

An exploration of the barriers, benefits, and enablers for the effective implementation of lean project management

PROJECT EXPERIENCES SIG

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Abstract

This paper explores the factors which contribute to the effective implementation of lean project management (LPM) as perceived by a group of practitioners working in lean project management. In contrast to traditional forms of project management, the lean approach has been considered beneficial, although difficult to execute due to a lack of understanding of the barriers and enablers that are relevant to the contemporary practice environment.

Between 2018 and 2019, 58 semi-structured interviews were conducted with project management professionals in Germany, the UK and Switzerland, from a variety of disciplines. Barriers, benefits and enablers were identified but more importantly, factors which specifically address barriers and enable effective implementation were also identified. Findings highlight the importance of awareness of underpinning elements of knowledge, experience, skills, social and behavioural factors, as well as the project environment context to facilitate long-term sustainability of the lean implementation journey in projects.

(146)

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Introduction

This paper explores the factors which contribute to the effective implementation of lean project management (LPM) as perceived by a group of practitioners working in lean project management. We explore the literature on lean project management and specifically, the extant literature on benefits, barriers and enablers which may impact on successful implementation. Since knowledge and understanding of lean project management is obtained by the identification of factors important to those experiencing and practicing it, we attempt to deepen our understanding to application in practice and to make a theoretical contribution to the extant literature on lean project management.

Lean project management (LPM)

It has been suggested that a lean approach to project management is needed as many established tools and methodologies that purport to help people successfully manage projects of any nature, size and complexity lack rigour in application (Axelos, 2017; Maric, 2017). Maric (2017) further suggests that when something changes in PRINCE2, its complicated process methodology means additional time is taken by project teams to adapt. Others consider that neither PRINCE2's structured traditional programme, nor its more recent agile iterative approach, adequately addresses comprehension, or management of complexity of the contemporary working environment (Thomas & Mengel, 2008; Mesjasz et al, 2016). Gabriel (1997) suggests that LPM has the advantage of reducing risk to the client, with the right balance of quality, performance, and value for money. LPM necessarily focuses on delivery, improving communication between stakeholders, process design and eliminating waste (Ballard & Howell, 2003; Joosten et al, 2009). The principles and mechanics of lean as outlined above rely on information and collaboration, visual techniques, sense-making, and decisions based on human creativity and interpretation, but particularly depend on the application of human values to determine best practice (Hopp & Spearman, 2004). This has led to difficulty in execution, hence the interest and growth of lean as a project management tool. In contrast to traditional forms of project management, the lean approach to project management has worked very successfully in potentially difficult and complex areas, often considered to have yielded a high level of commitment and motivation from the team, and to the satisfaction of the client organisations (Moujib, 2007). However, there has been ongoing debate in the literature surrounding lean thinking, not least due to its varied implementation results across different industries (Akmal et al, 2022).

Definition and practice of lean

Practicing lean as a project management approach is generally defined in the literature as a system of production control, project delivery system (Howell 2011), or as a conceptual model of the production process (Koskela et al, 2002, Green & May 2005). What is clear, is that lean shares many commonalities across industries in terms of its use as a production system (Pasquire, 2012; Ballard & Tommelein, 2012), strategic purpose e.g., waste reduction, efficient scheduling, and a goal-oriented tactical method (Bernstein & Jones, 2013). Criticisms of lean within the literature generally comprise two main elements: the lack of consistency and consensus in achieving a definition, despite its use as a worldwide management concept (Modig & Åhlström, 2017) and the application of the concept and the extension of its application, not least in non-automotive manufacturing settings. Contemporary project managers require a more tactical and clean working definition, which are relevant to their practice and environment (Hopp & Spearman, 2004). However, successful implementation of lean strategies is more than an overall acceptance of ideology, tools, and practices; it is about acceptance of the changing culture (Chesworth, 2015).

An essential step in adopting lean project management is to understand factors that can impact on its implementation. Our study investigates practitioners' perceptions of barriers, benefits, and enablers based on their lived experiences, whilst also seeking to identify other important factors.

