

# DIFFUSING LEAN IMPLEMENTATION & ORGANISATION CULTURAL MATURITY

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## ABSTRACT

Human capital is one of the most significant assets of any organisation. Construction industry problems associated with productivity, efficiencies and waste can be linked in some way to human behaviours. The characteristics of human behaviours in construction organisations are ultimately shaped and influenced by the values, beliefs and attitudes of individuals and groups within the organisational environment. Values, beliefs and attitudes provide the foundation of the organisational culture. The implementation of lean strategies as an alternate managerial approach to traditional managerial approaches has offered insights into the nature of human capital and organisational performance. Literature has identified that organisational culture in relation to lean implementation is categorised dichotomously, presented as either a ‘cultural’ performance of empowerment or exploitation. The discourse in relation to lean culture is thus divided. It is proposed in this paper that lean implementation is an evolutionary process and thus organisations mature as the lean concept is diffused. A necessary part of this maturing process is culture related. A constructivist approach guides the research, proposing the organisational environment to be made up of interconnected multiple realities. This proposition is informed by Rogers’ theory of diffusion, more specifically the relationships between time, communication and social systems within the organisational environment. A model of lean implementation is proposed which provides the investigative framework to explore how and why the behaviours and attitudes of human capital within the organisation during and after lean implementation mature the culture of the organisation.

## KEY WORDS

Constructivism, Cultural maturity, Diffusion theory, Human behaviours, Lean implementation

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## INTRODUCTION

Lean construction as a philosophical ideal is represented as a holistic process with a specific target on the removal of ‘waste’ while maintaining and improving ‘productivity’ (Koskela, 1992, 1993). Culturally, however the representation of lean construction theorisation and implementation is heavily one-sided towards the general acceptance of the strategy. One sided representations of lean theorisation are typically supported by deductive stances, in which a problem is ‘identified’ or ‘discovered’ with the problem strategically ‘eliminated’ through lean implementation. Culturally, the process undertaken result’s an overall organisational ‘acceptance’ towards the ‘strategy’. Such approaches fail to understand how the culture of the organisational evolves and matures throughout and beyond the process of implementation.

The purpose of this paper is to contextualise current cultural awareness of lean construction within an organisational environment throughout and beyond the implementation process (*lean theorisation*). Supporting the contextualisation of cultural awareness will be the development of a cultural maturity model which represents the investigative framework (*theoretical and investigative contexts*). It is proposed through current cultural and ideological thinking to challenge perspectives of lean construction processes by suggesting the culture of the organisation is unique and it’s the behaviours and relationships of individuals and groups which emerge during the process that evolve and mature culture. Further to this the process of implementation needs to be aligned to the cultural awareness of lean construction (*investigative framework*).

## LEAN THEORISATION: THE EMERGENCE OF LEAN CULTURE IN THE IMPLEMENTATION PROCESS

Lean theorisation encompasses a wide spectrum of philosophical thought specifically focused on minimising waste while maximising productivity (Koskela, 1992, 1993; Howell, 1999). According to London & Kenley (2001) the lean construction movement first emerged during the early 1990’s, with strategising originally focused on the transferring of principles from the field of manufacturing to construction (Alarcon, 1993; Koskela, 1993; Melles, 1994, Howell & Ballard, 1999). Since this time lean construction strategies have been successfully diffused across the UK, US and Europe.

Conversely discussions detailing lean implementation processes, particularly from an organisational perspective, suggest that the resulting change of implementation is culturally explicit (Green, 1998, 1999, 2000; Howell & Ballard, 1999; Buch & Sander, 2005; Orr, 2005; Pavez & Alarcon, 2006). The explicit nature of lean implementation processes (see Coffey, 2000; Buch & Sander, 2005; Orr, 2005), in construction organisations, is typically represented as:

- A need or decision to implement lean; and/or
- Identification of the lean strategy or lean principles to be implemented.

Culturally, the nature of the lean implementation process is represented as:

- A collective reaction towards the implementation process, identifiable as a consistent and transferable lean cultural ideal.

Such static interpretations of lean implementation processes neglect to acknowledge theoretical importance as a means of understanding the process, human capital, culture and behaviours towards implementation, particularly in terms of:

- The context of how and why cultural constructs change (or mature) throughout the implementation process;
- Transferability of cultural reactions across multiple organisations; and
- Cultural knowledge (see Green, 1998, 1999, 2000; Green & May, 2005).

It is further interesting to note that through the theorisation of lean, how culture is closely linked to implementation processes, however this link has not been contextualised well. Typically, the implementation process has been used to explore the cultural impact of lean, from organisational and project team perspectives. Research suggests the emerging lean environment encourages and produces:

- Situational leadership opportunities (Coffey, 2000; Arbulu & Zabelle, 2006);
- Team focused working environments (Orr, 2005); and
- Employee commitment and involvement (Jang et al, 2007).

Despite the identification of lean specific and cultural elements of the working environment lean cultural investigations still neglect the importance of cultural constructs, in understanding process changes. The cultural environment is explicitly identified as:

- Positive/empowering, characterised by acceptance and change embracement; or
- Negative/conflicting, characterised by rejection and change reluctance.

