methodology</td>
<td>Sector</td>
<td>Country</td>
<td>Culture</td>
<td>Lean Principles Adaptation</td>
<td>Notes</td>
</tr>
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<tr>
<td>10</td>
<td>Condel, J. L.; Sharbaugh, D. T.; Haab, S. S.</td>
<td>2004</td>
<td>Action Research</td>
<td>Service – Healthcare</td>
<td>USA</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>There are resistances to lean implementation, especially because of its origin in manufacturing industry. But a change strategy may consist of understanding lean as a long-term commitment and empowering staff in problem solving to meet customer demands.</td>
</tr>
<tr>
<td>11</td>
<td>Liker, J. K.; Morgan, J. M.</td>
<td>2006</td>
<td>Theoretical</td>
<td>Service – Multi-sector</td>
<td>–</td>
<td>Both</td>
<td>Other/no framework reference</td>
<td>Toyota faced the challenge of spreading the unique blend of Toyota and Japanese culture to different cultures and sectors. The way is to try to deeply understand the lean principles, what it means to become a lean learning organisation and the hard work required to build such a culture piece by piece over many years.</td>
</tr>
<tr>
<td>12</td>
<td>Lee-Mortimer, A.</td>
<td>2006</td>
<td>Single Case Study</td>
<td>Manuf – others</td>
<td>UK</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>A lean implementation journey brought up some new problems but management team realised that the problems had to be identified and fully resolved, with instant support and management visual charts, which proved much more efficient in problems identification and continuous improvement.</td>
</tr>
<tr>
<td>13</td>
<td>Mehri, D.</td>
<td>2006</td>
<td>Ethnographic study</td>
<td>Manuf – Automotive</td>
<td>Japan</td>
<td>Both</td>
<td>Other/no framework reference</td>
<td>Fundamental elements of lean culture are missed by Western observers, such as the human costs behind high productivity and profitability achievement. There is a culture of rules in Japanese companies which covers newcomers training, what is observed and learnt on daily basis and what is known after many years living in Japan for many years.</td>
</tr>
<tr>
<td>14</td>
<td>Lee-Mortimer, A.</td>
<td>2008</td>
<td>Single Case Study</td>
<td>Manuf – others</td>
<td>UK</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Learning lessons from previous lean implementation experiences made a company’s adoption of additional lean tool to be phased, combined with broad involvement, widespread training and the addressing of cultural issues.</td>
</tr>
<tr>
<td>15</td>
<td>Wang, B.</td>
<td>2008</td>
<td>Single Case Study</td>
<td>Manuf – Optic</td>
<td>China, Taiwan, Philippines</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Lean implementation yielded positive results in all three locations studied but differences in results were caused by differences in the stability of the manufacturing process, in the support from executive managers and in the quality and solidarity of the employees.</td>
</tr>
<tr>
<td>16</td>
<td>Green, S. D.; Harty, C.; Elmualim, A. A.; Larsen, G. D.; Kao, C. C.</td>
<td>2008</td>
<td>Theoretical</td>
<td>Service – Construction</td>
<td>–</td>
<td>Both</td>
<td>Other/no framework reference</td>
<td>NC perspective relates to UK policies enforcing the discourse of competitiveness. Lean construction and other ‘improvement recipes’ may be rational for individual firms (OC), but the systemic effect across the sector is very harmful. Currently, important counter-discourses promote the ideas of sustainability and corporate social responsibility.</td>
</tr>
<tr>
<td>17</td>
<td>Dickson, E. W.; Anguelov, Z.; Vetterick, D.; Eller, A.; Singh, S.</td>
<td>2009</td>
<td>Multi-Case Study</td>
<td>Service – Healthcare</td>
<td>Not specified</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Lean principles adapted to the local culture of care delivery can lead to cultural changes and sustainable improvements in healthcare. These improvements are not universal and are affected by leadership and frontline workforce engagement.</td>
</tr>
<tr>
<td>18</td>
<td>Vest, J. R.; Gamm, L. D.</td>
<td>2009</td>
<td>Literature Review</td>
<td>Service – Healthcare</td>
<td>USA</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>This review identified that, while the examined transformations advocate a cultural change, few of the reviewed studies examined indicators resembling OC. And, despite the positive features stated by the studies, the vast majority had methodological limitations that might undermine the validity of the results.</td>