Barriers, Benefits and Enablers to lean implementation

A table of key Literature summarises the relevant extant literature reviewed:

Table 1 Key Literature

Authors	Implementation details	Barriers
Andrés-López et al (2015)	PDS (Project Delivery System) in capital industrial projects in Brazil	Companies do not want to change their role Lack of lean training
Hussain et al (2019)	GLS (Green, Lean and Six Sigma) in the construction industry in Pakistan	Lack of customer involvement and awareness Lack of top leadership support
Albuquerque et al (2020)	Lean implementation in construction companies in Brazil	Internal cultural resistance to change, both internally and externally
Akmal et al (2022)	Lean implementation in healthcare environments	Lack of familiarity with lean Lack of motivation of staff for lean principles Incompatibility of the healthcare culture with lean thinking
Leite et al (2022)	Meaningful inhibitors of the lean journey (SLR)	Behavioural and cultural influence Organisational strategy and alignment Technical limitations Process-based Leadership commitment Resources constraints
Authors	Implementation details	Benefits
Fernández-Solis et al (2013)	LPS in construction industry	Greater collaboration with field personnel and subcontractors
Babalola et al (2019)	Lean implementation practices in the construction industry: Systematic review	Work efficiency increment/increased labour productivity and performance Generation of better value for client/customer satisfaction Employee satisfaction Improved health and safety Improved suppliers' relationship Achievement of reliability, accountability, certainty (predictability) and honesty on projects Better cooperation among stakeholders Improvement of management and control Better coordination
Demirkesen & Bayhan (2019)	Critical Success Factors of Lean Implementation in construction	Preventing rework Addressing safety concerns Meeting quality standards

Antomarioni et al (2020)	Lean projects' evaluation-perceiving levels of success and barriers	Job role and position influencing success and deployment of lean
Authors	Implementation	Enablers
Gabriel (1997)	Lean management	Client interests to be represented without communication delays Satisfaction for customers and the project teams
Hines et al (2011)	Lean management	Strategy Innovation Technical knowledge Process
Andrés-López et al (2015)	PDS (Project Delivery System) in capital industrial projects in Brazil	Satisfaction for customers and the project teams
Borges-Lopes et al (2015)	Lean manufacturing tools in the food and beverage industries	Satisfaction for customers and the project teams
Ahuja et al (2018)	Lean and green in construction projects	Technology Technical and social skills of employees
Jünge et al (2019)	Lean project planning and control in ETO projects	Planning flexibility, integrity, commitment, participation, and dedication Project dedication Re-planning ability Impact awareness Learning ability

Extant literature suggests that there are studies about barriers and enablers for the adoption of lean manufacturing, lean construction, increasing success rates in process and service improvements, but there is a lack of literature focused on the adoption of *lean project management* as an approach. Although there is a generally positive appetite for the implementation of lean approaches, within and across industries, there is also an acknowledgement of the challenges of and for implementation. Additionally, whilst there appears to be a general recognition of factors which contribute to the success (or otherwise) of the lean approach on delivery, outputs, and outcomes, these are often articulated in singular descriptive factors that appear to stand alone, such as barriers, inhibitors, enablers, challenges. Moreover, there is a paucity of research on the underpinning social and behavioural elements that contribute to understanding of barriers, benefits and enablers required for effective implementation. Therefore, our research explores this in more depth with experienced practitioners who have implemented a lean approach to their projects.

Research philosophy, theoretical lens, methodology and methods

This study focuses more on understanding, as opposed to explaining, human behaviour (Neuman, 2011), reflective of the values-based, subjectivity of the humans, their attitudes, cultures, feelings, and experiences (Gill & Johnson, 2010). The concern with seeking a new interpretation, or fuller, deeper, richer meaning by analysing the essence of what is described by the lived experiences of individuals (Moustakas, 1994). The phenomenon under investigation is the exploration of factors which are responsible for effective implementation of LPM. As such an axiological lens is useful in understanding projects on an in-depth level. This would provide an opportunity to strengthen the legitimacy of the research field beyond the limits of value as a theoretical concept alone (Biedenbach & Jacobsson, 2016). A purposive sampling strategy was undertaken using the research teams' professional, established

practitioner PM network to identify and approach Lean Project Managers from a variety of disciplines. A total of 58 semi-structured interviews were conducted with project management professionals between 2018 and 2019 in Germany, the UK and Switzerland, from a variety of disciplines. Interview respondents in this dataset were required to have at least 3 years of PM experience to be eligible to participate.