The interpretative cultural environment as presented in lean research is representative of current structural and operative construction environments research ideals. Dainty *et al* (2007) suggests structurally industry is affected by pre-existing sub-cultures as well as the assumption that construction workers establish cooperative working relationships which are rapid in nature. Operatively, the establishment of such relationships can result in the construction environment becoming naturally dominated by elements of diversity, structural fragmentation and temporary multiple organisations, traditionally industrial in nature (Brensen & Marshall, 2001; Brensen et al, 2004; Dainty et al, 2007). The suggestion that the structure and operation of industry has formed two ideal construction cultural environments:

- Conductive environment: characterised by active participation of employees and employee independence (Blauner, 1964; Blumberg, 1968; Patemen, 1970; Brennen, 1983; Coffey, 2000); and
- Industrial relations environment: characterised by employee separation, conflict and informality (Green, 1998, 1999, 2000; Green & May, 2005; Dainty *et al*, 2007; Koch, 2007).

The lean implementation process and resulting cultural environment is not interpreted well. Identifying the link between explicit lean interpretations and construction cultural ideals provides an opportunity to use cultural constructs; human behaviours and theoretical contexts to explore how and why culture mature throughout and beyond the implementation process. Central to this process is the identification and understanding of theoretical and investigative contexts underpinning the investigation. .

## **THEORITICAL & INVESTIGATIVE CONTEXTS: LEAN CONSTRUCTION, INNOVATION AND DIFFUSION**

Early lean theorisation discussed the value of lean production theory in providing new ways of thinking and approaching the management of the construction process.

Particularly this theorisation focused on relationships between the customer and client as well as issues associated with labour, finance, delivery, design and flow (Koskela, 1992, 1993, 2000, and 2004; Howell & Ballard, 1998; Isatto & Formoso, 1998; Howell, 1999; Feire & Alarcon, 2000). Lean theorisation has seen a shift in focus from resource management towards more human centred approaches (Coffey, 2000; Buch & Sander, 2005; Orr, 2005; Zuo & Zillante, 2005; Arbulu & Zabelle, 2006). Despite this shift in theorisation researchers still tend to use outdated interpretation models and methods to understand lean adoption rather than post-modern models of cultural theory.

The reliance on outdated interpretation methods has resulted in lean culture to be objectified as two extreme cultural outcomes, either positively empowering or negatively exploitative. The representation of two broad cultural interpretations fit within the pre-existing contextualised conductive (empowering) and industrial based (exploitative) cultural environments of construction (Dainty et al, 2007). To overcome such broad and extreme cultural outcomes a new interpretive approach needs to be considered which describes not only the process of implementation, but also considers culture, human behaviours and maturity. One such theory is Rogers' theory of diffusion.

In their critique of Roger's diffusion theory, London et al (2006) discuss Rogers' diffusion framework to largely be measured through the degree of adoption within a social system. Adopters are categorised by Rogers' as innovators, early adopters, early majority or laggards. These adopter categorisations are differentiated primarily in relation to diffusion as a temporal process, i.e. diffusion happens in time, whilst the other key elements of innovation; communication channels and social system exert variable influence upon the temporal diffusion process depending on their specific qualities. According to Rogers for example, communication channels vary in importance according to the type of adopter; mass media and expert knowledge has more influence on innovators, whereas personal networks are more important for late adopters (Rogers, 1995). "The key processes in Rogers' diffusion theory are thus the adoption-decision process and the rate of adoption- comprising multiple phases and influenced by various factors. The adoption-decision process is a key phase through which an individual (or group) passes from:

- First knowledge of the innovation;
- To forming an attitude to the innovation;
- To making the decision to adopt or reject the innovation;
- To implementing the innovation and confirming the decision taken.

This transition from first knowledge of the innovation to its implementation measure as a temporal process encompasses the innovations rate of adoption" (London et al, 2006). London et al (2006) further suggest the process may be affected by various factors relating to the key elements of Rogers' theory including:

- The specific attributes of the innovation in question – its relative advantage, compatibility, complexity, trial ability and observability (Rogers, 1995); also
- Influential is the type of innovation decision being made whether its option/individual, collective/organisational and authoritarian/hierarchical.

These factors parallel the recognition of organisational culture and managerial philosophy as a driver to lean construction adoption.

The basic significance of Rogers' theories of innovation diffusion according to London et al (2006) can be found in his acknowledgement of the complexity of the process. His unravelling of this complexity displayed considerable insight considering the inception of the original theory in the early 1960s. It is also worthwhile noting that London et al (2006) also critiqued Rogers' diffusion model stating that it was a useful starting point for analysing the processes involved in diffusion, and was particularly relevant to their study on e-business adoption due to its recognition of the importance of social and cultural factors on the adoption and diffusion of innovations. However, Bayer and Malone, (1989) aspects of the theory must be extended and modified before it can be applied, and in London's work with particular reference to IT adoption there are limitations to Rogers' diffusion model. Bayer and Malone (1989) argue that Rogers' theory of diffusion is oversimplified in terms of binary dualism of 'adopt' or 'not adopt'. Bayer and Malone (1989) further identify the lack of differentiation between adopting an innovation at a firm level and at an individual user level, and the failure to consider adoption and diffusion as a function of interactions between social systems, as other theory limitations.

