

# PROJECTS ARE BECOMING ‘LEAN’, BUT NOT ORGANISATIONS

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## ABSTRACT

There is significant evidence of successful lean implementation at the project level. However, there is limited evidence of lean percolating through organisations in both literature, as well as industry. While the critical aspects of strategic adoption of lean to overcome organisational resistance have been clearly highlighted, the implementation is in most cases limited to select projects and not all projects across an organisation’s portfolio.

Despite proven benefits on projects within their own portfolio and the knowledge and skills for successfully implementing lean, organisations still fail to change their approach towards continuous improvement and driving efficiency as a whole. The paper here focuses on the need for a revised approach towards the adoption and sustenance of lean within companies at a business level by highlighting the importance of culture across the company’s portfolio.

The authors reflect on their experience of working with client and contractor organisations across multiple projects to review the difference in the maturity and implementation of lean. Following this, the authors corroborate their findings from discussion with a major public sector body and its supply chain on their lean journey over the last decade, to shed light on the approach needed today for successful lean implementation for organisation-wide sustenance.

## KEYWORDS

Lean Construction, Lean Culture, Lean Implementation.

## PAPER STRUCTURE

The paper first highlights the evidence in literature on the success of lean implementation, with a keen focus on the success factors for sustenance of the approach. Following that, limitations of organisation-wise penetration will be evidenced, reinstating the major challenges towards the adoption and implementation of lean.

Post the literature summary, the authors build on their combined experience to highlight the key factors that have made lean implementation a localised success, while being challenged across other projects within the same organisation across other businesses. The authors proceed to elaborate on the hypothesis with a semi-structured interview conducted with multiple lean practitioners for providing a discussion on the key factors addressing the research question.

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## LITERATURE REVIEW

Research has provided immense evidence (a review of multiple “lean implementation/ lean culture” paper from IGLC itself) highlighting the limitations of isolated attempts at implementing lean to successfully percolate across organisation strategy (Kalyan et al. 2018; Neto and Alves 2007). Pekuri et al. (2012) highlight the problem of localised adoption of lean in organisations through the application of a few lean tools and process in some projects.

The Last Planner® System (LPS) (Ballard 2000) for collaborative planning has had immense success in driving this supply-chain inclusive approach towards lean outcomes, followed by other lean tools such as Kanban (Kim et al. 2007). A bottom-up approach to building a case for benefits obtained from lean implementation through LPS has been highlighted across numerous studies (Delhi et al. 2017). Tillmann et al. (2014) further emphasise this approach by highlighting the importance of participating with teams at the ground level to enable a cultural transformation towards lean outcomes.

Adoption of lean in organisations require changes in the overall business processes that needs a structured approach to sustain these improvements (Dave, 2017). Adoption of such a new business model must be governed by value offering, value creation, and revenue model, with a commitment from the management level (Pekuri et al., 2014).

Kalyan et al. (2018) highlights the critical factors of building organisation-wise lean culture in the context of Indian construction industry, by balancing the bottom-up approach at a project level with the top-down participation from the management across the organisation.

Driving lean initiatives at an organisation level with training and hands-on workshops has had proven success in building a lean culture of trust and participation amongst teams (Kalyan et al. 2018; Hacker et al. 2017; Alarcon and Diethelm, 2001; Delhi et al. 2017; Kim et al. 2007; Jang et al., 2007; Pekuri et al. 2012). This success has been evidently credited to lean leaders responsible for not just driving the initiative in the first place, but helping the implementation sustain through time (Tillmann et al. 2014; Alarcon and Diethelm, 2001). However, this approach is a double-edged sword since the dependence on a select few people can leave projects and teams crippled when such resources are not part of the organisation any longer (Neto and Alves, 2007).

Hackler et al. (2017) and Pekuri et al. (2012) both highlight the importance of building a lean culture within the organisation through a focus on people and lean principles, rather than tools and techniques, the rigidity and theory of which proves to be a critical factor for resistance from the teams. On the flip side, Neto and Alves (2007) emphasise the importance of strategic alignment of lean implementation with the company’s goals as the first step, before considering lean tools or principles at an operational level. Failure to implement the lean business model at an organisational level can lead to friction and conflict amongst teams across the company’s business verticals (Pekuri et al., 2014).