</tr>
<tr>
<td>19</td>
<td>Yamamoto, Y.; Bellgran, M.</td>
<td>2010</td>
<td>Action Research</td>
<td>Manuf – others</td>
<td>Sweden</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>A practical way of conducting a lean transformation, which requires an organisational cultural change, consists of creating the need for improvement, letting problems come to surface and involving people in solutions and the learning process. Institutionalising the new mindset depends on the leadership/management and people commitment.</td>
</tr>
<tr>
<td>Id #</td>
<td>Authors</td>
<td>Year</td>
<td>Research method</td>
<td>Industry sector</td>
<td>Country</td>
<td>NC/OC</td>
<td>Culture framework</td>
<td>Contribution</td>
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<tr>
<td>20</td>
<td>Saurin, T. A.; Ribeiro, J. L.; Marodin, G. A.</td>
<td>2010</td>
<td>Case Study + Survey</td>
<td>Manuf &amp; Service</td>
<td>Brazil USA Mexico</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Deeply understanding the lean culture is the most cited interest of managers when discussing lean. The major barriers to implementation are difficulties to adapt lean principles to each firm culture and context and put them into practice, added to major resistance to change among all organisational levels.</td>
</tr>
<tr>
<td>21</td>
<td>Richardson, M.; Danford, A.; Stewart, F.; Puligiano, V.</td>
<td>2010</td>
<td>Case Study + Survey</td>
<td>Manuf – Automobile and Aerospace</td>
<td>Italy UK</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Lean and high-commitment work regimes in both the Italian and the UK cases have failed to deliver effective voice mechanisms despite the desire, expressed by employees, for greater direct and indirect influence over workplace issues. Results from this study suggest that despite the efforts, the gap between what workers want and what they get is considerable. Patient care usually improve after lean implementation. Although the effects of Lean on employees were rarely discussed or measured systematically, there were some indications of positive effects on employees and on organisational culture.</td>
</tr>
<tr>
<td>22</td>
<td>Holden, R. J.</td>
<td>2011</td>
<td>Literature Review</td>
<td>Service – Healthcare</td>
<td>–</td>
<td>Not spec.</td>
<td>Other/no framework reference</td>
<td>Both NC dimensions and economic development play a significant role in the adoption of lean practices. There is not a clear dominance of one dimension over the other, but NC appears to be more important overall. The practices are positively correlated with each other; thus suggesting frequent joint adoptions.</td>
</tr>
<tr>
<td>23</td>
<td>Cagiano, R.; Caniato, F.; Golini, R.; Longoni, A.; Micelotta, E.</td>
<td>2011</td>
<td>Survey – 2nd db</td>
<td>Manuf – others</td>
<td>Multi-country</td>
<td>NC</td>
<td>Hofstede's model</td>
<td>Belief, commitment, work method and communication have a direct effect on workers’ perceptions regarding the lean success. In moderate change workers perceive work method and commitment as main success factors, conversely to communication and belief in radical change context. Study shows that lean does not soften gender segregation and hierarchy present in the organisation.</td>
</tr>
<tr>
<td>24</td>
<td>Losonci, D.; Demeter K.; Jenei, I</td>
<td>2011</td>
<td>Case Study + Survey</td>
<td>Manuf – Automotive</td>
<td>Hungary</td>
<td>Both</td>
<td>Reference to Hofstede's work</td>
<td>First, lean practices have been adopted in China to a greater extent than in the US. Second, the rate of adoption seems to be fairly comparable across different industries. And third that, while several economic factors function as enablers for the implementation of these practices, various social processes and cultural traits in China still hinder the full adoption of lean production.</td>
</tr>
<tr>
<td>25</td>
<td>Hofer, A. R.; Hofer, C.; Eroglu, C.; Wallet, M. A.</td>
<td>2011</td>
<td>Survey – 1st db</td>
<td>Manuf – multi-sector</td>
<td>USA China</td>
<td>NC</td>
<td>Hofstede's model</td>
<td>Implementing a lean approach implies never losing sight of what the customer wants, knowing that lean transformation is an ongoing commitment by all leadership and staff members and that each one contributions are encouraged and respected.</td>
</tr>
<tr>
<td>26</td>
<td>Kruskal, J. B.; Reedy, A.; Pascal, L.; Rosen, M. P.; Boiselle, F. M.</td>
<td>2012</td>
<td>Theoretical</td>
<td>Service – Healthcare</td>
<td>–</td>
<td>Not spec.</td>
<td>Other/no framework reference</td>
