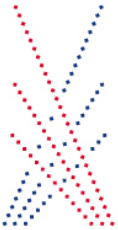

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3RD-5TH SEPTEMBER

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This paper is from the BAM2019 Conference Proceedings

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Lean Project Management as a facilitator of organisational learning

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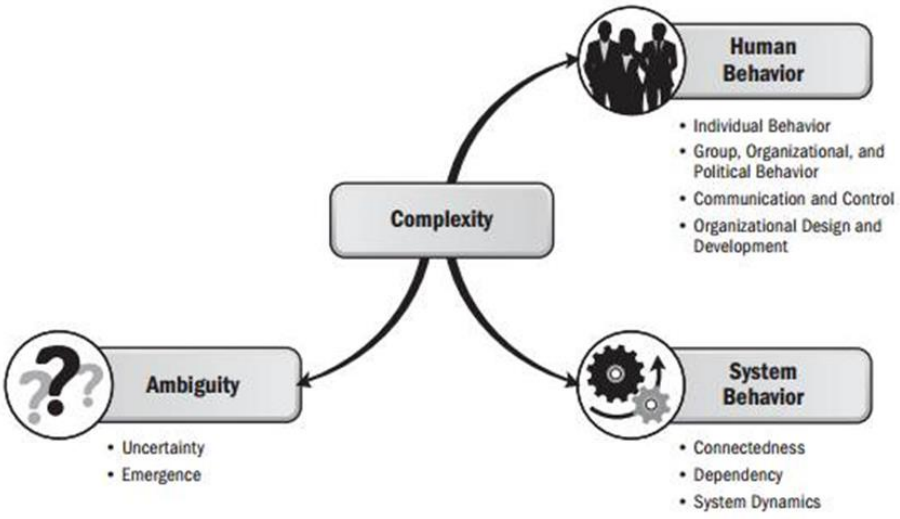
Introduction

The utility and impact of lean principles remains a point of contention (Staats *et al*, 2011) and few research studies have attempted to link lean project management (LPM) thinking with overall learning and knowledge success from a behavioural perspective (Hines *et al*, 2004). Those who have done so, have used lean project management principles to highlight singular process-related, task-driven systems and identify barriers in improving operational procedures (Spear, 2005; Poksinska, 2010; Staats *et al*, 2011) rather than investigating the potential link between desired outcomes and behaviours (Nidumolu & Subramani, 2003). Such studies have limited the progress of LPM as a viable change initiative in solution-focused environments. In this paper, we explore the utility of lean project management against a background of complexity and uncertainty and consider if, and how, LPM can facilitate learning within organisations to establish and sustain improvements for economic success.

Project complexity and organisational uncertainty

The study of complexity has gained attention within both general management and PM literature (Geraldi *et al*, 2011; Hass, 2011; Saynisch, 2010). Common dimensions of complexity suggested by Geraldi *et al* (2011) include structural complexity, uncertainty, dynamics, pace and socio-political complexity and summarises the majority of thinking from recent PM literature. This has been defined as an 'emergence and non-linearity of behaviours which are present in systems of interrelated elements' (Geraldi *et al*, 2011, p968) and can be characterised by the following illustration:

Figure 1: Influences of behaviour and systems on complexity



Source: PMI, 2013

Complexity has been characterised by interconnectedness of structures that link various objects and entities within project workflows and delivery (Antoniadis *et al*, 2011; Baccarini, 1996; Williams, 2002; Lucas, 2000; Burns, 2005), caused by time and/or cost pressures requiring creativity and co-operation (Bertelsen, 2005). Due to high technical specifications in the construction industry (Lillieskold & Ekstedt, 2003) the need to create complex procedures to the lowest organisational levels (Antoniadis *et al*, 2011) has led to an increased consideration of non-technical dimensions (Burns, 2005; Geraldi, 2008), in particular the requirement to execute less of a "command and control" approach to human resource management (Green, 2002). Interactions between systems and formulation of structures partially driven by such increased collaborative working within a dynamic environment (Kadefors, 2006) has led to the creation of further non-linear complexity in procedures and processes across boundaries and interconnections (Bertelsen, 2005).

Rather than continuing to focus solely on a collection of different tools, techniques and critical success factors, understanding complexity within PM enables a move away from such normative traditional frontiers of project management (Hass, 2011). Lack of insight into what constitutes complexity can have an undesirable effect upon the interpretation of knowledge sharing and learning processes within a project, organisation or environment (Bechky, 2006, Söderlund 2011).

