The originality of the lean manufacturing studies

A systematic literature review

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Abstract

Purpose – The purpose of this paper is to identify the originality value of the lean manufacturing (LM) studies carried out worldwide so far.

Design/methodology/approach – Four major publishers, namely, Emerald Online, Science Direct, Springer Link and Taylor and Francis provided the databases for a systematic literature review (SLR) of peer-reviewed journal articles in LM. In total, 211 articles published in 52 journals during 2005-2016 were collected. The affinity diagram was applied to group the originality value statements identified into logical themes.

Findings – The plethora of originality value statements identified in the literature are analytically presented. Furthermore, meaningful themes of the originality value of the LM studies are formulated.

Research limitations/implications – Some publishers might have been missed out in this SLR, given that it is based on only four academic publishers.

Practical implications – Identifying the originality value of the existing LM studies and presenting respective meaningful themes can help researchers and practitioners design their future research and implementation plans, respectively.

Originality value – The originality value of the LM studies is a subject which has not been reviewed in the literature previously.

Keywords Lean manufacturing, Systematic literature review, Originality-value

Paper type Literature review

Introduction

Lean manufacturing (LM) is widely used by organizations not only in the developed economies of the USA and Europe but also in the developing economies of Asia and India (Chaplin *et al.*, 2016). Organizations implement LM in an attempt to improve their cost, quality and performance (Sharma *et al.*, 2016a) and withstand the current circumstances which are characterized by strong global competition (Jasti and Kodali, 2014a) and an economic downturn (Gelei *et al.*, 2015).

The widespread adoption of LM by organizations has made academics and researchers focus more on this field (Samuel *et al.*, 2015). However, confusion still exists on a theoretical and practical level (Narayanamurthy and Gurumurthy, 2016a) because of the various LM definitions and interpretations provided by several authors (Stone, 2012). Thus, there is a limited understanding of lean across industry, a fact that is also supported by Abolhassani *et al.* (2016) studying US manufacturing, Jasti and Kodali (2016) examining Indian manufacturing and Filho *et al.* (2016) focusing on Brazilian small and medium-sized enterprises (SMEs). It is worth noting that few literature review studies on LM have been published so far (Marodin and Saurin, 2013; Jasti and Kodali, 2014a; Jasti and Kodali, 2015), which could have shed more light on LM research and implementation. Furthermore,

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authors such as Taylor *et al.* (2013), Wiengarten *et al.* (2015), Piercy and Rich (2015), Pakdil and Leonard (2016), Secchi and Camuffo (2016) identify a literature gap with regard to LM and make respective future research suggestions. For the LM research gap to be more clearly highlighted, for the benefit of academics and researchers, and furthermore, for the LM implementation plans to be more strongly supported by the knowledge obtained until now, for the benefit of practitioners, the area of the originality value of the existing LM studies should be clearly defined. Based on the above, the following question arises concerning the LM studies carried out so far:

RQ. what is the originality value of the LM studies?

The present study contributes to the literature by systematically reviewing LM articles published over a long period (2005-2016) and highlighting the originality value of the respective studies. Literature review studies on LM conducted so far, such as those of Stone (2012), Hasle *et al.* (2012), Moyano-Fuentes and Sacristan-Diaz (2012), Powell (2013), Jasti and Kodali (2014a), Bhamu and Sangwan (2014), Jasti and Kodali (2015), Samuel *et al.* (2015), Hu *et al.* (2015) and Narayanamurthy and Gurumurthy (2016a), do not focus on this subject. This reflects the differentiation of the present study compared to the previous ones and strongly supports the originality of the present systematic literature review (SLR).

The structure of the paper is as follows: in the next section, the SLR and the respective phases are presented. In the following section, the results of the SLR are analytically presented describing the profile of the articles reviewed and the originality value of the existing LM studies. The results are then discussed and the conclusions are presented. Finally, the limitations of the study and the proposals of the author for further literature review studies are presented.

Methodology

To elicit the originality value of the LM studies carried out worldwide so far, a literature review was conducted. Given that the traditional narrative review lacks thoroughness and rigor (Tranfield *et al.*, 2003), the SLR was selected as the methodological approach of the present study. The SLR adopts a scientific and transparent process (Tranfield *et al.*, 2003), and thus, many literature review articles published in high-quality scientific journals are based on the SLR (Hu *et al.*, 2015). The lean literature review studies of Albliwi *et al.* (2014), Hu *et al.* (2015) and Albliwi *et al.* (2015) are based on the SLR methodology presented by Tranfield *et al.* (2003). This methodology, which consists of the planning stage, conducting stage and reporting/dissemination stage, was also adopted in the present study.

Stage I – planning the review

Preparing and developing the review protocol is the main purpose of this stage. Thus, decisions should be made with regard to the population (or sample) of the present study, search strategy for the identification of relevant studies, criteria for inclusion and exclusion of studies in the review, as well as their quality assessment method (Tranfield *et al.*, 2003).

Following the approach adopted by Jasti and Kodali (2014a) and Jasti and Kodali (2015), the present SLR was based on the whole database of four well-known management science publishers of academic articles, namely, Emerald Online, Science Direct, Springer Link and Taylor and Francis. The restriction of the search to articles relevant to the objectives of the present study was achieved through specific inclusion and exclusion criteria (Table I). From 2005 onward, the number of LM articles has substantially increased, and moreover, LM transformations are more successful

Inclusion criteria	Exclusion criteria
Articles published between 2005 and 2016	Any publication before the year 2005 and after 2016
Well-known databases: Emerald Online, Science Direct, Springer Link and Taylor and Francis	Non-academic databases
Academic journals	Books, online sites and gray literature (conferences, master's theses, doctoral dissertations, textbooks, reports, working papers from research groups, technical reports, etc.)
Articles studying lean manufacturing, production, principles, practices/tools/ techniques	Articles studying an individual lean principle or tool/ technique or bundle of practices
	Articles studying lean – six sigma, lean – agile and lean – green implementation issues
Articles related to the manufacturing sector	Articles related to the services sector
The unit of the analysis is the organization itself	The unit of the analysis is the supply chain network
Articles highlighting the originality value of the study	Articles not highlighting the originality value of the study
Articles written in the English language	Articles written in any other language but English

Table I.
Inclusion and exclusion criteria for the SLR

because of the strategic align of LM throughout the enterprise (Stone, 2012; Bhamu and Sangwan, 2014). Thus, the year 2005 was taken as the beginning of the present SLR. Following the suggestion of Shah and Ward (2007), according to which LM should be considered from a multidimensional perspective covering a variety of highly inter-related individual management practices in an integrated system, the search of the literature was based on terms such as lean, lean manufacturing, lean production, lean principles, lean practices/tools/techniques. In other words, articles focusing on a specific lean principle or practice/tool/technique (e.g. value stream mapping, kanban/ pull, 5S, kaizen, etc.) (Bhamu and Sangwan, 2014) or bundle of lean practices (e.g. just-in-time, total quality management, total preventative maintenance and human resource management) (Yang *et al.*, 2011; Taylor *et al.*, 2013; Longoni *et al.*, 2013) were not taken into consideration.

Stage II – conducting the review

The inclusion and exclusion criteria, as well as the respective search terms revealed from Table I, set the basis for constructing the search strings which were entered in exactly the same way in the bibliographic databases. The result of this search was hundreds of articles, which were screened appropriately for their fit with the objectives of the study by carefully reading the title, abstract and keywords of each article, and if these were not clear enough, by reading the full paper. So, the disciplined screening process resulted in a final sample of 211 articles published in 52 journals (Table II).

The information of the sample articles such as the title, year of publication, journal, authors, paper type, geographic research area, industry sub-sectors, together with the statements describing the originality value of the studies, were extracted in an excel spreadsheet (Tranfield *et al.*, 2003; Hu *et al.*, 2015). The large number of the statements describing the originality value of the studies were grouped according to some form of natural affinity, based on a simple affinity diagram (McQuater *et al.*, 1995). Thus, meaningful themes of the originality value statements were formulated.

Publisher – journals	No. of articles	(%)
Emerald	86 articles	0.407
Journal of Manufacturing Technology Management	21	0.100
International Journal of Operations and Production Management	16	0.076
International Journal of Lean Six Sigma	11	0.051
International Journal of Productivity and Performance Management	8	0.037
Benchmarking: An International Journal	5	0.024
British Food Journal	2	0.009
Measuring Business Excellence	2	0.009
Supply Chain Management: An International Journal	2	0.009
Management Decision	2	0.009
The TQM Journal	2	0.009
Business Process Management Journal	2	0.009
European Business Review	1	0.005
Grey Systems: Theory and Application	1	0.005
International Journal of Quality and Reliability Management	1	0.005
Management Research News	1	0.005
The International Journal of Logistics Management	1	0.005
Journal of Quality in Maintenance Engineering	1	0.005
Competitiveness Review: An International Business Journal	1	0.005
International Journal of Organizational Analysis	1	0.005
Journal of Engineering, Design and Technology	1	0.005
Journal of Modeling in Management	1	0.005
Research Journal of Textile and Apparel	1	0.005
VINE Journal of Information and Knowledge Management Systems	1	0.005
Industrial Management and Data Systems	1	0.005
Taylor and Francis	*66 articles*	*0.312*
International Journal of Production Research	33	0.156
Production Planning and Control	21	0.100
Total Quality Management and Business Excellence	6	0.027
International Journal of Computer Integrated Manufacturing	4	0.019
Construction Management and Economics	1	0.005
Journal of Asia-Pacific Business	1	0.005
Elsevier/Science Direct	*43 articles*	*0.205*
International Journal of Production Economics	13	0.062
Journal of Operations Management	10	0.047
Procedia Manufacturing	3	0.014
Expert Systems with Applications	3	0.014
Management Accounting Research	2	0.009
Computers in Industry	2	0.009
Journal of Business Research	1	0.005
Elsevier/Science Direct		
Business Research Quarterly	1	0.005
Review of Applied Management Studies	1	0.005
International Journal of Information Management	1	0.005
Business Horizons	1	0.005
Accounting, Organizations and Society	1	0.005
Journal of Engineering and Technology Management	1	0.005
Computers and Industrial Engineering	1	0.005
Journal of Cleaner Production	1	0.005
European Management Journal	1	0.005
Springer Link	*16 articles*	*0.076*
The International Journal of Advanced Manufacturing Technology	10	0.047
Operations Management Research	2	0.009
Journal of Intelligent Manufacturing	1	0.005
Systemic Practice and Action Research	1	0.005
Production Engineering Research and Development	1	0.005
Journal of Business Ethics	1	0.005

Table II.
The list of journals considered in the present study

Stage III – reporting and dissemination
Based on the excel spreadsheet developed in the previous stage, the profile of the LM studies reviewed is clearly presented. Furthermore, the themes of the originality value statements are presented and critically discussed.

Results

The profile of the articles reviewed
Table II presents the number and percentage of the sample articles published in each journal and the respective publisher. A limited number of journals have published the majority of the sample articles at each publisher. More specifically, 70.9 per cent of the LM articles of Emerald have been published by five out of 24 journals of this publisher, 81.8 per cent of the LM articles of Taylor and Francis have been published by two out of six journals of this publisher, 67.4 per cent of the LM articles of Elsevier/Science Direct have been published by four out of 16 journals of this publisher and 62.5 per cent of the LM articles of Springer Link have been published by one out of six journals of this publisher. The distribution of the journals among the four publishers is presented in Figure 1, while the distribution of the sample articles among the four publishers is presented in Figure 2.

