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Exploring lean office in project management by means of a systematic literature review

Edson Oliveira Martins and Guilherme F. Frederico
School of Management, Federal University of Paraná, Curitiba, Brazil

Abstract

Purpose – This study aims to find the main contributions from lean office (LO) that can be applied to the project management field, correlating these two areas toward an improvement in project management performance.

Design/methodology/approach – This paper uses a systematic literature review as a methodological approach to find the main potential contributions from LO that can be applied to project management.

Findings – This study has selected the 13 most cited potential contributions from LO and its level of occurrence in a systematic literature review (SLR).

Research limitations/implications – This study explores theoretical aspects of LO benefits on project management, and further empirical studies are needed to determine the risks and benefits of the concept listed here.

Practical implications – The practical implications are that the most cited potential contribution from LO to the project management and those can be used as a guidance for project managers.

Originality/value – This article highlights the potential contributions from LO to project management field, which is novelty in the face of the existent literature.

Keywords Lean office, Project management, Literature review, Project managers, Guidance

Paper type Literature review

1. Introduction

Project management is a fundamental discipline to deal with projects properly towards a valuable outcome for clients and stakeholders. It consists in a group of several practices built and oriented to have a structured way of managing and here are the steps of management: initiation, planning, execution, monitoring and control and closure based on the Project Management Body of Knowledge (PMBOK) (Project Management Institute, 2021). It is important to notice that the PMBOK is a guide of project management which brings us a general view about this discipline and its areas of knowledge (Frederico, 2021; Luiz *et al.*, 2017).

Project management has its triple constraint that is the cost, the scope and the schedule of the project, and these dimensions must be monitored to lead the project to success (Shahibi *et al.*, 2019; Tariq *et al.*, 2020; Barbalho *et al.*, 2017; Sanchez *et al.*, 2017; Pollack *et al.*, 2018; Liu, 2020). Several factors can affect project success like having no dedicated resources, triple constraint changes, simultaneous management of multiple projects (Kianpour *et al.*, 2021; Almasifar *et al.*, 2021; Liu *et al.*, 2016). Adding others causes for its failure like project

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managers' loss of competence, inadequacy of budget, unrealistic expectation (Andres, 2018; Bomfin *et al.*, 2012; Dempsey *et al.*, 2022). These factors lead the projects to fail in a rate between 40% and 86% to respect its constraints, which causes loss of time, not respect scope and indeed loss of money (Rogers, 2019; Mladenova, 2019; PMI, 2021). Project managers are often influenced by subjectivism, wrong information, inefficient communication, relying on intuition drawn from experience, poor investment on their competences and due these factors, the decision making can be biased as well as the allocation of resources (Biedenbach and Müller, 2011; Aguda *et al.*, 2021; Tsiga and Emes, 2021; Arraiza Irujo and Pérez Ezcurdia, 2017; Kim *et al.*, 2022). One way to cope properly with the projects is to constantly communicate with the clients/stakeholders about the scope changes (knowing scope management as occurring all along the full project cycle), having connection between projects and the company's key strategic priorities, controlling the cost of the project and training the team (Almeida *et al.*, 2020; Tariq *et al.*, 2020; Al-Tmeemy and Al Bassam, 2018; Goncalves and Figueiredo, 2008; Fossum *et al.*, 2019; Jin *et al.*, 2018; Lappe and Spang, 2014).

The lean office (LO) deals with the application of a set of practices in the administrative environment that aims to reduce waste and maximize customer value and is alternative to increase productivity (Bodin Danielsson, 2013; Campos, 2022; Gronovicz *et al.*, 2013). Conceptually, LO comes from lean manufacturing (LM), a term exposed in the book The machine that changed the world to showing the Western view of Toyota Production System (TPS) Womack *et al.* (2007).

The application of LO in projects proved to be effective in reducing the lead time of the project and helping to obtain the list of actions to be adopted to improve the process through the application of a framework and value stream mapping (VSM) (Takeda Yokoyama *et al.*, 2023; Carneiro *et al.*, 2017).

By considering the extant literature regarding the themes herein explored, some authors have showed that the improvement of the information flow and the mapping of the value stream, as well as the identification and elimination of waste, was achieved through the application of the concepts of LO (Besser Freitag *et al.*, 2018; Magalhães *et al.*, 2019; Sastre *et al.*, 2018; Paes *et al.*, 2020).

Other studies showed the implementation of LO may generate time and productivity gains, reduce costs and increase process' flexibility. This was achieved through the standardization of the work, the grouping of it into distinct groups, which facilitated the identification of the added value of each work package more easily (de Oliveira Nascimento *et al.*, 2016; Rossiti *et al.*, 2016; Da Silva *et al.*, 2015). Additionally, no one systematic literature review (SLR) has been found correlating LO and project management. Knowing the benefits of LO into the office environment, it is important to find and list them towards project management.

Based on the improvements obtained from LO into administrative environment and on the information about losses coming from poor project management performance listed before, it leads to the research question of this paper:

RQ1. How can the application of LO support project management?

This paper contributes to the project management literature by listing the main concept from LO that can be applied to have a better performance. In regard to its practical contribution, the study and its results can benefit project managers by giving them another view to the project management routines.

This article is structured as it follows: After the presentation of the introduction regarding this study, a SLR was performed by following the steps: planning, conducting, reporting and disseminating to find the main potential contributions from LO that can be applied on project management. Afterward, the list of articles selected is exposed showing also the databases selected, the title and the journal. Particularly, on the third section the main contributions from LO to project management are listed according to extract made

from selected articles and a briefly description about each one of 13 main contributions is made too. Finally, the fourth section brings the conclusion from the research explaining how the concepts from LO can support project management correlating these findings with the research question.

2. Systematic literature review

SLR has been chosen as the research method because it is exploratory research of the benefits of LO towards project management and it helps to understand this field. SLR was conducted to find he main constructs of the theoretical relations between LO and project management.

The literature review followed a systematic process proposed by Tranfield *et al.* (2003), like: plan, conduct and disseminate. Table 2 was built for the dissemination stage, and it was adopted the concept of the author-concept matrix proposed by Watson and Webster (2020).