How can lean project management facilitate organisational learning in project environments?

Lean project management perspectives

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, 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, for example waste reduction, efficient scheduling, and a goal-oriented tactical method (Bernstein & Jones, 2013). Lean project management (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 rely on information and collaboration, visual techniques, sense-making and decisions based on human creativity and interpretation. Such reliance on organisation and 'housekeeping', and the application of human values to determine best practice (Hopp & Spearman, 2004) has led to difficulty in execution, hence the interest and growth of lean as a project management tool.

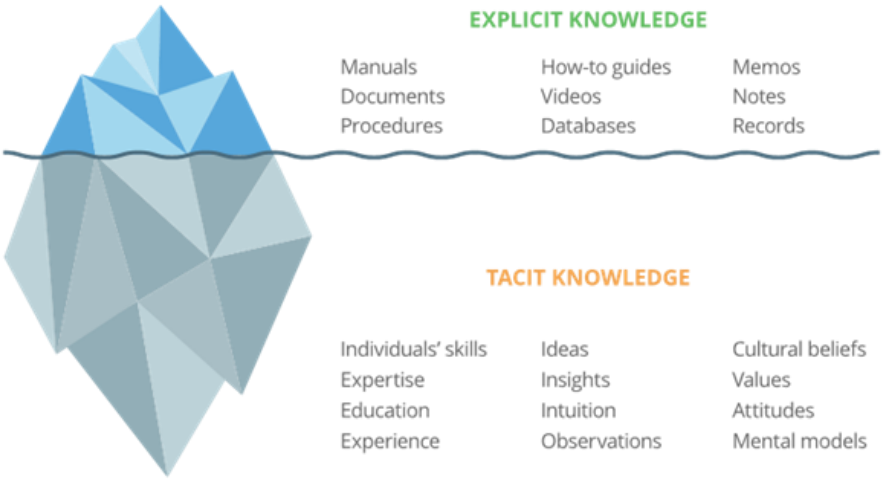
Criticisms of lean within the literature generally comprise two main elements: the lack of consistency and consensus in achieving a definition, despite its use as a worldwide management concept (Modig & Åhlström, 2017) and the application of the concept, for example, the extension of its application in non-automative manufacturing settings. Although lean thinking principles are considered to have universal applicability across a wide range of project and environment settings (Sauser & Voss, 2001), lean has also been cited as causing a lack of consideration of human aspects (Hines *et al*, 2004; Williams *et al* 1992). This includes stifling of workers' creativity (Chen *et al*, 2010; Silverthorne, 2004), limitations on the ability of companies to achieve continuous improvement (Mehri, 2006) and actual ability to deal effectively with variability (Joosten *et al*, 2009). Additionally, recent research has proposed

that lean tools unintentionally facilitate knowledge creation (Zhang & Cheng, 2016) and that decision making in supply chains can be supported by a knowledge management (KM) framework (Liu *et al*, 2013). Such learning and development requires investment, intellect, and interactions (the 3 I's), within a carefully constructed supportive culture to maximise opportunities for individual and organisational learning (OL) (Pedler *et al*, 1989; Korac-Kakabadse *et al*, 2002).

The importance of organisational learning

The origins of organisational learning can be traced back to positive interactions of knowledge creation which provide the essential foundations for tacit knowledge. This is the most valuable source of knowledge, but also provides the greatest management challenge, since it is hard to define, communicate, and is deeply rooted in action, commitment, and behavioural processes (Nonaka, 1994). Explicit (or informal) knowledge requires a variety of systems, processes and environments in order for it to become tacit (or formal) as shown in the illustration below:

Figure 2: The difference between Tacit and Explicit Knowledge



Source: adapted from Nonaka & Takeuchi (1995)

The illustration is a good example of what, and how much, is often seen and unseen, which can mean the difference between the *possession of knowledge* and the *act of knowing* (Cook & Brown, 1999). Often it is the cultural norms at play which can foster or hinder motivation to share knowledge and learning (Levitt & March, 1988), even where rapid creation of knowledge has been achieved.

