LEAN CONSTRUCTION: ARENAS OF ENACTMENT, MODELS OF DIFFUSION AND THE MEANING OF ‘LEANNESS’

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ABSTRACT

The existing literature on lean construction is overwhelmingly prescriptive with little recognition of the social and politicised nature of the diffusion process. The prevailing production-engineering perspective too often assumes that organisations are unitary entities where all parties strive for the common goal of ‘improved performance’. An alternative perspective is developed that considers the diffusion of lean construction across contested pluralistic arenas. Different actors mobilise different storylines to suit their own localised political agendas. Multiple storylines of lean construction continuously compete for attention with other management fashions. The conceptualisation and enactment of lean construction therefore differs across contexts, often taking on different manifestations from those envisaged. However, such localised enactments of lean construction are patterned and conditioned by pre-existing social and economic structures over which individual managers have limited influence. Taking a broader view, ‘leaness’ can be conceptualised in terms of a quest for structural flexibility involving re-structuring, downsizing and outsourcing. From this perspective, the UK construction industry can be seen to have embarked upon leaner ways of working in the mid-1970s, long before the terminology of lean thinking came into vogue. Semi-structured interviews with construction sector policy makers provide empirical support for the view that lean construction is a multi-faceted concept that defies universal definition.

Key words: lean construction, leanness, pluralism, diffusion, industry change

INTRODUCTION
Lean construction has attracted interest from academics since the early 1990s (e.g. Koskela, 1992; Ballard and Howell, 1998). However, it was only with the publication of *Rethinking Construction* (DETR, 1998) that the discourse of lean construction became central to the quest for industry improvement amongst industry practitioners. There continues to be much debate regarding the definition of lean construction and what it means to be ‘lean’. Any such discussion must start with the ideas of 'lean production' as originally developed in the Japanese car industry (cf. Womack et al 1990). The debate is further complicated by Womack and Jones’ (1996) use of ‘lean thinking’ as the generic term to describe application beyond manufacturing. The ideas of lean thinking comprise a complex bundle of ideas including continuous improvement, flattened organisation structures, the elimination of waste, teamwork, efficient use of resources and co-operative supply chain management. Further complications are added by the notion of ‘lean organisation’ and the metaphorical connotations associated with the word ‘lean’ itself. This ongoing confusion of definition has not prevented ‘lean construction’ becoming an established component of construction best practice (cf. CBPP, 1998). However, there have been notable dissenting voices (e.g. Green, 1999a, Winch 2005). What is noticeably missing is any empirical research into the way that ‘leanness’ is diffused and enacted in practice.

The paper is structured in four parts. Firstly, three frames of reference are introduced for understanding organisations as political systems. These provide a useful means of classifying the different meta-perspectives that characterise the literature. It is particularly useful to classify competing standpoints on lean construction in terms of their underlying assumptions. Secondly, the literature on the diffusion of lean production is reviewed and a number of different models are
identified. The third part of the paper re-visits the meaning of ‘lean’ to address the nature of leanness and ‘lean organisation’ as manifested in the construction sector. It is suggested that the concepts of ‘leanness’ and ‘lean construction’ must be understood in the context of 30 years of construction sector re-structuring. The final part of the paper describes empirical research that sought to access the ascribed meanings of ‘lean’ by construction sector policy makers and practitioners.

PERSPECTIVES ON ORGANISATION

An essential starting point for reviewing the models of organisation that are implicit in the published models of lean construction is provided by the unitary, radical and pluralist frames of reference (cf. Burrell and Morgan, 1979; Fox, 1974; Morgan, 1997). These three perspectives are derived from the idea that organisations can usefully be understood as political systems. The description that follows gives particular attention to the pluralistic perspective.

**Unitary perspective**

The unitary perspective assumes that all parties strive to achieve common objectives for the organisation. It is this perspective that dominates the production-engineering literature and is especially evident amongst the advocates of lean construction (e.g. Ballard, 2000; Koskela, 1992; Ballard and Howell, 1998). Emphasis is given to efficiency, control and leadership with little recognition of conflict or power. Organisations are seen to comprise homogeneous entities with no variation between the interests of individuals (Marchington and Vincent, 2004). Burgoyne and Jackson (1997) suggest that an appropriate metaphor to capture the essence of the unitary
perspective is that of a ‘parade of individuals marching purposefully forward in step in one
direction to the same tune’. From this perspective, the implementation of ‘lean construction’ in
the cause of waste elimination is seen to be in everyone’s interests. Whilst such assumptions are
implicit within many improvement recipes, they sit ill-at-ease with the fragmentation and
occupational diversity of the construction sector. Of further note amongst those who adopt a
unitarist perspective is the assumption that the implementation of lean construction falls within
the remit of ‘management’, i.e. there is an assumption that management are able to implement
lean construction irrespective of the actions of others. Furthermore there is no recognition that
different organisational actors may have different interpretations of what constitutes ‘lean
construction’. Different authors pursue the goal of waste elimination through broadly similar
means. For example, Koskela (1992) emphasises the need for construction to have a better all-
embracing ‘theory of production’, whereas Ballard (2000) advocates the ‘last planner’ system of
production control. Both are characterised by a unitarist perspective, although the latter is much
more tactical and directly prescriptive than the former. Tommelein’s (1998) work on pull-driven
scheduling and simulation is also frequently cited as an exemplar of lean construction.

Radical perspective
In harsh contrast to the unitary perspective described above, Morgan (1997) describes the
‘radical’ frame of reference as influenced by ‘old-fashioned’ structural Marxism. From this
perspective, society is viewed as ‘comprising antagonistic class interests, characterised by deep-
routed social and political cleavages held together as much by coercion as by consent’. Such
deep-rooted conflicts are seen to be played out within organisations, which are in themselves
viewed as ‘instruments of oppression’. The appropriate metaphor here is that of a ‘battlefield’ where rival forces such as management and trade unions strive to achieve ends that are ultimately incompatible (Burgoyne and Jackson, 1997). There is a significant literature that analyses lean production from this perspective, primarily within the context of the automotive sector (cf. Beale, 1994; Dohse et al, 1985; Garrahan and Stewart, 1992). Green (1999a, 1999b) is one of the few authors to mobilise these critical arguments in the domain of lean construction. However, such provocations have had minimal impact on the accepted discourse. Howell and Ballard (1999) provide one of the few attempts from mainstream authors to engage with critical arguments:

“We argue that Green misses the key foundations of lean which are drawn from a long history of production management thinking which first attempts to manage the physics of production in the service of higher performance”.

