

AN EXPLORATORY STUDY OF THE MAIN BARRIERS TO LEAN CONSTRUCTION IMPLEMENTATION IN PERU



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AGENDA

1. Background and motivation
2. Literature Review: Barriers of lean implementation
3. Survey: Ranking of barriers
4. Conclusions and outlook

BACKGROUND AND MOTIVATION

High share of non-value adding activities in the construction industry requires strategies to minimize waste

Productive time vs. Non-value adding activities in manufacturing and construction

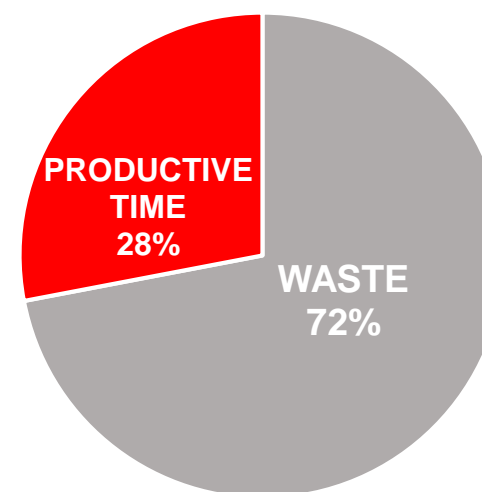
MANUFACTURING GLOBAL



CONSTRUCTION GLOBAL



CONSTRUCTION PERU



(Aziz and Hafez, 2013; Lean Construction Institute, 2004; Ghio, 2001)