The balance of lean maturity between General Contractors (GC) and sub-contractors plays a significant role in the overall success of lean implementation on the project. Kim et al. (2007) evidences the positive impact of lean through increased plan reliability of a sub-contractor, the outcome of which was the adoption of lean by the GC itself. Jang et al. (2007) reinforces the need for active involvement by both parties towards improving collaboration and communication between the teams. Specifically crucial in this case was the role of the GC as the lean driver, supporting the sub-contractors through the implementation.

Technology plays a key role in enabling lean adoption (Kalyan et al. 2018), simplifying collaboration and information exchange across the projects to enable lean outcomes. Including a production management system with real-time updates has proven to be a driving factor for sub-contractor participation (Jang et al., 2007)

*“One person cannot make a project lean. But one person can promote lean philosophies to a project team and foster a collaborative environment where these principles take root and are applied”* (Hacker et al. 2017).

## **KEY FACTORS TO LEAN IMPLEMENTATION**

In summary, the literature review highlights the following key factors towards driving the adoption and sustenance of lean implementation in the construction industry.

### **People in Leadership**

Top-level management involvement plays a key role in enabling and driving the implementation of lean practices and culture within the organisation (Alarcon and Diethelm, 2001). Constant participation and observation by management is the key to sustaining the culture amongst the teams (Delhi et al. 2017).

### **Respect for People**

Korb (2016) goes on to highlight the importance of “Respect for People” as a crucial driver towards sustaining lean practices within an organisation. Continuous improvement as a culture is heavily dependent on building an atmosphere of trust and mutual respect within the people, without which every CI initiative is ad-hoc and lacks the ability to sustain at an organisation-level.

### **A bottom-up Approach**

Involving the teams at the ground-level for any lean initiative, either driven through a cultural approach or through lean tools, becomes extremely important to ensure the adoption and sustenance of lean (Kim et al. 2007; Tillmann et al., 2014; Delhi et al., 2017).

### **Business Opportunity**

There is a need for the management to understand the strategies and business models before they decide to implement lean. The adoption of lean is heavily driven by business development, with a commitment by the team to deliver business improvement at various stages as the company grows (Kim et al. 2007). Having the ‘lean’ edge offers a competitive leverage in the construction market today.

## **HYPOTHESIS**

The authors hypothesise that while lean tools and principles have evident potential in improving construction project delivery, the implementation in the industry today is limited to select projects, and not the organisation as a whole.

The authors acknowledge that success recipes for lean adoption, developed through pilot experimentation, need to be standardised and implemented using a balanced top-down and bottom-up approach across the portfolio of projects. A key role here is played by participating lean champions through working closely with teams at the ground-level.

The authors believe that a revised approach is needed to ensure the adoption of lean at the organisation level. While there are various contributing factors, as mentioned above, a key focus is needed on the overall business culture that can help sustain the implementation of the defined lean-processes and tools within the organisation.

## **THE TYPICAL LEAN JOURNEY**

From their experience, the authors have noted a general trend in projects adopting lean. More and more clients are starting to demand efficient project delivery through proven competence. Driven by a motivation for bigger clients, profit, and business advantage, contractors in the industry are starting to deploy resources and tools to drive efficiency on such projects. This is generally where the localised implementation of lean stems from.

### **CONTEXT**

As technical support to a lean tool on these projects, as well as lean champions driving the implementation within organisations itself, the authors' have been involved in the capacity of

- Working with clients who are top construction companies (in UK, Europe, USA)
- Working on 15+ Projects including hyper-scale Data Centres (over 500 M€)
- Working on various types of projects, ranging from Airports to Highways,
- Interacting with the clients on a weekly/bi-weekly basis through direct conversation, participation in various collaborative planning & review meetings, and strategy ideation & deployment meetings.

### **Pilot Projects**

A lot of experimentation takes place in such projects; lean initiatives are introduced, lean champions driving the adoption start to emerge within the organisation, processes are revised, and lean tools/technology are deployed to further the implementation. While the first projects are experimental, this approach replicated across a few more prominent projects starts to shape some of these protocols towards performance improvement, tools that are playing a critical role, and lean champions who seem to be driving project benefits.