<td>A successful implementation requires a systematic and controlled change strategy and every company needs to find its own way to implement lean – a never-ending journey. The articles identify the major motives to lean adoption, the firm’s aspirations with lean implementation, the impact on individuals and the performance of lean.</td>
</tr>
<tr>
<td>27</td>
<td>Bhasin, S.</td>
<td>2012</td>
<td>Case Study + Survey</td>
<td>Manuf – others</td>
<td>UK</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Despite opposing views, the study shows that Japanese continuous improvement culture might support radical innovations and highlights the NC and OC traits accountable: intensified knowledge development, gradual supplier involvement and parallel pursuit of alternative product concepts and close attention to early users/customers’ demand.</td>
</tr>
<tr>
<td>Id</td>
<td>Authors</td>
<td>Year</td>
<td>Case Study Type</td>
<td>Industry Sector</td>
<td>Country</td>
<td>Culture Framework</td>
<td>Service – Healthcare</td>
<td>Ref.</td>
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<tr>
<td>29</td>
<td>Shim, W. S.; Steers, R. M.</td>
<td>2012</td>
<td>Case Study</td>
<td>Manuf – Automotive</td>
<td>Japan, Korea</td>
<td>Both</td>
<td>GLOBE model; reference to Hofstede's work</td>
<td>Findings suggest that the success of both Toyota &amp; Hyundai has been based on different NCs and leadership styles which helped create and sustain different OCS. At Toyota, the culture reinforced efforts aimed at systematising operations and minimising and mitigating uncertainty. And the Japanese tend to favor a culture characterised by risk avoidance and commitment to the larger family and society as opposed to the American tendency to control risk and focus on an individual's success or failures. The study found a decrease in process-dependent near-miss events, although the frequency of operator-dependent near-miss events did not significantly improve. While lean implementation is supposed to represent a wide structural OC change, when put into practice, it is translated (and transformed), being limited to a waste elimination effort or, at the most, to industrial partnering and knowledge sharing initiatives. OC change is possible through worker participation in process improvement. The main elements for achieving both motivation and participation have proved to be training, teamwork and recognition. The adoption of lean also implies a change in management mentality. The article argues that the adoption of lean system has brought high pressure on workers, who are supposedly paying for the increase in productivity through reduced earnings, minimal workplace autonomy and an unprecedented increase in the pace of work (without being accompanied by smarter working practices). Firms still struggled to adapt Toyota product development practices because differences in OC. Toyota adopt an active risk reduction strategy, involves workers in decision-making processes; possesses deep technical competency, use extensive visual communication, appears to be more process-oriented and trusts its suppliers.</td>
</tr>
<tr>
<td>30</td>
<td>Smith, M. L.; Wilkerson, T.; Gryzbicki, D. M.; Raab, S. S.</td>
<td>2012</td>
<td>Action Research</td>
<td>Service – Healthcare</td>
<td>Not specified</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Through culture change and implementation of specific work process changes, lean implementation may improve pathology patient safety. The study found a decrease in process-dependent near-miss events, although the frequency of operator-dependent near-miss events did not significantly improve. While lean implementation is supposed to represent a wide structural OC change, when put into practice, it is translated (and transformed), being limited to a waste elimination effort or, at the most, to industrial partnering and knowledge sharing initiatives. OC change is possible through worker participation in process improvement. The main elements for achieving both motivation and participation have proved to be training, teamwork and recognition. The adoption of lean also implies a change in management mentality. The article argues that the adoption of lean system has brought high pressure on workers, who are supposedly paying for the increase in productivity through reduced earnings, minimal workplace autonomy and an unprecedented increase in the pace of work (without being accompanied by smarter working practices). Firms still struggled to adapt Toyota product development practices because differences in OC. Toyota adopt an active risk reduction strategy, involves workers in decision-making processes; possesses deep technical competency, use extensive visual communication, appears to be more process-oriented and trusts its suppliers.</td>