2.1 Planning the review

The planning of the literature review included the establishment of the following search criteria "lean office"; "lean office" AND "project management"; "lean office" AND "project"; "lean office" AND "engineering"; "lean office" AND "automotive" and checking these keywords combination on the fields "title, abstract and keywords" of the articles were selected in the search. The two databases selected were Web of Science and Scopus to go for research. The exclusion criteria were about established as lack of focus on engineer or administration, lack of focus on benefits of LO, lack of access on article and doubled articles. By following these steps, initially 114 articles and others works were selected.

2.2 Conducting the review

In the conduction phase, the exclusion criteria shown in Figure 1 were applied. Initially, 114 works were found, including articles, journals, conference records, etc., however with the

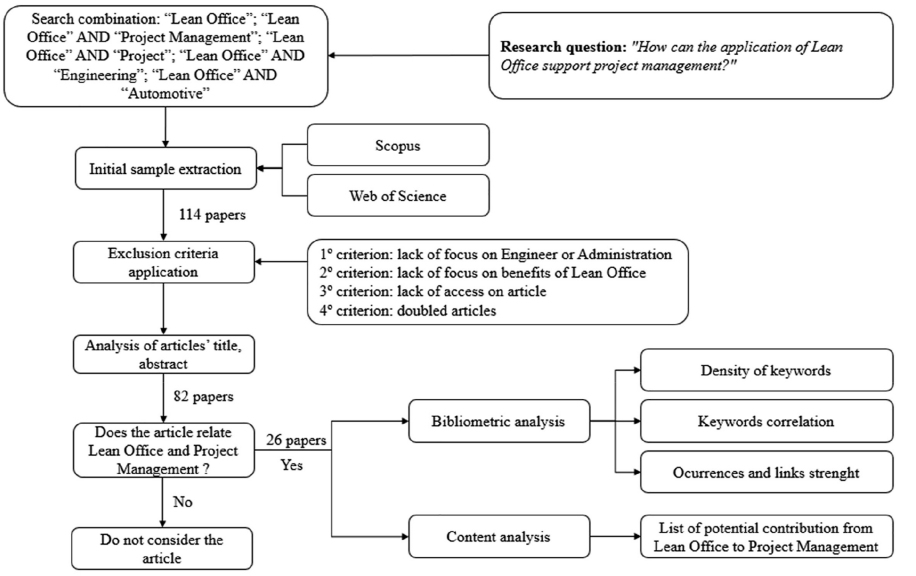


Figure 1.
Research protocol

Source(s): Figure created by authors

selection in the search period (2012–2022), this number dropped to eighty-two works and, after the application of the other exclusion criteria, 26 works relevant to the research question were reached. To demonstrate the affinity between the keywords, a bibliometric view between these keywords was constructed with the use of the software VOS viewer as shown on Figure 2. The connection between LO and lean thinking can be noticed since they are directly related themes since their origin in the TPS. Another strong connection stands out, such as the link between LO and decision making, as well as between LO and performance.

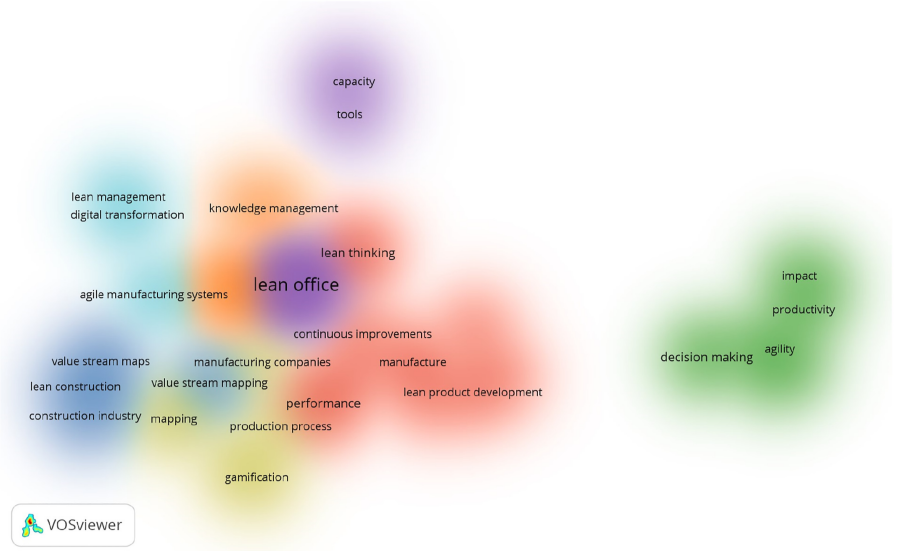
Figure 3 shows the relationship between the keywords, and the minimum co-occurrence established was two within the sample of articles analyzed. The keywords LO, lean thinking, performance, decision making, and VSM stood out in terms of occurrence. The keyword "project management" did not appear on this research, evidencing the need of investigation on this gap of literature correlating the "lean office" and "project management" through a SLR.

The occurrence of the thirty-seven keywords presents in the sample of articles and its total link strength was analyzed using VOS Viewer software. LO and lean production have the highest values for occurrences, but this is related to the fact the research is connected to the lean. Besides that, it is important to notice that VSM is on the third position in terms of occurrence and total link strength. Decision-making and lean thinking come after connecting this information to the need of shifting mindset to be effective on LO applications Figure 4.

The number of articles correlating LO and project management found was twenty-six articles. In most recently years (2021 and 2022) only two articles per year Figure 5. This information reinforces the need for research on this topic.