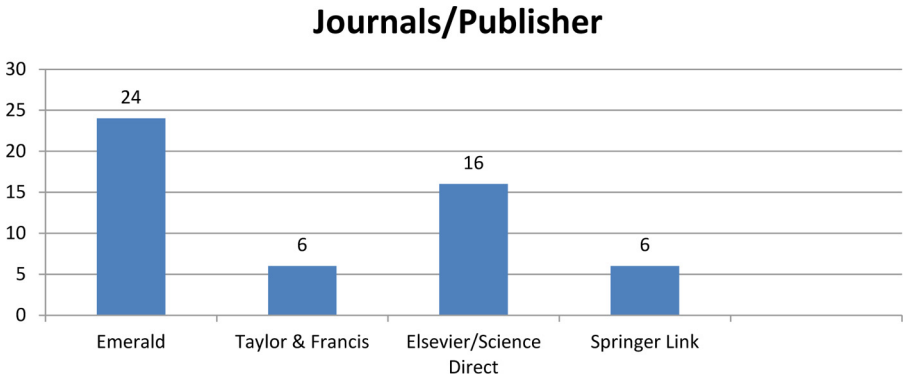

Figure 1.
Journals per publisher

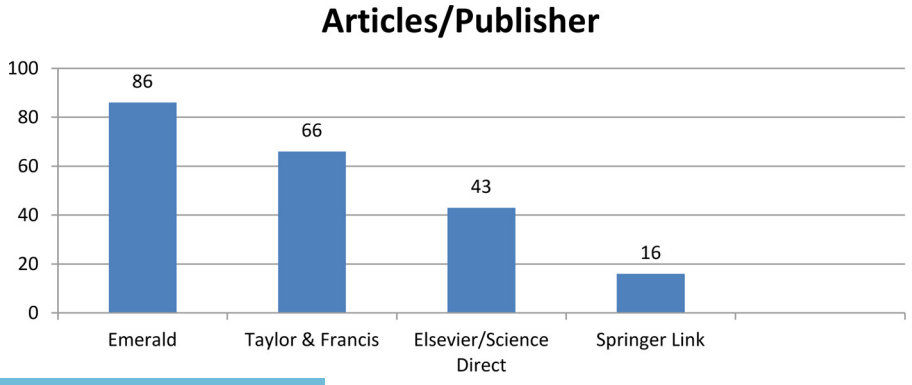

Figure 2.
Articles per publisher

Figure 3 presents how LM publication has evolved over the last decade. The increase of LM publication from 2011 onward is much higher than the increase of LM publication from 2005 to 2011. The majority of the sample articles present surveys and case studies (44.5 per cent and 36.5 per cent, respectively), while the minority of the sample articles present literature reviews and conceptual studies (9.5 per cent and 9.5 per cent, respectively) (Figure 4). It is worth noting that the majority of the surveys (76 out of 94) are based on a research sample which is smaller than 300, the majority of the case studies (47 out of 77) are based on only one case organization, while the majority of the literature review studies (17 out of 20) have reviewed fewer than 200 articles. The manufacturing sub-sectors that mostly participated in the surveys and case studies presented in the sample articles are the following: automotive, electrical/electronics, machinery, food, textiles and apparel, plastics and rubber and chemicals. Finally, the countries with the highest number of LM surveys and case studies are the following: the USA (34), the UK (33), India (26), Brazil (18), Italy (14), Sweden (10), Spain (10) and Germany (10).

The originality value of the LM articles

Table III presents the statements describing the originality value of the LM studies reviewed. These statements were classified, through the affinity diagram, into

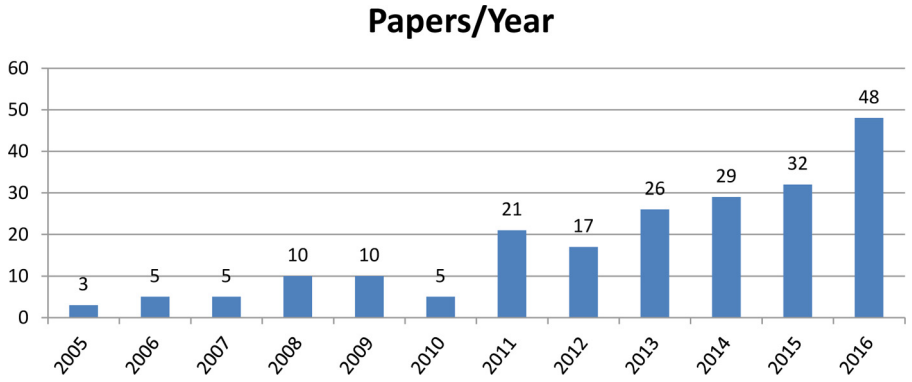

Figure 3.
Articles per publication year

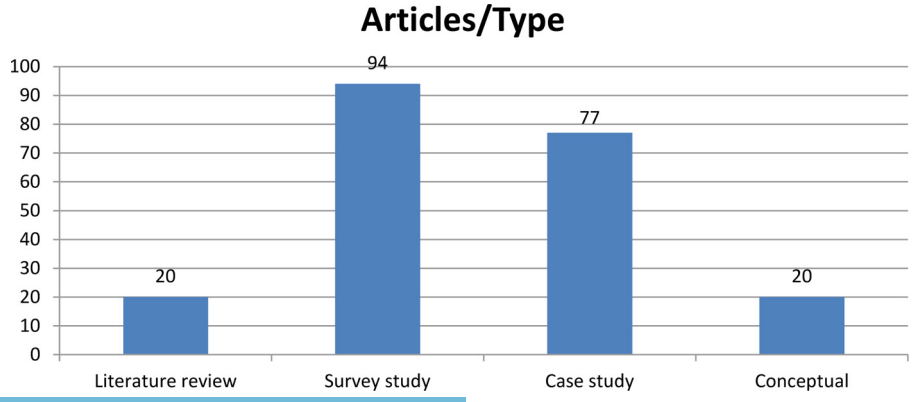

Figure 4.
Article type

Themes	Statements presenting the originality of the studies
Lean literature review	Presenting a historical account of the research that led to the formulation and dissemination of one of the most influential manufacturing paradigms of recent times, namely, lean (Holweg, 2007); presenting a topical review and historical overview of the development in the use of IT and its relation to lean production (LP) (Riezebos *et al.*, 2009); addressing the challenge many scholars and practitioners encounter when communicating the ideology of lean by offering a literature review of the four decades of scholarly lean literature (Stone, 2012); conducting a comprehensive literature review with regard to lean, the definitions of and assumptions about lean (Arlbjorn and Freytag, 2013); providing a unique review of the lean product development research area (Khan *et al.*, 2013); revising 209 research papers for various characteristics of LM (Bhamu and Sangwan, 2014); systematically reviewing the literature and critically evaluating key themes of lean implementation within an SME environment (Hu *et al.*, 2015); exploring and evaluating previous work focusing on the relationship and links between lean and sustainable manufacturing and their impact on business performance (Hartini and Ciptomulyono, 2015); providing a complete review of lean articles in terms of various aspects of LP classifications and verifying the depth of the research carried out in the field of LP (Jasti and Kodali, 2015); providing a comprehensive review of the process industry's assimilation of lean principles (Panwar *et al.*, 2015b); reviewing the topic of leanness assessment (Narayanamurthy and Gurumurthy, 2016a)
Lean theory	Proposing lean schools of thought (Hoss and Caten, 2013); extending the theories of resource-based view (RBV) and its extension, i.e. dynamic capability (DC) theory, to the area of lean operations (Wong *et al.*, 2014)
Lean future research agenda	Focusing on the main areas of research, the needs of and opportunities for research on the LP (Marodin and Saurin, 2013)
Lean barriers – difficulties	Correlating the lean barriers encountered to the size of an organization (Bhasin, 2012a); explaining many of the failures that occur in exporting the LP outside Japan (Dominici and Palumbo, 2013); identifying potential barriers of LM in food SMEs (Dora *et al.*, 2013); providing a concise description of 24 barriers of LM (Jadhav *et al.*, 2014); concentrating on the value stream, revealing weaknesses, detecting their causes and evaluating the impact on the process according to LM (Magenheimer *et al.*, 2014); re-interpreting the factors, barriers and difficulties for the LP from the perspective of risk management and presenting a classification of the risks (Marodin and Saurin, 2015a); taking a holistic view of the barriers to the LP and systematically analyzing the context (the nature of the LM barriers, their origins, interrelations and relative importance) (Marodin and Saurin, 2015b); addressing the problems in lean during the product development process (Forno *et al.*, 2016); assessing the incidence of lean product development problems (Tortorella *et al.*, 2016); identifying the properties of RFID-based lean manufacturing which are helpful for the handling of detected barriers (Rafique *et al.*, 2016)

(*continued*)

Table III.
The originality of the LM studies

Themes	Statements presenting the originality of the studies
Human factor involved in lean	Carrying out a multi-industry empirical study of the relationship of job stress (job demand, support, control) to a range of lean practices and to the degree of lean implementation (Conti *et al.*, 2006); examining whether the LP job design or increased management control causes intrinsic motivation of employees to implement lean and whether managers hoping for worker commitment should avoid the LP because of its standardization (Treville and Antonakis, 2006); studying the partial success of the LP due to the persistence of legacy attitudes on the part of unionized and high-seniority employees (Sim and Rogers, 2008); exploring soft building blocks (e.g. employee commitment, belief, communication and work method) of successful LM on the shop-floor level and how workers' perceptions and influential success factors vary in particular contexts (Losonci *et al.*, 2011); establishing a statistically valid relationship between LP and worker commitment and associated work practices (Angelis *et al.*, 2011); highlighting the importance of the human dimension in the LP and determining employee beliefs and attitudes to various dimensions of new management initiatives such as LM (Wickramasinghe and Wickramasinghe, 2011); making use of the existing research evidence to examine the complex and ambiguous relations between lean and the working environment (Hasle *et al.*, 2012); examining the debate on the role of worker involvement and innovation in a lean setting (Angelis and Fernandes, 2012); accessing shop-floor employees and providing insights into the inner workings of a lean system showing several examples of the delicate balances and tensions (Taylor *et al.*, 2013); discussing how intrinsic motivation is affected by lean enablers such as clear project objectives and customer requirements, continuous improvement and cross-functional teams (Ringen and Holtskog, 2013); providing empirical evidence on the impact of lean on both operational and worker health and safety performance (Longoni *et al.*, 2013); addressing the role that people play during the different phases of the transition process to the LP (Martinez-Jurado *et al.*, 2014); investigating the effects of lean operations, high involvement work practices and management behaviors on occupational safety (Camuffo *et al.*, 2015); exploring the how's and whys of human behavior as an organization undergoes the massive transformation from traditional manufacturing to LM (Keyser *et al.*, 2016); understanding of management communication daily practices used in the LP context (Alpenberg and Scarbrough, 2016); focusing exclusively on the content of values and behaviors of effective lean managers (Dun *et al.*, 2016); examining the impact of perceived causal ambiguity on employee motivation during a change initiative involving the implementation of the LP (Shamsudin *et al.*, 2016); investigating continuous improvement and job performance of shop-floor employees within the LP (Wickramasinghe and Wickramasinghe, 2016a); examining human factors associated with effective lean teams, thereby importing organization behavioral insights into the operations management (Dun and Wilderom, 2016); investigating design features of variable pay plans adopted for shop-floor workers engaged in manufacturing firms that currently implement the LP (Wickramasinghe and Wickramasinghe, 2016b); considering linkages between specific

(*continued*)

Table III.

Themes	Statements presenting the originality of the studies
	types of leadership (transformational, servant and empowering leadership styles) and lean (Assen, 2016)
Waste management	Providing a coherent and consistent definition of waste, improving the understanding of waste (Thurer *et al.*, 2016)
Leanness	Developing a generic framework for leanness and clarifying the major elements of the lean concept that are commonly referenced by the researchers and practicing engineers (Papadopoulou and Ozbayrak, 2005); proposing a leanness measure which delivers features such as an integrated index covering essential dimensions, variable scope of application, self-contained benchmark, up-to-date frontier and tradeoffs between competitive strategies (Wan and Chen, 2008); developing a relative, dynamic, long-term, integrative, holistic and objective measure of leanness (Bayou and Korvin, 2008); demonstrating the application of a model for measuring the degree of leanness and the extent of business improvement (Forrester *et al.*, 2010); assessing the leanness of an organization using multi-grade fuzzy approach (Vinodh and Chintha, 2011b); investigating the effect of inventory leanness on firm performance and presenting a size-adjusted inventory leanness measure controlling for the effect of firm size on inventory leanness (Eroglu and Hofer, 2011); assessing the leanness level of a manufacturing organization using a model based on fuzzy logic (Vinodh and Balaji, 2011); investigating the relationship between the LP and financial performance and the mediating role of inventory leanness (Hofer *et al.*, 2012); developing a simplified leanness evaluation metric considering both efficiency and effectiveness attributes and integrating it with the lean implementation methodology (Karim and Arif-Uz-Zaman, 2013); the development and implementation of an efficient decision-making procedural hierarchy to support leanness extent evaluation using interval-valued fuzzy sets (Matawale *et al.*, 2014b); demonstrating the large differences in the inventory leanness-financial performance link and the factors that govern it (Isaksson and Seifert, 2014); providing a measure for assessing the leanness level of an organization, adopting a holistic approach of performance measurement based on the socio-technical perspective which considers the inter-dynamics of human, system and technology (Wong *et al.*, 2014); exploring how firm characteristics and environmental dynamism – measured in terms of innovative intensity, demand uncertainty and competitive intensity – moderate the link between inventory leanness and performance (Eroglu and Hofer, 2014); developing an efficient decision-making procedural hierarchy to support leanness extent evaluation (Azadeh *et al.*, 2015); developing a conceptual model for leanness assessment for SMEs (Vidyadhar *et al.*, 2016); measuring the leanness level using an integrated metric that combines efficiency, WIP performance, as well as service level and studying the impact of demand uncertainty on the leanness level dynamics (Ali and Deif, 2016); studying the importance of interactions between the lean elements and incorporating them to assess the systemic leanness (Narayanamurthy and Gurumurthy, 2016b)

Table III.