</tr>
<tr>
<td>31</td>
<td>Sage, D.; Dainty, A.; Brookes, N.</td>
<td>2012</td>
<td>Ethnographic study</td>
<td>Service – Construction</td>
<td>UK</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>OC change is possible through worker participation in process improvement. The main elements for achieving both motivation and participation have proved to be training, teamwork and recognition. The adoption of lean also implies a change in management mentality. The article argues that the adoption of lean system has brought high pressure on workers, who are supposedly paying for the increase in productivity through reduced earnings, minimal workplace autonomy and an unprecedented increase in the pace of work (without being accompanied by smarter working practices). Firms still struggled to adapt Toyota product development practices because differences in OC. Toyota adopt an active risk reduction strategy, involves workers in decision-making processes; possesses deep technical competency, use extensive visual communication, appears to be more process-oriented and trusts its suppliers.</td>
</tr>
<tr>
<td>32</td>
<td>Jaca, C.; Santos, J.; Errasti, A.; Viles, E.</td>
<td>2012</td>
<td>Action Research</td>
<td>Service – Distribution</td>
<td>Spain</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>OC change is possible through worker participation in process improvement. The main elements for achieving both motivation and participation have proved to be training, teamwork and recognition. The adoption of lean also implies a change in management mentality. The article argues that the adoption of lean system has brought high pressure on workers, who are supposedly paying for the increase in productivity through reduced earnings, minimal workplace autonomy and an unprecedented increase in the pace of work (without being accompanied by smarter working practices). Firms still struggled to adapt Toyota product development practices because differences in OC. Toyota adopt an active risk reduction strategy, involves workers in decision-making processes; possesses deep technical competency, use extensive visual communication, appears to be more process-oriented and trusts its suppliers.</td>
</tr>
<tr>
<td>33</td>
<td>Mathew, S. K.; Jones, R.</td>
<td>2013</td>
<td>Single Case Study</td>
<td>Manuf – Automotive</td>
<td>India</td>
<td>Both</td>
<td>Other/no framework reference</td>
<td>OC change is possible through worker participation in process improvement. The main elements for achieving both motivation and participation have proved to be training, teamwork and recognition. The adoption of lean also implies a change in management mentality. The article argues that the adoption of lean system has brought high pressure on workers, who are supposedly paying for the increase in productivity through reduced earnings, minimal workplace autonomy and an unprecedented increase in the pace of work (without being accompanied by smarter working practices). Firms still struggled to adapt Toyota product development practices because differences in OC. Toyota adopt an active risk reduction strategy, involves workers in decision-making processes; possesses deep technical competency, use extensive visual communication, appears to be more process-oriented and trusts its suppliers.</td>
</tr>
<tr>
<td>34</td>
<td>Martinez-Jurado, P. J.; Moyano-Fuentes, J.; Jerez-Gomez, P.</td>
<td>2013</td>
<td>Multi-Case Study</td>
<td>Manuf – Aerospace</td>
<td>Spain</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Lean implementation should be conducted in phases and in each phase there are key elements to its success, such as managing resistance, training, communication, reward system and others. The elements interact with each other in a systemic viewpoint, in order to understand the sequence that leads to the cultural change associated with lean. A model was developed to understand the sequence (phases and critical factors) that leads to the cultural change associated with lean. Five main factors are found in the other three phases of the adoption and implementation process: training, communication, rewards, job design and work organisation. The article argues that the adoption of lean system has brought high pressure on workers, who are supposedly paying for the increase in productivity through reduced earnings, minimal workplace autonomy and an unprecedented increase in the pace of work (without being accompanied by smarter working practices). Firms still struggled to adapt Toyota product development practices because differences in OC. Toyota adopt an active risk reduction strategy, involves workers in decision-making processes; possesses deep technical competency, use extensive visual communication, appears to be more process-oriented and trusts its suppliers.</td>