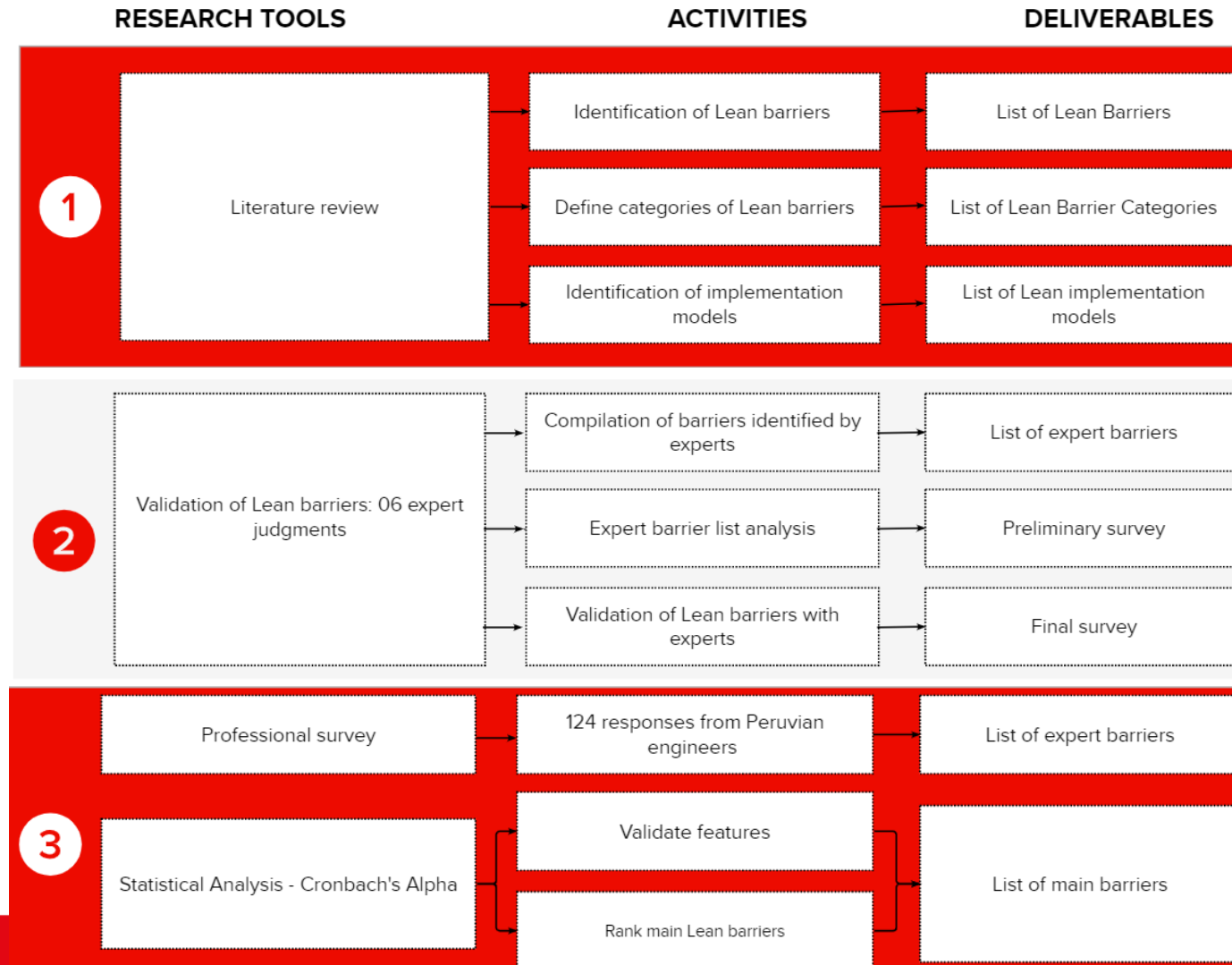
BACKGROUND AND MOTIVATION

To get the most out of lean construction: you need to overcome barriers



(Almanei et al. 2017; Murguia 2019; Bashir et al. 2015)

Research methods to identify barriers of lean implementation



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LITERATURE REVIEW(1/3)

Literature review

- Keywords: “barriers, challenges, factor influencing, lean construction implementation”.
- Databases such as : Google Scholar, IGLC papers, Scimedirect, Asce library, Lean Construction Journal, Peruvian Institutional Research Repository.
- 93 papers review
- 68 lean barriers identified



Discussion with experts

- Semi-structured zoom interviews
- Experts with more than 12 years of experience in implementing Lean
- 01 expert per industry
- 05 barriers identified with experts

32 barriers prioritized with the experts for the study

LITERATURE REVIEW(2/3)

Philosophy

Barriers associated with the Lean philosophy

Lack of understanding of the fundamental purpose and rationale for Lean implementation.

Lack of transparent information between team members and management, reducing reliability in Lean.

Local and not global flow optimization

Lack of information exchange between teams, suppliers, subcontractors, etc.

Lack of long-term thinking in the organization for Lean implementation

Lack of clear definition of scope, identifying value and definition from the customer's point of view.

