

LEAN CONSTRUCTION AND ORGANIZATIONAL KNOWLEDGE CREATION



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AGENDA

- General Context
- Methodology
- Results and Discussion
- Conclusions

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GENERAL CONTEXT



Brazilian Lean Construction Consulting Company

Analyses of 6 projects which were undergoing stages of implementing Lean Construction and Operational Excellence

GENERAL CONTEXT



Eolic Energy
Construction



Photovoltaic Energy
Construction



Power Transmission
Lines Construction



Grain Storage
Construction



2 Residencial
Constructions

GENERAL CONTEXT

	LC Implementation time	Application of Lean Construction Tools					Formal Skills Training	
		Line Of Balance (LOB)	Kaizen	MFV	Look Ahead	Check-in/Check-out	Training Operational Excellence	Training in LC concepts
Company 1	8 months	x	x	x	x	x	x	x
Company 2	7 months	x	x	x	x	x	x	x
Company 3	3 months		x	x	x	x	x	x
Company 4	2 months	x			x	x		x
Company 5	20 months	x			x	x	x	x
Company 6	5 months	x		x	x	x	x	x

Table 1. LC tools implemented in the companies analyzed

GENERAL CONTEXT

Lean Construction is not just about learning to use tools and applying them. In reality, its essence is to create a collaborative environment between those involved in the enterprise, thereby creating moments of discussion and interaction, generating solutions, learning and creating opportunities for innovation.

(Christensen and Christensen 2010; Skinnarland and Yndesdal 2012)

And what would all that be about, if not a way to create, maintain and explore knowledge dynamically?



GENERAL CONTEXT

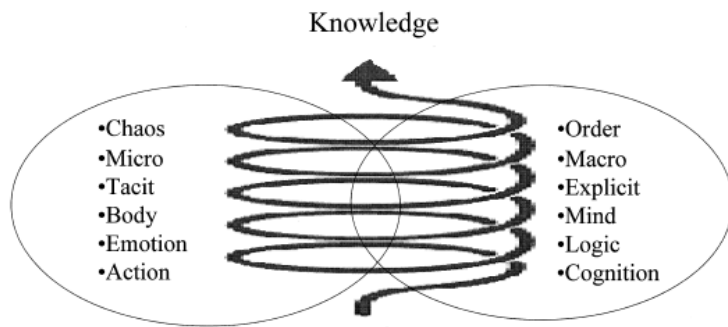


Figure 1. Knowledge created through a spiral (Nonaka, Toyama and Konno 2000)

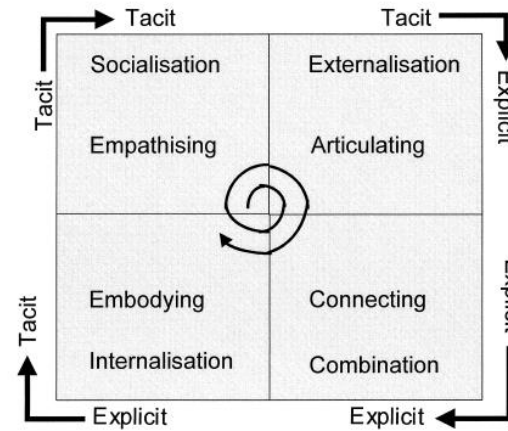


Figure 2. The SECI Process(Nonaka, Toyama and Konno 2000)

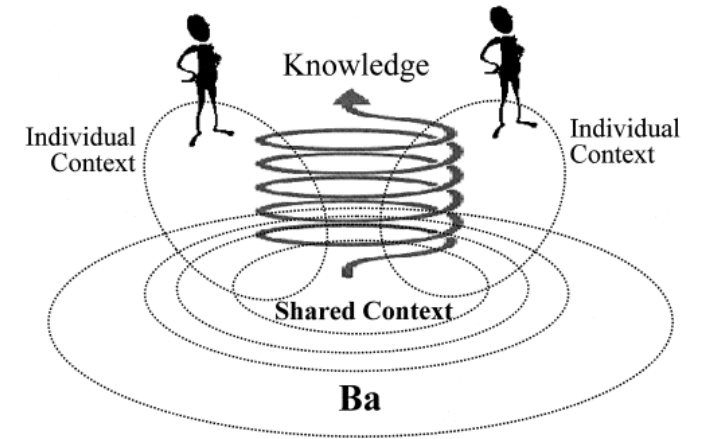


Figure 3. Ba as shared context in motion (Nonaka, Toyama and Konno 2000)