Knowledge management concerns itself with the complex process of capturing, developing, sharing and effectively using organisational knowledge (Pedler *et al*, 1997) through a multi-disciplinary approach to achieving organisational objectives by making best use of knowledge (O'Keeffe, 2002). According to Rose *et al* (2014), organisations create knowledge by tackling problems and learning from experience. In this way, competitive advantage (Porter, 1980) is facilitated and the domains of knowledge management and organisational learning become not only intertwined, but mutually dependent on another (Kennedy & Burford, 2013) if competitive advantage is to become sustained (Porter, 1998).

Efficient management of knowledge is critical to organisational survival (Bettis & Hitt, 1995) and the highly specialised nature of projects and organisations requires action–oriented knowledge management activities through flexible, supportive working conditions, to underpin and stimulate the creative activities that are need to work collaboratively (McIver *et al*, 2013). The unpredictability of human behaviour is an essential element of project management (Kreiner, 1992), which some argue impact on the ability (or inability) of the organisation to integrate and improve the knowledge sharing processes and outcomes (Bechky, 2006; Ivory *et al*, 2007; Kim & Wilemon, 2007). A study by Lehtinen *et al* (2014) indeed suggests that the very (multi-dimensional) processes that connected people, tasks and environments responsible for failure, and compounding further complexity, were also found to potentiate remediation and improve project performance. The knowledge conversion process is central to the support and extension of the individual's ability to acquire, retain and retrieve knowledge (Walsh & Ungson, 1991). This is essential to the learning process of the organisation and can be facilitated (or hindered) by additional processes of shared understanding, decision making, co-operation, systems and perceptions (Frost, 2014). Undertaking this process can also foster a positive relationship between the job satisfaction of the employees involved and newfound organisational commitment that is influenced by a satisfaction of the actual knowledge management process itself, according to Chatzoudes *et al* (2015). This supports the premise that knowledge capital is still the most significant driver that dictates an organisation's processes and performance (Dunford, 2000; Ditillo, 2004).

However, it is this inter-related **process and action** of transferring knowledge into a business's service/product offering that helps us to understand how knowledge management and organisational learning can support wider project management and organisational development thinking against the backdrop of sustainability (Hind *et al*, 2013). The experience of implementing LPM provides an ideal opportunity for multi-professional and interdisciplinary project environments to not only create, share and manage knowledge, but offers further benefits through the act of conversion of knowledge and learning for both individuals and organisations. Thus, in our research we propose that LPM occupies a unique position in that it makes sense of, interacts with, responds to and often shapes the very systems and processes that can be responsible for both success and failure. Important insight may be gained from further exploration of the relationship between lean project management and organisational learning in order to facilitate improved operational and project performance. This is supported by Cicmil (2006) and Geraldi (2008) who agree that gaining insights into the actuality of PM practice through social processes, and experience of practice, is inclusive and complementary to traditional project management.

Framing the research: philosophy, design and methods

Rather than become restricted by the categorisation of thinking within boundaries, pluralism in project management can help researchers to better explore the reality of project management, increasing the probability of project success (Chugh, 2011; Söderlund, 2011). Exploring LPM and OL together primarily falls within the Relationship and Behavioural Schools of thought and investigates, amongst other things, the processes of organising and the nature and organisation of social interaction in projects, problem solving, sense-making, and learning dimensions through analysis of the nature and process of behaviour within projects (Söderlund, 2011).

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. Data collection techniques for semi-structured interviewing employed the critical incident technique (Flanagan, 1954) which also provided a critical reflexive opportunity for participants, recalling notable projects, or incidences within project interactions. To obtain a baseline understanding of practitioner's knowledge and understanding of LPM, implementation and progress of LPM within practice environments, a total of 62 semi-structured interviews were conducted with project management professionals between May 2018 and May 2019. Interview respondents in this dataset include experienced Project Managers whose career history and business environments include Construction, Manufacturing, IT, Public Sector, and Engineering.