2.3 Reporting and dissemination

By reading the twenty-six articles selected using research criteria, it was possible to resume what the authors have cited into their articles in terms of contributions provided by applying



Source(s): Figure created by authors using VOSviewer software

Figure 2.
Density of keywords

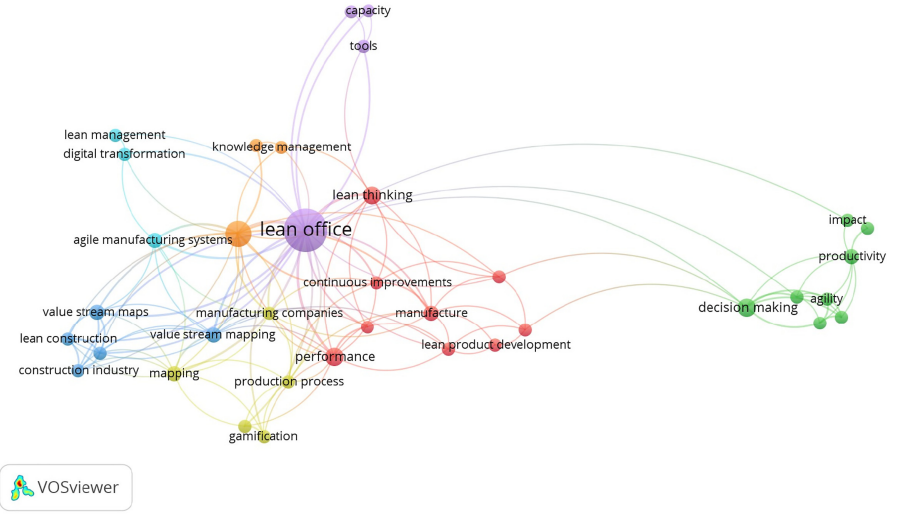


Figure 3.
Keywords

Source(s): Figure created by authors using VOSviewer software

LO concepts on project management. After finishing the analysis of the content analysis of the articles listed in Table 1, the main findings related to the contribution from LO to project management were extracted (based on the concept author matrix Watson and Webster (2020)).

3. Main contributions from lean office to project management

3.1 List of main findings

Considering the analysis of the articles in Table 1 and resuming the contribution mentioned per author in Table 2, the following main potential contributions (most mentioned) from LO to project management is listed (Table 3).

3.2 Main findings explanation

Here it a brief description of each one of main findings (Table 4).

Top management involvement with the lean experts is an important success factor to implement lean into organizations and without having support from top management almost no initiative would be successfully implemented Demeter and Losonci (2019).

VSM is one of the most important potential contributions from LO to the project management due the fact that it starts by identifying the value stream, which means that those activities that create value are identified in this phase, it also allows the elimination of waste. Knowing these activities create value for final client, they are worth to pay for it (Sabur and Simatupang, 2015; Freitas *et al.*, 2018). Without having previously identified the value stream it is almost impossible to carefully look at those more critical tasks with high and low added value. VSM is a method used to identify graphically all the stages of a process (the initial state with its problems and limitation and the future state), how they are connected to each other and how they finally generate value. This method helps to identify the wastes of process allowing to eliminate them, then letting the process more efficiently and usually faster (so it helps to reduce the loss of budget and time) Gonçalves *et al.* (2015). Therefore, VSM is an almost imperative condition for the proper successful implementation of LO

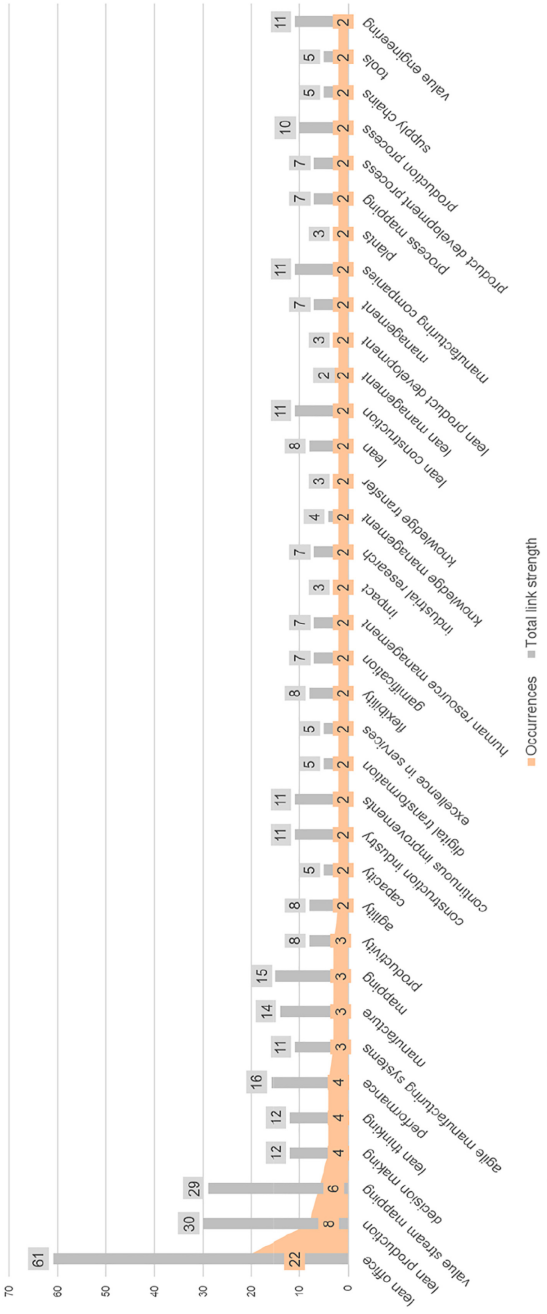


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Figure 4.
Occurrences and total link strength

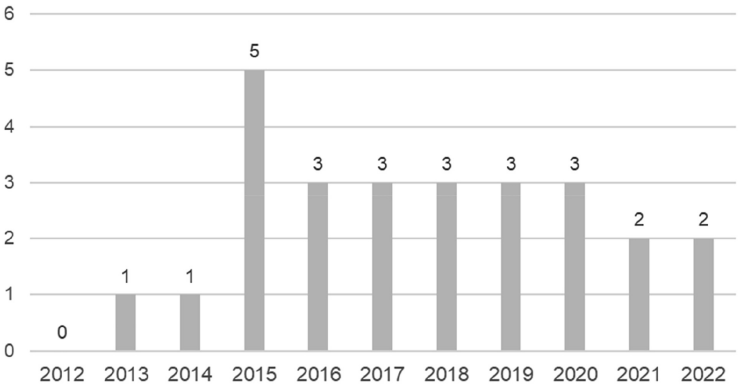

Figure 5.
Number of articles/ years [lean office and project management]

Source(s): Figure created by authors

(Freitas *et al.*, 2018; De Almeida *et al.*, 2017; Sousa and Dinis-Carvalho, 2021; Carneiro *et al.*, 2017; Cavaglieri and Juliani, 2016; Monteiro *et al.*, 2015; Gonçalves *et al.*, 2015; Sabur and Simatupang, 2015; Fuchs *et al.*, 2020).