(continued)

Themes	Statements presenting the originality of the studies
Lean integration with other management approaches	Understanding the impact of lean thinking on ISO 9001 and proposing a guideline for their integration (Chiarini, 2011); mapping manufacturing execution system and lean activities onto the same framework and determining their dependency (Cottyn *et al.*, 2011); proposing a concurrent engineering framework based on the application of IT and object-oriented methodology for LM (Pullan *et al.*, 2013); designing a flexible lean model for integrated management systems in the real environment of an industrial SME (Rebelo *et al.*, 2014); showing that lean and international operations, knowledge management, dynamic capabilities and organizational configurations literature can be integrated to model lean roll-out processes (Secchi and Camuffo, 2016); embedding Taguchi's quality philosophy and practice in an LM System (Gamage *et al.*, 2016)
Countries	Investigating actual LM practice and performance in Chinese plants (Taj, 2008); conducting a longitudinal study on the association between the LP and performance in British manufacturing (Menezes *et al.*, 2010); providing insights into the adoption of lean practices in Thailand (Rahman *et al.*, 2010); systematically comparing the adoption of lean practices in China and the USA (Hofer *et al.*, 2011); addressing key relationships between LP, product quality performance and business performance within the Malaysian manufacturing industry (Agus and Hajinoor, 2012); measuring adherence to lean practices for Turkish automotive part suppliers (Sezen *et al.*, 2012); investigating the degree of the LP implementation in the Indian manufacturing plants and its impact on operational metrics (Ghosh, 2012); developing a measurement framework to evaluate the lean readiness level and lean systems within Kuwaiti small and medium-sized manufacturing industries (Al-Najem *et al.*, 2013); finding suitable LM frameworks for the Indian context (Jasti and Kodali, 2014b); reporting comprehensive insights on current awareness and implementation of LM in India and highlighting the initiatives taken by the Government of India (Thanki and Thakkar, 2014); exploring the status of lean adoption in the Indian process industries (Panwar *et al.*, 2015a); exploring principles of lean product development in automotive companies in South Africa (Mund *et al.*, 2015); examining the implementation of lean thinking and practices in Iran's manufacturing industry (Zahraee, 2016); reporting the status of LM implementation in the Indian manufacturing industries (Jasti and Kodali, 2016); studying the application of LM in a company with limited resources operating in a developing economy (Pakistan) (Chaplin *et al.*, 2016); examining a western organization implementing lean to a subsidiary in Southeast Asia (Indonesia) (Frahm, 2016); investigating the LM and its implications for business performance from a developing country standpoint (Indonesia) (Nawanir *et al.*, 2016); investigating the degree to which LM practices are being implemented within Brazilian SMEs (Filho *et al.*, 2016); examining the LM in companies operating in a context of economic instabilities and market changes (Italy) (Bevilacqua *et al.*, 2016); studying individual practices used in the US industry (Abolhassani *et al.*, 2016)

(*continued*)

Table III.

Themes	Statements presenting the originality of the studies
Methodology of the study	Analyzing the causes for the limited adoption of LM based on the study of multiple cases (Lasa *et al.*, 2009); studying the adoption of lean practices in an Asian context using survey data as opposed to case studies (Rahman *et al.*, 2010); applying the QFD approach for linking the lean competitive bases, lean attributes and lean enablers (Vinodh and Chintha, 2011a); combining the balance scorecard and other group decision-making methods such as Delphi, Nominal Group Technique and DEMATEL, to introduce a lean strategy map for the auto part manufacturers (Seyedhosseini *et al.*, 2011); establishing the validity and reliability of the model measuring adherence to lean practices, through rigorous statistical analysis (Sezen *et al.*, 2012); utilizing a systematic approach to the analysis of LM system and considering the leanness practices or enablers in an integrated and not an isolated manner (Vinodh and Joy, 2012); using a fuzzy logic advisory system to assess the LM within SMEs (Achanga *et al.*, 2012); developing a mathematical model and a systematic methodology to estimate the manufacturer perceived effectiveness of reduction of manufacturing wastes by implementing appropriate lean strategies within their limited time (Amin and Karim, 2013); measuring the value of the influence of lean attributes on manufacturing systems by using fuzzy membership functions and considering the decision makers' attitude toward risks (Anvari *et al.*, 2013); taking into consideration the number of the articles reviewed (178 in 24 journals) and published over a time span of 20 years (Jasti and Kodali, 2014a); applying, through a large-scale empirical study, a multilevel and simultaneous dimensional test of the congruence between national culture and LM practices (Kull *et al.*, 2014); integrating AHP and DEA with desirable and undesirable factors to evaluate the lean tools and techniques and to rank the aspect of efficacy (Anvari *et al.*, 2014); considering as the unit of the literature review analysis, the lean phenomenon itself and not the organization (Samuel *et al.*, 2015); obtaining objective information about the implementation of lean in companies other than the Japanese (Bamford *et al.*, 2015); developing a more comprehensive understanding of lean by considering various dimensions of organizational culture, LM and performance, rather than focusing on a specific set of variables and by relying on a well-established OC model, the global leadership and organizational behavior effectiveness model (Bortolotti *et al.*, 2015b); evaluating 29 GLOBE leadership attributes from the perspective of an ideal lean leadership profile (Gelei *et al.*, 2015); applying the Bayesian network for business performance measures considering both the tangible and intangible results due to LM implementation under changing business conditions (Buyukozkan *et al.*, 2015); examining the adoption of lean latent constructs and their effect on lean-based quality and productivity improvement model using SEM (Al-Tahat and Jalham, 2015); identifying the enablers for lean implementation in the manufacturing sector, to establish a relationship among them using interpretive structural modeling and to rank them using an interpretive ranking process (Sharma *et al.*, 2016a)

Table III.

(*continued*)

Themes	Statements presenting the originality of the studies
Lean knowledge and training	Developing a model of the role of external information sources (training sessions, plant visits and conferences) in the success of lean (Boyle *et al.*, 2011); managing the training needs of temporary workers to enhance the efficiency and effectiveness of lean (Tan *et al.*, 2013); examining the relationships between dimensions of learning organization and contextual variables in companies that are implementing the LM (Tortorella *et al.*, 2015); identifying which mechanisms for transferring lean knowledge are most important according to different contextual conditions (the maturity of lean in a subsidiary and headquarters–subsidiary relations) as lean evolves over time (Boscari *et al.*, 2016); analyzing the effect of cross-training the lean tool in knowledge transfer processes in product development processes (Stanica and Peydro, 2016)
Lean implementation issues	Proposing a method of feature selection during incremental lean product development to maximize the customer perceived value for the changes (Gautam and Singh, 2008); monitoring the maintenance operation during the transition process from a non-lean to a lean production system (Moayed and Shell, 2009); developing a simple yet effective game on the LM (Ozelkan and Galambosi, 2009); providing a practical definition of core competence and application of theory within a lean implementation, trialed and validated in an industrial setting (Parry *et al.*, 2010); focusing on a bespoke change strategy for lean (Bhasin, 2011b, 2012b); developing a decision framework for the selection of the best sequence of VSM tool application to maximize the performance of a lean manufacturer (Ramesh and Kodali, 2012); presenting the best practice case studies from selected manufacturing SMEs that have recently improved or deployed lean strategies (Panizzolo *et al.*, 2012); determining the optimum route for lean implementation taking into consideration various factors (implementation cost, benefits, time of completion, technological capabilities, administrative constraints and the degree of risk involved) that govern the effective implementation of lean (Almomani *et al.*, 2014); developing a new approach to evaluate the optimal quantity to be produced when a customer places an order, considering the impact of the risk of non-sale on the total cost of the LP (Lyonnet and Toscano, 2014); exploring the partial implementation of lean (Bamford *et al.*, 2015); analyzing, for a single machine, which shop-floor variables should be prioritized by lean-based improvement programs that reduce the lead time (Filho and Barco, 2015); studying, in the case of the LP, the coming together of different concepts of management control (Tillema and Steen, 2015); analyzing what practitioners describe – in their own words – as critical for implementing lean in their factories (Netland, 2016); developing and testing a financially driven method for objectively targeting lean interventions (Darlington *et al.*, 2016); presenting the ongoing work toward an interface for digitizing the LP methods using a cyber-physical system (Kolberg *et al.*, 2016); analyzing an inventory model by considering a random defective rate in a cleaner multi-stage LM system (Tayyab and Sarkar, 2016)

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Table III.

Themes	Statements presenting the originality of the studies
Lean implementation assessment	Offering a practical and easy-to-use lean assessment tool (Taj, 2005); presenting an adaptive lean assessment approach that provides an effective way to guide the lean process, using computer-based decision support tool for lean (Wan and Chen, 2009); examining whether an organization has adopted lean as a philosophy, and deducing the phase of a lean journey the organization has reached (Bhasin, 2011a); gaining an understanding of how the LM can be measured (Chauhan and Singh, 2012); developing a comprehensive assessment tool for lean transformation (taking into account the objectives of the enterprise, the stakeholders' expectations and a variety of system-change initiatives) and identifying the relative importance weights for every element (Cil and Turkan, 2013); developing an evaluation module of lean exploring the gray numbers theory (Matawale *et al.*, 2014a); concentrating on lean assessment within a qualitative and quantitative perspective (Pakdil and Leonard, 2014); proposing a way to measure the degree of the LM (Lucato *et al.*, 2014); proposing a method to assess the LP in a manufacturing cell (Marodin *et al.*, 2015); assessing the adoption of lean product development enablers (Tortorella *et al.*, 2016); measuring the current product development processes and comparing them to the lean best-case scenario (Al-Ashaab *et al.*, 2016); evaluating warehouse performance on the basis of lean assessment (Sharma and Shah, 2016)
Modeling lean – lean constructs	Providing a framework that identifies the most salient dimensions (internal and external) of the LP (Shah and Ward, 2007); creating a conceptual framework for a set of lean principles within the context of information management (Hicks, 2007); presenting the essentials of the LP and conveying its most salient philosophical elements (Pettersen, 2009); operationalizing and empirically validating the concept of complementarity of two of the main lean bundles, namely, JIT and TQM (Furlan *et al.*, 2011); identifying the key aspects that should be included for the LP (apart from internal aspects at the shop-floor level and value chain elements, work organization and geographical context should also be considered) (Moyano-Fuentes and Sacristan-Diaz, 2012); developing a model for measuring adherence to lean practices, where a lean construct is uni-dimensional (Sezen *et al.*, 2012); conceptualizing the LP as two bundles (internal and external) that collectively encompass all lean practices and testing the synergy between these lean bundles at the firm level, instead of at the plant level (Hofer *et al.*, 2012); proposing a systematic lean methodology based on lean principles and continuous improvement techniques (Karim and Arif-Uz-Zaman, 2013); formulating a reference framework for the enablers that Toyota has used for lean product development (Khan *et al.*, 2013); presenting the lean "Leadership People Process Outcome" model (Dibia *et al.*, 2014); testing a model of lean (consisting of constructs such as deployment, engagement, training, processes, drivers and culture) on companies that have achieved successful and sustained lean (Sisson and Elshennawy, 2015); proposing an integrative structure of lean thinking (e.g. principles, practices, waste identification and value stream mapping) within the maintenance activities (Mostafa *et al.*, 2015); studying three dimensions of lean, the technical, rhetorical and organizational (Langstrand and Drotz, 2016); focusing on segmenting the set of lean criteria into some meaningful portions (Sharma *et al.*, 2016b)

Table III.