Long duration of the Lean learning curve

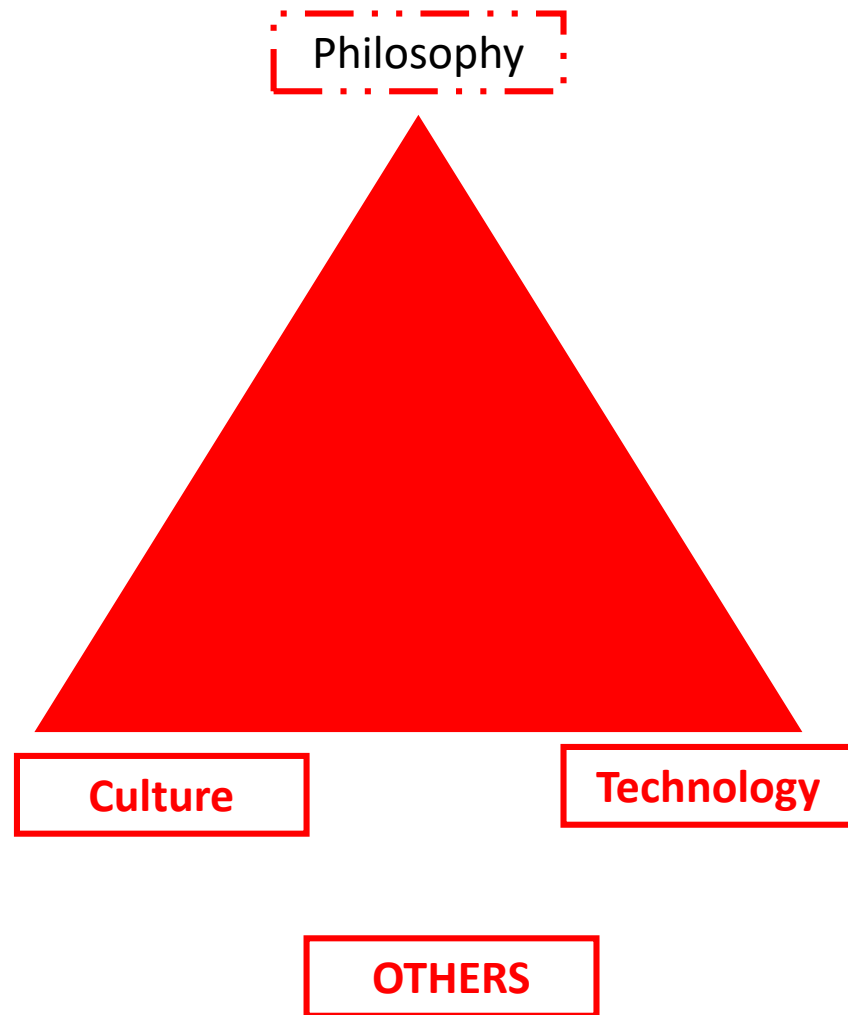
Lack of leadership and empowerment of people in the project.

Culture

Technology

(Salvatierra et. al 2015, triangle GEPUC)

LITERATURE REVIEW(3/3)



Barriers associated with the lean culture

Lack of centralized, stored, and shared information to generate a continuous improvement cycle.

Incorrect selection of Lean tools

Ease of communication from top management with improvement initiatives.

Resistance to change of people in the organization

Barriers associated with the lean tools

Lack of self-criticism to learn from mistakes and identify problems

Lack of improvement culture throughout the organization

Inability to measure team performance and progress

Lack of advance work planning and realistic scheduling using Lean tools

Lack of time to implement Lean in ongoing projects

Lack of collaboration of all project stakeholders at all levels and early stages of design and production (suppliers, subcontractors, etc.).

People use tools without supporting them with culture and philosophy.

Other barriers related to lean implementation.

Replicating the Lean strategy of another organization

Lack of top management commitment to the implementation

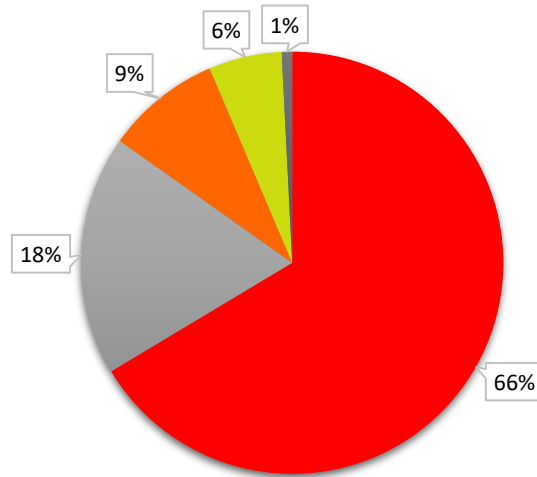
Lack of knowledge and experience of

Lack of collaborative work between academia and the construction industry

High cost of implementation

SURVEY: RANKING OF BARRIERS

Profile survey



■ 1 to 5 years ■ 6 to 10 years ■ 11 to 15 years ■ 15 to 20 years ■ more than 20 years

- ➔ 124 lean Peruvian practicing engineers responded to the survey
- ➔ Questions with positive or neutral syntaxes so as not to influence or sympathize with answers.