Promote 5S. The 5 Ss are simply and at the same time so powerful tool that require discipline to be applied however it causes impacts on daily tasks, here are they briefly describe (SEIRI - Eliminate that which is not needed and useful; SEITON - Organize what remains after sorting; SEISO - Clean and inspect the work area; SEIKETSU - Write standards for 5S; SHITSUKE - Consistently apply the 5S standards and be self-discipline) (Sastre *et al.*, 2018; Carneiro *et al.*, 2017; Bodin Danielsson, 2013).

Implement Kaizen plan, it is like never-ending improvement. The value stream never stops to be revised so it should be continuously rethink, knowing there is no perfect plan it means it can become better (Freitas *et al.*, 2018; Monteiro *et al.*, 2017, Takeda Yokoyama *et al.*, 2023; De Almeida *et al.*, 2017; Andersson *et al.*, 2015).

Visual Management of Indicators will show the team and to the stakeholders "if the team are winning the game." If not, the indicators will allow the team to see where the deviation is and they can go back to the baseline whether is in cost or schedule (time) (Magalhães *et al.*, 2019; Monteiro *et al.*, 2017, Takeda Yokoyama *et al.*, 2023, Sum *et al.*, 2019).

Shift mindset team is sometimes a difficult challenge because people are often stuck in their traditional way of working, besides that, changes are often seen as a threat for the jobs. But, without shifting mindset of the team, the efforts to implement a new methodology, a redesign of process are all the useless. To avoid this, starting the changing process through a "welcome" to the team will help any initiative to be successful and promote people to realize that they are not alone in change Csiszér (2022).

Optimize information flow. Information flow should be pursued to state of effortless state where the members of the team have all information they need to move forward with their tasks efficiently. According to Freitas and Freitas (2020) there are five key factors to optimize information flow, here they are: information seeking, access to information, information processing, information quality and use of information and communication technology.

Establish work cells allow to the team to collaborate more closely with their coworkers and it helps the information flow (key point for a proper project management). It eliminates the need for walking towards another office, event tough by using communication software it is not necessary the displacement, sometimes it is necessary having a face-to-face conversation or a meeting to let the things clearer. Having the coworkers closely to each other, it lets the

no	Authors	Title	Database	Journal
1	Bodin Danielsson (2013)	An explorative review of the lean office concept	Scopus	*Journal of Corporate Real Estate*
2	Viswanath (2014)	Lean transformation: How lean helped to achieve quality, cost and schedule: A case study in a multi-location product development team	Scopus	*Proceedings - 2014 IEEE 9th International Conference on Global Software Engineering, ICGSE 2014*
3	Andersson *et al.* (2015)	Total productive maintenance in support processes: an enabler for operation excellence	Web of Science	*Total Quality Management and Business Excellence*
4	Dobrin *et al.* (2015)	One management method, two countries. Lean method applied in Romania and France	Web of Science	*Proceedings of the 9th international management conference: management and innovation for competitive advantage*
5	Monteiro *et al.* (2015)	Implementing lean office: A successful case in public sector	Scopus	*FME Transactions*
6	Gonçalves *et al.* (2015)	Lean office: Concept Applicability Study on a Federal Public University	Scopus	*Espacios*
7	Sabur and Simatupang (2015)	Improvement of customer response time using lean office	Scopus	*International Journal of Services and Operations Management*
8	de Oliveira Nascimento *et al.* (2016)	Commercial Vehicle Production Flexibility Factors	Web of Science	*Advances in production management systems: initiatives for a sustainable world*
9	Cavaglieri and Juliani (2016)	Lean archives: The use of lean Office in archive management [Lean archives: O emprego do lean office na gestão de arquivos]	Scopus	*Perspectivas em Ciencia da Informacao*
10	Rossiti *et al.* (2016)	Impacts of lean office application in the supply sector of a construction company	Scopus	*IGLC 2016–24th Annual Conference of the International Group for lean Construction*
11	Monteiro *et al.* (2017)	Processes improvement applying lean office tools in a logistic department of a car multimedia components company	Web of Science	*Manufacturing Engineering Society International Conference 2017; Mesic 2017)*
12	De Almeida *et al.* (2017)	Lean thinking: planning and implementation in the public sector	Web of Science	*International Journal Of lean Six Sigma*
13	Carneiro *et al.* (2017)	Proposed use of lean office in reducing call time on products of the project analysis of polo industrial Manaus	Scopus	*Espacios*
14	Freitas *et al.* (2018)	Lean office contributions for organizational learning	Web of Science	*Journal Of Organizational Change Management*
15	Besser Freitag *et al.* (2018)	Lean office and digital transformation: a case study in a services company	Web of Science	*Brazilian Journal of Operations and Production Management*
16	Sastre *et al.* (2018)	Lean office: Study on the applicability of the concept in a design company	Scopus	*Proceedings of International Design Conference, DESIGN*

(*continued*)

Table 1.
List of articles selected for literature review

no	Authors	Title	Database	Journal
17	Yokoyama *et al.* (2019)	A Systematic Literature Review on lean office	Web of Science	*Industrial Engineering and Management Systems*
18	Magalhães *et al.* (2019)	Improving processes in a postgraduate office of a university through lean office tools	Web of Science	*International Journal for Quality Research*
19	Demeter and Losonci (2019)	Transferring lean knowledge within multinational networks	Web of Science	*Production Planning and Control*
20	Sum *et al.* (2019)	Analysis of the Implementation of a lean Service in a Shared Service Center: A Study of Stability and Capacity	Web of Science	*IEEE Transactions on Engineering Management*
21	Freitas and Freitas (2020)	Information management in lean office deployment contexts	Web of Science	*International Journal Of lean Six Sigma*
22	Fuchs *et al.* (2020)	Proposal to improve the maintenance management plan based on rcm and lean office in the polymer injection process	Scopus	*Revista Iberica de Sistemas e Tecnologias de Informacao*
23	Sousa and Dinis-Carvalho (2021)	A game for process mapping in office and knowledge work	Web of Science	*Production Planning and Control*
24	Porsev *et al.* (2021)	Digital Transformation of Employment Centers Based on the Concept of lean Manufacturing	Scopus	*Proceedings of the 2021 IEEE International Conference*
25	Takeda Yokoyama *et al.* (2023)	Bayesian networks as a guide to value stream mapping for lean office implementation: a proposed framework	Web of Science	*Operations Management Research*
26	Csiszér (2022)	Critical Failure Factors of Process Development by the lean office Methodology	Scopus	*Acta polytechnica hungarica*

Table 1. **Source(s):** Table created by authors

team to create themselves their own mindset by facing challenges all day altogether. Work cells increase synergy and exchange of experiences Freitas *et al.* (2018).