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</tr>
<tr>
<td>36</td>
<td>Mulholland, K.; Stewart, P.</td>
<td>2014</td>
<td>Single Case Study</td>
<td>Service – Distribution</td>
<td>UK</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Lean implementation should be conducted in phases and in each phase there are key elements to its success, such as managing resistance, training, communication, reward system and others. The elements interact with each other in a systemic viewpoint, in order to understand the sequence that leads to the cultural change associated with lean. A model was developed to understand the sequence (phases and critical factors) that leads to the cultural change associated with lean. Five main factors are found in the other three phases of the adoption and implementation process: training, communication, rewards, job design and work organisation. The article argues that the adoption of lean system has brought high pressure on workers, who are supposedly paying for the increase in productivity through reduced earnings, minimal workplace autonomy and an unprecedented increase in the pace of work (without being accompanied by smarter working practices). Firms still struggled to adapt Toyota product development practices because differences in OC. Toyota adopt an active risk reduction strategy, involves workers in decision-making processes; possesses deep technical competency, use extensive visual communication, appears to be more process-oriented and trusts its suppliers.</td>
</tr>
<tr>
<td>37</td>
<td>Pereira, R.; Ro, Y. K.; Liker, J. K.</td>
<td>2014</td>
<td>Multi-Case Study</td>
<td>Manuf – Automotive</td>
<td>USA</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Lean implementation should be conducted in phases and in each phase there are key elements to its success, such as managing resistance, training, communication, reward system and others. The elements interact with each other in a systemic viewpoint, in order to understand the sequence that leads to the cultural change associated with lean. A model was developed to understand the sequence (phases and critical factors) that leads to the cultural change associated with lean. Five main factors are found in the other three phases of the adoption and implementation process: training, communication, rewards, job design and work organisation. The article argues that the adoption of lean system has brought high pressure on workers, who are supposedly paying for the increase in productivity through reduced earnings, minimal workplace autonomy and an unprecedented increase in the pace of work (without being accompanied by smarter working practices). Firms still struggled to adapt Toyota product development practices because differences in OC. Toyota adopt an active risk reduction strategy, involves workers in decision-making processes; possesses deep technical competency, use extensive visual communication, appears to be more process-oriented and trusts its suppliers.</td>
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<td>Id #</td>
<td>Authors</td>
<td>Year</td>
<td>Research method</td>
<td>Industry sector</td>
<td>Country</td>
<td>NC/OC</td>
<td>Culture framework</td>
<td>Contribution</td>
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<tr>
<td>38</td>
<td>Martinez-Jurado, F. J.; Moyano-Fuentes, J.</td>
<td>2014</td>
<td>Multi-Case Study</td>
<td>Manuf – Aerospace</td>
<td>Spain</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Without the engagement of the whole organisation to lean adoption, the initiative will fail. Success factors identified were: a prior total quality culture, top managers’ full commitment, a full-time organisational structure, joint negotiation with unionisation and the use of a variety of mechanisms to overcome skepticism/resistance</td>
</tr>
<tr>
<td>39</td>
<td>Kull, T. J.; Yan, T.; Liu, Z.; Wacker, J.</td>
<td>2014</td>
<td>Survey (secondary data)</td>
<td>Manuf – Multi-sector</td>
<td>Multi-country</td>
<td>NC</td>
<td>GLOBE model; reference to Hofstede’s work</td>