Rogers' theoretical tendency towards frameworking a simplified binary conceptualisation of the adoption-decision process is considerably problematic particularly in understanding construction (see Koskela & Vrijhoef, 2001; Green & May, 2005) in that it does not address the complex nature of the construction industry, nor does it take into account the flexibility and multi functionality of, in this case lean construction. Firms are typically selective on how they may implement an innovation such as lean construction as they have their own contextual environment to deal with. Therefore this makes it very difficult to make broad generalisations about level of adoption as it can be quite individualistic and idiosyncratic. It is proposed that it is difficult to place firms into one definite category because adoption is not simply an either/or situation – and if it is then this is a fairly simplistic reading of the situation.

The diversity of lean construction implementation situations as well as the competitive nature and fragmented structure of the industry with so many SMEs with restricted resources – grounded simultaneously in project-based relationships of close collaboration with limited time frames – introduces the notion of discontinuance in the temporary project organisation. A firm or internal organisational unit within a firm may shift slightly in its uptake because it is influenced by another firm or other factors and this diffusion of shifts and the impact on lean culture is an interesting proposition to study. The way in which an organisation's culture transforms and matures as the lean construction innovation is diffused is particularly relevant in the lean construction adoption process. Using the basic elements of communication and the social system within Rogers' theory will assist interpreting the process of lean implementation as an innovation, mapping cultural maturity and investigating human behaviours as a core ideal of organisational culture.

## **INVESTIGATIVE FRAMEWORK: CULTURAL MATURITY**

Lean culture theorisation and research characterises and interprets construction as a singular reality (see Coffey, 2000; Buch & Sander, 2005; Orr, 2005; Pavez & Alarcon, 2006, 2007). The singular reality interpretation suggests that when an organisation decides to implement an innovation the cultural expectation is essentially two-fold, i.e. either an empowering or exploitative culture emerges/occurs. The

singular reality which usually is presented within literature neglects to consider the ebb and flow of individual changes within the organisation overtime making culture more pluralistic and complex than perhaps a simplistic mono culture of a 'lean culture' and it is this diversity that needs further investigation - suggesting culture is simply an additional entity within the organisation. Culture as an additional entity of the organisation is a prominent stance of Hofstede, particularly in his writings and interpretation of the relationship between national and organisational cultures. Hofstede's interpretation is based around five 'key' dimensions of culture, those of power distance, individualism vs. collectivism, masculinity vs. femininity, uncertainty avoidance and long vs. short term orientation. Underpinning Hofstede's model of 'national' cultural thinking is the ideal of management, particularly in the role nationality plays in political, sociological and psychological behaviours within the organisational system (Hofstede, 1983). Although offering insight to political, sociological and psychological elements present within culture, the problem of Hofstede's interpretation of organisational culture is identity. Identity as a problem arises particularly in Hofstede's assumptions that within each 'nation' a uniformed 'national culture' exists (McSweeney, 2002). Issues of identity are also present in underpinning other current model interpretations of culture (see Duffy, 2001; Rooke et al, 2001); however these models of cultural understanding are also assuming that changes within the culture of an organisation are influenced by the implementation of 'tools' and 'techniques' of change, and as such model towards this assumption (see Root, 2001).

Considering elements of identity (and other behaviours/attitudes) within cultural maturity are Waard (2001) and Fuller & Vassie (2002). The basis behind their modelling of cultural maturity is to identify culture as a representation of evolutionary change within the organisation. Central to the exploration of cultural maturity is the exploration of culture being more than an additional entity but as an entity impacted by elements of the organisation, particularly attitudes or behaviours, structures and relationships. Although the models are representative of new 'evolutionary' understanding into culture the models however, are still representative of the static approach and interpretation of culture through the facilitation of culture as a process, rather than a 'maturing' as such. This is evident particularly in:

- Interpreting culture as a 'collective' or 'collection' of attitudes;
- Ranking and 'guiding' organisations to a particular cultural 'outcome';
- Analysing cultural change on scales of 'maturity' and 'immaturity';
- Viewing cultural change as 'generalist zones' of 'understanding'; and
- Viewing cultural change as a series of 'centric' circles.

Another issues underpinning current models of cultural interpretation further is the idea that the maturing of culture can be used as a mechanism or tool in which to generalise future cultural experiences within similarly structured organisations. Particularly in the way specific strategies are implemented and adopted within the organisational framework as a process. Current models and interpretations investigating elements of cultural change, maturity or evolution highlight and box discussion into identifying the 'what' (strategy/change) and then final 'solution' (outcome) of innovation implementation. The one-dimensional approach of lean implementation further complicates 'cultural understanding' by implying specific 'cultural outcomes' of one organisation undergoing the lean process are transferable