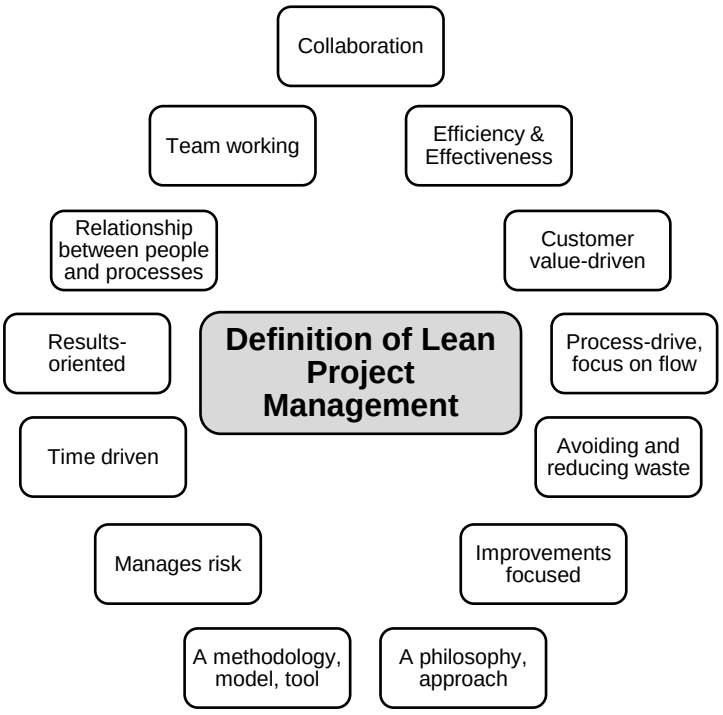
Transcripts of 20 interviews were analysed by three researchers using thematic analysis (Braun & Clarke, 2006) supported by NVivo 11. To test the degree of deviation of the outputs, the researchers analysed the same interview as a pilot. Subsequently, the themes and codes resulting from individual analyses were compared and debated in order to establish consensus for the analysis of the full interview dataset according to MacQueen (1999). Themes proposed by the researchers from the pilot analysis did not differ in context or layout. The resulting merged NVivo file of the pilot interview served as guidance for creation of codes for the remaining nineteen interviews, which led to the creation of three emergent themes.

Presentation of Findings and Discussion

It is anticipated that the final themes will strengthen the evidence for the relationship between LPM and OL as an evolving construct and inform future implementation practice of project managers. The following section presents findings suggested by the interview data.

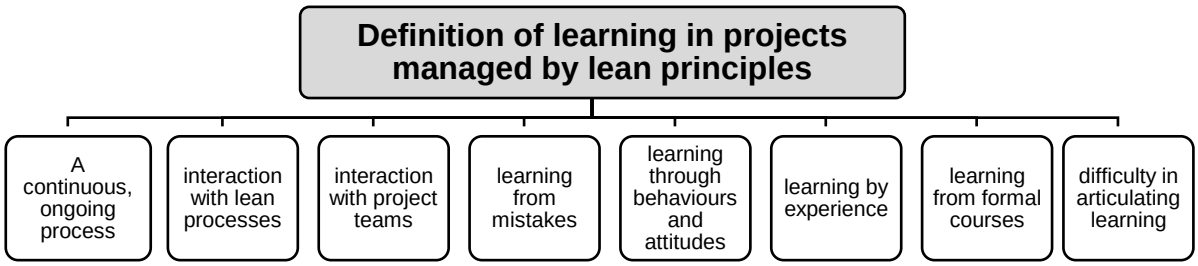
Theme 1: Knowledge and understanding of LPM

Figure 3a Definitions of LPM perceived by project managers



From this initial data, it can be seen that practitioner articulation and definition of the term LPM varies, even with this small dataset, as evidenced by the existence of 13 differently coded responses. Nonetheless, the five principles of lean (Womack & Jones; 2003) were included in the range of responses and support the main aspects of focus that differentiates lean project management from traditional project management in the pursuit of increased improvement and competitive advantage (Howell & Ballard, 1997).

Figure 3b: Definition of learning in projects managed by lean principles



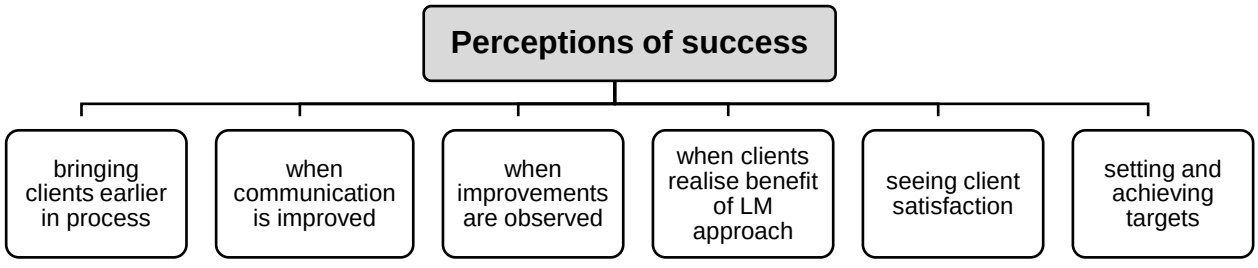
The following quotes provide evidence to support this sub-theme:

> "So, it's looking to make continuous improvements, to always learn things from the past so that mistakes aren't made into the future." **Interviewee no. 12**
>
> "If you learn you share, share what you learn. If you learn you perform. If you perform you will design improvements. That's learning for me, sharing, collaboration, that's learning." **Interviewee no. 2**
>
> "Yes, definitely, the people who are transparent, they learn much more than the people who don't want to show what they are doing." **Interviewee no. 1**

In line with the literature, learning within LPM appears to occur as a continuous, ongoing process which includes opportunities for improvements in processes, characterised by knowledge sharing mechanisms of learning (Kolb, 1984), as an individual endeavour for the purpose of sense-making for self and others (Weick, 1995; Liu *et al*, 2013; Zhang & Cheng, 2016).

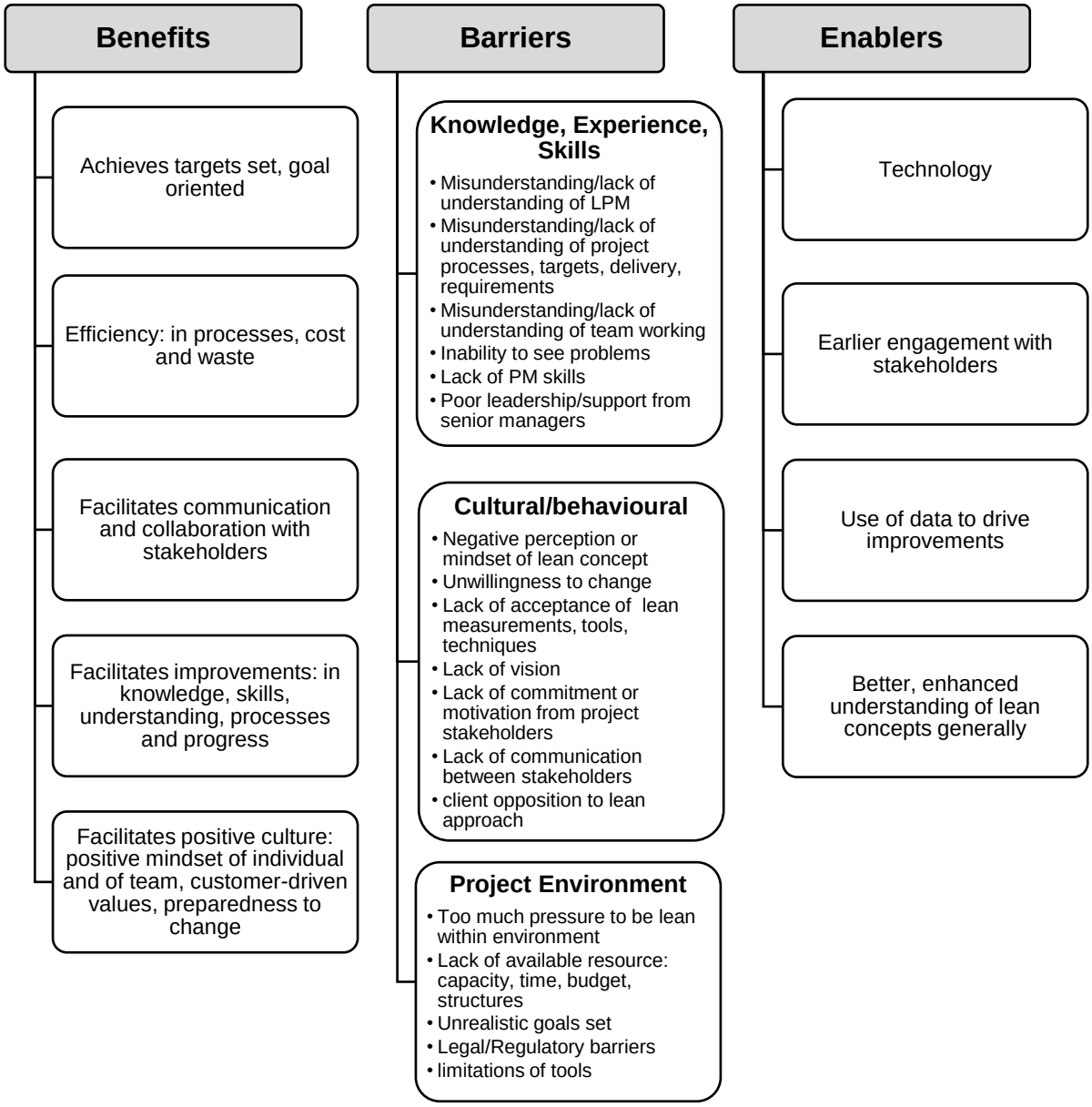
Theme 2: Factors influencing implementation of LPM