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Themes	Statements presenting the originality of the studies
Manufacturing sub-sectors and units	Explaining how some lean techniques can improve productivity and quality in red meat-cutting plants (Simons and Zokaei, 2005); evaluating the current state of the LM in some selected plants in electronics, telecommunication/wireless and computer industries in the Republic of China (Taj, 2005); determining the degree of use of some of the most representative LP practices in the Spanish ceramic tile industry (Bonavia and Marin, 2006); studying lean visual communication from the tools being developed on the shop-floor throughout the aerospace companies (Parry and Turner, 2006); realization of critical factors determining a successful implementation of the LM within the environment of SMEs (Achanga *et al.*, 2006); taking a case-based approach (in the steel industry) to address the view that the process sector is less amenable to many lean techniques (Abdulmalek and Rajgopal, 2007); exploring the relationships between the general application of lean principles primarily in the domain of engineering and product development (where much of the character of a product is determined) and success in markets for premium products (Oliver *et al.*, 2007); examining the relationships of two aspects of lean strategy – lean design and lean manufacturing – to overall firm performance of the automotive supply industry (Jayaram *et al.*, 2008); analyzing the decision to introduce a reverse-logistics system for remanufacturing used products in an LP environment (Rubio and Corominas, 2008); assessing the culture and understanding the influence of culture on the applicability of lean principles to industrialized housing (Hook and Stehn, 2008); tracing the challenges and accomplishments that a large, global organization (European manufacturer of food processing equipment) faced on its journey to achieving a vibrant and sustained lean program (Scherrer-Rathje *et al.*, 2009); reconceptualizing the relationship between lean implementation and production costs, with evidence from the F-22 program, synthesizing the empirical data with other existing theories of complexity and learning (Browning and Heath, 2009); identifying the lean concepts (promoted by the use of VSM) which have limited use in discontinuous flow-line manufacturing system-type companies (Lasa *et al.*, 2009); implementing the LM in a material handling system of a petroleum drill bit manufacturing company (Green *et al.*, 2010); providing a detailed analysis of the implementation of lean operations in the agricultural sector in Brazil (Forrester *et al.*, 2010); assessing the extent to which LP practices are used and their relationships, at the cell level, not in the plant as a whole (Saurin *et al.*, 2011); applying lean principles (in a straightforward manner) downstream the point (of semi-process industries) where process production turns into discrete production (Pool *et al.*, 2011); examining the use of LM in the textile industry (Hodge *et al.*, 2011); comparing the validation of the lean practices constructs, as well as their impact on firm performance between manufacturing and service firms (Alsmadi *et al.*, 2012); analyzing the current status of the use of LM practices among food-processing SMEs in Europe (Dora *et al.*, 2013)

(*continued*)

Table III.

Themes	Statements presenting the originality of the studies
Manufacturing sub-sectors and units	Analyzing the extent to which the LP is compatible with the nature of complex systems such as construction sites, which have different characteristics of complexity in comparison with manufacturing plants (Saurin *et al.*, 2013); linking specific process industry characteristics and the structure of process industry operations to specific lean principles (Lyons *et al.*, 2013); providing some key enablers for the successful implementation of lean tools in Indian tyre manufacturing (Gupta *et al.*, 2013); studying the applicability of LM to a different environment: a seasonal food industry (Tanco *et al.*, 2013); applying a customized flowchart tailored for the aerospace manufacturing industry, supported by the lean principles and with focus on automation (Barbosa *et al.*, 2014); investigating lean at Blue Star Limited, Dadra Plant, India, engaged in manufacturing air-conditioning coils, and in particular, condenser and evaporator coils for air-conditioning systems (Das *et al.*, 2014); contrasting the common characteristics of SMEs with the realm of lean "genius" – Toyota (Rymaszewska, 2014); studying lean in the New Zealand apple and pear (pipfruit) industry (Doevendans *et al.*, 2015); applying lean thinking to information management to improve the performance of an automotive company (Bevilacqua *et al.*, 2015); demonstrating how the LM can help improve work efficiency of a company's sheet-metal stamping process (Choomlucksana *et al.*, 2015); providing information on the application of lean thinking in product engineering, not only in product design and development in automotive companies (Mund *et al.*, 2015); examining the concurrent effect of lean fundamentals and relationship enterprise approach of collaboration on new product development in the automotive domain (Tuli and Shankar, 2015); developing a new lean action plan that can be adopted by SMEs, particularly by those operating in the food sector (Vlachos, 2015); developing a methodology that can help SMEs, in the manufacturing sector, to select an appropriate lean tool (Alaskari *et al.*, 2016); identifying the most dominant factors influencing the implementation of lean remanufacturing principles in the context of advanced production and sustainable systems (Vasanthakumar *et al.*, 2016); investigating the adaptability of the LM in a complex small and medium-sized food-processing enterprise environment (Dora *et al.*, 2016); studying lean intervention projects in a UK low-volume manufacturer of large vehicles (Darlington *et al.*, 2016); testing the lean principles in a service and administrative context of a textile SME (Manfredsson, 2016); combining lean principles with the boundary spanning theory to explore lean in the context of the operations management – applied service interface space within a large aerospace organization (McAdam *et al.*, 2016)
Lean effects	Examining the mediating role of lean bundles on operational performance (Pont *et al.*, 2008); proposing a dynamic multi-dimensional LM performance model that not only focuses on the intangible and intellectual assets but also embraces various time horizons and interests of multiple stakeholders (Bhasin, 2008); adopting an SEM framework for the examination of non-financial manufacturing performance measures as potential sources of variation in lean strategies' financial performance effects (Fullerton and Wempe, 2009); studying how to survive in recession by means of lean principles and philosophies (Singh *et al.*, 2009); studying the integration between operations management

Table III.

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Themes	Statements presenting the originality of the studies
	and HRM practices associated with lean production and the effects on firm performance (Menezes *et al.*, 2010); seeking the complementarity effects of lean bundles, namely, JIT and TQM, on operational performance (Furlan *et al.*, 2011); exploring the relationships between the LM, environmental management practices and environmental and business performance (Yang *et al.*, 2011); examining the role of contingency variables such as environmental dynamism and industry clockspeed in the relationship between internal lean practices and operational performance (quality, delivery, flexibility and cost) (Chavez *et al.*, 2013); investigating the impact of the LM on financial performance, and more specifically, how this impact has been measured, based on more than 20 years of experience in LM implementation (Camacho-Minano *et al.*, 2013); explaining how lean operations and lean purchasing have distinct characteristics that influence the plant's gross margin and assessing the influence of two different environmental contexts (complexity and dynamism) on the effects of lean practices (Azadegana *et al.*, 2013); studying how the LM can affect organizational performance, not only at the operations level but also at the business level (Nawanir *et al.*, 2013); highlighting the key areas of the LP that contribute to superior business performance (Losonci and Demeter, 2013); understanding the LP and its dynamics for the viability of the firms (Dominici and Palumbo, 2013); providing empirical evidence of the relationships among lean management accounting practices, operations performance and financial performance (Fullerton *et al.*, 2014); analysis of the effects of all the most essential lean methods (JIT, automation, kaizen, TPM, VSM) on the most currently important measures of operational performance (cost, speed, dependability, quality and flexibility) (Belekoukias *et al.*, 2014); developing an integrative stage-based model of lean and sustainable outcomes (which considers lean as more than a toolkit, but a philosophy and strategic direction also) (Piercy and Rich, 2015); studying the contingency effect of technological turbulence on the lean-performance link (Chavez *et al.*, 2015); providing support for the sand cone of cumulative performance due to lean implementation (Bortolotti *et al.*, 2015a); studying the effect of JIT/lean on performance of SMEs (Filho *et al.*, 2016)
Impact on lean	Studying the relationship between LM practices, inventory turnover (different types of inventories) and contingency factors (Demeter and Matyusz, 2011); demonstrating how different manufacturing process choices (craft and mass production) influence the lean transformation process (Deflorin and Scherrer-Rathje, 2012); investigating the dynamics (uncertainty caused by demand variation and system's availability) associated with applying some of the lean principles to a manufacturing cell (Deif, 2012); gaining insight regarding how management accounting and control practices work together to support an LM strategy (Fullerton *et al.*, 2013); demonstrating the synergistic relationship between manufacturing technologies and lean practices (Khanchanapong *et al.*, 2014); quantitatively testing the impact and complementarities between various control forms in a lean organization (Kristensen and Israelsen, 2014); exploring the causal relationships among the drivers which can be used for decision-making to implement lean easily and effectively (Sangwan *et al.*, 2014); exploring whether or

(*continued*)

Table III.

Themes	Statements presenting the originality of the studies
	not organizational culture can counterbalance the negative influences of national culture on the efficacy of lean practices (Wiengarten *et al.*, 2015); testing an integrated model that includes supplier partnership, customer relationship and internal lean practices (Chavez *et al.*, 2015); describing the role that external resources like suppliers can play in mastering lean cumulatively (Bortolotti *et al.*, 2015a); investigating differences in organizational culture dimensions between successful and unsuccessful lean plants (Bortolotti *et al.*, 2015b); determining the role of management control practices (financial and nonfinancial rewards) in implementing large-scale strategic initiatives such as corporate lean programs (Netland *et al.*, 2015); analyzing the relationship among leadership behaviors, leadership attributes and lean contexts (Gelei *et al.*, 2015); examining the impact of HK (Hoshin kanri) on quality management – lean production success and company performance (Nicholas, 2016); empirically comparing synergy/tradeoff between operational resilience and lean with reference to changes in operations performance (Birkie, 2016); presenting an analysis of the status of resource flexibility and LM (Chauhan, 2016); determining how the contextual factors of company size, position at the supply chain and age of the formal lean implementation affect the degree of use of LP practices (Marodin *et al.*, 2016); examining lean efforts in terms of the connections with societal culture (Pakdil and Leonard, 2016); examining the association between enablers and problems of lean product development (Tortorella *et al.*, 2016); discussing how the complexity and dynamism factors (both internal and external) have configuration and moderation roles of influence on lean implementation strategy (Birkie and Trucco, 2016)
Lean motivation	Analyzing an integrated framework of the factors that might explain the reasons why companies adopt the LP and interrelationships among these factors in the adoption process (Martinez-Jurado and Moyano-Fuentes, 2014)

Table III.

meaningful themes. Thus, the following themes of originality value were revealed, which refer to the manufacturing context: lean literature review, theory, future research agenda, barriers-difficulties, knowledge and training, integration with other management approaches, effects, implementation issues, implementation assessment, modeling and constructs, motivation; waste management; human factor involved in lean; leanness; the countries which companies operate in; the manufacturing sub-sectors and units where lean is implemented; the methodology of the study of lean; and the impact on lean.

Discussion

Discussing the profile of the reviewed articles

The majority of the journals publishing LM articles belong to the publishers of Emerald and Elsevier/Science Direct, while the majority of the LM articles are published by Emerald and Taylor and Francis. A small number of journals have published the majority of LM articles at each publisher, which reflects the Pareto principle 80/20. This means that, at each publisher, a "vital few" journals have published the majority of the

LM articles, while the "useful many" journals have published the minority of the LM articles. However, the Pareto principle (in terms of the journals and the published LM articles) is clearly reflected not only in the present SLR but also in the literature review studies of Jasti and Kodali (2014a) and Jasti and Kodali (2015). The *International Journal of Production Research*, *Journal of Manufacturing Technology Management* and *Production Planning and Control Journal* are the journals with the highest number of the LM articles reviewed in the present SLR. These journals also rank among the journals with the highest number of LM articles of the literature review studies of Bhamu and Sangwan (2014) and Jasti and Kodali (2015). The increase of the LM articles with the passing of time is not only observed in the present SLR but also in the literature review studies of Jasti and Kodali (2015), Samuel *et al.* (2015) and Narayanamurthy and Gurumurthy (2016a). Surveys and case studies are presented in the majority of the LM articles of the present SLR, as well as in the literature review studies of Jasti and Kodali (2014a), Samuel *et al.* (2015) and Narayanamurthy and Gurumurthy (2016a). It is worth noting that the manufacturing sub-sectors mostly examined in the surveys and case studies of the present SLR are similar to the respective sub-sectors examined in the articles reviewed by Jasti and Kodali (2015) and Narayanamurthy and Gurumurthy (2016a). Finally, the present SLR reveals that the USA and UK are the countries where the highest number of LM studies has been conducted, which is in line with the findings of the literature review studies of Jasti and Kodali (2014a) and Bhamu and Sangwan (2014).