FIFO (first in – first out) method. The waste of waiting means wasting time, it disturbs the information flow, and the FIFO method gives us an idea to do not let the things behind, it means the topic first arrived should be processed first also. Following this method will allow us to have the continuous flow in the process (Yokoyama *et al.*, 2019; Sastre *et al.*, 2018; Cavaglieri and Juliani, 2016; Sabur and Simatupang, 2015).

Establish patterns and follow them up. How can be effective without having patterns? It might be impossible to achieved it. The patterns must be established by those who know the process, eventually specialists and must also be spread to the company where they belong to. The idea here is to put order into the way the company does things, the way the projects are developed etc. And as hard as establish the patterns is to follow them! After years of working in a company or department, sometimes someone can attempt to do not follow what is written onto the patterns and goes by "his/her way". Even if they are following a more effective way of working it not a good idea if this way of working is not shared with the other members of team and it can cause problems when these people left the company knowing they are the only ones who know how can that process be efficiently done. So, the efforts should be put whether to create patterns and to follow them up. Remembering also of "implement kaizen plan", it means that the patterns can be evaluated through a feedback process, doing this, in a

no	Authors	Title	Findings
1	Bodin Danielsson (2013)	An explorative review of the lean office concept	It mentions the advantages of applying 5S A "standardization" of the office design is pursued to the possible extent
2	Viswanath (2014)	Lean transformation: How lean helped to achieve quality, cost and schedule: A case study in a multi-location product development team	The lean transformation was wholly supported by the management The focus in lean is continuous improvement to achieve customer value Visual indicator supports the transparency as a key aspect for success of lean It describes advantages for workcell lean is 20% process and 80% mindset
3	Andersson *et al.* (2015)	Total productive maintenance in support processes: an enabler for operation excellence	Need to establish framework Creating Work Standards by 5S
4	Dobrin *et al.* (2015)	One management method, two countries. Lean method applied in Romania and France	Standardization and Kaizen
5	Monteiro *et al.* (2015)	Implementing lean office: A successful case in public sector	The authors indicate to begin LO implementation by value stream mapping. This alternative was effective in generating rapid improvements and more motivation and involvement for everyone Implementation of kaizen plan, visual management of indicators Avoiding wasting time by using standard documents
6	Gonçalves *et al.* (2015)	Lean office: Concept Applicability Study on a Federal Public University	Mapping of processes to reduce the time spent on activities and also the application of Kaizen for improvements
7	Sabur and Simatupang (2015)	Improvement of customer response time using lean office	VSM analysis to eliminate waste Prioritizing by using FIFO
8	de Oliveira Nascimento *et al.* (2016)	Commercial Vehicle Production Flexibility Factors	Implementation of lean office allowed gains in flexibility and time by applications of value stream mapping
9	Cavaglieri and Juliani (2016)	Lean archives: The use of lean Office in archive management [Lean archives: O emprego do lean office na gestão de arquivos]	Verification of the performance of activities that do not add value to the process and still delay essential activities Visual mapping of the current state of the process through the use of post-it notes saving time in the process Promoting 5S, FIFO, kaizen plan, visual management and standardization

(*continued*)

Table 2.
Main findings per author

no	Authors	Title	Findings
10	Rossiti *et al.* (2016)	Impacts of lean office application in the supply sector of a construction company	The separation of the materials into four distinct groups enabled four different indicators in the future status map, for lead time, lead time and added value. Significant gain in process time. Implementing kaizen plan, standardization and the 8 steps for lean implementation
11	Monteiro *et al.* (2017)	Processes improvement applying lean office tools in a logistic department of a car multimedia components company	Standard Work, Visual Management, 5S, Poka-Yoke mechanisms, brainstorming and Kaizen methodologies
12	De Almeida *et al.* (2017)	Lean thinking: planning and implementation in the public sector	Kaizen, A3 methodology, value stream map and continuous flow map and it is mentioned the 8 steps for lean implementation
13	Carneiro *et al.* (2017)	Proposed use of lean office in reducing call time on products of the project analysis of polo industrial Manaus	The use of VSM identified several points of improvement to save time in the operation (verified gains in time and money) The advantages of 5S, FIFO and pull flow
14	Freitas *et al.* (2018)	Lean office contributions for organizational learning	Work Cells increase synergy and exchange of experiences VSM is an effective tool Kaizen advantage
15	Besser Freitag *et al.* (2018)	Lean office and digital transformation: a case study in a services company	The value stream mapping (VSM) in the current and future state allowed the identification of residues in the "programming" macro-flow, which will be attacked by the use of digital devices
16	Sastre *et al.* (2018)	Lean office: Study on the applicability of the concept in a design company	Description of the 8 steps to lean office implementation Description of tools such as VSM, 5S, work cells, FIFO, pull flow Description of waste in offices
17	Yokoyama *et al.* (2019)	A Systematic Literature Review on lean office	Initiate lean office implementation by VSM It is mentioned also the 5S, FIFO and 8 steps for Lean implementation
18	Magalhães *et al.* (2019)	Improving processes in a postgraduate office of a university through lean office tools	Standardization of performance indicators Standardization of the electronic work environment
19	Demeter and Losonci (2019)	Transferring lean knowledge within multinational networks	It demonstrates the importance of top management's Involvement in supporting lean activities
20	Freitas and Freitas (2020)	Information management in lean office deployment contexts	Five factors to optimize the flow of information information seeking, access to information, information processing, information quality and use of information and communication technology