The above rejoinder is primarily of note in its acknowledgement of lean construction’s intellectual heritage and the associated unitary frame of reference. The overriding concern with the ‘physics of production’ illustrates clearly the technocist orientation of the mainstream lean construction literature. It is taken for granted that ‘higher performance’ is an aspiration shared by all parties. The lack of engagement with critical perspectives is perhaps not surprising. Those who insist on seeing the world in terms of exploitation and domination will inevitably marginalize themselves from the mainstream conversation. Condemning every new initiative as a means of technocratic totalitarianism ultimately becomes sterile and threatens to replace one set of supposed dogma with another. Critical arguments based on a materialist understanding of
power have in recent years been challenged by postmodernist interpretations that advocate the need for a discursive understanding of power (cf. Alvesson and Deetz, 1996; Fournier and Grey, 2000). The rejection of ‘grand narratives’ in favour of an emphasis on multiple voices and localised contexts resonates better with a pluralistic frame of reference.

**Pluralist perspective**

Within the domain of political science, the term pluralism is usually associated with liberal democracies where potential authoritarian tendencies are constrained by the free-interplay of interest groups with a stake in government (Morgan, 1997). The pluralist view of organisations emphasises the diversity of individual and group interests. In the words of Morgan (1997): “*the organisation is regarded as a loose coalition which has just a passing interest in the formal goals of the organisation*. Morgan’s words resonate strongly with Cherns and Bryant’s (1984) model of temporary multi-organisations (TMOs) in the construction sector; both are underpinned by the same pluralist perspective. Conflict is accepted as an inevitable characteristic of organisations, although this is not seen to be dysfunctional. Power is the medium through which conflicts of interest are mediated, and interest groups draw power from a plurality of sources (Clegg, 1979; Morgan, 1997). Such perspectives are by no means new, but they have been largely ignored in the debate about lean construction.

**Arenas of enactment**

Burgoyne and Jackson (1997) build on the pluralist perspective to suggest that organisations can usefully be understood as an ‘arena’. The arena concept creates an image of an organisation as
space where differences come together, are contested and to some extent, reconciled. The outcomes comprise a partial reconfiguration of the pre-existing factions and alliances. Events in the arena are to some extent visible; all parties can observe what takes place. Furthermore, observers may choose to become active participants if they perceive that their interests are at stake. Perhaps most pertinently, events constitute an element of performance (cf. Clark and Salaman, 1996). Individuals act out ‘roles’ and utilise ‘scripts’. However, Burgoyne and Jackson (1997) go beyond the dramaturgical metaphor to suggest that the appropriate metaphor for understanding the pluralistic perspective is that of the ‘carnival’:

“Within the carnival, dazzling array of seemingly unrelated activities are being simultaneously undertaken by individuals and groups with diverse agendas seeking to satisfy diverse needs and desires. This frenzied activity, however, invariably takes place with more synergy than conflict, and with a dynamic complexity that is beyond the intelligence of any single agent to understand.”

Any appointed (or self-appointed) ‘champion’ of lean construction, is therefore seeking to act out a role in the above arena. Published ‘best practice’ guidelines and prescriptive textbooks such as Womack and Jones (1996) provide the scripts against which they improvise. The lexicon of ‘lean thinking’ therefore provides the language of the performance: ‘value must be generated’, ‘flow must be managed’ and ‘waste must be eliminated’. Others within the arena will challenge the meaning of such ‘jargon’ and may marshal other resources as a means of resistance.
Language is therefore mobilised as a source a power whereby individuals compete for influence and resources. The task of ‘management’ is to shape the debate and convince competing parties to follow their chosen course of action. Language in its narrative form therefore dictates the agenda. It frames the way that people understand and act. But ‘management’ itself will be a pluralistic arena characterised by competing interest groups. There is rarely any certainty of outcome. Even if lean construction were a coherent recipe for industry improvement, it is doubtful whether this coherence would survive its progressive mediation through the multitude of arenas that characterises each construction project. The likelihood is that the language of lean will mix with the language of other scripts in unique and transient combinations. But any such interactions about the meaning of lean construction will only comprise a small part of the ‘dazzling array of seemingly unrelated activities’ that characterise the arena.

Notwithstanding the above, it is important to recognise that the acceptability of different scripts will depend upon their persuasiveness as ‘sense-making’ devices (Weick, 1995). Practitioners will attach more legitimacy to those narratives that help them make sense of their experienced reality. The discourse of any improvement initiative is more likely to be accepted if it resonates with the observed changes already underway. Managers are increasingly overwhelmed by externally-driven change over which they have little control. Narratives such as lean construction may provide some degree of comfort that they are in control of events whilst boosting their sense of self-identity. More importantly, such narratives may serve to sustain and accelerate structural changes that are already underway. Such issues are notably ignored by the technocist literature on lean construction. Questions concerning the complex interaction between action and structure
over time echo the structure-agency debate that has long characterised the broader domain of
social theory (cf. Giddens, 1984). Issues of consideration include the relationship between
language and action, the manner in which human agency relates to structural aspects of society
and the way that action is structured in everyday contexts.

MODELS OF DIFFUSION

Contested nature of management knowledge
The pluralist perspective developed above provides a standpoint on the diffusion of new
management ideas that is noticeably missing from the current literature on lean construction. A
further essential point of reference is provided by Bresnen and Marshall’s (2001) consideration of
the problems of transferring and applying new management ideas in the construction sector. Their
observations on the contested nature of mainstream management knowledge are especially
pertinent in the case of lean, which continues to defy universal definition and is repeatedly
criticised for its lack of coherence (cf. Kinnie et al., 1996; Legge, 2000). Bresnen and Marshall
(2001) further cite the highly socialised and politicised nature of the knowledge diffusion process.
Such a diagnosis is readily compatible with Burgoyne and Jackson’s (1997) notion of a ‘carnival’
of activities being played out across a succession of arenas.