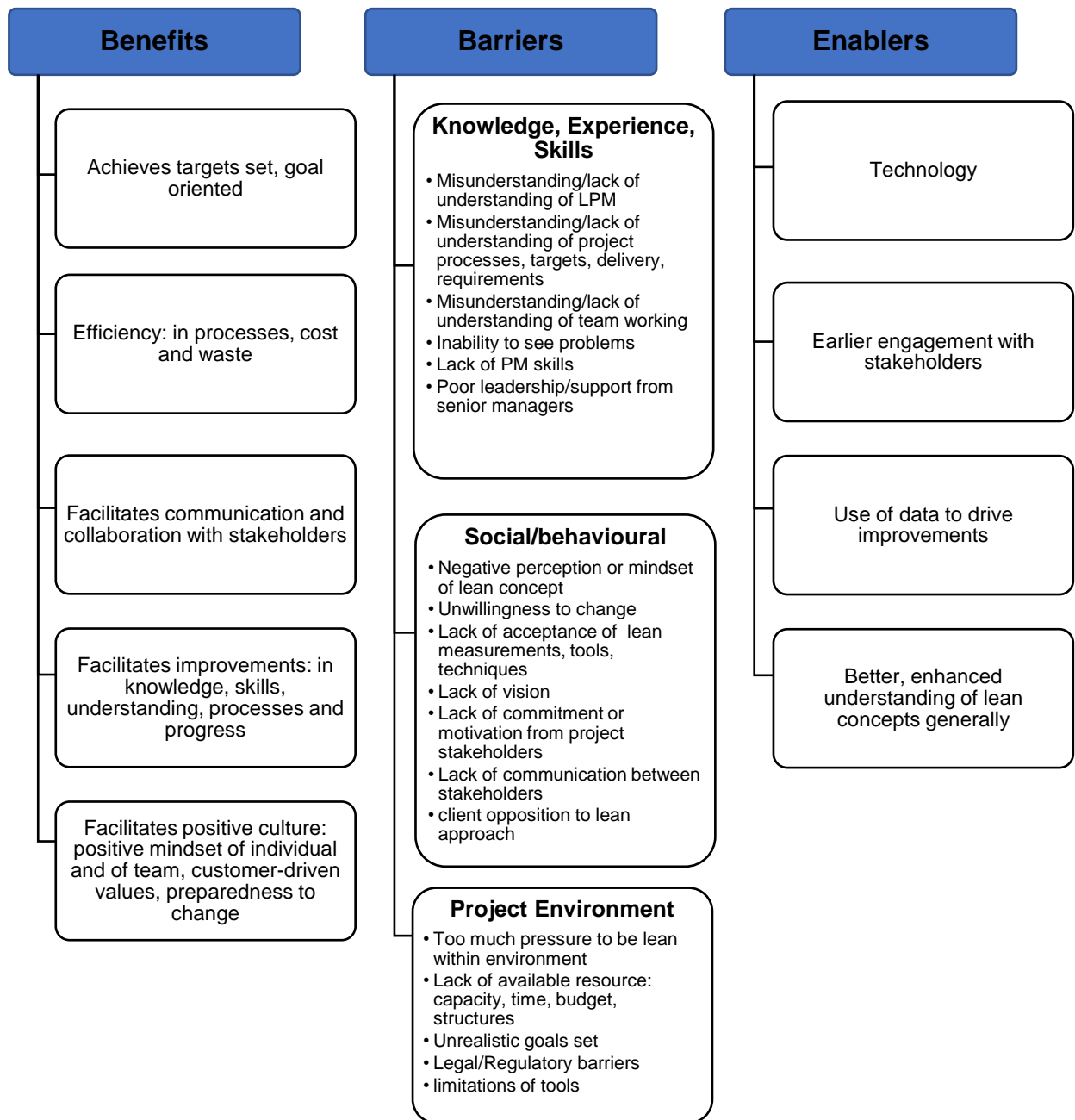
Data collection was undertaken through semi-structured interviewing providing a critical reflexive opportunity for participants, recalling notable projects, or incidences within project interactions. We obtained over 40 hours of audio recorded data. Once confidential and potential identifiers were removed, transcriptions of 58 interviews were uploaded to Nvivo Pro (12) and an initial coding structure based on the first 10 interviews was developed by the lead author. To establish intercoder reliability and intercoder agreement, two researchers analysed the 11th interview and a high degree of intercoder reliability (Campbell et al, 2013; Lavrakas, 2008) was found. The initial coding scheme and allocation of content to nodes reached 95% agreement and following discussion, subsequent minor refinements were made to the coding scheme before the rest of the interviews were analysed by a team of six researchers and verified by a seventh researcher.