Table 2. (*continued*)

no	Authors	Title	Findings
21	Sum *et al.* (2019)	Analysis of the Implementation of a lean Service in a Shared Service Center: A Study of Stability and Capacity	Establishment of indicators
22	Fuchs *et al.* (2020)	Proposal to improve the maintenance management plan based on rcm and lean office in the polymer injection process	Cost reduction through VSM that identified points of improvement
23	Sousa and Dinis-Carvalho (2021)	A game for process mapping in office and knowledge work	Mapping office processes and knowledge using a specific tool, analyze this map to identify waste and other opportunities for improvement and devise possible improvement solutions in order to increase process performance, for example, in terms of production time or value-added ratio
24	Porsev *et al.* (2021)	Digital Transformation of Employment Centers Based on the Concept of lean manufacturing	Optimization of work through 5S Development of standard procedures Default Document Usage
25	Takeda Yokoyama *et al.* (2023)	Bayesian networks as a guide to value stream mapping for lean office implementation: a proposed framework	Establish predictable and repeatable outputs, having patterns for employees, the procedures should be easily found and never-ending improvement Selecting a product/service family for conducting VSM Proposing a value stream plan to reach future ideal state of company, conducting kaizen events to reach the future state VSM
26	Csiszér (2022)	Critical Failure Factors of Process Development by the lean office Methodology	Knowing the current state is a condition for successful implementation Report Progress Status Promote people to realize that they are not alone in change

Source(s): Table created by authors

Table 2.

structured way it will help the company to redesign its process and methods towards a better level (Porsev *et al.*, 2021; Rossiti *et al.*, 2016; Dobrin *et al.*, 2015, Takeda Yokoyama *et al.*, 2023).

Create pull flow is necessary to do not overcharge a member of the team and not having information stuck. This tool balances the task among all the flow avoiding waste of waiting and overproduction (Yokoyama *et al.*, 2019; Sastre *et al.*, 2018; Carneiro *et al.*, 2017; Monteiro *et al.*, 2015).

Follow the 8 steps to lean implementation. According to Tapping and Shuker (2018), the eight steps to lean implementation are 1. commit to lean. 2. choose the value stream. 3. learn about lean. 4. map the current state. 5. identify lean metrics. 6. map the future State (using the demand, flow and leveling concepts). 7. create kaizen plans. 8. implement kaizen plans (Freitas *et al.*, 2018; Takeda Yokoyama *et al.*, 2023; De Almeida *et al.*, 2017; Sastre *et al.*, 2018; Rossiti *et al.*, 2016).

Communicate progress is necessary to let the team know what is going on with the project if they are "winning the game or not". Having the information allow the team to increase their efforts and focusing on what is the most important thing at that moment, it can be reducing lead time, it can be controlling better the budget etc. Csiszér (2022).

Table 3. List of articles and main findings

no		Authors	Title	1	2	3	4	5	6	7	8	9	10	11	12	13
1	2013	Bodin Danielsson (2013)	An explorative review of the lean office concept			X							X			
2	2014	Viswanath (2014)	Lean transformation: How lean helped to achieve quality, cost and schedule: A case study in a multi-location product development team	X	X			X			X					
3	2015	Andersson *et al.* (2015)	Total productive maintenance in support processes: an enabler for operation excellence				X						X			
4	2015	Dobrin *et al.* (2015)	One management method, two countries. Lean method applied in Romania and France					X					X			
5	2015	Monteiro *et al.* (2015)	Implementing lean office: A successful case in public sector		X		X	X					X	X		
6	2015	Gonçalves *et al.* (2015)	Lean office: Concept Applicability Study on a Federal Public University		X		X									
7	2015	Sabur; Simatupang (2015)	Improvement of customer response time using lean office		X							X				
8	2016	de Oliveira Nascimento *et al.* (2016)	Commercial Vehicle Production Flexibility Factors		X											
9	2016	Cavaglieri; Juliani (2016)	Lean archives: The use of lean Office in archive management [Lean archives: O emprego do lean office na gestão de arquivos]		X	X	X	X				X	X			
10	2016	Rossiti *et al.* (2016)	Impacts of lean office application in the supply sector of a construction company		X		X						X		X	
11	2017	Monteiro *et al.* (2017)	Processes improvement applying lean office tools in a logistic department of a car multimedia components company				X	X								
12	2017	De Almeida *et al.* (2017)	Lean thinking: planning and implementation in the public sector		X		X								X	
13	2017	Carneiro *et al.* (2017)	Proposed use of lean office in reducing call time on products of the project analysis of polo industrial Manaus		X	X							X	X		
14	2018	Freitas *et al.* (2018)	Lean office contributions for organizational learning		X		X				X				X	
15	2018	Besser Freitag *et al.* (2018)	Lean office and digital transformation: a case study in a services company		X											
16	2018	Sastre *et al.* (2018)	Lean office: Study on the applicability of the concept in a design company		X	X					X	X		X	X	

(*continued*)

no		Authors	Title	1	2	3	4	5	6	7	8	9	10	11	12	13
17	2019	Yokoyama *et al.* (2019)	A Systematic Literature Review on lean office		X	X						X		X		
18	2019	Magalhães *et al.* (2019)	Improving processes in a postgraduate office of a university through lean office tools					X					X			
19	2019	Demeter; Losonci (2019)	Transferring lean knowledge within multinational networks	X												
20	2020	Freitas and Freitas (2020)	Information management in lean office deployment contexts							X						
21	2020	Sum *et al.* (2019)	Analysis of the Implementation of a lean Service in a Shared Service Center: A Study of Stability and Capacity					X								
22	2020	Fuchs *et al.* (2020)	Proposal to improve the maintenance management plan based on rcm and lean office in the polymer injection process		X											
23	2021	Sousa; Dinis-Carvalho (2021)	A game for process mapping in office and knowledge work		X											
24	2021	Porsev *et al.* (2021)	Digital Transformation of Employment Centers Based on the Concept of lean Manufacturing										X			
25	2022	Takeda Yokoyama *et al.* (2023)	Bayesian networks as a guide to value stream mapping for lean office implementation: a proposed framework		X		X	X					X		X	
26	2022	Csiszér (2022)	Critical Failure Factors of Process Development by the lean office Methodology		X				X							X

Source(s): Table created by authors

Table 3.