### **Lean Strategies**

From a stand-point of execution specifically, some of the tools and practices commonly adopted on such projects are highlighted below.

- Production Planning and Control Protocols
- Sticky-note Planning
- Last Planner® System
- Lean induction for each Trade/Sub-contractor
- Work clarity through Daily Activity Briefing and Weekly Work plans.
- Digital lean tools
- BIM-tools to support efficient decision making (4D Visualisation, CDE, etc.)

### **Success Stories**

These projects tend to become successful case studies – flagship projects that start to shape the future businesses of the organisation. Benefits and testimonials start to pull in similar large clients and the pilot project 'A-team' is deployed to continue this approach on such new projects. Supported by careful attention and amplified funding from management, and established protocols (the likes of which have been highlighted above), these projects become the foundations of a lean portfolio, which become the 'lean' impression of the organisation in the industry.

## **Ground-reality**

While these pilot projects become exemplary demonstrations of lean benefits, the percolation within the organisation, at a deeper review, proves to be very shallow. This practice is evident across multiple projects, where on paper numerous processes and lean protocols would be established, however, the ground-reality would be evidently different.

## **PROBLEMS WITH THE TYPICAL APPROACH**

As far as lean 'adoption' is the target, the implementation tends to be quite challenging and limited to select projects. This is because the entire focus is taken away from the benefits of deploying lean to achieve efficiency in project delivery and performance improvement, and instead looked at as a check-box exercise of doing 'lean'. Some of the key problems with this approach are highlighted below.

### **Resistance**

The top-down approach of lean implementation faces significant resistance at the ground-level, as observed in most of these projects. New processes and tools are challenged by teams on-site and external participants as consultants or sub-contractors. Often, lean champions find it difficult to even get participation from the teams, which often reflects poorly on the initiative and hence, more resistance from the management as well.

### **Ad-hoc Approach**

With conventional processes as the norm within the organisation, plugging in lean at every stage becomes an ad-hoc approach towards performance improvement. While this approach does provide localised benefits, it fails in changing the overall approach towards project delivery, hence, overlooking the business processes as a whole.

### **Push-based Approach**

Instead of driving a pull-based approach, lean is pushed to the ground through tools and processes. This approach, being contextual to the project and team it is deployed on, faces challenges when replicated across other projects and business verticals.

This push in the industry is categorised by the deployment of lean tools at each stage. The implementation of lean tools is referred to as "lean implementation", while the target of achieving lean outcomes is isolated out of the equation completely.

This becomes a major challenge towards delivering efficiency; while the deployment of lean tools will reassure clients and the industry that the organisation is lean capable, the achievement of any actual success in terms of value generation is still vague.

### **Lack of Faith**

When project teams at the ground-level start to see through this fragile approach, there is no faith and reassurance in the approach, thereby limiting any potential of taking a similar approach on other projects. Therefore, the ground-reality is always different, and a simple *Gemba* can start to highlight the reality very clearly.

This is where the real challenge of lean implementation in the industry sits, and all the ad-hoc localised approaches to its adoption stem from.

## **INTERVIEW WITH LEAN PRACTITIONERS**

The interview conducted by the authors has been used as a central point to orbit the literature reviewed and authors' own experience around. The interview was profiled with the intent to include the entire supply chain for a major public sector body in the United

Kingdom. The supply chain involves various sub-contractors, who have been part of numerous projects, some even participating through joint ventures through various stages of the projects.

The semi-structured interview broadly covered the following categories:

- How lean initiated within these organisations
- Factors that helped them to expand the lean initiative further across various teams
- The sustenance of lean within the organisation, today
- Understanding role of client demand and business goals in lean adoption
- Tools and practices for deploying lean across various projects
- Critical success factors for lean sustenance from the experience of the lean practitioners

**Please note:** The interview was conducted over a two-hour period as a virtual meeting with the participants and authors present together through the entire duration.

The profiles of the participating lean practitioners have been described below.