The diffusion of management fashions
Following on the above, there is an extensive literature on management fashions and the way in
which they are marketed to practicing managers (e.g. Abrahamson, 1996; Clark and Salaman,
In many respects ‘lean production’ follows the pattern of previous management fashions such as total quality management (TQM) and business process re-engineering (BPR) (cf. Legge, 2002; Fincham, 1995). All were initially presented as major innovations that were indispensable for modern managers. Selected aspects of the associated terminologies were subsequently absorbed into the discourse of practising managers and in many cases triggered change programmes with direct material consequences (Benders and van Bijsterveld, 2000). The process through which such fashions are generated and diffused therefore impacts directly upon the ‘reality’ of modern organisations. Of particular importance is the range of actors involved in the fashion-setting process. Participants include business school academics, management ‘gurus’, practising managers, the business media and various government bodies. Scarbrough (2003) gives particular emphasis to the intermediary roles performed by consultants and professional groups in terms of mediating between management gurus and end consumers. This mediating function is seen to be enacted through their involvement in inter-organisational networks and their ability to legitimise new ideas in the eyes of practising managers.

Within the context of the construction sector, the networks that are mobilised include a diverse range of interest groups, quangos, government outreach bodies and membership clubs purportedly committed to promoting ‘change’. Such networks are in a constant state of flux with little inherent stability. Legge (2002) argues that consultants use such networks to build the client base for their products. In the case of TQM, consultants are seen to have developed three ‘good stories’ that enable them to sell TQM in response to a range of different concerns. The first is termed the operational management ‘story’ and emphasises conformance to the requirements of
customers. The second presents quality in terms of ‘value for money’ and is used to counter concerns about low price. The third story draws from the ‘excellence literature’ (e.g. Peters and Waterman, 1982) and emphasises employee involvement and empowerment as a means of achieving a ‘quality culture’. Management groups within client organisations are seen to mobilise different stories to suit their own political agendas. In this respect, consultants and users have a shared vested interest in the ‘interpretative viability’ of management fashions (cf. Benders and van Veen, 2001). The key point is that actions undertaken under a fashion’s label vary significantly across contexts. Indeed, the inherent ambiguity of a management fashion is essential for its effective diffusion. The possibility of generating alternative storylines makes the label much more marketable in a wider variety of contexts. If promoters were only able to mobilise one ‘good story’ it would be perceived as relevant in far fewer cases. Even if there were an uncontested core of technological innovations that are central to lean production, such innovations would still be subject to complex processes of social shaping (cf. Bijker et al., 1987; Williams and Edge, 1996).

Responses to lean production

Moving beyond management fashions in general, Scarbrough and Terry (1998) provide specific insights into the diffusion of lean practices in the UK automotive sector. On the basis of previous studies, they outline two competing models to explain a firm’s response to lean production. The first is derived from the prescriptive literature and focuses on the diffusion of the ‘Japanese paradigm’ of lean production as a unique socio-technical innovation that offers significant advantages over other methods. This is very much the line of argument advocated in the
prescriptive literature (cf. Wickens, 1987; Womack et al., 1990). Competitive forces in the marketplace leave firms with little choice other than to adopt the most efficient techniques and practices. The history of individual firms and sectors is considered of secondary importance; the key elements of lean production are seen to be universally applicable irrespective of context. Scarbrough and Terry (1998) emphasise that the assigned role of management is that of acceptance; there is little scope for managerial discretion. In this respect, the advice of Womack and Jones (1996) is unequivocal: “just do it!”. It is this same storyline of technological determinism that dominates the plethora of consultant-led courses promoting lean construction to the UK industry. The fact that these courses continue to attract audiences suggests that the message is popular with at least some industry representatives. However, unfortunately the advocated ‘universal applicability’ model is largely discredited in the literature (cf. Abo, 1994; Morris and Wilkinson 1995; Delbridge 1998).

The second model outlined by Scarbrough and Terry (1998) follows Storey and Sisson’s (1989) diagnosis and is described as the “bolt-on” model of change. From this perspective, lean production is seen to be an addition to the technical fixes already available. Emphasis is placed on the constraints of the cultural and institutional context. Storey and Sisson (1989) cite the limitations imposed by de-regulated labour markets and the institutionalised allegiance to short-term cost reduction policies. They further note a deeply ingrained aversion to risk amongst British managers, who are condemned to adopt short-term cost reduction policies as a result of external factors beyond their control. Managers can therefore give lip-service to the language of lean production, whilst persevering with established practices and routines. At best, individual
‘lean techniques’ are piloted alongside other accepted techniques. The bolt-on model rejects any radical re-orientation in operating practices as infeasible given contextual constraints within which managers operate. In essence, context and local history are of primary importance in conditioning a firm’s response to lean production. This view resonates strongly with Bresnen and Marshall’s (2001) argument that the institutional-cultural environment surrounding the construction process must be taken into account when seeking to import approaches developed in other sectors.

Scarborough and Terry (1998) subsequently move beyond the above dichotomy to offer an alternative ‘adaptation model’ on the basis of empirical research within Rover and Peugeot-Talbot between 1993 and 1995. The adaptation model credits management with a more proactive role and highlights the possibility that lean production may act as a catalyst for workplace change. However, the resultant changes are by no means pre-determined by the discourse of lean production. In this respect, Scarborough and Terry’s (1998) findings concur with Benders and van Bijsterveld’s (2000) study of the diffusion of lean production in Germany. Both studies give prominence to the tendency for innovations to be re-invented within different social contexts, thereby echoing the core arguments against technological determinism found within the literature on the social shaping of technology (SST) (cf. Bijker et al., 1987; Williams and Edge, 1996). The outcomes of the adaptation process will therefore differ across contexts with little uniformity, and often in different forms to those envisaged. Given that technological innovations are subject to interpretative flexibility across contexts, any attempt to generalise about the outcomes of attempts to implement ‘lean production’ are highly problematic. Historical and plant-level factors continue
to be important and change is construed as highly path dependent. The dynamics of the wider institutional context are also seen to be critical in shaping technological innovation (cf. Pettigrew, 1997).

