

# Supply Chain Management in Construction: Three developments in search of a theory

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## Abstract

*This research engages with recent calls within the supply chain management community to advance conceptual theory development. Theory development arguably defines a scientific discipline, provides operational legitimacy and formulates systematic frameworks for further analysis and critical evaluation. Over the past two decades supply chain management in a construction context has largely borrowed ideas and concepts from other industries, most notably the automotive and manufacturing sectors. Whilst this may be convenient for casual comparison, others argue that close assimilation with other industries only serves to confuse and confound the conceptual comprehension of supply chain management in a construction context.*

*Three areas of development arguably dominate the supply chain management debate; conceptual immaturity, post-positivist models of research and editorial gatekeepers. First, given the lack of conceptual maturity, especially within supply chain management and construction it is logical to explore and exploit established academic disciplines such as economics and management. However, inter-disciplinary synthesis with supply chain management and construction requires careful and incremental refinement to accommodate inherent and contextual limitations. Secondly, to engage meaningfully with conceptual theory development requires alternative methodological models of enquiry. In construction management literature the positivist models of hypothesis testing need to be complemented with post-positivist iterative models of research. A methodological correction in construction management research would arguably inform and stimulate critical debate. Thirdly, searching for a theory requires encouragement and sponsorship. In this respect, academic journals, their editorial boards and reviewers all have a key role to play. Without the support of enthusiastic journals and reviewers sympathetic to largely qualitative approaches, the search for a theory of supply chain management in a construction context is likely to remain vague.*

*Despite considerable construction industry interest, the theoretical understanding of supply chain management continues to reflect concepts and practices rooted elsewhere. This paper identifies and discusses three key developments in search of a theory of supply chain management in a construction context. Individually, the developments represent important milestones in theory building; in concert these developments would arguably spark an intellectual curiosity that would further advance the conceptual development of supply chain management and construction.*

**Keywords:** Supply Chain Management, Theory Building, Construction Industry

# 1. Introduction

*“Theory defines a scientific discipline”* (Carter, 2011 p.3). In addition, theory formulates systematic frameworks (Whetten, 1989), informs public policy (Koskela, 2008) and provides operational legitimacy (Pinder and Bourgeois, 1982) for further analysis, critical evaluation and theory development. Recent calls from the supply chain management community have challenged academics and practitioners to proactively engage with theory building approaches (Choi and Wacker, 2011). In contrast to well-established and refined domains of study such as economics or management, it is argued that supply chain management is devoid of a conceptual foundation (Carter, 2011). According to Carter (2011), the lack of supply chain management theory building subsequently stifles maturity, accepts mediocrity and simply sponsors compliance with already established policy and procedure. The net outcome is preservation of the status quo.

To challenge established tenets of supply chain management with a critical appraisal is arguably a reflection of discipline maturity and progressive scientific outlook. For example, internationally recognized journals in economics and management have on a number of occasions dedicated special issues and editorial forums to the notion of theory building (Van de Van, 1989, Rindova, 2008). The supply chain management community readily acknowledge this ‘conceptual gap’ and importance in developing uniqueness, fecundity and cognitive integration (Wacker, 1998). Theory building in the built environment has also received recent attention (Koskela, 2008), however connecting theory building with supply chain management and the construction industry arguably remains underdeveloped, marginalized, patchy and without vital sponsorship.

Over the past two decades supply chain management in construction has largely borrowed supply chain management theory and practice from other industries, most notably the automotive, retail and manufacturing sectors (Briscoe and Dainty, 2005). Whilst this may be convenient for casual comparison, others argue that close assimilation with other industries only serve to confuse and confound the conceptual comprehension of the construction sector (Groak, 1994, Fernandez-Solis, 2008). Notwithstanding repeated arguments for a contextually sensitive response (Fernie et al., 2003), supply chain management practices witnessed elsewhere continue to be wholeheartedly embraced. Given recent calls within the supply chain management community to advance conceptual theory development, the construction sector with its fragmented structure, discontinuous work patterns, complex power relations, history and routine is arguably well-placed to make a critical contribution to the ensuing debate.

This research paper echoes recent calls for supply chain management theory building. Those within the construction sector similarly have a role to play; especially given that supply chain management theory building in construction remains sparse and uneven. This is manifest in the language, metaphors and ‘taken for granted’ institutional assumptions of many ‘borrowed’ and rehashed theories. Part of the difficulty for construction as ‘compulsive borrowers’ from many other eclectic disciplines is that very often the utility of the theories adopted is strictly limited to the settings where its institutional assumptions are in force. For example, the discourse of supply chain management in manufacturing is frequently used to endorse and diffuse supply chain management ‘best practice’ in

construction (Rimmer, 2009) despite the obvious differences. Contrary to the endemic practice of theory borrowing and testing, the ambition of this paper is to explore developments that may advance theory building in the field of supply chain management and construction. Three developments arguably dominate the supply chain management theory building debate; conceptual immaturity, post-positivist models of research and editorial gatekeepers (Carter, 2011).

The paper is organised as follows. Following the introduction, the rationale for theory building is explored and developed. The next section connects the notion of theory building with supply chain management and construction. Within the discussion, three key areas of research development come under critical scrutiny namely; conceptual immaturity, post-positivist models of research and editorial gatekeepers. It is recommended that a construction contribution to recent calls for theory building in supply chain management will provide an alternative and discerning perspective to the mainstream management debate.