Table 1: Profiles of Lean Practitioners participating in the interview

Organisation Type	Organisation Description	Profile of Lean Practitioner
Client	Public sector body	Lean Area Manager
Contractor	Civil Engineering Contractors	Lean Manager
Contractor	Engineering & Construction Company	Head of Quality – UK Construction and Group Civils
Contractor	Engineering Solution Providers	Quality, Performance and Lean Deployment Manager
Contractor	Multinational Infrastructure Group	Head of Project Services; Performance, Quality & Business Improvement

## CONTEXT

The client started to look at driving lean initiatives back in 2008 towards improving the efficiency of their supply chain in delivering their projects. The initial investment played a very crucial role; the client invested heavily in the training and development of its supply chain, including some of the major contractors participating in these projects today (the participants of the interviews are from these organisations).

While it was certainly unique for a client back then to be adopting this approach, they were convinced that this is the best way to show where the pain-points are to encourage the teams to work towards resolving them. As the lean drive started to build momentum, the supply chain started to see benefits, from where the percolation within their own businesses started to seep through. The adoption strategies were deployed across some more projects, post which the client could start to mandate the use of lean tools and principles on its projects as a competitive offering in the market, rather than having to drive the adoption and training itself.

The primary factors contributing to lean adoption, implementation, and its sustenance within the organisations have been highlighted in the section below, as absorbed from the interview conducted.

## **INTERVIEW OUTCOMES**

### **Lean Initiation**

The initiation from the client was agreed to have been a stick and carrot approach – all contractors were clear of the fact that participation in the lean initiative was essential to sustaining business with the client. This led to the development of an extrinsic approach from the beginning of the lean initiative towards driving efficiency and performance improvement across the supply chain. This implied that a lot of training and mentoring was required to involve teams rapidly towards deploying numerous new protocols that were being pushed down to the site level, by which stage a lot of the knowledge had diluted.

### **Lean as a Business Driver**

One of the contractors of the supply chain in this equation has undergone extensive re-organisation to reinstate business improvement teams that are now selling performance and efficiency driving services to not just other parts of the supply chain, but also to the client. What is interesting to note is the percolation across the supply chain, that had stemmed from the client-driven initiative - the contractor realised that the client itself lacked clarity on what they were expecting and how to efficiently drive the initiative towards a goal. This led to the contractor becoming experts themselves, following the principal approach of generating value within their business, successfully monetising on lean as a business driver.

### **Leadership Engagement**

While the client is driving lean initiatives even today, they do acknowledge pockets of good practices within the business. However, what has remained as a critical factor is the leadership buying into the initiatives with reinforcing actions that really focus on driving improvement. This is further driven by added funding and opportunities, provided by management participation, the absence of which limits the scaling of such initiatives.

With participation from leadership or management, the focus shifts from an extrinsic approach to one which is intrinsic, growing within the organisation and evidencing benefits at the ground-level. You start to see a switch from strategic *jargon* to real-time benefits that can be documented, evidenced, and deployed at the jobsite; this approach is a critical factor for sustaining lean within an organisation. When other business verticals start to take notice, the intrinsic approach spreads across other parts of the organisation, thereby becoming seeds within their own sections to further the growth.

### **Managing People & Expectations**

When lean cultures started to develop within automotive manufacturing, with setups offering relatively high levels of control and minimal variability, it still took organisations years to truly reach a level of sustainable lean. On the flipside, construction is very dynamic with teams constantly switching to different jobsites and locations with completely new teams to work with for a period of time. This makes the sustenance of lean culture within the construction industry incredibly challenging.

By the time you get the systems right, your human resources have generally moved onto another project, where they will encounter a different team at the ground-level and a different management to work with. This leads to hurdles at each stage, leaving teams with a feeling of “*starting-from-scratch*” again. Passion starts to wane within the lean champions themselves, when after all their effort and investment, the project ends.

## **Training & Support**

To overcome this, the practitioners highlighted the importance of consolidated training. A tick-box exercise in the name of “lean induction” leads to no long-term benefits; you want to focus your efforts on where people are going to actually deploy process improvement and embed the learning such that it becomes self-sustained. Balancing the push-and-pull here becomes really important; the management can play a critical role by defining certain expectations from the teams at the ground, for which the teams on the ground can then deploy performance improvement for the management to take notice.

## **DISCUSSION**

With a combined review of both the personal experience of the authors, as well as the interview of the industry experts, it is evident that organisations in the construction industry have started to realise the need for a revised approach to improve efficiency in project delivery. Stemming from this need has been the adoption and implementation of lean tools and practices by some of these organisations.