**Interconnectivity between micro arenas and macro structures**

It is notable that the ‘universal applicability’ model is compatible with the assumptions of a unitary organisation. The overriding assumption is that all parties within the firm act in pursuit of the same objectives. Of particular note is the assumption that all parties share the same interpretation of ‘lean production’ and act accordingly. In contrast, the “bolt-on” model recognises the dissipation of management purpose as grandiose board-room initiatives are mediated by line managers. The ‘adaptation model’ rests even more explicitly on a pluralistic view of organisations, but credits managers with a much greater capacity for independent innovation. The extent to which the discourse of lean production is translated into practice depends upon the ‘absorptive capacity’ of individual organisations, i.e. their capacity to evaluate and put into operation externally sourced knowledge (cf. Cohen and Levinthal, 1990; Gann 2001). However, the tendency of the management fashion literature to emphasise the role of rhetoric within micro arenas risks under-emphasising the broader influence of social and economic structures.

Underpinning much of the preceding discussion is the contested distinction between ‘rhetorical’ and ‘substantive’ adoption. Innovations that have substantive material components are arguably much easier to investigate empirically in that material objects may be directly observed (Benders
and van Bijsterveld, 2000). However, this argument loses its cogency once ‘adoption’ is loosened to include ‘adaptation’. Benders and van Bijsterveld (2000) further note that organisations may already operate in ways advocated by the supposedly new concept. Studying a fashion’s substantive adoption may therefore lead to the conclusion that it was widely implemented before it became popular. It has already been argued that the persuasiveness of managerial improvement recipes within organisational arenas is linked to the extent to which they provide a narrative that enables practising managers to ‘make sense’ of an external experienced reality. There is therefore a degree of interconnectivity between the favoured rhetoric within organisational arenas and the broader pre-existing structural characteristics of the industry concerned. Such arguments echo the ongoing attempts within SST to bridge the gap between the ‘micro’ and the ‘macro’ (Williams and Edge, 1996). They also resonate with the long-standing debates within social theory generally regarding the interaction between agency and structure (cf. Giddens, 1984).

THE MEANING OF LEANNESS

It has been argued that ‘interpretative viability’ is an essential characteristic of any management fashion. As such, any management fashion will have multiple meanings. Lean production is variously understood as a set of techniques, a discourse, a ‘socio-technical paradigm’ or even a cultural commodity. This co-existence of different interpretations is no less evident within the specific domain of ‘lean construction’. The Egan Report (DETR, 1998) has undoubtedly been responsible for popularising the lean label amongst construction professionals. Furthermore, it is clear that the authors of the Egan Report see lean primarily as a set of techniques that are directly applicable to construction.
“Lean thinking presents a powerful and coherent synthesis of the most effective techniques for eliminating waste and delivering significant sustained improvements in efficiency and quality.” (DETR, 1998).

Whilst many consultants who advocate lean construction undoubtedly share the above view, it is by no means dominant within the academic literature. The lean construction literature tends to view lean either as a system of production control (e.g. Ballard, 2000; Ballard and Howell, 1998; Choo et al 1999) or, alternatively, as a conceptual model of the production process (e.g. Koskela, 1992). The reliance of such authors on a unitary conceptualisation of ‘organisation’ has already been noted. However, they are by no means advocating the slavish application of “universal principles” derived from outside the construction sector. They tend to see lean construction to be ‘inspired’ from lean production, rather being a direct derivative. Koskela (2000) proposes an alternative ‘theory of production’ which is distinct from the “Japanese model”. He is notably critical of the lean cocktail proposed by Womack and Jones (1996), whose five core ‘principles’ are unceremoniously dismissed as slogans. Koskela (2000) further criticises their terminology for being imprecise and unsystematic. Nevertheless, it is difficult to believe that Koskela’s work has had any significant impact on the meaning of ‘lean’ amongst practitioners. Ballard’s (2000) last planner technique has perhaps achieved a greater degree of industrial penetration. In some circles ‘last planner’ and ‘lean construction’ are synonymous. However, Ballard’s approach is much more tactical in its orientation and, as such, can be more easily ‘bolted-on’ to existing practices. Without wanting to denigrate the contributions of authors such as Ballard and Koskela, it must be
recognised that their interpretations of ‘lean’ are competing with the more popularised versions derived from the discourse of general management. Alternative scripts are offered by a plethora of consultants who derive their legitimacy from the ‘slogans’ promoted by Womack and Jones (1996).

Moving beyond the narrow confines of the lean construction community, the term ‘lean organisation’ has a much wider currency and carries with it a number of metaphorical connotations. This wider debate extends beyond idealised models of production to consider the defining characteristics of ‘lean organisation’. Legge (2000) suggests that the popularity of ‘lean’ can in part be credited to the nuances of the word itself. ‘Lean’ is the opposite of ‘fat’, but different from ‘thin’. Whilst both ‘fat’ and ‘thin’ have negative connotations, ‘lean’ equates with healthiness and fitness. In this respect, ‘lean’ is a metaphor for a desirable bodily condition. To say that an organisation is ‘too fat’ would be to invite a degree of ‘downsizing’. On the other hand, to say that an organisation is ‘too thin’ (or even anorexic) would be to imply that it lacks some sort of nutrition and, by implication, the capacity to perform the required functions. Such reflections are noticeably absent from the lean construction literature, which has very little to say about ‘leaness’ beyond the narrow confines of production control.

**Stages of leanness**

One of the most comprehensive attempts to define ‘leaness’ is that offered by Kinnie et al. (1996), who define leanness in terms of three overlapping phases. Stage 1 is a transitional phase where the focus is on helping the organisation become leaner. Stage 2 concentrates on the
achieved state of leanness as an end point. Stage 3 focuses on leanness as a process for managing the lean organisation so that it remains lean and responsive. They further suggest that the most negative connotations are associated with the first stage, and the most optimistic with the last. Their diagnosis is especially pertinent to the construction sector, and goes some way towards providing a contextually sensitive interpretation of leanness.