Discussing the originality value of the LM studies

The majority of the themes of the originality value statements refer to the three phases of the lean context, meaning its pre-implementation phase, implementation phase and post-implementation phase (Bhamu and Sangwan, 2014). More specifically, themes with regard to the lean literature review, theory, future research agenda, barriers-difficulties, knowledge and training, modeling and constructs, motivation and the human factor involved in lean concern the LM pre-implementation phase. Themes describing lean implementation issues and assessment and waste management concern the LM implementation phase itself, while themes describing lean effects and leanness concern the LM post-implementation phase (Bhamu and Sangwan, 2014). On the other hand, there are also themes of originality value which do not concern the lean context itself, such as the integration of lean with other management approaches, the countries which companies operate in, the manufacturing sub-sectors and units where lean is implemented, the methodology of the study of lean and factors which have an impact on lean. From the above, it is apparent that the originality value of the LM studies do not concern only the lean methodology itself but also the broader environment where it is developed.

Conclusions

The literature review articles of LM published so far focus on various subjects excluding the originality value of the LM studies carried out worldwide. This has strongly motivated the author of the present study to systematically review the literature focusing exclusively on the originality value of the existing LM studies. The contribution of the present SLR is attributed, firstly, to the fact that the subject that is analyzed has not been previously reviewed; secondly, to the analytical way that the originality value statements are presented; and finally, to the summarized picture of the originality value statements that is revealed though formulating the respective themes.

Portraying the originality value of the existing LM studies would help researchers better highlight the literature and research gap, as well as practitioners formulate their LM implementation plans.

A vital few journals contribute mostly to the evolution of the LM publication, which is increasing with the passing of time. The themes of originality value of the published LM studies concern mostly the pre-implementation, implementation and post-implementation phases of LM. However, they also concern factors outside the LM context, meaning other management systems, environment of a country, manufacturing sub-sectors and units, methodological research approach of LM and factors influencing LM implementation.

Limitations and future studies

The present SLR suffers from some limitations as every study does, even a literature review study. More specifically, the main limitations of the present SLR include the limited number of the publishers used for the literature review; the exclusion of studies examining an individual lean practice/tool/technique, lean – six sigma, lean – agile manufacturing, lean – green management, lean in the supply chain network, as well as lean in services, and finally, the subjectivity of grouping the large number of the originality value statements into themes. The above limitations can set the foundations for further literature review studies on LM. For example, focusing on all the available publishers and journals, studying not only the lean phenomenon individually but simultaneously with other managerial approaches which have many common elements with lean and incorporating into the review study the supply chain network of a company, as well as the services sector, could be among the main dimensions of the future research agenda.

References

Abdulmalek, F.A. and Rajgopal, J. (2007), "Analyzing the benefits of lean manufacturing and value stream mapping via simulation: a process sector case study", *International Journal of Production Economics*, Vol. 107 No. 1, pp. 223-236.

Abolhassani, A., Layfield, K. and Gopalakrishnan, B. (2016), "Lean and US manufacturing industry: popularity of practices and implementation barriers", *International Journal of Productivity and Performance Management*, Vol. 65 No. 7, pp. 875-897.

Achanga, P., Shehab, E., Roy, R. and Nelder, G. (2006), "Critical success factors for lean implementation within SMEs", *Journal of Manufacturing Technology Management*, Vol. 17 No. 4, pp. 460-471.

Achanga, P., Shehab, E., Roy, R. and Nelder, G. (2012), "A fuzzy-logic advisory system for lean manufacturing within SMEs", *International Journal of Computer Integrated Manufacturing*, Vol. 25 No. 9, pp. 839-852.

Agus, A. and Hajinoor, M.S. (2012), "Lean production supply chain management as driver towards enhancing product quality and business performance", *International Journal of Quality and Reliability Management*, Vol. 29 No. 1, pp. 92-121.

Al-Ashaab, A., Golob, M., Urrutia, U.A., Gourdin, M., Petritsch, C., Summers, M. and El-Nounu, A. (2016), "Development and application of lean product development performance measurement tool", *International Journal of Computer Integrated Manufacturing*, Vol. 29 No. 3, pp. 342-354.

Alaskari, O., Ahmad, M.M. and Pinedo-Cuenca, R. (2016), "Development of a methodology to assist manufacturing SMEs in the selection of appropriate lean tools", *International Journal of Lean Six Sigma*, Vol. 7 No. 1, pp. 62-84.

Albliwi, S.A., Antony, J. and Lim, S.A.H. (2015), "A systematic review of lean six sigma for the manufacturing industry", *Business Process Management Journal*, Vol. 21 No. 3, pp. 665-691.

Albliwi, S., Antony, J., Lim, S.A.H. and van der Wiele, T. (2014), "Critical failure factors of lean six sigma: a systematic literature review", *International Journal of Quality and Reliability Management*, Vol. 31 No. 9, pp. 1012-1030.

Ali, R. and Deif, A. (2016), "Assessing leanness level with demand dynamics in a multi-stage production system", *Journal of Manufacturing Technology Management*, Vol. 27 No. 5, pp. 614-639.

Almomani, M.A., Abdelhadi, A., Mumani, A., Momani, A. and Aladeemy, M. (2014), "A proposed integrated model of lean assessment and analytical hierarchy process for a dynamic road map of lean implementation", *The International Journal of Advanced Manufacturing Technology*, Vol. 72 Nos 1/4, pp. 161-172.

AL-Najem, M., Dhakal, H., Labib, A. and Bennett, N. (2013), "Lean readiness level within Kuwaiti manufacturing industries", *International Journal of Lean Six Sigma*, Vol. 4 No. 3, pp. 280-320.

Alpenberg, J. and Scarbrough, D.P. (2016), "Exploring communication practices in lean production", *Journal of Business Research*, Vol. 69 No. 11, pp. 4959-4963.

Alsmadi, M., Almani, A. and Jerisat, R. (2012), "A comparative analysis of lean practices and performance in the UK manufacturing and service sector firms", *Total Quality Management*, Vol. 23 Nos 3/4, pp. 381-396.

Al-Tahat, M.D. and Jalham, I.S. (2015), "A structural equation model and a statistical investigation of lean-based quality and productivity improvement", *Journal of Intelligent Manufacturing*, Vol. 26 No. 3, pp. 571-583.

Amin, M.A. and Karim, M.A. (2013), "A time-based quantitative approach for selecting lean strategies for manufacturing organisations", *International Journal of Production Research*, Vol. 51 No. 4, pp. 1146-1167.

Angelis, J., Conti, R., Cooper, C. and Gill, C. (2011), "Building a high-commitment lean culture", *Journal of Manufacturing Technology Management*, Vol. 22 No. 5, pp. 569-586.

Angelis, J. and Fernandes, B. (2012), "Innovative lean: work practices and product and process improvements", *International Journal of Lean Six Sigma*, Vol. 3 No. 1, pp. 74-84.

Anvari, A., Zulkifli, N., Sorooshian, S. and Boyerhassani, O. (2014), "An integrated design methodology based on the use of group AHP-DEA approach for measuring lean tools efficiency with undesirable output", *The International Journal of Advanced Manufacturing Technology*, Vol. 70 Nos 9/12, pp. 2169-2186.

Anvari, A., Zulkifli, N. and Yusuff, R.M. (2013), "A dynamic modeling to measure lean performance within lean attributes", *The International Journal of Advanced Manufacturing Technology*, Vol. 66 Nos 5/8, pp. 663-677.

Arlbjorn, J.S. and Freytag, P.V. (2013), "Evidence of lean: a review of international peer-reviewed journal articles", *European Business Review*, Vol. 25 No. 2, pp. 174-205.

Assen, M.F. (2016), "Exploring the impact of higher management's leadership styles on lean management", *Total Quality Management and Business Excellence*, pp. 1-30.

Azadegana, A., Patel, P.C., Zangoueinezhad, A. and Linderman, K. (2013), "The effect of environmental complexity and environmental dynamism on lean practices", *Journal of Operations Management*, Vol. 31 No. 4, pp. 193-212.

Azadeh, A., Zarrin, M., Abdollahi, M., Noury, S. and Farahmand, S. (2015), "Leanness assessment and optimization by fuzzy cognitive map and multivariate analysis", *Expert Systems with Applications*, Vol. 42 Nos 15/16, pp. 6050-6064.

Bamford, D., Forrester, P., Dehe, B. and Leese, R.G. (2015), "Partial and iterative lean implementation: two case studies", *International Journal of Operations and Production Management*, Vol. 35 No. 5, pp. 702-727.

Barbosa, G.F., Carvalho, J. and Filho, E.V.G. (2014), "A proper framework for design of aircraft production system based on lean manufacturing principles focusing to automated processes", *The International Journal of Advanced Manufacturing Technology*, Vol. 72 Nos 9/12, pp. 1257-1273.

Bayou, M.E. and Korvin, A. (2008), "Measuring the leanness of manufacturing systems – a case study of ford motor company and general motors", *Journal of Engineering and Technology Management*, Vol. 25 No. 4, pp. 287-304.

Belekoukias, I., Garza-Reyes, J.A. and Kumar, V. (2014), "The impact of lean methods and tools on the operational performance of manufacturing organisations", *International Journal of Production Research*, Vol. 52 No. 18, pp. 5346-5366.

Bevilacqua, M., Ciarapica, F.E. and Paciarotti, C. (2015), "Implementing lean information management: the case study of an automotive company", *Production Planning and Control*, Vol. 26 No. 10, pp. 753-768.

Bevilacqua, M., Ciarapica, F.E. and Sanctis, I. (2016), "Lean practices implementation and their relationships with operational responsiveness and company performance: an Italian study", *International Journal of Production Research*, Vol. 55 No. 3, pp. 769-794.

Bhamu, J. and Sangwan, K.S. (2014), "Lean manufacturing: literature review and research issues", *International Journal of Operations and Production Management*, Vol. 34 No. 7, pp. 876-940.

Bhasin, S. (2008), "Lean and performance measurement", *Journal of Manufacturing Technology Management*, Vol. 19 No. 5, pp. 670-684.

Bhasin, S. (2011a), "Measuring the leanness of an organisation", *International Journal of Lean Six Sigma*, Vol. 2 No. 1, pp. 55-74.

Bhasin, S. (2011b), "Performance of organisations treating lean as an ideology", *Business Process Management Journal*, Vol. 17 No. 6, pp. 986-1011.

Bhasin, S. (2012a), "Prominent obstacles to lean", *International Journal of Productivity and Performance Management*, Vol. 61 No. 4, pp. 403-425.

Bhasin, S. (2012b), "An appropriate change strategy for lean success", *Management Decision*, Vol. 50 No. 3, pp. 439-458.

Birkie, S.E. (2016), "Operational resilience and lean: in search of synergies and tradeoffs", *Journal of Manufacturing Technology Management*, Vol. 27 No. 2, pp. 185-207.

Birkie, S.E. and Trucco, P. (2016), "Understanding dynamism and complexity factors in engineer-to-order and their influence on lean implementation strategy", *Production Planning and Control*, Vol. 27 No. 5, pp. 345-359.

Bonavia, T. and Marin, J.A. (2006), "An empirical study of lean production in the ceramic tile industry in Spain", *International Journal of Operations and Production Management*, Vol. 26 No. 5, pp. 505-531.

Bortolotti, T., Boscari, S. and Danese, P. (2015a), "Successful lean implementation: Organizational culture and soft lean practices", *International Journal of Production Economics*, Vol. 160, pp. 182-201.

Bortolotti, T., Danese, P., Flynn, B.B. and Romano, P. (2015b), "Leveraging fitness and lean bundles to build the cumulative performance sand cone model", *International Journal of Production Economics*, Vol. 162, pp. 227-241.

Boscari, S., Danese, P. and Romano, P. (2016), "Implementation of lean production in multinational corporations: a case study of the transfer process from headquarters to subsidiaries", *International Journal of Production Economics*, Vol. 176, pp. 53-68.

Boyle, T.A., Scherrer-Rathje, M. and Stuart, I. (2011), "Learning to be lean: the influence of external information sources in lean improvements", *Journal of Manufacturing Technology Management*, Vol. 22 No. 5, pp. 587-603.

Browning, T.R. and Heath, R.D. (2009), "Reconceptualizing the effects of lean on production costs with evidence from the F-22 program", *Journal of Operations Management*, Vol. 27 No. 1, pp. 23-44.