GENERAL CONTEXT

Explicit Knowledge

Explicit knowledge is encoded and stored in formal language and shared in the form of data, figures, specifications, manuals, etc. so that it can be easily transferred between individuals in the organization



Tacit Knowledge

Tacit knowledge is difficult to transmit and encode. It is subjective and deeply rooted in an individual's actions, attitudes, commitments, ideals, values and emotions

(Zhang and Chen 2016)

GENERAL CONTEXT

There is already a rich bibliography for this field of study which has been developed by academics and researchers with extensive experience...

- Christensen, R. M.; Christensen, T. N. 2010. “Lean construction facilitates learning on all organisational levels? Challenging Lean Construction Thinking: What Do We Think and What Do We Know?” - *18th Annual Conference of the International Group for Lean Construction, IGLC18*, n. July, p. 406–414.
- Skinnarland, S.; Yndesdal, S. 2014. “Barriers to a Continuous Learning”. *Proc. 22th Ann. Conf. of the Int’l. Group for Lean Construction*. Group for Lean Construction, p. 1191–1201.
- Skinnarland, S.; Yndesdal, S. 2012. “The last planner system as a driver for knowledge creation”. *IGLC 2012 - 20th Conference of the International Group for Lean Construction*.
- Tyagi, S. et al. 2015. “Lean tools and methods to support efficient knowledge creation”. *International Journal of Information Management*, v. 35, n. 2, p. 204–214.
- Zhang, L.; Chen, X. 2016. “Role of Lean Tools in Supporting Knowledge Creation and Performance in Lean Construction”. *Procedia Engineering*, v. 145, p. 1267–1274.

GENERAL CONTEXT

However, the theme of Lean Construction is still incipient in Brazil, being mainly concentrated in consultancies and large companies.

The perception of construction professionals about the results of implementing Lean Construction in Brazilian projects has hitherto been little explored in Brazil.



GENERAL CONTEXT

The aim of the research:

Identify the participants' perception of the knowledge generated in the projects, by exploring in-depth the distinction between **explicit** and **tacit knowledge** during the implementation of Lean Construction.

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METHODOLOGY

- QUALITATIVE SURVEY
- 8 QUESTIONS
- 6 COMPANYS, 6 PROJECTS
- 29 RESPONDENTS

METHODOLOGY

ASSUMED BY THE AUTHORS:

Explicit Knowledge

Generated by the formal skills training, for making use of data, methods and formal language

Tacit Knowledge

Generated by the application of Lean Construction Tools in practice, due to its moments of collaboration and practice;

METHODOLOGY

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RESULTS AND DISCUSSION

At least at some point during the course of the projects in the participants companies, implementing Lean Construction tools led naturally to...

1

SHARING INFORMATION

2

IMPROVEMENT ACTIONS FOR PROJECTS BEING CREATED

3

TO CREATING KNOWLEDGE FOR THE COMPANY

4

TACIT x EXPLICIT KNOWLEDGE

RESULTS AND DISCUSSION

1

SHARING INFORMATION: 86% of respondents believe that implementing Lean Construction tools always favors the greatest and best information sharing.