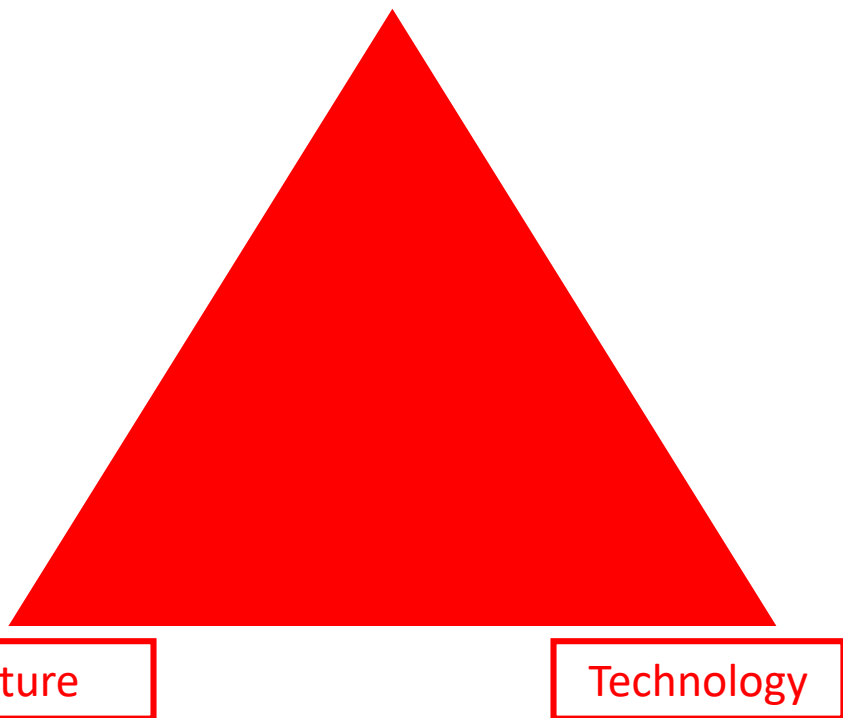
Method of evaluation 1–5 point Likert scale

Rate the frequency with which you experience the practices mentioned above ...

	1 Never	2 Rarely	3 Occasionally	4 Frequently	5 Very frequently
	Nunca=1	Raramente=2	Ocasionalmente=3	Frecuentemente=4	Muy frecuentemente=5
Realiza continuamente retroalimentación de las actividades diarias con su equipo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Las personas de su equipo proponen continuamente mejoras para su trabajo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La empresa usa indicadores para medir el rendimiento y progreso de los equipos del proyecto.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SURVEY: RANKING OF BARRIERS

Philosophy ↑ Highest rated group



(Salvatierra et. al 2015, triangle GEPUC)

Ranking results – Top 5 barriers of lean implementation

Variable	Rank
Lack of government policies to encourage the use of Lean.	1
Lack of collaborative work between academia and the construction industry.	2
High cost of implementation	3
Low empowered capacity of people in the organization delays decision making.	4
Low knowledge of Lean among university graduates.	5

CONCLUSIONS AND OUTLOOK

Lessons learned

- The Peruvian State must adapt the contracting laws to allow flexibility to lean projects.
- Understanding the Lean philosophy by workers is still complex in Peruvian industry.
- Collaboration between academia and companies can reduce many barriers.
- The implementation of lean is possible if we all contribute, know each other, inform ourselves and work as a team.

Outlook

- Generate and propose a roadmap.
- Study of the level of Lean maturity in university students.
- Lean perception study on suppliers, customers, subcontractors, etc.
- Generate and propose a roadmap for implementing Lean in the public sector.

This study is part of a macro study to propose a roadmap for Peru. Identifying the root causes of barriers is fundamental to improve construction in general and to execute projects more successfully.

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THANK YOU!

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