Buyukozkan, G., Kayakutlu, G. and Karakadilar, I. (2015), "Assessment of lean manufacturing effect on business performance using Bayesian belief networks", *Expert Systems with Applications*, Vol. 42 No. 19, pp. 6539-6551.

Camacho-Minano, M., Moyano-Fuentes, J. and Sacristan-Diaz, M. (2013), "What can we learn from the evolution of research on lean management assessment?", *International Journal of Production Research*, Vol. 51 No. 4, pp. 1098-1116.

Camuffo, A., Stefano, F. and Paolino, C. (2015), "Safety reloaded: Lean operations and high involvement work practices for sustainable workplaces", *Journal of Business Ethics*, pp. 1-15.

Chaplin, L., Heap, J. and O'Rourke, S.T.J. (2016), "Could 'lean lite' be the cost effective solution to applying lean manufacturing in developing economies?", *International Journal of Productivity and Performance Management*, Vol. 65 No. 1, pp. 126-136.

Chauhan, G. (2016), "An analysis of the status of resource flexibility and lean manufacturing in a textile machinery manufacturing company", *International Journal of Organizational Analysis*, Vol. 24 No. 1, pp. 107-122.

Chauhan, G. and Singh, T.P. (2012), "Measuring parameters of lean manufacturing realization", *Measuring Business Excellence*, Vol. 16 No. 3, pp. 57-71.

Chavez, R., Gimenez, C., Fynes, B., Wiengarten, F. and Yu, W. (2013), "Internal lean practices and operational performance. The contingency perspective of industry clockspeed", *International Journal of Operations and Production Management*, Vol. 33 No. 5, pp. 562-588.

Chavez, R., Yu, W., Jacobs, M., Fynes, B., Wiengarten, F. and Lecuna, A. (2015), "Internal lean practices and performance: the role of technological turbulence", *International Journal of Production Economics*, Vol. 160, pp. 157-171.

Chiarini, A. (2011), "Integrating lean thinking into ISO 9001: a first guideline", *International Journal of Lean Six Sigma*, Vol. 2 No. 2, pp. 96-117.

Choomlucksana, J., Ongsaranakorn, M. and Suksabai, P. (2015), "Improving the productivity of sheet metal stamping subassembly area using the application of lean manufacturing principles", *Procedia Manufacturing*, Vol. 2, pp. 102-107.

Cil, I. and Turkan, Y.S. (2013), "An ANP-based assessment model for lean enterprise transformation", *The International Journal of Advanced Manufacturing Technology*, Vol. 64 Nos 5/8, pp. 1113-1130.

Conti, R., Angelis, J., Cooper, C., Faragher, B. and Gill, C. (2006), "The effects of lean production on worker job stress", *International Journal of Operations and Production Management*, Vol. 26 No. 9, pp. 1013-1038.

Cottyn, J., Landeghem, H., Stockman, K. and Derammelaere, S. (2011), "A method to align a manufacturing execution system with lean objectives", *International Journal of Production Research*, Vol. 49 No. 14, pp. 4397-4413.

Darlington, J., Francis, M., Found, P. and Thomas, A. (2016), "Targeting lean process improvement projects for maximum financial impact", *Production Planning and Control*, Vol. 27 No. 2, pp. 114-132.

Das, B., Venkatadri, U. and Pandey, P. (2014), "Applying lean manufacturing system to improving productivity of air conditioning coil manufacturing", *The International Journal of Advanced Manufacturing Technology*, Vol. 71 Nos 1/4, pp. 307-323.

Deflorin, P. and Scherrer-Rathje, M. (2012), "Challenges in the transformation to lean production from different manufacturing-process choices: a path-dependent perspective", *International Journal of Production Research*, Vol. 50 No. 14, pp. 3956-3973.

Deif, A.M. (2012), "Dynamic analysis of a lean cell under uncertainty", *International Journal of Production Research*, Vol. 50 No. 4, pp. 1127-1139.

Demeter, K. and Matyusz, Z. (2011), "The impact of lean practices on inventory turnover", *International Journal of Production Economics*, Vol. 133 No. 1, pp. 154-163.

Dibia, I.K., Dhakal, H.N. and Onuh, S. (2014), "Lean leadership people process outcome (LPPO) implementation model", *Journal of Manufacturing Technology Management*, Vol. 25 No. 5, pp. 694-711.

Doevendans, H.J.T., Grigg, N.P. and Goodyer, J. (2015), "Exploring lean deployment in New Zealand apple packhouses", *Measuring Business Excellence*, Vol. 19 No. 1, pp. 46-60.

Dominici, G. and Palumbo, F. (2013), "Decoding the Japanese lean production system according to a viable systems perspective", *Systemic Practice and Action Research*, Vol. 26 No. 2, pp. 153-171.

Dora, M., Goubergen, D.V., Kumar, M., Molnar, A. and Gellynck, X. (2013), "Application of lean practices in small and medium-sized food enterprises", *British Food Journal*, Vol. 116 No. 1, pp. 125-141.

Dora, M., Kumar, M. and Gellynck, X. (2016), "Determinants and barriers to lean implementation in food-processing SMEs – a multiple case analysis", *Production Planning and Control*, Vol. 27 No. 1, pp. 1-23.

Dun, D.H., Hicks, J.N. and Wilderom, C.P.M. (2016), "Values and behaviors of effective lean managers: Mixed-methods exploratory research", *European Management Journal*, Vol. 35 No. 2, pp. 174-186.

Dun, D.H. and Wilderom, C.P.M. (2016), "Lean-team effectiveness through leader values and members' informing", *International Journal of Operations and Production Management*, Vol. 36 No. 11, pp. 1530-1550.

Eroglu, C. and Hofer, C. (2011), "Lean, leaner, too lean? the inventory-performance link revisited", *Journal of Operations Management*, Vol. 29 No. 4, pp. 356-369.

Eroglu, C. and Hofer, C. (2014), "The effect of environmental dynamism on returns to inventory leanness", *Journal of Operations Management*, Vol. 32 No. 6, pp. 347-356.

Filho, M.G. and Barco, C.F. (2015), "A framework for choosing among different lean-based improvement programs", *The International Journal of Advanced Manufacturing Technology*, Vol. 81 Nos 1/4, pp. 183-197.

Filho, M.G., Ganga, G.M.D. and Gunasekaran, A. (2016), "Lean manufacturing in Brazilian small and medium enterprises: implementation and effect on performance", *International Journal of Production Research*, Vol. 54 No. 24, pp. 7523-7545.

Forno, A.J.D., Forcellini, F.A., Kipper, L.M. and Pereira, F.A. (2016), "Method for evaluation via benchmarking of the lean product development process", *Benchmarking: An International Journal*, Vol. 23 No. 4, pp. 792-816.

Forrester, P.L., Shimizu, U.K., Soriano-Meier, H., Garza-Reyes, J.A. and Basso, L.F.C. (2010), "Lean production, market share and value creation in the agricultural machinery sector in Brazil", *Journal of Manufacturing Technology Management*, Vol. 21 No. 7, pp. 853-871.

Frahm, J. (2016), "Effective strategy for lean implementation under a culturally diversified environment case", *The TQM Journal*, Vol. 28 No. 3, pp. 377-389.

Fullerton, R.R., Kennedy, F.A. and Widener, S.K. (2014), "Lean manufacturing and firm performance: the incremental contribution of lean management accounting practices", *Journal of Operations Management*, Vol. 32 Nos 7/8, pp. 414-428.

Fullerton, R.R., Kennedy, F.A. and Widener, S.K. (2013), "Management accounting and control practices in a lean manufacturing environment", *Accounting, Organizations and Society*, Vol. 38 No. 1, pp. 50-71.

Fullerton, R.R. and Wempe, W.F. (2009), "Lean manufacturing, non-financial performance measures, and financial performance", *International Journal of Operations and Production Management*, Vol. 29 No. 3, pp. 214-240.

Furlan, A., Vinelli, A. and Dal Pont, G. (2011), "Complementarity and lean manufacturing bundles: an empirical analysis", *International Journal of Operations and Production Management*, Vol. 31 No. 8, pp. 83-850.

Gamage, P., Jayamaha, N.P. and Grigg, N.P. (2016), "Acceptance of Taguchi's quality philosophy and practice by lean practitioners in apparel manufacturing", *Total Quality Management and Business Excellence*, Vol. 27, pp. 1-17.

Gautam, N. and Singh, N. (2008), "Lean product development: Maximizing the customer perceived value through design change (redesign)", *International Journal of Production Economics*, Vol. 114 No. 1, pp. 313-332.

Gelei, A., Losonci, D. and Matyusz, Z (2015), "Lean production and leadership attributes – the case of Hungarian production managers", *Journal of Manufacturing Technology Management*, Vol. 26 No. 4, pp. 477-500.

Ghosh, M. (2012), "Lean manufacturing performance in Indian manufacturing plants", *Journal of Manufacturing Technology Management*, Vol. 24 No. 1, pp. 113-122.

Green, J.C., Lee, J. and Kozman, T.A. (2010), "Managing lean manufacturing in material handling operations", *International Journal of Production Research*, Vol. 48 No. 10, pp. 2975-2993.

Gupta, V., Acharya, P. and Patwardhan, M. (2013), "A strategic and operational approach to assess the lean performance in radial tyre manufacturing in India", *International Journal of Productivity and Performance Management*, Vol. 62 No. 6, pp. 634-651.

Hartini, S. and Ciptomulyono, U. (2015), "The relationship between lean and sustainable manufacturing on performance: literature review", *Procedia Manufacturing*, Vol. 4, pp. 38-45.

Hasle, P., Bojesen, A., Jensen, P.L. and Bramming, P. (2012), "Lean and the working environment: a review of the literature", *International Journal of Operations and Production Management*, Vol. 32 No. 7, pp. 829-849.

Hicks, B.J. (2007), "Lean information management: Understanding and eliminating waste", *International Journal of Information Management*, Vol. 27 No. 4, pp. 233-249.

Hodge, G.L., Ross, K.G., Joines, J.A. and Thoney, K. (2011), "Adapting lean manufacturing principles to the textile industry", *Production Planning and Control*, Vol. 22 No. 3, pp. 237-247.

Hofer, C., Eroglu, C. and Hofer, A.R. (2012), "The effect of lean production on financial performance: the mediating role of inventory leanness", *International Journal of Production Economics*, Vol. 138 No. 2, pp. 242-253.

Hofer, A.R., Hofer, C., Eroglu, C. and Waller, M.A. (2011), "An institutional theoretic perspective on forces driving adoption of lean production globally", *The International Journal of Logistics Management*, Vol. 22 No. 2, pp. 148-178.

Holweg, M. (2007), "The genealogy of lean production", *Journal of Operations Management*, Vol. 25 No. 2, pp. 420-437.

Hook, M. and Stehn, L. (2008), "Applicability of lean principles and practices in industrialized housing production", *Construction Management and Economics*, Vol. 26 No. 10, pp. 1091-1100.

Hoss, M. and Caten, C.S. (2013), "Lean schools of thought", *International Journal of Production Research*, Vol. 51 No. 11, pp. 3270-3282.

Hu, Q., Mason, R., Williams, S.J. and Found, P. (2015), "Lean implementation within SMEs: a literature review", *Journal of Manufacturing Technology Management*, Vol. 26 No. 7, pp. 980-1012.

Isaksson, O.H.D. and Seifert, R.W. (2014), "Inventory leanness and the financial performance of firms", *Production Planning and Control*, Vol. 25 No. 12, pp. 999-1014.

Jadhav, J.R., Mantha, S.S. and Rane, S.B. (2014), "Exploring barriers in lean implementation", *International Journal of Lean Six Sigma*, Vol. 5 No. 2, pp. 122-148.

Jasti, N.V.K. and Kodali, R. (2014a), "A literature review of empirical research methodology in lean manufacturing", *International Journal of Operations and Production Management*, Vol. 34 No. 8, pp. 1080-1122.

Jasti, N.V.K. and Kodali, R. (2014b), "Validity and reliability of lean manufacturing frameworks: an empirical study in Indian manufacturing industries", *International Journal of Lean Six Sigma*, Vol. 5 No. 4, pp. 361-391.

Jasti, N.V.K. and Kodali, R. (2015), "Lean production: literature review and trends", *International Journal of Production Research*, Vol. 53 No. 3, pp. 867-885.