The adoption of Kinnie at el.’s (1996) three-phase model of leanness provides the basis for bringing together many of the arguments previously presented. Under Stage 1, key topics include restructuring, downsizing, de-layering and changes in the contractual status of employees. In this respect, the onset of leanness in the UK construction sector can be traced back 30 years. Since the mid-1970s, the industry has seen extensive re-structuring involving the outsourcing of labour and increased reliance on sub-contracting (Green and May, 2003). Coupled with this has been a significant shift in the employment status of the industry’s workforce. Self-employment grew from 30% of the total workforce in 1977 and peaked at 60% in 1995 (ILO, 2001). The major contractors that characterised the 1970s have since developed into exemplars of the lean ‘hollowed-out’ firm. As such, they have largely removed themselves from the physical work of construction, preferring to concentrate on management and coordination functions. This trend has significantly undermined the industry’s capacity for training and innovation (cf. Gann, 2001). Recent years have seen a series of intermittent attempts by government to tighten up the taxation regimes governing self-employment (Harvey, 2003). These partial clampdowns have initiated a limited shift back to direct employment, but the long-term accumulative effects of downsizing, de-layering and outsourcing are not so easily eradicated. It would therefore seem that many
construction firms completed Stage 1 before ‘leanness’ came into vogue.

Stage 2 - leanness as an outcome - was arguably reached for the majority of firms in the mid-1990s. According to Kinnie et al. (1996) the critical characteristic of a lean organisation that has gone though a phase of delayering, re-structuring and downsizing is its assumed structural flexibility. The notion of firms being “staffed for troughs, not peaks” will be familiar to anybody with experience of the construction sector. Forms of flexibility such as reliance on sub-contracting, overtime, temporary and seasonal working have long since been part of the construction sector’s ‘industry recipe’ (cf. Spender, 1989). These initiatives are invariably centrally directed and imposed. Business process re-engineering (BPR) can also have a role here. Task flexibility is further achieved through team-working and work intensification as means of managing with fewer employees. Subcontractors are assembled on a project-by-project basis in accordance with local market conditions. However, once this lean outcome is achieved, Kinnie et al. (1996) argue that it immediately creates problems in that the assumed flexibilities are not sufficient to allow firms to respond to new market demands. This observation echoes similar criticisms by Naim and Barlow (2003), who argue that the lean model frequently offers efficiency at the expense of effectiveness; i.e. lean organisations may lack the ‘ability to give customers exactly what they want, when they want it’.

Stage 3 of Kinnie et al.’s (1996) model is concerned with the ongoing process of managing the lean organisation so that it remains lean and responsive. The model focuses attention onto the weaknesses of ‘leanness’ as an outcome in the context of a turbulent external environment subject
to strong competitive pressures. Leanness as a process focuses attention on the attributes required by organisations if they are to respond to environmentally induced change. Tactics here include continuous improvement, TQM and team-working, which are described as the means of instilling a capacity for change at the lower levels of the organisation. Such techniques are seen to counteract the lack of responsiveness of lean organisations. Cultural change programmes and supply chain management are also placed within this stage. Kinnie et al. (1996) comment that very few organisations get to Stage 3.

Kinnie et al. (1996) are ambiguous in terms of whether the original recipe of lean production promoted by Womack et al. (1990) fits into Stage 2 or 3, although they do concede that there is much overlap between these stages. In many respects Stages 2 and 3 are best understood as largely concurrent and mutually adjusting. In this respect, Rees et al.’s (1996) interpretation of lean production is useful in that it distinguishes between the ‘hardware’ of production systems such as just-in-time (JIT) and the ‘software’ of ‘high commitment’ human resource management (HRM) practices. Womack et al. (1990) gave little emphasis to the importance of integrating HR practices (cf. MacDuffie, 1995). One possible interpretation of how lean production fits into Kinnie et al.’s model is that the ‘hardware’ falls within Stage 2 whereas the ‘software’ falls within Stage 3. Given the continuing low status and influence of HRM in the construction sector (Cully et al., 1999), this raises the question of whether there is any significant number of construction firms who have reached Stage 3. However, this comment must be judged against Kinnie et al.’s (1996) observation that few organisations of any sort appear to get to this stage.
Finally, it is pertinent to consider the relationship between the previously outlined models of diffusion and the three-stage model of leanness described above. Stage 1 is clearly driven by economic imperatives with little discretion on the part of middle managers. However, management responses during Stages 2 and 3 will be highly path dependent and different organisations will tend to adapt the lean production paradigm to suit their own circumstances. Possibilities include both the ‘bolt-on’ and ‘creative adaptation’ models. The notion of organisational arenas also remains useful in understanding how different ideas compete for attention. But – if Kinnie et al. (1996) are right - it is only the achievement of leanness as an outcome (with the associated backcloth of downsizing and de-layering) that makes ‘lean production’ meaningful. The overall picture is one of almost bewildering complexity. Certainly the framework developed here is significantly broader and more complex than those provided in the lean construction literature. However, it should be noted that Ballard and Howell (1998) start their argument in favour of ‘shielding production’ with the observation that project managers in construction ‘manage contracts’ rather than task execution. There is therefore an implicit assumption that the organisation in question has already become ‘lean’ in accordance with Stage 1 of Kinnie et al.’s (1996) model. It should further be noted that the above interpretation resonates with Pettigrew’s (1997) notion of ‘processual analysis’ that seeks to understand organisations as a sequence of individual and collective events, actions, and activities unfolding over time in context. Of particular importance is the recognition of a complex interplay between human action and the context within which it occurs. Managerial actions are not only shaped by context, but they are also shaping. To some extent at least, the current context of the UK construction sector has been shaped by government and management actions over the last 30
years. From this perspective, ‘leaness’ is a systemic outcome and ‘lean construction’ (in all its variants) is the means by which managers seek to eradicate the damaging side effects.

PERCEPTIONS OF LEAN AMONGST INDUSTRY POLICY MAKERS

Research method

The picture painted in the preceding sections is one of considerable complexity and to ‘test’ it empirically would be unachievable. Indeed, it has already been conceded that the ‘carnival’ of events played out in any organisational arena is beyond the intelligence of a single agent to understand. Nevertheless, it is possible to access the storylines propagated by those policy makers who advocate lean thinking for the UK construction sector.