Figure 4a: Perceptions of Success



> "Success in projects is actually, success is the people, they don't want to work in a standard project any more. They don't want to miss lean. That's real success. After getting out of projects they are enthusiastic, they have had hard fact results, like for example, the success of a project was the project was finished ahead of time, say 1 month or 2 months in an overall duration of 12 months." **Interviewee no. 6**

Figure 4b: Benefits, Barriers and Enablers influencing the implementation of LPM



Of particular note, is the prevalence of coding references that comprise cultural/behavioural barriers particularly those that relate to implementing LPM in order to improve culture, values, stakeholder communication, and ability to change. This would appear to support the literature that suggests the existence of operational challenges such as strong competition for resources can lead to inconsistent participation for practice improvement, thus inhibiting successful

project delivery (Harris *et al*, 2002; Söderlund, 2011; Chen *et al*, 2012;). The following quotes support this:

> "I think there is huge potential for lean project management to reduce wasteful activities and therefore make our projects and processes more efficient." **Interviewee no 3**

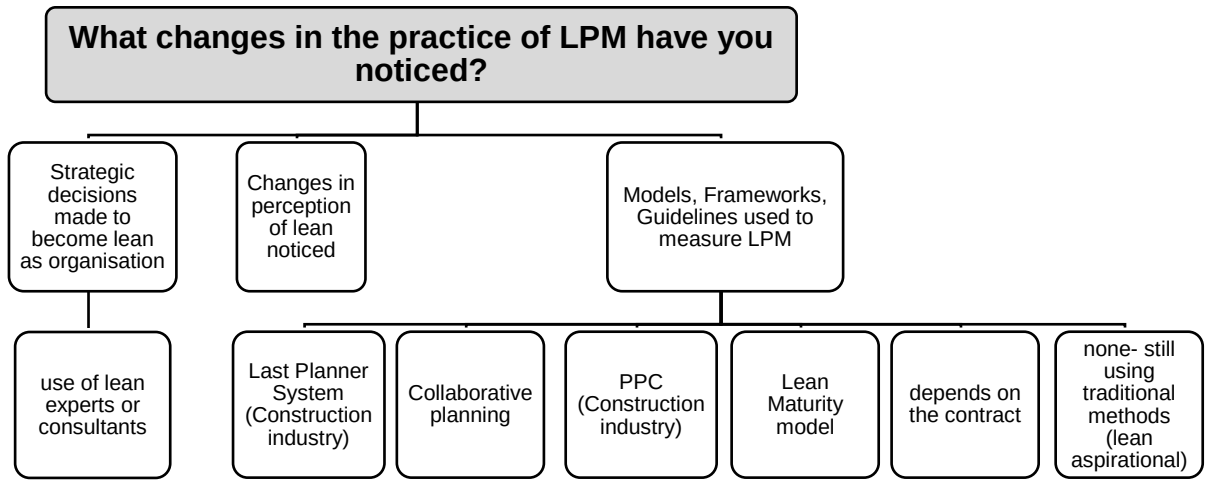
> "I think it's probably 90% a mindset." **Interviewee no 3**

> "Being transparent in terms of our capabilities and what we are able to do." **Interviewee no 7**

> "Oftentimes in project teams are persons who don't want to share, with other people, so they cannot learn from each other." **Interviewee no 2**

Theme 3: Organisational journey to lean

Figure 5: What changes in the practice of LPM practice have you noticed?