Jasti, N.V.K. and Kodali, R. (2016), "An empirical study for implementation of lean principles in Indian manufacturing industry", *Benchmarking: An International Journal*, Vol. 23 No. 1, pp. 183-207.

Jayaram, J., Vickery, S. and Droge, C. (2008), "Relationship building, lean strategy and firm performance: an exploratory study in the automotive supplier industry", *International Journal of Production Research*, Vol. 46 No. 20, pp. 5633-5649.

Karim, A. and Arif-Uz-Zaman, K. (2013), "A methodology for effective implementation of lean strategies and its performance evaluation in manufacturing organizations", *Business Process Management Journal*, Vol. 19 No. 1, pp. 169-196.

Keyser, R.S., Sawhney, R.S. and Marella, L. (2016), "A management framework for understanding change in a lean environment", *Review of Applied Management Studies*, Vol. 14 No. 1, pp. 31-44.

Khan, M.S., Al-Ashaab, A., Shehab, E., Haque, B., Ewers, P., Sorli, M. and Sopelana, A. (2013), "Towards lean product and process development", *International Journal of Computer Integrated Manufacturing*, Vol. 26 No. 12, pp. 1105-1116.

Khanchanapong, T., Prajogo, D., Sohal, A.S., Cooper, B.K., Yeung, A.C.L. and Cheng, T.C.E. (2014), "The unique and complementary effects of manufacturing technologies and lean practices on manufacturing operational performance", *International Journal of Production Economics*, Vol. 153, pp. 191-203.

Kolberg, D., Knobloch, J. and Zühlke, D. (2016), "Towards a lean automation interface for workstations", *International Journal of Production Research*, Vol. 55 No. 10, pp. 2845-2856.

Kristensen, T.B. and Israelsen, P. (2014), "Performance effects of multiple control forms in a lean organization: a quantitative case study in a systems fit approach", *Management Accounting Research*, Vol. 25 No. 1, pp. 45-62.

Kull, T.J., Yan, T., Liu, Z. and Wacker, J.G. (2014), "The moderation of lean manufacturing effectiveness by dimensions of national culture: testing practice-culture congruence hypotheses", *International Journal of Production Economics*, Vol. 153, pp. 1-12.

Langstrand, J. and Drotz, E. (2016), "The rhetoric and reality of lean: a multiple case study", *Total Quality Management and Business Excellence*, Vol. 27 Nos 3/4, pp. 398-412.

Lasa, I.S., Castro, R. and Laburu, C.O. (2009), "Extent of the use of lean concepts proposed for a value stream mapping application", *Production Planning and Control*, Vol. 20 No. 1, pp. 82-98. No

Longoni, A., Pagell, M., Johnston, D. and Veltri, A. (2013), "When does lean hurt? An exploration of lean practices and worker health and safety outcomes", *International Journal of Production Research*, Vol. 51 No. 11, pp. 3300-3320.

Losonci, D. and Demeter, K. (2013), "Lean production and business performance: international empirical results", *Competitiveness Review: An International Business Journal*, Vol. 23 No. 3, pp. 218-233.

Losonci, D., Demeter, K. and Jenei, I. (2011), "Factors influencing employee perceptions in lean transformations", *International Journal of Production Economics*, Vol. 131 No. 1, pp. 30-43.

Lucato, W.C., Calarge, F.A., Junior, M.L. and Calado, R.D. (2014), "Performance evaluation of lean manufacturing implementation in Brazil", *International Journal of Productivity and Performance Management*, Vol. 63 No. 5, pp. 529-549.

Lyonnet, B. and Toscano, R. (2014), "Towards an adapted lean system – a push-pull manufacturing strategy", *Production Planning and Control*, Vol. 25 No. 4, pp. 346-354.

Lyons, A.C., Vidamour, K., Jain, R. and Sutherland, M. (2013), "Developing an understanding of lean thinking in process industries", *Production Planning and Control*, Vol. 24 No. 6, pp. 475-494.

Magenheimer, K., Reinhart, G. and Schutte, C.S.L. (2014), "Lean management in indirect business areas: modeling, analysis and evaluation of waste", *Production Engineering*, Vol. 8 Nos 1/2, pp. 143-152.

Manfredsson, P. (2016), "Textile management enabled by lean thinking: a case study of textile SMEs", *Production Planning and Control*, Vol. 27 Nos 7/8, pp. 541-549.

Marodin, G.A., Frank, A.G., Tortorella, G.L. and Saurin, T.A. (2016), "Contextual factors and lean production implementation in the Brazilian automotive supply chain", *Supply Chain Management: An International Journal*, Vol. 21 No. 4, pp. 417-432.

Marodin, G.A. and Saurin, T.A. (2013), "Implementing lean production systems: research areas and opportunities for future studies", *International Journal of Production Research*, Vol. 51 No. 22, pp. 6663-6680.

Marodin, G.A. and Saurin, T.A. (2015a), "Classification and relationships between risks that affect lean production implementation", *Journal of Manufacturing Technology Management*, Vol. 26 No. 1, pp. 57-79.

Marodin, G.A. and Saurin, T.A. (2015b), "Managing barriers to lean production implementation: context matters", *International Journal of Production Research*, Vol. 53 No. 13, pp. 3947-3962.

Marodin, G.A., Saurin, T.A., Tortorella, G.L. and Denicol, J. (2015), "How context factors influence lean production practices in manufacturing cells", *The International Journal of Advanced Manufacturing Technology*, Vol. 79 Nos 5/8, pp. 1389-1399.

Martinez-Jurado, P.J. and Moyano-Fuentes, J. (2014), "Key determinants of lean production adoption: evidence from the aerospace sector", *Production Planning and Control*, Vol. 25 No. 4, pp. 332-345.

Martinez-Jurado, P.J., Moyano-Fuentes, J. and Jerez-Gómez, P. (2014), "Human resource management in lean production adoption and implementation processes: success factors in the aeronautics industry", *Business Research Quarterly*, Vol. 17 No. 1, pp. 47-68.

Matawale, C.R., Datta, S. and Mahapatra, S.S. (2014a), "Lean metric appraisement: exploration of grey numbers set theory", *Grey Systems: Theory and Application*, Vol. 4 No. 3, pp. 400-425.

Matawale, C.R., Datta, S. and Mahapatra, S.S. (2014b), "Leanness estimation procedural hierarchy using interval-valued fuzzy sets (IVFS)", *Benchmarking: An International Journal*, Vol. 21 No. 2, pp. 150-183.

McAdam, R., Galbraith, B., Miller, K., Moffett, S. and McAdam, M. (2016), "The role of lean at the interface with between operations management and applied services within a large aerospace organisation: a boundary spanning perspective", *Production Planning and Control*, Vol. 27 No. 15, pp. 1298-1311.

McQuater, R.E., Scurr, C.H., Dale, B.G. and Hillman, P.G. (1995), "Using quality tools and techniques successfully", *The TQM Journal*, Vol. 7 No. 6, pp. 37-42.

Menezes, L.M., Wood, S. and Gelade, G. (2010), "The integration of human resource and operation management practices and it link with performance: a longitudinal latent class study", *Journal of Operations Management*, Vol. 28 No. 6, pp. 455-471.

Moayed, F.A. and Shell, R.L. (2009), "Comparison and evaluation of maintenance operations in lean versus non-lean production systems", *Journal of Quality in Maintenance Engineering*, Vol. 15 No. 3, pp. 285-296.

Mostafa, S., Dumrak, J. and Soltan, H. (2015), "Lean maintenance roadmap", *Procedia Manufacturing*, Vol. 2, pp. 434-444.

Moyano-Fuentes, J. and Sacristan-Diaz, M. (2012), "Learning on lean: a review of thinking and research", *International Journal of Operations and Production Management*, Vol. 32 No. 5, pp. 551-582.

Mund, K., Pieterse, K. and Cameron, S. (2015), "Lean product engineering in the South African automotive industry", *Journal of Manufacturing Technology Management*, Vol. 26 No. 5, pp. 703-724.

Narayanamurthy, G. and Gurumurthy, A. (2016a), "Leanness assessment: a literature review", *International Journal of Operations and Production Management*, Vol. 36 No. 10, pp. 1115-1160.

Narayanamurthy, G. and Gurumurthy, A. (2016b), "Systemic leanness An index for facilitating continuous improvement of lean implementation", *Journal of Manufacturing Technology Management*, Vol. 27 No. 8, pp. 1014-1053.

Nawanir, G., Lim, K.T. and Othman, S.N. (2016), "Lean manufacturing practices in Indonesian manufacturing firms", *International Journal of Lean Six Sigma*, Vol. 7 No. 2, pp. 149-170.

Nawanir, G., Teong, L.K. and Othman, S.N. (2013), "Impact of lean practices on operations performance and business performance", *Journal of Manufacturing Technology Management*, Vol. 24 No. 7, pp. 1019-1050.

Netland, T.H. (2016), "Critical success factors for implementing lean production: the effect of contingencies", *International Journal of Production Research*, Vol. 54 No. 8, pp. 2433-2448.

Netland, T.H., Schloetzer, J.D. and Ferdows, K. (2015), "Implementing corporate lean programs: the effect of management control practices", *Journal of Operations Management*, Vol. 36, pp. 90-102.

Nicholas, J. (2016), "Hoshin kanri and critical success factors in quality management and lean production", *Total Quality Management and Business Excellence*, Vol. 27 Nos 3/4, pp. 250-264.

Oliver, N., Schab, L. and Holweg, M. (2007), "Lean principles and premium brands: conflict or complement?", *International Journal of Production Research*, Vol. 45 No. 16, pp. 3723-3739.

Ozelkan, E. and Galambosi, A. (2009), "Lampshade game for lean manufacturing", *Production Planning and Control*, Vol. 20 No. 5, pp. 385-402.

Pakdil, F. and Leonard, K.M. (2014), "Criteria for a lean organisation: development of a lean assessment tool", *International Journal of Production Research*, Vol. 52 No. 15, pp. 4587-4607.

Pakdil, F. and Leonard, K.M. (2016), "Implementing and sustaining lean processes: the dilemma of societal culture effects", *International Journal of Production Research*, Vol. 55 No. 3, pp. 700-717.

Panizzolo, R., Garengo, P., Sharma, M.K. and Gore, A. (2012), "Lean manufacturing in developing countries: evidence from Indian SMEs", *Production Planning and Control*, Vol. 23 Nos 10/11, pp. 769-788.

Panwar, A., Jain, R. and Rathore, A.P.S. (2015a), "Lean implementation in Indian process industries – some empirical evidence", *Journal of Manufacturing Technology Management*, Vol. 26 No. 1, pp. 131-160.

Panwar, A., Nepal, B.P., Jain, R. and Rathore, A.P.S. (2015b), "On the adoption of lean manufacturing principles in process industries", *Production Planning and Control*, Vol. 26 No. 7, pp. 564-587.

Papadopoulou, T.C. and Ozbayrak, M. (2005), "Leanness: experiences from the journey to date", *Journal of Manufacturing Technology Management*, Vol. 16 No. 7, pp. 784-807.

Parry, G., Mills, J. and Turner, C. (2010), "Lean competence: integration of theories in operations management practice", *Supply Chain Management: An International Journal*, Vol. 15 No. 3, pp. 216-226.

Parry, G.C. and Turner, C.E. (2006), "Application of lean visual process management tools", *Production Planning and Control*, Vol. 17 No. 1, pp. 77-86.

Pettersen, J. (2009), "Defining lean production: some conceptual and practical issues", *The TQM Journal*, Vol. 21 No. 2, pp. 127-142.

Piercy, N. and Rich, N. (2015), "The relationship between lean operations and sustainable operations", *International Journal of Operations and Production Management*, Vol. 35 No. 2, pp. 282-315.

Pont, G.D., Furlan, A. and Vinelli, A. (2008), "Interrelationships among lean bundles and their effects on operational performance", *Operations Management Research*, Vol. 1 No. 2, pp. 150-158.

Pool, A., Wijngaard, J. and Zee, D.J. (2011), "Lean planning in the semi-process industry, a case study", *International Journal of Production Economics*, Vol. 131 No. 1, pp. 194-203.

Powell, D. (2013), "ERP systems in lean production: new insights from a review of lean and ERP literature", *International Journal of Operations and Production Management*, Vol. 33 Nos 11/12, pp. 1490-1510.