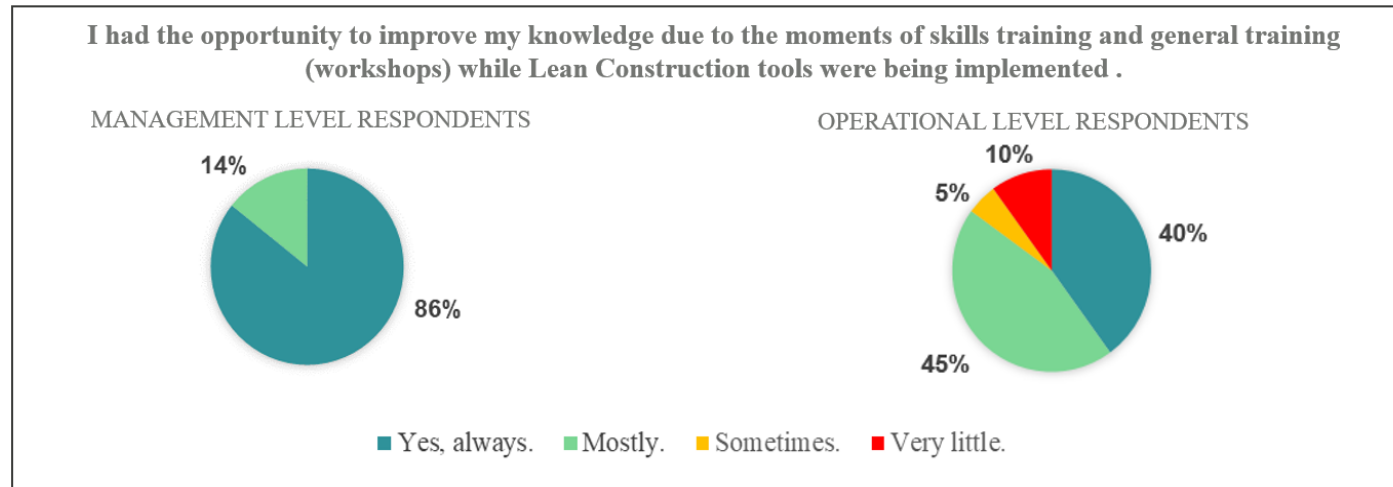


Figure 5. Answers to Question 1 of the survey

RESULTS AND DISCUSSION

2

IMPROVEMENT ACTIONS FOR PROJECTS BEING CREATED: 84.9% of the respondents identified that, in most cases of implementing Lean Construction tools, this aspect is favored.

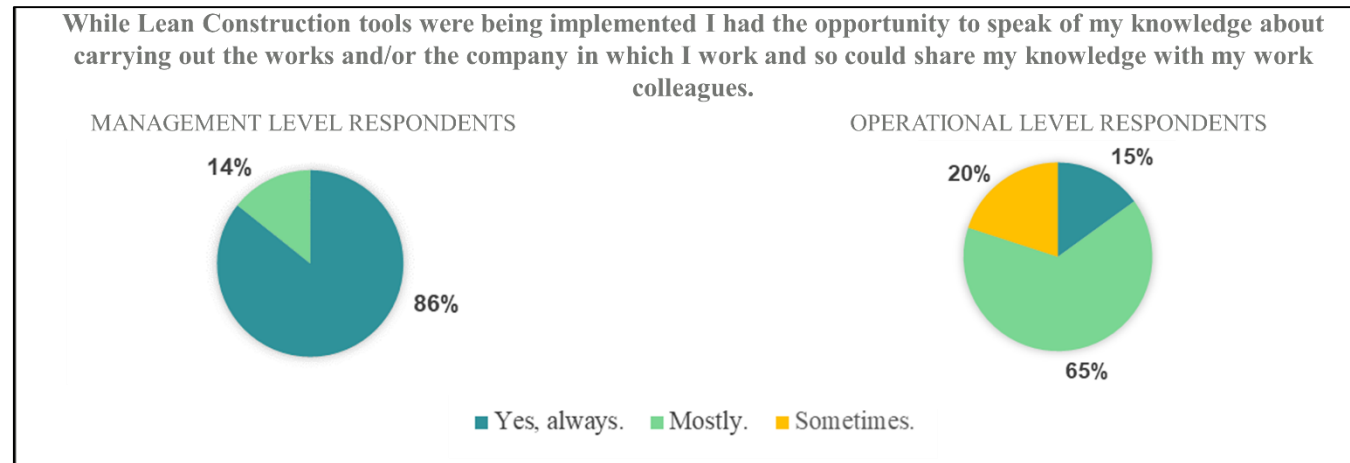


Figure 6. Answers to Question 2 of the survey

RESULTS AND DISCUSSION

3 TO CREATING KNOWLEDGE FOR THE COMPANY: 90% of respondents believe that, in most implementations, knowledge was generated for the company.