Data analysis

The research uses a qualitative, inductive approach to data analysis, using an iterative process of cleaning of node structures, removing any duplicates, creating, or merging relevant nodes leading to the production of a final structure which was checked and verified by all researchers for relevance and content, using reflexive thematic analysis (Braun & Clarke, 2006; 2020). To obtain a sense of the features, size and magnitude of the data analysed, 106 codes were created from 58 interview transcripts. Rich data was obtained from participants, in total 2374 individual 'pieces of evidence' were considered appropriate for coding. Demographic information is presented in Appendix 1.

Presentation of Findings

Figure 1: Presentation of identified benefits, barriers, and enablers of LPM



Following the initial ordering outlined from the descriptive categories of Barriers, Benefits and Enablers, the data was further analysed, comparing and contrasting matched elements, leading to a different and more holistic view of the emerging themes and sub-themes. Matched elements for Barriers and Enablers were found in three further categories, Knowledge, Experience & Skills; Social & behavioural Factors, and Project Environment as seen in the figures below.

Figure 2: Knowledge, Experience and Skills

Matched elements (shown in bold) reveal that that knowledge and understanding of lean and its implementation mechanisms (processes, requirements, targets, delivery modes) is considered both a barrier and an enabler.

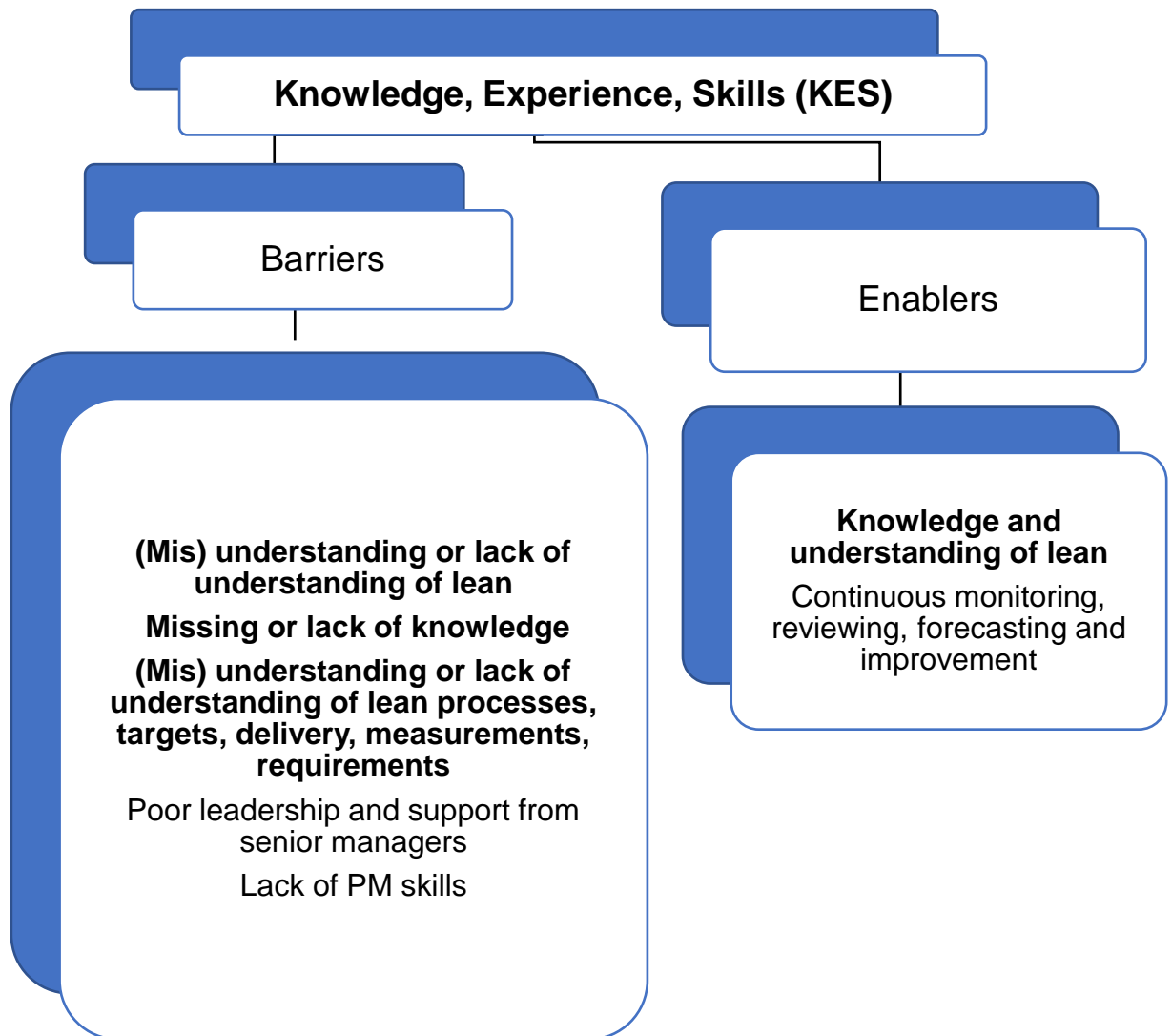


Figure 3: Social and Behavioural factors

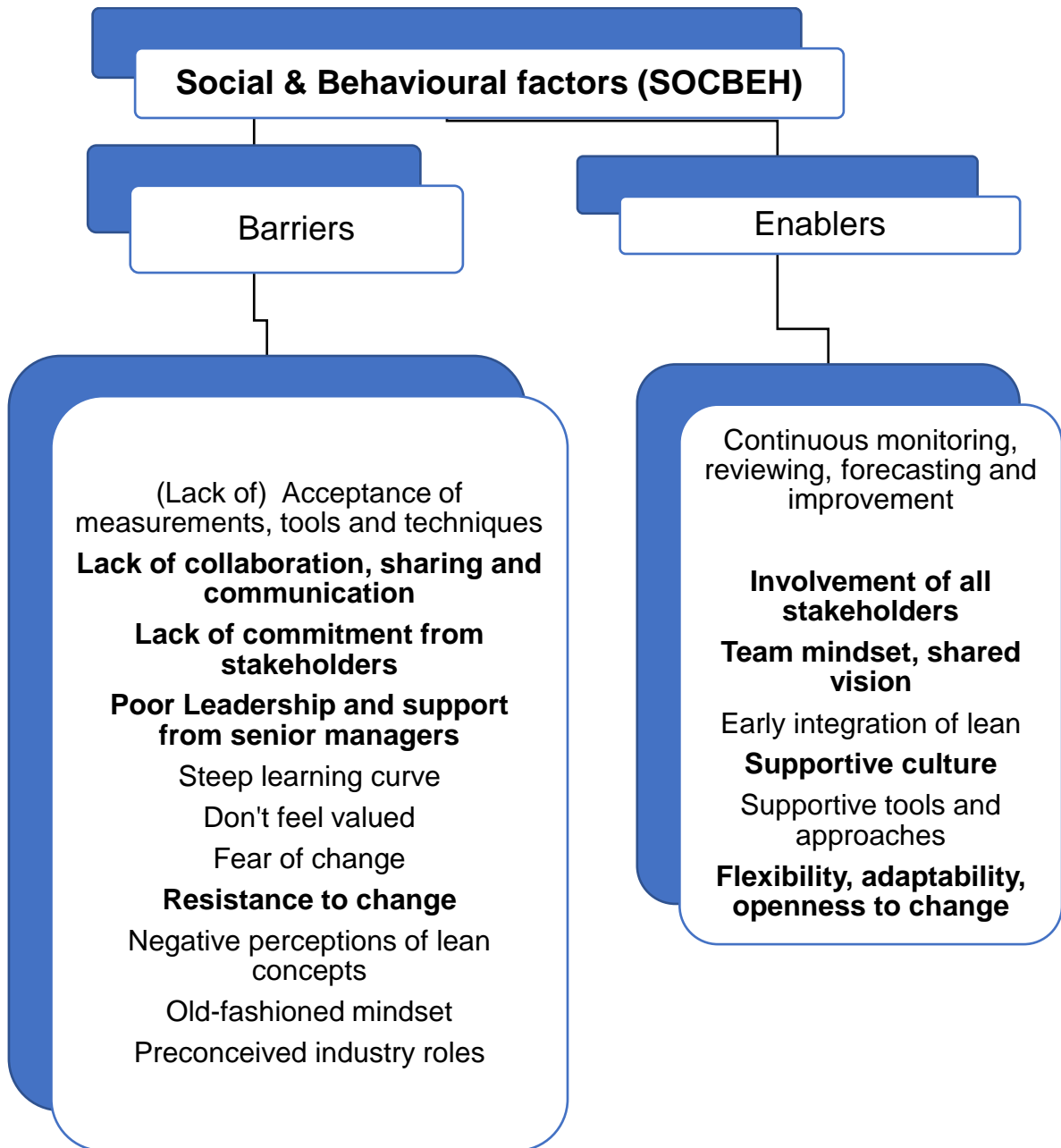
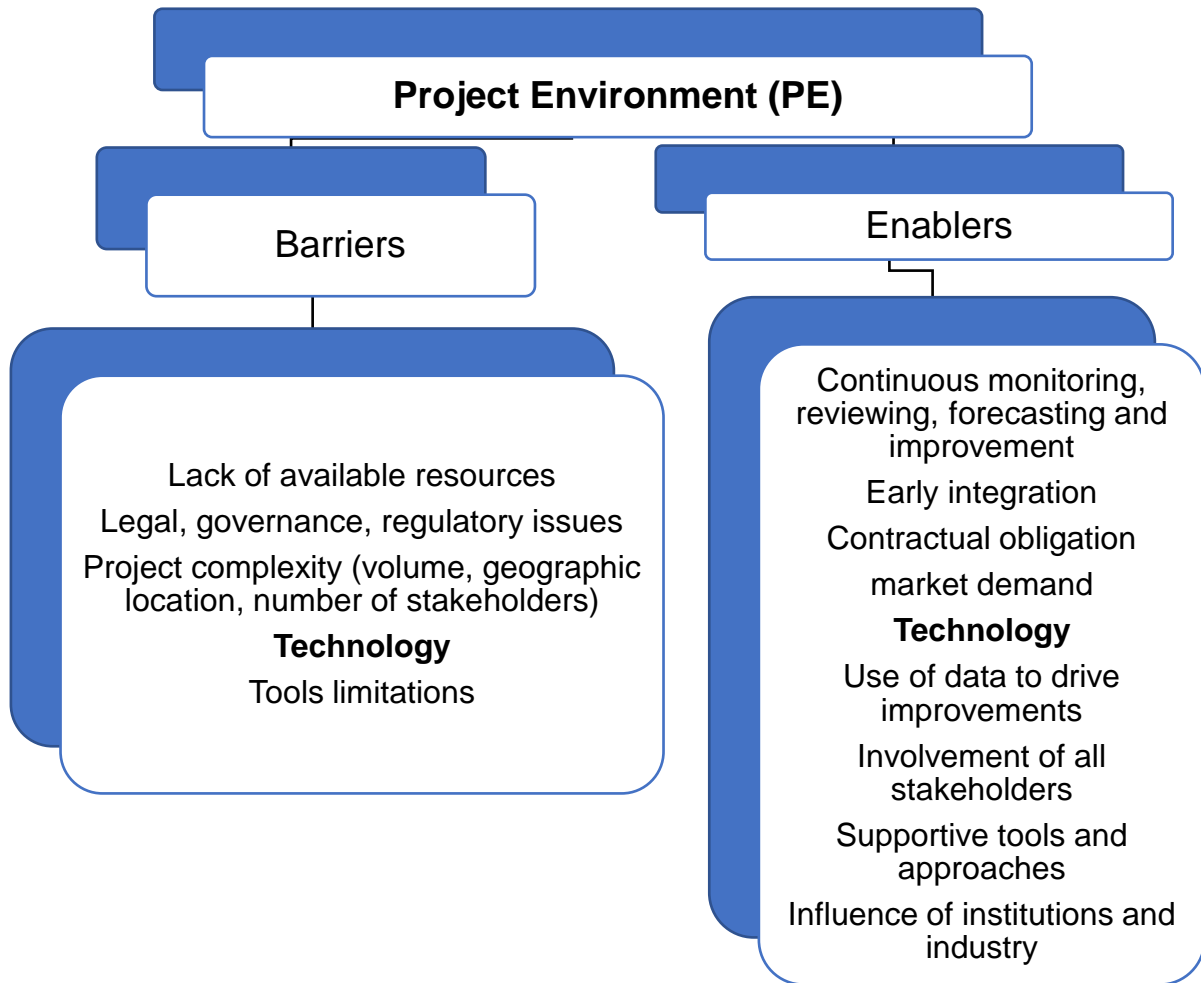