1 – Top management involvement
2 – Value Stream Mapping
3 – Promote 5S
4 – Implement Kaizen plan
5 – Visual Management of Indicators
6 – Shift mindset team
7 – Optimize information flow
8 – Establish work cells
9 – FIFO (first in – first out) method
10 – Establish patterns and follow them up
11 – Create pull flow
12 – Follow the 8 steps to lean implementation
13 – Communicate progress

Table 4.
Legend

Source(s): Table created by authors

3.3 Main findings occurrences

Another critical point to highlight is most cited LO concepts. The top eight most cited LO concepts sum up 89% of the list of LO concepts mentioned by authors investigated on SLR as illustrated on Figure 6.

VSM has stood out far ahead of the second ones (establish patterns, follow them up and implement kaizen plan) showing the importance of this tool that eventually it is forgotten onto the classical project management. Having an appropriate VSM since starting the project can effectively highlight which tasks and deliverables should be prioritized to create value for clients (internal and external ones) as soon as possible. Finding where the wastes are using VSM is useful because it can help the team to design a better and more effective process. By doing this, the wastes can be identified and eliminated, so the process becomes "leaner."

Establish patterns and follow them up. It is difficult to establish them but certainly even more difficult is to keep them being used on daily routines. But, without a proper follow up about the use of the patterns, a "hidden company" can be created based on the knowledge of people who know more profoundly about the process in use. What happens when these people left the company? Loss of performance. Not because they are great, but because they were the ones who knew how the process works better. That is also the reason why "implement kaizen plan" is important . . . to help the company constantly look inwards and

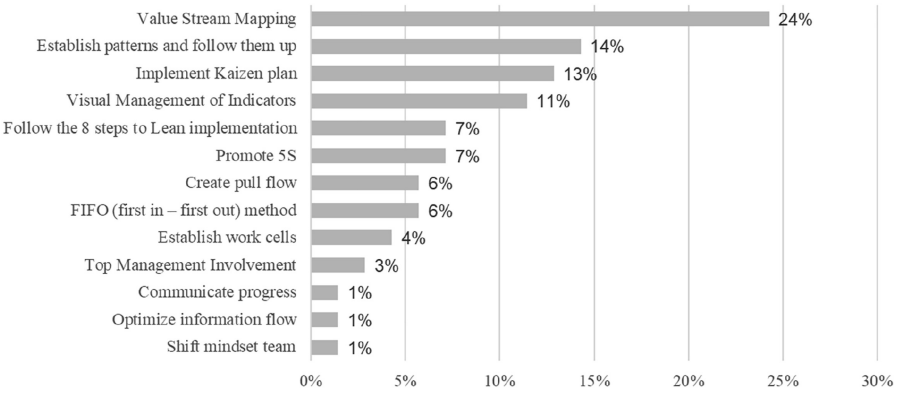

Figure 6.
Most cited lean office concept

Source(s): Figure created by authors

see what is not going so well and improve their internal processes towards a better/higher level.

Implement kaizen plan. Keep improving all the time. Do not consider the process or project management stuck. Looking carefully to the internal process, based on kaizen method is important to avoid having a bias process, "making the same mistakes again and again."

Visual management of indicators will show the team and to the stakeholders "if the team are winning the game or not." If not, the indicators will allow the team to focus on the exactly they to go back to the baseline whether is in cost or schedule (time).

Follow the 8 steps to lean implementation. It is not enough to change the way of working, it is also necessary to commit to the change and by choosing lean as a way of changing, it will necessary following the 8 steps ahead for providing a structure process to be successful on lean implementation, here they are: Commit to lean, Choose the Value Stream, Learn About lean, Map the Current State, Identify lean Metrics, Map the Future State, Create Kaizen Plans, Implement Kaizen Plans.

Promote 5S. Simple organization is always helpful. The 5S bring simple ideas to let the workspace more productive, enabling lastly the better performance.

The other concepts mentioned Figure 6 are also important like communicate progress because it causes reaction to the Project Team whenever they get aware about what going on with project and what are the next steps to move forward. Often lack of communication is cited still like one of the most dramatically skill forgotten by Project Managers and Project Member, here it means communicate effectively, communicate value to the listener, communicate useful information, being sure to be understood.

Looking closely at the top eight most cited LO concepts (89% of total) and the authors who have mentioned these concepts onto their articles Figure 7 was built.

4. Discussion and conclusion

Considering the research question "How can the application of LO support project management?", the SLR returned 26 articles selected for further analysis and these ones shown us the most mentioned potential contribution from LO to project management, resulting in 13 constructs. Even tough, the number of research on LO have not increased over the course of recent years, its ideas and concepts give an alternative on what project managers can add to their practices, for example by using simple but powerful tool like VSM. Twenty-four percent of the authors selected have mentioned (VSM). This practice can be a such strong step to move forward and up on the project performance (identify the current state and its wastes). Mapping also the future state (ideally state) is what the project managers should pursue like a state of art, knowing it will never be achieved (based on the kaizen plan – never ending improving), however it helps the process to be continuously improved on its daily basics.

The patterns should be followed. There is no news on having/establishing patterns, on the other hand, it is not so easy to properly follow them up every single day on daily tasks. But by following the patterns, the process will be stress and evaluated in a real use and its limitations soon are going to be seen and noticed. It gives one feedback about what is going well and what it is not going well and ultimately the patterns themselves can be modified to face the project where they have been used on.