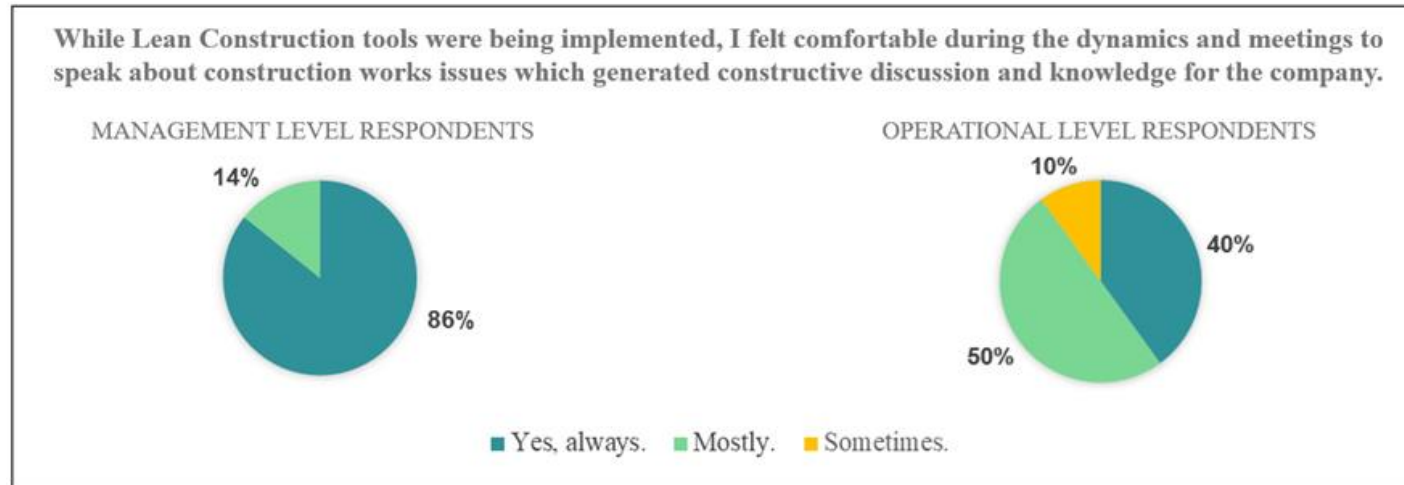


Figure 7. Answers to Question 3 of the survey

RESULTS AND DISCUSSION



Greater degree of sharing information, improvement actions for projects and the perception of the creating knowledge at the project management level than at the operational level;

RESULTS AND DISCUSSION

4

TACIT x EXPLICIT KNOWLEDGE: Although explicit knowledge, generated through formal training, has extremely expressive returns, tacit knowledge emerges as a great aggregator of results in the work environment.

85.2%

of respondents identified that in most cases of formal skills training and general training on Lean Construction, their knowledge was improved

=

transfer and generation of explicit knowledge

92.6%

of the respondents identified that in most cases of the practical application of the Lean Construction tools their knowledge was improved;

=

transfer and generation of tacit knowledge

RESULTS AND DISCUSSION

4

TACIT x EXPLICIT KNOWLEDGE

81.5%

of the respondents identified that the most **effective way** to generate organizational knowledge in Lean Construction implementation projects is to combine tools, methods and training that involve both **tacit** knowledge and **explicit** knowledge.

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CONCLUSIONS

The **variation between people in management and operational functions** in the perception of knowledge creation and the formation of a collaborative environment;



Although explicit knowledge, generated through formal training, has extremely expressive returns, **tacit knowledge emerges as a great aggregator of results in the work environment;**



The most effective way to generate organizational knowledge in Lean Construction implementation projects is to combine tools, methods and training that involve **both tacit knowledge and explicit knowledge;**



CONCLUSIONS

LIMITATIONS:

- having only 29 respondents for qualitative research;
- having only 6 companys for qualitative research.

CONCLUSIONS

FUTURE RESEARCHS:

- the sample analyzed consists entirely of Brazilian companies and participants, so future studies could replicate this research in other countries with different contexts and levels of Lean Construction maturity;
- the depth understanding of the variation between people in management and operational functions in the perception of knowledge generation and the formation of a collaborative environment.

THANK YOU!



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