Figure 4: Project Environment



Discussion

Noticeable from the above figures is that *continuous monitoring, reviewing, forecasting and improvement* appeared as an Enabler in all three categories of Knowledge, Social/Behavioural and Project Environment. The notion of supportive culture, supportive tools and approaches also appeared as an enabler in both Social/Behavioural and Project Environment. Involvement of all stakeholders and early integration appeared as an enabler in both of these categories. Poor leadership and support from senior managers appeared as a barrier in both Knowledge and Social/Behavioural factors. The importance of a solid knowledge base, supported by a culture of timely and committed stakeholder involvement and collaboration, may facilitate this principle. This provides an opportunity to focus on these areas in more detail to support implementation. Hines et al (2020) suggest that lean is a lifelong journey that creates a culture of improvement based on rigorous use of four core systems that ensures improvement is aligned, behaviours are exemplified, improvement is planned and organic, systems are checked, and people undergo continual coaching and development (2020, p404). Leite et al (2022) support this holistic approach agreeing that lean managers should rethink the way value is addressed during implementation, focusing on meaningful elements of context and organisation to ensure sustainable lean implementation (2022, p417). Therefore our research has supported and extended the prior literature which suggested and highlighted the importance

of supportive leadership and management in order to facilitate the implementation process. Rather than focusing on singular elements such as barriers, benefits and enablers, the research reveals a different way of identifying requirements for effective lean implementation. We propose that scholars and practitioners consider the social and behavioural elements identified, the varying knowledge base of individuals and teams within the project and the project's operating environment. The following illustration helps to understand how these elements combine to facilitate effective implementation of a lean approach to project management.

Figure 5: Lean implementation requirements



Conclusions

The research has revealed that there are a number of elements within these factors which can be further categorised as underpinning requirements to effective lean implementation. These elements importantly include social and behavioural elements, levels of knowledge and understanding of lean principles, tools, methodologies and a vital consideration of the project environment within which practitioners operate. This aligns with Leite et al's (2022) suggestion of the need to raise awareness of contemporary behavioural and organisational aspects, as well as traditional tool-based and resource-based issues. Challenging barriers and facilitating opportunities to counter-measure barriers with enablers can lead to a more positive effect on the likelihood of effective implementation of lean as a PM approach, and additionally facilitates longer-term sustainability of the lean implementation journey.

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Appendix 1:

Demographic data from the sample population

	Number	Percentage	
Gender			
Male	45	78%	
Female	13	22%	
	58		
Project Type			
Construction	43	74%	
Engineering	4	7%	
IT	3	5%	
Health/Bio/Med	1	2%	
Estates/FM	1	2%	
Manufacturing	1	2%	
Nuclear	1	2%	
Petrochemical	1	2%	
Social Enterprise	1	2%	
Transport	1	2%	
Utilities	1	2%	
	58		
Organisational size			Of which: Number of distinct organisations
SME ¹	20	34%	10
large - private	30	52%	12
large- public	7	12%	6
freelance	1	2%	1
	58		29
Current operational base:			
UK	22	38%	²
Germany	27	47%	
Switzerland	9	16%	
	58		

¹ SME definition as per EU: https://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en