Twenty-five interviews were conducted with construction sector policy makers in the period May 2001 to April 2003. The interviewees were drawn from a range of quangos, institutions and sector ‘clubs’, including Egan’s original Construction Task Force responsible for Rethinking Construction (DETR, 1998). In addition to those directly involved in The Egan Report, senior representatives were interviewed from the following organisations:

- Strategic Forum for Construction
- Construction Industry Training Board (CITB)
- Royal Institute of British Architects (RIBA)
- Construction Research and Innovation Strategy Panel (CRISP)
• Design Build Foundation (DBF)
• Construction Industry Council (CIC)
• Construction Round Table (CRT)
• Construction Best Practice Programme
• Reading Construction Forum (RCF)

Whilst it is appropriate to list the above organisations, it should also be emphasised that the views expressed were personal opinions rather than sanctioned policy statements. As an aside, it is interesting to note that several of the named organisations have since ceased to exist. The fractured and ever-changing landscape of the industry’s lobby groups stands as testament to the difficulties of harnessing disparate interest groups to the ‘common good’. The interviewee sample also included senior representatives of construction firms and client organisations who were recognised as exemplars of ‘lean construction’. Whilst these companies are often cited in numerous ‘sanitised’ case studies promoting the benefits of lean, it is not appropriate that they should be named here. It should be noted that several interviewees had multiple allegiances, i.e. they were active within at least one of the above policy arenas whilst also promoting lean thinking within their own organisation. A further two interviewees were sourced within consultancy firms actively involved in the promotion of lean construction as an improvement recipe. The interviewees were typically between one and two hours in length.

The interviews were semi-structured, and were orientated towards accessing the interviewees
interpretations of ‘lean’ with the minimum amount of prompts from the interviewer. Whenever possible the interviewees were recorded and fully transcribed to allow for subsequent analysis and the coding of emergent themes. However, 12 of the 25 interviewees were uncomfortable with being recorded and in these cases the subsequent analysis relied on handwritten notes. However, it is pertinent to emphasise that the interviewer was fully skilled in shorthand and the research team remained confident that the essence of the interviews had been accurately recorded. It was of course recognised that the interviews were likely to contain an element of performance in that the interviewees may have felt the need to tell the story that they thought the interviewer wanted to hear. In contrast, other interviewees appeared to want to be deliberately provocative by adopting a contrary position. Such issues are of course common to all interview research and can only be partially counter-acted through ‘good interview technique’. The credibility of the summary analysis presented below has subsequently been validated by a series of focus groups involving industry practitioners. The research methodology also included five multi-perspective case studies of lean exemplars and a questionnaire survey of construction organisations. The full results of this additional fieldwork will be reported elsewhere.

**Contrasting perspectives**

It is perhaps not surprising to record that the perceptions of ‘lean’ amongst industry policy makers shared all the vagueness of definition, contradictions and ambiguities found in the literature. The variety of lean perspectives and ‘theories’ described by the interviewees was striking. They ranged from narrowly-defined operational techniques implemented at project level to strategically orientated, sometimes industry-wide models. Some of the descriptors used were:
• “...it is a philosophy, a way of thinking.”

• “...an infinite stream.”

• “...a set of principles.”

• “...a set of techniques.”

• “...a process where there is no going back, the task and the pull of the next phase drives the pace...”

Just-in-time (JIT), partnering and supply chain management were all variously positioned as over-arching themes as well as tools that are used in ‘becoming lean’. What was noticeably absent was any interpretation of leanness in the more generic sense proposed by Kinnie et al. (1996).

Beyond the dedicated lean champions, few of those interviewed admitted to having read the source texts on lean production (e.g. Womack et al. 1990; Womack and Jones, 1996). Even fewer were familiar with, or even aware of, the work of the Lean Construction Institute (LCI) or International Group for Lean Construction (IGLC). However, several had met Dan Jones in
discussion seminars preceding the publication of the Egan Report, and all were aware of origins of lean production in the Toyota manufacturing system. One interviewer remarked upon the absence of explicit ‘lean’ references in *Rethinking Construction* although he went on to emphasise that it was “of course, all about lean”.

Without exception the interviewees were thoughtful and reflective. There was scepticism amongst many regarding the direct application to the construction process of the Japanese model of lean production. Certainly there were few advocates of the ‘universal applicability’ model of diffusion. This was summed up nicely in the comment: “simple idea, but very difficult to put into practice given the nature of construction”. Some were somewhat measured in their support for lean thinking even in principle, and preferred to see it more as a rallying call for industry improvement rather than as a specific recipe for improvement. It was interesting to note that there was unanimous agreement on the need to improve performance, which was invariably construed to be identical to waste elimination. Several were fond of using the Japanese word ‘muda’ to signify waste (usually accompanied by a raising of the eyebrows). Muda was seen to take a variety of forms and its elimination was generally seen as a healthy way of reducing costs.

Whilst many were sceptical about the application of lean production to the construction process, several suggested that the real opportunities for application of the ‘purer’ models lay with the off-site manufacture of components and pre-fabricated units. The lean model of off-site manufacturing extended to the just-in-time delivery of components to site. Two of the clients interviewed were very clear that they had been ‘doing lean’ even before the term was invented.
Both of these organisations are repeatedly cited as exemplars of lean construction. One has achieved impressive productivity improvements for repetitive building through prefabrication, modularisation and multi-skilling. The interviewee claimed that their buildings are 90-95% complete in the factory:

“all we have to do on site is fit the ‘lego’ parts together, and this takes a matter of hours rather than days.”

A significant proportion of interviewees associated lean with partnering, which was sometimes described on a project level and sometimes at a more strategic level in terms of framework agreements. Several interviewees also referred to supply chain management, which was often used interchangeably with partnering. It is interesting to note that partnering was either seen to be a means of achieving leaner working, or alternatively as an outcome of leaner working. Several attributed Latham (1994) as the main promoter of partnering. Indeed, several expressed the view that they felt much more comfortable with the Latham Report than they did with the Egan Report. It was also of note that a number of interviewees felt the need to emphasise that they were talking about ‘real’ partnering, thereby acknowledging that some contractors talked about partnering ‘whilst screwing discounts out of sub-contractors’.