Pullan, T.T., Bhasi, M. and Madhu, G. (2013), "Decision support tool for lean product and process development", *Production Planning and Control*, Vol. 24 No. 6, pp. 449-464.

Rafique, M.Z., Rahman, M.N.A., Saibani, N., Arsad, N. and Saadat, W. (2016), "RFID impacts on barriers affecting lean manufacturing", *Industrial Management and Data Systems*, Vol. 116 No. 8, pp. 1585-1616.

Rahman, S., Laosirihongthong, T. and Sohal, A.S. (2010), "Impact of lean strategy on operational performance: a study of Thai manufacturing companies", *Journal of Manufacturing Technology Management*, Vol. 21 No. 7, pp. 839-852.

Ramesh, V. and Kodali, R. (2012), "A decision framework for maximising lean manufacturing performance", *International Journal of Production Research*, Vol. 50 No. 8, pp. 2234-2251.

Rebelo, M., Santos, G. and Silva, R. (2014), "Conception of a flexible integrator and lean model for integrated management systems", *Total Quality Management and Business Excellence*, Vol. 25 No. 5-6, pp. 683-701.

Riezebos, J., Klingenberg, W. and Hicks, C. (2009), "Lean production and information technology: connection or contradiction?", *Computers in Industry*, Vol. 60 No. 4, pp. 237-247.

Ringen, G. and Holtskog, H. (2013), "How enablers for lean product development motivate engineers", *International Journal of Computer Integrated Manufacturing*, Vol. 26 No. 12, pp. 1117-1127.

Rubio, S. and Corominas, A. (2008), "Optimal manufacturing–remanufacturing policies in a lean production environment", *Computers and Industrial Engineering*, Vol. 55 No. 1, pp. 234-242.

Rymaszewska, A.D. (2014), "The challenges of lean manufacturing implementation in SMEs", *Benchmarking: An International Journal*, Vol. 21 No. 6, pp. 987-1002.

Samuel, D., Found, P. and Williams, S.J. (2015), "How did the publication of the book 'the machine that changed the world' change management thinking? exploring 25 years of lean literature", *International Journal of Operations and Production Management*, Vol. 35 No. 10, pp. 1386-1407.

Sangwan, K.S., Bhamu, J. and Mehta, D. (2014), "Development of lean manufacturing implementation drivers for Indian ceramic industry", *International Journal of Productivity and Performance Management*, Vol. 63 No. 5, pp. 569-587.

Saurin, T.A., Marodin, G.A. and Ribeiro, J.L.D. (2011), "A framework for assessing the use of lean production practices in manufacturing cells", *International Journal of Production Research*, Vol. 49 No. 11, pp. 3211-3230.

Saurin, T.A., Rooke, J. and Koskela, L. (2013), "A complex systems theory perspective of lean production", *International Journal of Production Research*, Vol. 51 No. 19, pp. 5824-5838.

Scherrer-Rathje, M., Boyle, T.A. and Deflorin, P. (2009), "Lean, take two! Reflections from the second attempt at lean implementation", *Business Horizons*, Vol. 52 No. 1, pp. 79-88.

Secchi, R. and Camuffo, A. (2016), "Rolling out lean production systems: a knowledge-based perspective", *International Journal of Operations and Production Management*, Vol. 36 No. 1, pp. 61-85.

Seyedhosseini, S.M., Taleghani, A.E., Bakhsha, A. and Partovi, S. (2011), "Extracting leanness criteria by employing the concept of balanced scorecard", *Expert Systems with Applications*, Vol. 38 No. 8, pp. 10454-10461.

Sezen, B., Karakadilar, I.S. and Buyukozkan, G. (2012), "Proposition of a model for measuring adherence to lean practices: applied to Turkish automotive part suppliers", *International Journal of Production Research*, Vol. 50 No. 14, pp. 3878-3894.

Shah, R. and Ward, P.T. (2007), "Defining and developing measures of lean production", *Journal of Operations Management*, Vol. 25 No. 4, pp. 785-805.

Shamsudin, S., Radzi, N.I.M. and Othman, R. (2016), "Causal ambiguity in lean production implementation in Malaysia", *Journal of Asia-Pacific Business*, Vol. 17 No. 3, pp. 249-266.

Sharma, V., Dixit, A.R. and Qadri, M.A. (2016a), "Modeling lean implementation for manufacturing sector", *Journal of Modelling in Management*, Vol. 11 No. 2, pp. 405-426.

Sharma, V., Dixit, A.R. and Qadri, M.A. (2016b), "Empirical assessment of the causal relationships among lean criteria using DEMATEL method", *Benchmarking: An International Journal*, Vol. 23 No. 7, pp. 1834-1859.

Sharma, S. and Shah, B. (2016), "Towards lean warehouse: transformation and assessment using RTD and ANP", *International Journal of Productivity and Performance Management*, Vol. 65 No. 4, pp. 571-599.

Sim, K.L. and Rogers, J.W. (2008), "Implementing lean production systems: barriers to change", *Management Research News*, Vol. 32 No. 1, pp. 37-49.

Simons, D. and Zokaei, K. (2005), "Application of lean paradigm in red meat processing", *British Food Journal*, Vol. 107 No. 4, pp. 192-211.

Singh, B., Garg, S.K. and Sharma, S.K. (2009), "Lean can be a survival strategy during recessionary times", *International Journal of Productivity and Performance Management*, Vol. 58 No. 8, pp. 803-808.

Sisson, J. and Elshennawy, A. (2015), "Achieving success with lean", *International Journal of Lean Six Sigma*, Vol. 6 No. 3, pp. 263-280.

Stanica, S. and Peydro, J. (2016), "How does the employee cross-training lean tool affect the knowledge transfer in product development processes?", *VINE Journal of Information and Knowledge Management Systems*, Vol. 46 No. 3, pp. 371-385.

Stone, K.B. (2012), "Four decades of lean: a systematic literature review", *International Journal of Lean Six Sigma*, Vol. 3 No. 2, pp. 112-132.

Taj, S. (2005), "Applying lean assessment tools in Chinese hi-tech industries", *Management Decision*, Vol. 43 No. 4, pp. 628-643.

Taj, S. (2008), "Lean manufacturing performance in China: assessment of 65 manufacturing plants", *Journal of Manufacturing Technology Management*, Vol. 19 No. 2, pp. 217-234.

Tan, K.H., Denton, P., Rae, R. and Chung, L. (2013), "Managing lean capabilities through flexible workforce development: a process and framework", *Production Planning and Control*, Vol. 24 No. 12, pp. 1066-1076.

Tanco, M., Santos, J., Rodriguez, J.L. and Reich, J. (2013), "Applying lean techniques to nougat fabrication: a seasonal case study", *The International Journal of Advanced Manufacturing Technology*, Vol. 68 No. 5/8, pp. 1639-1654.

Taylor, A., Taylor, M. and McSweeney, A. (2013), "Towards greater understanding of success and survival of lean systems", *International Journal of Production Research*, Vol. 51 No. 22, pp. 6607-6630.

Tayyab, M. and Sarkar, B. (2016), "Optimal batch quantity in a cleaner multi-stage lean production system with random defective rate", *Journal of Cleaner Production*, Vol. 139, pp. 922-934.

Thanki, S.J. and Thakkar, J. (2014), "Status of lean manufacturing practices in Indian industries and government initiatives", *Journal of Manufacturing Technology Management*, Vol. 25 No. 5, pp. 655-675.

Thurer, M., Tomasevic, I. and Stevenson, M. (2016), "On the meaning of 'waste': review and definition", *Production Planning and Control*, Vol. 28 No. 3, pp. 244-255.

Tillema, S. and Steen, M. (2015), "Co-existing concepts of management control: the containment of tensions due to the implementation of lean production", *Management Accounting Research*, Vol. 27, pp. 67-83.

Tortorella, G.L., Marodin, G.A., Fettermann, D.C. and Fogliatto, F.S. (2016), "Relationships between lean product development enablers and problems", *International Journal of Production Research*, Vol. 54 No. 10, pp. 2837-2855.

Tortorella, G.L., Marodin, G.A., Miorando, R. and Seidel, A. (2015), "The impact of contextual variables on learning organization in firms that are implementing lean: a study in Southern Brazil", *The International Journal of Advanced Manufacturing Technology*, Vol. 78 Nos 9/12, pp. 1879-1892.

Tranfield, D., Denyer, D. and Smart, P. (2003), "Towards a methodology for developing evidence-Informed management knowledge by means of systematic review", *British Journal of Management*, Vol. 14 No. 3, pp. 207-222.

Treville, S. and Antonakis, J. (2006), "Could lean production job design be intrinsically motivating? contextual, configurational, and levels-of-analysis issues", *Journal of Operations Management*, Vol. 24 No. 2, pp. 99-123.

Tuli, P. and Shankar, R. (2015), "Collaborative and lean new product development approach: a case study in the automotive product design", *International Journal of Production Research*, Vol. 53 No. 8, pp. 2457-2471.

Vasanthakumar, C., Vinodh, S. and Ramesh, K. (2016), "Application of interpretive structural modelling for analysis of factors influencing lean remanufacturing practices", *International Journal of Production Research*, Vol. 54 No. 24, pp. 7439-7452.

Vidyadhar, R., Kumar, R.S., Vinodh, S. and Antony, J. (2016), "Application of fuzzy logic for leanness assessment in SMEs: a case study", *Journal of Engineering, Design and Technology*, Vol. 14 No. 1, pp. 78-103.

Vinodh, S. and Balaji, S.R. (2011), "Fuzzy logic based leanness assessment and its decision support system", *International Journal of Production Research*, Vol. 49 No. 13, pp. 4027-4041.

Vinodh, S. and Chintha, S.K. (2011a), "Application of fuzzy QFD for enabling leanness in a manufacturing organisation", *International Journal of Production Research*, Vol. 49 No. 6, pp. 1627-1644.

Vinodh, S. and Chintha, S.K. (2011b), "Leanness assessment using multi-grade fuzzy approach", *International Journal of Production Research*, Vol. 49 No. 2, pp. 431-445.

Vinodh, S. and Joy, D. (2012), "Structural equation modelling of lean manufacturing practices", *International Journal of Production Research*, Vol. 50 No. 6, pp. 1598-1607.

Vlachos, I. (2015), "Applying lean thinking in the food supply chains: a case study", *Production Planning and Control*, Vol. 26 No. 16, pp. 1351-1367.

Wan, H. and Chen, F.F. (2009), "Decision support for lean practitioners: a web-based adaptive assessment approach", *Computers in Industry*, Vol. 60 No. 4, pp. 277-283.

Wan, H.D. and Chen, F.F. (2008), "A leanness measure of manufacturing systems for quantifying impacts of lean initiatives", *International Journal of Production Research*, Vol. 51 No. 19, pp. 5824-5838.

Wickramasinghe, D. and Wickramasinghe, V. (2011), "Differences in organizational factors by lean duration", *Operations Management Research*, Vol. 4 No. 3/4, pp. 111-126.

Wickramasinghe, G.L.D. and Wickramasinghe, V. (2016a), "Effects of continuous improvement on shop-floor employees' job performance in lean production. The role of lean duration", *Research Journal of Textile and Apparel*, Vol. 20 No. 4, pp. 182-194.

Wickramasinghe, V. and Wickramasinghe, G.L.D. (2016b), "Variable pay and job performance of shop-floor workers in lean production", *Journal of Manufacturing Technology Management*, Vol. 27 No. 2, pp. 287-311.

Wiengarten, F., Gimenez, C., Fynes, B. and Ferdows, K. (2015), "Exploring the importance of cultural collectivism on the efficacy of lean practices. Taking an organisational and national perspective", *International Journal of Operations and Production Management*, Vol. 35 No. 3, pp. 370-391.

Wong, W.P., Ignatius, J. and Soh, K.L. (2014), "What is the leanness level of your organisation in lean transformation implementation? An integrated lean index using ANP approach", *Production Planning and Control*, Vol. 25 No. 4, pp. 273-287.

Yang, M.G., Hong, P. and Modi, S.B. (2011), "Impact of lean manufacturing and environmental management on business performance: An empirical study of manufacturing firms", *International Journal of Production Economics*, Vol. 129 No. 2, pp. 251-261.

Zahraee, S.M. (2016), "A survey on lean manufacturing implementation in a selected manufacturing industry in Iran", *International Journal of Lean Six Sigma*, Vol. 7 No. 2, pp. 136-148.

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