Our world is constantly changing, our clients, our needs, the clients' needs, everything changes so fast like probably has never happened before. Why should be different with our internal processes of management? Why should they be considered like "done"? Well, by assuming our processes are done we miss the opportunity to modify them towards a better and more productive way. That is the idea behind "implement kaizen plan", basically it

Authors	Value Stream Mapping 24%	Establish patterns and follow them up 14%	Implement Kaizen plan 13%	Visual Management of Indicators 11%	Follow the 8 steps to Lean implementation 7%	Promote 5S 7%	Create pull flow 6%	FIFO (first in – first out) method 6%
Freitas *et al.* (2018)	x		x		x			
Yokoyama *et al.* (2019)	x					x	x	x
Besser Freitag *et al.* (2018)	x							
Magalhães *et al.* (2019)		x		x				
Monteiro *et al.* (2017)			x	x				
Takeda Yokoyama *et al.* (2022)	x	x	x	x	x			
De Almeida *et al.* (2017)	x		x		x			
Sousa and Dinis-Carvalho (2021)	x							
Andersson *et al.* (2015)		x	x					
Sum *et al.* (2020)				x				
De Oliveira Nascimento *et al.* (2016)	x							
Dobrin *et al.* (2015)		x		x				
Csiszér (2022)	x							
Porsev *et al.* (2021)		x						
Fuchs *et al.* (2020)	x							
Sastre *et al.* (2018)	x				x	x	x	x
Carneiro *et al.* (2017)	x	x				x	x	
Cavaglieri and Juliani (2016)	x	x	x	x		x		x
Rossiti *et al.* (2016)	x	x	x		x			
Monteiro *et al.* (2015)	x	x	x	x			x	
Gonçalves *et al.* (2015)	x		x					
Sabur and Simatupang (2015)	x							x
Bodin Danielsson (2013)		x				x		
Viswanath (2014)	x			x				

Figure 7.
Contribution per author

Source(s): Figure created by authors

consists of look at the process as always changing to a higher level of maturity and more closely connected to the real process in a productive way.

Keeping every member of the team informed about what is going on the project by using visual indicators, certainly provide the support to the more accurate decision making on all levels, since the daily basics tasks until the strategy level of the project, looking at it like part of a portfolio. It should be based on the information, available information, immediately. It is like driving down to a road, there is no time to calculate how fast we are or how much fuel we still have into the tanks. The information must be available every time we need to take decision, to see clearly what is missing for the project success.

The 5S must be integrated into the routine of each member of the team, here it refers on the 5S on the office, on the desk, even on the desktop, to help easily find the report, the information, the folder, they need to develop their tasks.

Having a plan without commitment means nothing. If the decision to go for LO is taken, it must be followed by consistent action plan, all the team (including the top management) must commit to lean. It will be more likely to be successful by doing this and to help through this phase, follow the 8 steps for lean implementation.

Finally, it is important to highlight the rest of the list of main potential contribution are also relevant and keeping them on the practical daily routine will bring contribution to the project management too.

Adding something else to guide and inspire other researchers for goes beyond, here are some listed proposed research questions:

(1) Is that possible to apply the constructs found here on the PMBOK?

(2) How can LO concepts can help agile methodology?

(3) How LO concepts can be adhered to emerged technologies like artificial intelligence (AI)?

4.1 Practical implications

The practical implications are that the most cited potential contribution from LO to project management exposed and synthetized here in this article can help other researchers have a compilation about "how can lean office support project management?"

Also, the findings listed here in this article may support project management showing them the benefits coming from LO benefits that can be used on their projects whether they are ongoing or still to be decided.

Additionally, project managers can have a different view on the way of project management, having some list of tips coming from LO and by studying these potential contributions they also can have some inspiration to perform their way of management more effectively.

Finally, the constructs found here can also be used for social organizations (non-organizational organizations, universities, hospitals etc.) and it can lead them to improve their internal processes too.

4.2 Theoretical implications

No one SLR has been found through the research done into the databases selected. Besides that, this article brings a novel contribution, showing the main potential contributions from LO to project management.

This article can support future research on the field whether to reinforce its constructs listed here or include new ones.

The propositions found and listed in this article cooperate to project management theory, adding contributions extracted from LO concepts.

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About the authors

Edson Oliveira Martins is a Mechanical Engineer at Federal Technological University of Paraná (UTFPR), and he has performed an MBA – Project Management at Federal University of Paraná (UFPR). He also holds a master's degree in Business Administration – School of Management – UFPR. He works currently at a multinational OEM from Automotive sector at his hometown Curitiba, there he is in charge of management Power Train projects, it includes Engines and Gearboxes locally produced and also overseas as well. His past function at the same company was Project Management for Engines where he helped the company got disruptive results in terms of Quality, Cost reduction and Punctuality of the projects. At that time, he studied internally how Agile works and applied into the Company with almost no investment and fortunately the results arrived, and it helps to the Company look at the Agile differently and applies onto others sectors too.

Guilherme F. Frederico is a Professor of Operations, Supply Chain and Project Management at Federal University of Paraná – UFPR – School of Management, Curitiba, Brazil. He works by teaching and leading researches in the graduate programs (PhD and MSc in Information Management and Master in Business Administration) and undergraduate programs (Business Management) at UFPR. Also, Prof. Frederico has been working in collaboration with the Center for Supply Chain Improvement at University of Derby–UK as a Visiting Professor and affiliated Researcher. His research interests and expertise on Supply Chain Management field are related to Maturity and Performance Measurement, Project Management, Knowledge Management, Strategic Sourcing and Impacts from Industry 4.0 and Industry 5.0. He has published his research outcomes in international journals such as Supply Chain Management an International Journal, Journal of Cleaner Production, Business Process Management

Journal, International Journal of Productivity and Performance Management, Operations Management Research Journal, Benchmarking an International Journal, International Journal of Logistics Management and Knowledge and Process Management Journal. Prof. Frederico is an Area Editor of Operations Management Research - OMR – Springer Journal and member of the Editorial Board of the Computers and Industrial Engineering Journal – Elsevier, Sustainable Manufacturing and Service Economics – Elsevier and International Journal of Industrial Engineering and Operations Management - Emerald. He has also been leading some special issues on reputed and highly ranked journals as managing guest editor as well as serving as an expert reviewer. Prof. Frederico has also been contributed to some reputable supply chain magazines (e.g. Supply Chain Management Review, Logistics Management, Celerity Logistics, Performance Magazine) publishing articles with relevant practical insights. Also, he has been invited as international guest speaker in universities of different countries such as UK, Sweden, India and UAE. Previously the academic career he worked in strategic positions for more than 10 years on SCM field in Global and Large Companies (e.g. Bunge, Deere and Company) involving different segments of Industry including manufacturing and logistics services operations. Guilherme F. Frederico is the corresponding author and can be contacted at: guilherme.frederico@ufpr.br