The expression ‘integration’ was used a great deal by several interviewees (cf. Strategic Forum, 2002). Some conceptualised integration in terms of increased trust, teamwork and co-operation amongst contracting parties; thereby leading to a reduction in ‘adversarial waste’. Others
described it in a more instrumental way, focusing on the need for better planning and task organisation. In either case, integration was seen as an antidote to the fragmentation of construction, both in terms of the supply base and the construction process. Some interviewees linked fragmentation to flexibility, describing them as ‘different sides of the same coin’. Flexibility to expand and contract in accordance with fluctuations in demand was seen to be an important characteristic of contracting firms. Such comments echo the notion of ‘structural flexibility’ that Kinnie et al. (1996) contend to be the central condition of ‘leanness as an outcome’.

**HRM Implications**

Given the emphasis by authors such as MacDuffie (1995) on the importance of supporting HR practices in ensuring the successful outcome of lean production, it was considered appropriate to probe the views of the interviewees on this issue. HR issues were rarely mentioned either spontaneously or explicitly. When specifically prompted by the interviewer, the most common response related to the need for training. However, one interviewee rejected the idea that training was needed as a precondition of the effective implementation of lean:

“...low-level tasks will increasingly be accomplished by new technology, standardisation and off-site fabrication. Fewer people will be needed and those who are will not require much training since the work will comprise mainly prefabricated unit assembly.”
At the same time, any suggestion of perceived de-professionalisation or de-skilling of design and construction was firmly rejected. The potential for any consequent reduction in motivation and commitment was treated as irrelevant. The long-term implications of the trend towards prefabrication should be considered in the context that approximately 50% of the construction sector’s turnover is concerned with the maintenance and refurbishment of the existing building stock. Such work will continue to require traditional craft skills that will seemingly be eradicated from the new-build sector should the projected dominance of pre-assembly become a reality.

More generally, interviewees provided scant evidence of confidence in ‘high-commitment’ HR practices or in HRM practices generally. One interviewee expressed the view that:

“…it’s a tough industry out there. It’s about survival. We really don’t have the luxury of investing in namby-pamby HR stuff. We have to get things built.”

Whilst the above opinion was at the extreme end of the spectrum, the interviewees were generally much more comfortable talking about efficiency than they were on the topic of supporting HR practices. Paradoxically, several talked at length about the need for better ‘soft skills’ relating to human issues. Perhaps most pertinent is the fact that only two out of the twenty-five interviewees talked about HR issues without direct prompting.

**Concurrent and competing models of lean**
The diversity of the views expressed make any summary prone to over-generalisation. Nevertheless, detailed coding and analysis of the interview data revealed three dominant models of lean construction. However, it should be emphasised that these stylised accounts were frequently co-existent, i.e. individual interviewees were by no means consistent in their interpretation of lean even over the course of a single interview. The three models derived from the interviews should therefore be understood as characterisations rather than accurate depictions of the views expressed. Whilst overly simplified and neat, they could be portrayed as depicting a progression in conceptualisation from a narrow, operational project-level point of view to a strategic perspective on the industry at large.

**Lean Model 1: Waste elimination**

- Waste elimination is paramount.
- Technical/operational focus.
- Espoused aim is to ensure smooth uninterrupted flow of activities.
- Assumed that cost savings made at the operational level will aggregate to the corporate level.
- Further assumed that all parties will benefit equally from ‘improved performance’.
- Discourse dominated by machine metaphor,
- Underlying unitary perspective on organisations
Lean Model 1 to a large extent reflects and reinforces long-established improvement storylines. For the advocates of this model, the discourse of lean construction has seemingly been assimilated into a pre-existing industry recipe. There is a progressive and seamless transition from scientific management to operational research to value engineering to BPR to lean thinking. The favoured slogans are adjusted accordingly: “eliminate needless movements”, “optimise workflow”, “cut out unnecessary cost”, “obliterate non value-adding activities”, “eliminate muda”. The words change, but the underlying intellectual construct remains intact. The worldview is to sort out the inefficiencies first, and thereafter we can worry about other things (if we ever get round to it). The storyline is notably limited to the ‘hardware’ of lean production. Advocates of this approach are frequently embarrassed by reference to supporting HR practices. It is indeed a ‘hard, cold world out there’. In terms of diffusion models, Lean Model 1 is very much representative of the “bolt-on” model.

**Lean Model 2: Partnering**

- Emphasis on relations between firms partnering and supply chain management.
- Project/corporate view
- Aim is to eliminate adversarial relationship/change culture
- Leanness is seen to be the outcome of better relationships
- Less conflict, more trust equals improved collaboration
- Emphasis on knowledge sharing, learning
- Dominant metaphors: teamwork, cybernetic
• Underlying pluralistic perspective on project organisations, unitary perspective on firms.

If Model 1 is characterised as ‘assimilation by the old guard’, then Model 2 can be characterised as ‘assimilation by the new guard’. The underlying storyline owes more to Latham than to Egan. Most interviewees talked about both ‘project partnering’ and ‘strategic partnering’. Many also talked about ‘framework agreements’ as a means of formulating long-term relationships. The advocates of this model also had a great deal of faith in ‘partnering workshops’ as a means of resolving conflict. Effective facilitators were seen as key in this respect; they should be trained in the ‘appropriate soft skills’. A limited number of major clients were seen to be taking the lead; “if you want to work with us, then you have to work the way we want to”. Some expressed concerns that they were becoming too autocratic and that the ‘partnership’ was somewhat one sided. Contractors were expected to trust the client, but were themselves subject to ‘key performance indicators’. Trust and a commitment to ‘measuring performance’ are in many respects strange bedfellows. The advocates of this model recognised the notion of the ‘project coalition’ to a greater extent than the advocates of Model 1. It was clearly recognised that different parties in the ‘project team’ had different objectives that would need to be reconciled. However, the unit of analysis rarely strayed below the level of the firm. The unitary perspective on firms remained very much in place. In terms of diffusion models, Lean Model 2 is once again reflective of the “bolt-on” model. Furthermore, its advocates were broadly silent on the need for supporting HR practices and the required shift in the established ‘industry recipe’.