<td>LM is most effective in countries that value high uncertainty avoidance, low assertiveness, low future orientation and low performance orientation. Human orientation, in-group collectivism and institutional collectivism are found to be insignificant. This ‘ideal’ culture differs from Japanese mainstream culture</td>
</tr>
<tr>
<td>40</td>
<td>James, R.; Jones, R.</td>
<td>2014</td>
<td>Single Case Study</td>
<td>Manuf – Automotive</td>
<td>India</td>
<td>NC</td>
<td>Other/no framework reference</td>
<td>Lean transference efficacy depends on the unique cultural, social, historical and environmental factors peculiar to the host country. HRM adaptations might be needed to Indian transplant, such as additional hierarchical organisational levels, more worker empathy, lower productivity rates and recognition of national trade unions</td>
</tr>
<tr>
<td>41</td>
<td>Fullerton, R. R.; Kennedy, F. A.; Widnes, S. K.</td>
<td>2014</td>
<td>Survey (primary data)</td>
<td>Manuf – multi</td>
<td>USA</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Lean manufacturing has a significant relationship with operational performance as does lean management accounting practices. One of them, visual performance measures, is directly related to operations performance, which in turn is directly related to financial performance</td>
</tr>
<tr>
<td>42</td>
<td>Jayamaha, N. P.; Wagner, J. P.; Grigg, N. P.; Campbell-Allen, N. M.; Harvie, W.</td>
<td>2014</td>
<td>Survey (secondary data)</td>
<td>Manuf – Automotive</td>
<td>Multi-country</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>People development has no direct effect on outcomes, but it has an indirect effect by leveraging process improvement. Toyota’s people development capabilities are unique, hard to achieve. A core finding is that people development should be understood as an integral component of a complete lean implementation</td>
</tr>
<tr>
<td>43</td>
<td>Morganti, K. G. et al.</td>
<td>2014</td>
<td>Case Study + Survey</td>
<td>Service – Healthcare</td>
<td>USA</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>OC is one of major contributors to quality improvement success. Intensive lean training has a positive effect on cultural achievements, on implementing improvements and on company’s outcomes. Although cultural achievements appeared to be more difficult to attain</td>
</tr>
<tr>
<td>44</td>
<td>Andersen, H.; Rovik, K. A.; Ingebrigtsen, T.</td>
<td>2014</td>
<td>Literature Review</td>
<td>Service – Healthcare</td>
<td>–</td>
<td>Not spec.</td>
<td>Other/no framework reference</td>
<td>The study identified 23 facilitators (of change) associated with successful interventions, although little is known about which facilitators are most important. One of the main facilitators is a supportive OC. Findings suggest that characteristics and local application of lean, in addition to strategic and cultural capability, should be given further attention in healthcare quality improvement</td>
</tr>
<tr>
<td>45</td>
<td>Zimmermann, A.; Bollbach, M. F.</td>
<td>2015</td>
<td>Multi-Case Study</td>
<td>Manuf – Automotive</td>
<td>China</td>
<td>NC</td>
<td>Some Hofstede’s dimensions</td>
<td>Institutional (management norms, legal system, education system and manufacturing norms) and cultural (Confucian values, high power distance, ‘face’, high context communication style, language and collectivism) context of China might represent a significant barrier to the lean transfer to this country today and in the near future</td>
</tr>
<tr>
<td>46</td>
<td>Oudhuis, M.; Olsson, A.</td>
<td>2015</td>
<td>Single Case Study</td>
<td>Manuf – Metal</td>
<td>Sweden</td>
<td>NC</td>
<td>Some Hofstede’s dimensions</td>
<td>NC traits such as perfection, obedience, uncertainty avoidance, long term view and other Japanese culture elements opposes Swedish cultural traits of participation, self-government, equality and creativity. Such different mindsets cannot be ignored, but can be handled through understanding and by taking them into regard</td>
</tr>
<tr>
<td>Authors</td>
<td>Culture framework</td>
<td>Service – Healthcare</td>
<td>Year</td>
<td>NC/OC</td>
<td>Research method</td>
<td>Data</td>
<td>Study Details</td>
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<tr>
<td>Li, B. B.; Nahm, A. Y.; Wyland, R.; Ke, J. Y.; Yan, W.</td>
<td></td>
<td></td>
<td>2015</td>
<td>Both</td>
<td>Survey (primary data)</td>
<td>Manuf – multi</td>
<td>China</td>
<td>Some Hofstede's dimensions</td>
</tr>
<tr>
<td>Wiengarten, F.; Gimenez, C.; Fynes, B.; Ferdows, K.</td>
<td></td>
<td></td>
<td>2015</td>
<td>Multi-country</td>
<td>Survey (primary data)</td>