The relationship and interaction between people and processes is a recurring theme, appearing in every theme and sub-theme as informed by perceptions and experiences reported by interview respondents. This includes not only for the benefit of immediate project outputs and outcomes, but additionally extends to client organisations, client values and their satisfaction. Changes appear to have been driven from internally focused or driven needs, as well those perhaps influenced from external drivers. Project managers have noticed that perceptions of lean are changing and this is evidenced by the fact that some organisations have chosen to use LPM as a direct strategic choice, not only to enable progress within projects but across their organisations more generally. This was echoed by the following interview respondents:

> "A lot of the principles of lean is just being naturally integrated into businesses and everyone is looking to see where you can save, where you can you know reduce the waste." **Interviewee no 41**

> "There's a trend to have information in real time, that's a change, so 5 years ago, 7,8 years ago you had to check it out at the office, if you were in a client's meeting. Nowadays everything is on our smartphone, our laptop, there's no latency. Immediately you have the information. That's a big change, and that's a faster way to make decisions and to act. And now that's everywhere.". **Interviewee no.2**

> "A lot of the main contractors understand that we should be doing lean and yes, they're on different stages of the journey within transformation or whether it's just project level. But a lot of supply chain now are very much responding to this." **Interviewee no. 17**

Measuring an organisation's journey to becoming lean is also evidenced by the models and frameworks employed to measure progress. Increasingly, organisations are using models and frameworks which measure project progress in complex and uncertain environments, notably, the Last Planner System and collaborative planning. Organisations that choose to measure LPM based on contractual obligations indicates the importance of projects and organisations must adapt to dominant external drivers in their industry (Barreto, 2010). This is particularly prevalent within construction, in terms of increased engagement with lean experts and consultants to help facilitate both project planning and progress.

Implications for further research and practice

Findings thus far suggest that there is an appetite and a value in implementing LPM for the delivery of longer term sustainability, even where negative experiences of LPM have been perceived in practice. Initial results suggest that LPM **creates an opportunity to promote learning and collaboration** through the *process* of learning itself which is as important, if not more so, than the finite end product of the created knowledge and its subsequent use (Nonaka & Takeuchi, 1995). The research may also provide a **clearer understanding into the mechanisms of learning,** in terms of timing, format and preferred frameworks. Additionally the **direction of knowledge transfer** from, within and between individuals, projects and organisations may be identified and explored, which may or may not support the organisation's goal of competitive advantage as well as fostering positive satisfaction for individual stakeholders (Chatzoudes *et al*, 2015). This has the potential to enable diversity, uncertainty and continuous change to thrive within projects and organisational environments, rather than be continually challenged by these complexities. The research brings together the fields of Project Management, operations, organisational Learning, Organisational Development, Knowledge Management, Human Resource Management and Psychology. The research offers an opportunity to investigate further how clusters of practice may emerge and develop over time, but additionally facilitates understanding more precisely what practitioners really do to enable better management of the limited resources available (Besner & Hobbs, 2012).

From a practitioner point of view, the outcomes of this research will be important as findings will enable project managers, project-based organisations and project teams to make informed choices about LPM knowledge and behaviours, thus potentiating improvements in capacity and capability for project and organisational success.

Conclusions

Andersen (2003) reports that project practitioners continue to adopt transactional rather than transformational approaches, therefore finding evidence and examples rooted in robust research

is essential in supporting clear understanding of the application of LPM within a contextualised environment. Cooke-Davies *et al* (2007) assert that investigations in different disciplines into the complex behavioural dynamics may reveal new insights and paradigm shifts away from traditional project management. This extends the application and perception of both systems theory and complexity theory from organisations to projects and project management (Vidal & Marle, 2008), thus treating projects as human activity systems (Small & Walker, 2012), and socio-cultural systems (Sankaran, 2012; Schöttl & Lindemann, 2015). This is supported by Syed (2016) and Whitney & Daniels, (2013) who assert that new approaches and lines of inquiry are required in order for projects to achieve organisational objectives, and for PM's to thrive within chaotic, socially complex organisations. This does not abandon conventional PM methods, but rather enriches and extends the field beyond current intellectual foundations, connecting it more closely to the challenges of contemporary, adaptive PM practice (Whitney & Daniels, 2013: p639). **[3288 excluding references]**

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