Lean Model 3: Structuring the Context
• Lean is about structural change in the way projects are delivered
• Long-term contractual relationships an essential pre-requisite
• Implementation of lean requires ‘complete re-think of design and construction’.
• Technology clusters, integrated teams, integrated processes
• Big emphasis on simplification of design, standardisation, pre-fabrication, application of IT.
• Dominant metaphors: psychic prison, organic, cybernetic
• Underlying pluralistic perspective on organisations

Lean Model 3 combines elements of the previous two models, but has a much stronger emphasis on the institutional context within which projects are delivered. It was seen by its advocates to be a radical break from the previous modus operandi of project delivery. From this perspective, lean cannot be achieved by considering construction, design and building operation in isolated compartments. Lean requires a re-arrangement of the contractual boundaries between parties, and an incentivisation system that rewards both firms and individual team members. There was a much stronger storyline on innovation as the engine of competitiveness. The industry was therefore encouraged to break out of its long-established industry recipe and operate on a different basis. Different solutions were seen to be necessary for different circumstances. The commitment was less about ‘continuous improvement’ and more about ‘continuous evolution.’ There was much talk of ‘system integration’, especially in terms of the process of design and construction but also in terms of the product. There was also a far greater emphasis on technology
than the previous models. Product and process innovation were seen to be essential components of improved performance. There was also a recognition that training was essential at all levels if this new industry was to become a reality. However, change was seen to be dependent upon some degree of shelter from short-term competitive forces. In contrast to the other two perspectives, there was a much stronger emphasis on the role of individuals in ensuring success, and the commitment to ‘responsible innovation’ rested upon the need for diversity in terms of skills and outlook. In terms of diffusion models, Lean Model 3 was suggestive of ‘creative adaptation’. People were claimed to be constantly involved in horizon scanning on the look out for new ideas from which they could learn. One client had adapted last planner to suit their specific purposes and the interviewee was positive about the results. The commitment to a structural re-alignment and innovation was therefore combined with a recognition that innovation is primarily a bottom-up activity.

Lean Model 3 is clearly more sophisticated than then other two models. It is also much more optimistic in terms of its vision for the future. Its advocates claimed to be committed to research and development, but it is notable that the system was dependent upon some degree of shelter from competitive forces. The model is also dependent upon a repeat client with a significant capital expenditure programme. The clients in question were prepared to engage proactively with the construction industry to ensure that it could achieve its own objectives. Whilst Lean Model 3 was certainly in a minority in comparison to the other models, it was by no means limited to a single organisation. Others also expressed the commitment to the principle of ‘creative adaptation’. Finally, it must be conceded that the advocates of Lean Model 3 were highly
ambivalent towards the label ‘lean construction’. One interviewee actually suggested that the label was avoided because of the ‘lean is mean’ connotation: “we don’t really call what we do lean construction. I think we’ve moved beyond lean now.” One suspects that many of the interviewees would tell very similar stories irrespective of whether they were asked about lean construction or not. There is also a nice irony in moving ‘beyond lean’ before anybody has quite defined what it is.

**Concluding remarks**

The starkest conclusion is that lean construction defies universal definition. The meaning of ‘lean’ is characterised by an empirical elusiveness, although the essential vagueness of lean construction has not prevented its acceptance as a recommended component of ‘best practice’. The continuing popularity of consultant-led training courses is indicative of an interactive collusion between the promoters and receivers of lean discourse. However, the ‘receiving’ managers should not be cast as passive, gullible recipients. Management practitioners have a continuous need for persuasive scripts against which they can act out the role of improvement champions. The legitimacy of lean construction is underpinned by sources such as Womack and Jones (1996) and the Egan Report (DETR, 1998). The lean brand has been further institutionalised by its endorsement by a succession of government outreach bodies and sector membership clubs dedicated to ‘industry improvement’. The reported interviews with construction sector policy makers confirm the essential ambiguity of lean construction, even amongst those who promote its adoption. In many respects, the inherent ambiguity of lean construction discourse is essential for its effective diffusion. The co-existence of different
storylines serves to make it relevant to a much broader range of contexts. As with any other management fashion, its ‘interpretive flexibility’ is an essential condition for its longevity.

It follows that lean construction is conceptualised and enacted differently in different contexts, frequently taking on different manifestations from those envisaged. Whilst lean construction is frequently marketed as a unique socio-technical innovation directed at enhanced productivity, its meaning is continuously re-negotiated within localised arenas. Ongoing processes of meaning attribution make ‘closure’ on an accepted definition unlikely. The multiple storylines of lean construction also compete for attention with other ‘improvement’ recipes as managers strive to control the ‘improvement agenda’. The likeliest outcome is that managers give lip-service to the language of lean, whilst persisting with established practices and routines. The wholesale implementation of any ‘new production paradigm’ would entail not only the cost of learning the new approach, but also the cost of ‘unlearning’ the old one. More optimistically, there is a possibility that lean construction may act as a catalyst for workplace change. The ‘creative adaptation’ option credits middle managers with a much greater capacity for innovation. It also assumes that they have sufficient domain control to break with the institutionally embedded practices that characterise the construction sector. This may well depend upon the creation of business context that is sheltered from the short-term competitive pressures that shape the sector at large. It is perhaps no coincidence that the ‘structuring the context’ model was predominantly advocated by interviewees from within large client organisations. As such, they enjoy an unusual degree of market power to influence the behaviour of the construction supply chain.
Considerable emphasis has been given to the way the meaning of ‘lean construction’ is socially constructed within localised arenas. However, it must also be recognised that such processes are enacted within broader social and economic structures. Of central importance is the relationship between language and action, the way that human agency relates to structural aspects of society and the way that action is structured in everyday contexts. Lean construction as a form of organisation cannot be understood in isolation from long-term structural changes at the sector level. Managers continuously seek legitimising discourses to help them make sense of experienced reality. The legitimacy of lean discourse is rooted in 30-year trends of corporate re-structuring, de-layering and outsourcing. Such trends are characteristic of the transitional stage of ‘becoming lean’ in search of structural flexibility. In this respect, the construction sector embarked upon the quest for leaner ways of working in the mid-1970s, long before the terminology of lean thinking became fashionable. Changes attributed to lean thinking may therefore have more to do with isomorphism (commonality of forms) at the sector level. Of particular concern in the UK construction sector are the inherent weaknesses of ‘leanness as an outcome’. The emergence of the hollowed-out firm has reduced absorptive capacity and constrained the sector’s dynamic capabilities to respond to changing demands. The unstable endgame of lean construction equates too easily to corporate anorexia.

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