<td>Manuf – multi</td>
<td>Multi-country</td>
<td>Some Hofstede's dimensions; reference to GLOBE</td>
</tr>
<tr>
<td>Glover, W. J.; Farris, J. A.; Van Allen, E. M.</td>
<td></td>
<td></td>
<td>2015</td>
<td>USA</td>
<td>Survey (primary data)</td>
<td>Manuf – multi</td>
<td>China</td>
<td>Other/no framework reference</td>
</tr>
<tr>
<td>Bortolotti, T.; Boscari, S.; Danese, F.</td>
<td></td>
<td></td>
<td>2015</td>
<td>Multi-country</td>
<td>Survey (secondary data)</td>
<td>Manuf – others</td>
<td>Multi-country</td>
<td>GLOBE model; reference to Hofstede's work</td>
</tr>
<tr>
<td>Zarbo, R. J.; Varney, R. C.; Copeland, J. R.; Angelo, R. D.; Sharma, G.</td>
<td></td>
<td></td>
<td>2015</td>
<td>USA</td>
<td>Action Research</td>
<td>Service – Healthcare</td>
<td>USA</td>
<td>Other/no framework reference</td>
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<tr>
<td>Ko, C.; Kuo, J.</td>
<td></td>
<td></td>
<td>2015</td>
<td>Taiwan</td>
<td>Single Case Study</td>
<td>Service – Construction</td>
<td>Taiwan</td>
<td>Other/no framework reference</td>
</tr>
<tr>
<td>Alves, J. R. X.; Alves, J. M.</td>
<td></td>
<td></td>
<td>2015</td>
<td></td>
<td>Theoretical</td>
<td></td>
<td></td>
<td>Other/no framework reference</td>
</tr>
<tr>
<td>Brunet-Thornton, R.; Koza, M.; Bures, V.</td>
<td></td>
<td></td>
<td>2016</td>
<td>Japan</td>
<td>Survey (primary data)</td>
<td>Not specified</td>
<td>Not specified</td>
<td>Some Hofstede's dimensions</td>
</tr>
</tbody>
</table>

This research shows that leadership can be an engine for changes in OC, starting from workers' trust, more secure workplaces, and freely participation in improvement projects without fearing the loss of face. Chinese workers will participate in problem-solving when a conducive OC evolves, but results indicate that this has not been reached yet.

National collectivism is the dominant force moderating performance and its potential disadvantages cannot be fully counterbalanced by organisational collectivism (plant wide shared vision, mission and goals, employee involvement and employee training and education).

The ability to sustain the results of a Kaizen event after significant time is in part explained by the extent to which management and the workforce are accepting of change.

Additionally, higher perceptions of accepting changes appear to be evident in work areas that encourage learning and stewardship among their employees.

Successful lean plants show higher institutional collectivism, future orientation, human orientation, and lower level of assertiveness than unsuccessful lean plants. The last one is typical only of successful lean plants, when compared to high performers in general. In addition, successful plants use more 'soft LM practices' than unsuccessful plants.

Daily management reinforces the cultural expectations of continuous improvement through leaders, managers, and workforce engagement and alignment with corporate goals. The processes that employed more metrics and used targeted short-term metrics showed more improvements.

With a waste-reduction focus, the adoption of Andon systems to establish an on-site quality control culture, added to Kanban system to achieve continuous flow, are found successful in increasing value to formwork engineering.

The study presents some dichotomies which challenges lean implementation, such as using highly structure processes while promoting flexibility and continuous improvement.

The study highlights the importance of the leadership role and suggests that developing appropriate OC and leadership capacity should precede other systemic changes.

A culture of innovation and collaboration together with empowerment of staff at all levels and visual display of performance metrics are identified as specific drivers of change for a successful lean implementation.

This study proposes a model of production management and its implementation methodology, integrating the lean principles and sustainability, supported by a OC transformation. Cultural transformation is infused in the model by organisational actions that provide knowledge and facilitate the development of employee potential, aiming to change attitudes, values, behaviors and outcomes.

Data from the survey show that both Czech and Japanese employees have similar values related to work and neither job satisfaction nor number of conflicts is connected with TPS training. It was not possible to determine whether values inherent to Japanese management are closer to the values proposed by the TPS than the values inherent to Czech management.