However, it is evident that lean is yet to become an organisation-wide practice across most cases; numerous of these organisations are still in the pilot project stage or struggling to multiply the learnings and protocols deployed across their portfolio of projects. Some of the key factors governing this for the organisations are:

- The strategic/business decisions
- The role of leadership and Lean Champions
- The culture & training of teams at the ground-level
- The adoption & deployment of standard processes and tools

While these factors have proven to be essential towards initiating and driving lean across these organisations, the factor that has stood out to sustain lean implementation is to develop an intrinsic approach and deploy it with persistence to keep driving the initiative constantly within the organisation, despite changes in management, teams, projects, or business strategies. This sustenance is heavily fuelled by the leadership participation, and lean champions, who can work with teams, offer training and guidance, and continue to encourage them.

Essentially, while the governing factors will always play a role, the inclusion of lean within the organisation’s culture and practices will require constant review of processes, tools, and culture, and most importantly, human resources who can continue to learn and apply the feedback.

## **THE APPROACH NEEDED**

The target for construction organisations should be to deliver smart and sustainable models of project development. To revise your business strategy towards adopting an efficiency-based approach, and as evidenced by Hackler et al. (2017), processes need to be redesigned around the lean principles of value generation and continuous improvement as the defining core.

Learnings from the experimentation on the pilot projects need to be considered when defining the new implementation strategies. This is where the role of Lean Champions is essential in bringing together the benefits from success stories of the bottom-up approach aligned with the management’s business targets. Champions help by working closely with the teams at the ground-level and applying their knowledge and experience to break the



notion of returns-on-investment dependency on project scale or type. The fact that lean outcomes are beneficial across any project and keeping the larger picture at the business level in mind, champions can help convince the management on driving this approach across their portfolio of projects. These can be evidenced by:

- Success stories in terms of data – Time & cost savings.
- Building a case for business growth for the organisation
- Protocols & tools that helped teams collaborate
- Feedback and learning through Continuous Improvement loops
- Developing a culture of communication and trust

A structured approach is required to implement the changes in the overall business processes. Teams need to understand the problems with their current state, the potential for improvement, and learn from the benefits achieved from industry case studies or their own pilot projects. Lean sustenance is an iterative process between the ground-level teams, lean champions, and the leadership, to be in constant dialogue and agreement on the implementation strategies. Without standardisation and clarity, managing human resources and expectations proves to be challenging.

This plan must be simple enough for teams across projects and business verticals to understand and implement at the ground level. Standard protocols, agreed by both the project and the senior management team, need to be simple enough for both new personnel and new projects to adopt quickly.

While developing these standard processes and protocols are important, the most critical factor is the culture that the senior management develops with the lean champions and the project teams. Communication and trust among the teams play a vital role here. Leadership can help bring the team to a common collaborative platform, where they can respectfully vocalise their expectations, provide feedback, and find solutions. This ensures there is continuous improvement within projects as well in the strategic plans. Aspects of collaboration, trust, respect and better communication are the main factors that shape the culture of the organisation.

## CONCLUSION

From both the authors' experience and the interview with the lean practitioners, it is evident that a top-down approach to push lean initiatives in projects fails to sustain in the long run within the organisation. There are challenges faced at both the business-level, as well as the ground level, by the teams driving the initiative.

With lean implementation being primarily driven by client demand for increased efficiency and timely delivery of projects in the industry today, this approach isolates the implementation to a project or client-level scale, considering only the business value of that project or working with that client. This limits a business-wide implementation of lean while giving a false impression of a "lean" organisation

With the pilot project approach and ad hoc adoption of some lean tools and processes, the teams fail to see the overall picture of why these changes in project delivery are being brought. Without a structured change management process, with proper training and incubation period for teams at the ground, teams find it hard to share the vision and therefore, resist aligning towards the process changes.

Unless there is an overall standard adoption plan along with a continuous improvement framework, these initiatives remain weak and fade away with any change

in the human resources within the organization. There is an evident need for an inclusive and collaborative approach, with each stakeholder enabling the other by acknowledging and appreciating the effort being invested into delivering value to one another.

To deploy lean is to constantly focus on one of its own pillars – continuous improvement; lean implementation will be an on-going process and must be championed through by passionate people within the organisation.

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