<table>
<thead>
<tr>
<th>Id #</th>
<th>Authors</th>
<th>Year</th>
<th>Research method</th>
<th>Industry sector</th>
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<th>NC/OC</th>
<th>Culture framework</th>
<th>Contribution</th>
</tr>
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<tbody>
<tr>
<td>57</td>
<td>Boscari, S.; Danese, P.; Romano, P.</td>
<td>2016</td>
<td>Single Case Study</td>
<td>Manuf – Eletronic</td>
<td>Italy China USA</td>
<td>Both</td>
<td>Some Hofstede's dimensions</td>
<td>International team work and secondary mechanisms are important to perform training, sense giving, adaptation and pressure, which will hamper the success of a lean transfer initiative</td>
</tr>
<tr>
<td>58</td>
<td>Shokri, A.; Waring, T. S.; Nabhani, F.</td>
<td>2016</td>
<td>Survey (primary data)</td>
<td>Manuf – multi</td>
<td>Germany</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>The study found a strong positive association between the core competence of people and organisational culture with readiness for commencing lean in the manufacturing SMEs studied. The core values of people, education level and the vision of making continuous quality improvement were identified as key variables in promoting lean readiness in these manufacturing SMEs</td>
</tr>
<tr>
<td>59</td>
<td>Dora, M.; Kumar, M.; Gellynck, X.</td>
<td>2016</td>
<td>Multi-Case Study</td>
<td>Manuf – Food</td>
<td>Belgium</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>The findings confirm that factors such as commitment of top management, training, resources, organisational culture and structure were important to lean implementation success. The culture of the company (e.g. communication, respect, discipline) proves to be a very important determinant for successful lean implementation</td>
</tr>
<tr>
<td>60</td>
<td>Netland, T. H.</td>
<td>2016</td>
<td>Survey (primary data)</td>
<td>Manuf – Auto &amp; Que- mical</td>
<td>Multi</td>
<td>Both</td>
<td>Some Hofstede's dimensions</td>
<td>The study found that to succeed with the implementation of lean, managers should: (1) commit to, lead and take an active part in the lean program; (2) provide and attend training and education; (3) have a long-term plan and follow it up on a day-to-day basis; (4) allocate resources and share the gains; (5) apply lean tools and techniques</td>
</tr>
<tr>
<td>61</td>
<td>van Dun, D. H.; Wilderom, C. P. M.</td>
<td>2016</td>
<td>Survey (primary data)</td>
<td>Manuf &amp; Service</td>
<td>Netherlands</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>The study shows that lean work teams are more effective when their leaders endorse self-transcendence and reject conservation values while their employees share a lot of information</td>
</tr>
<tr>
<td>62</td>
<td>Rafique, M. Z.; Ab Rahman, M. N.; Saibani, N.; Arsad, N.; Saadat, W.</td>
<td>2016</td>
<td>Literature Review</td>
<td>Not specified</td>
<td>–</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>This literature review highlights the main barriers that affect the lean implementation in the manufacturing industry, which are OC, top management commitment, poor employee administration, lack of finances, unbalanced inventory control, unstable customer handling and longer lead times</td>
</tr>
<tr>
<td>63</td>
<td>Alpenberg, J.; Scarbrough, D. P.</td>
<td>2016</td>
<td>Case study</td>
<td>Manuf – Auto</td>
<td>Multi</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>The communication practices of blending, positive engagement and soft words exist in all embedded lean work contexts, while the practices of separation, negative engagement and hard words exist in failed lean contexts</td>
</tr>
<tr>
<td>64</td>
<td>van Leijen-Zeeelenberget, J. E. et al.</td>
<td>2016</td>
<td>Case Study + Survey</td>
<td>Service – Healthcare</td>
<td>Netherlands</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td>Willingness to change and openness among employees increased after the intervention, indicating effects beyond operational aspects like waste reduction. Employee satisfaction with communication in the organisation rose significantly, whereas employee satisfaction with autonomy and participation was significantly lower. Main success factors regarding lean projects were the organisation's existing culture of quality improvement, IT support and resources supporting staff training and hiring of external experts. Lean initiative was considered as one more quality tool and, therefore, did not readily change organisational culture</td>
</tr>
<tr>
<td>65</td>
<td>Harrison, M. I. et al.</td>
<td>2016</td>
<td>Multi-Case Study</td>
<td>Service – Healthcare</td>
<td>USA</td>
<td>OC</td>
<td>Other/no framework reference</td>
<td></td>
</tr>
</tbody>
</table>

**Appendix 1. (Continued)**