## 2. Theory Building

Despite considerable academic interest and study, a universal definition of the term ‘theory’ remains shrouded in a fog of conceptual dissonance (Corley and Gioia, 2011). Given the absence of a definitive meaning of ‘theory’, it remains “*difficult to separate what is theory from what isn’t, especially if theory development starts with guesses and speculations and ends with explanations and models*” (Weick, 1995). In an attempt to develop the theory of conceptual development, Corley and Gioia (2011 p.12) succinctly characterize theory as “*a statement of concepts and their interrelationships that show how and/or why a phenomenon occurs*”. The key use of ‘how and/or why’ is further complemented by Whetten’s (1989) assertion that addressing research questions of how, why, where, what, when and who form the foundation for theory building.

In contrast, Sutton and Straw (1995) offer an unconventional approach to clarify what constitutes theory building by stating clearly what theory is not, namely; references, data, constructs or diagrams. Making sense of theory and theory building simply as an outcome or product would ultimately support Sutton and Straw’s standpoint (Weick, 1995). However, contrary to the notion of theory building as a product, according to Weick (1995) theory building is a process and may justifiably rely on references, data, constructs and diagrams as staging posts in conceptual maturity. Despite the divergent viewpoints on what theory is or is not, four building blocks of ‘good’ theory; clarity of expression, distinct discipline, relationships and prophecy are more widely acknowledged (Wacker, 1998).

A general consensus relating to the essential building blocks of good theory is helpful, however precisely what finally differentiates ‘good’ theory from ‘bad’ theory remains highly contentious. According to Lewin (1943 p.113) “*there is nothing more practical than good theory*”. Alternatively, Ketchen and Hult (2011 p.13) suggest good theory simply presents “*ideas that contradict pre-existing notions and offer well-articulated alternatives in their place, spark others’ intellectual curiosity and inspire people to conduct further research*”. Somewhat contrary to empirical forms of research protocol, a ‘well-articulated alternative’ does not necessarily require logical substantiation; the goal of

good theory is to generate interest, stimulate dialogue and excite (Skilton, 2011). Expressed simply, “*good theory is a plausible theory*” (Weick, 1989 p.517)

In response for greater conceptual clarity especially within the discipline of social science, Glaser and Strauss (1967) pioneered a process to theory building called ‘grounded theory methodology’. The methodological outlook challenged mainstream positivist models of enquiry by favouring conceptual frameworks of cross-examination and inductive analysis (Bryant and Charmaz, 2010a). The resultant grounded theory methodology of iteration and ‘self’ subsequently raises many fundamental questions and is not without criticism. The role and ‘objectivity’ of the researcher and the use and ‘clarity’ of the data is frequently the subject of epistemological debate and methodological tension (Astley, 1984).

The process of theory building and accompanying research methodologies such as grounded theory therefore challenge many preconceived notions connected with mainstream research strategies. The methodological discussion is arguably not about right or wrong, the debate is essentially addressing the notion of ‘fit for purpose’. For example, scientific rigour is frequently judged in terms of three central axioms namely; objectivity, validity and pragmatism (Astley, 1984). For theory testing as opposed to theory building this approach is indeed fit for purpose.

However, it is repeatedly contested that the success of theory building cannot be measured simply in terms of conventional scientific rigour. Given the largely aesthetic ambition to postulate and spark an intellectual curiosity within the scientific community, ‘hard’ evidence favoured by the traditional custodians of scientific rigour is arguably inappropriate. On the contrary, ‘soft’ validation such as ‘practical’ (Lewin, 1943), ‘plausible’ (Weick, 1989) and ‘that’s interesting’ (Davis, 1971) better reflect the abstractionist qualities of good theory building. A successful conceptual article “*has to excite these essentially aesthetic sensibilities in the author or in other scholars to such an extent that they set about the process of falsification, and thereby extend the life of the theory*” (Skilton, 2011 p.23). In other words if the theory makes sense, theory testing will follow.

### **3. Supply Chain Management and Construction**

Supply chain management in construction continues to grow in popularity (O'Brien et al., 2009). The volume and array of publications are testimony to the increasing importance of supply chain management as applied to the construction industry (Meng et al., 2011). Over the past three years numerous books on the topic have been published (Pryke, 2009, O'Brien et al., 2009, Benton and McHenry, 2010) and in the second half of 2010 two academic journals in the field of supply chain management dedicated special issues to supply chain management in the construction industry (Ellegaard et al., 2010, Segerstedt and Olofsson, 2010). In addition, 2011 also witnessed the inaugural publication of the International Journal of Construction Supply Chain Management.

A review of supply chain management publications disclose a wide range of academic and industry interest, however the debate largely focuses on the utility, applicability and performance of supply chain management and construction practice. There are compelling reasons for the implementation of

supply chain management in construction. For example, given the significant levels of sub-contracting, the construction sector arguably epitomises key characteristics likely to benefit from the principles of supply chain management. Advocates of supply chain management are also keen to highlight significant commercial opportunities for greater integration, collaboration, trust, organizational learning and ultimately economic advantage.

However, within construction there are also enduring circumstances that arguably inhibit the development and diffusion of the supply chain concept (Briscoe and Dainty, 2005). It is often argued that supply chain management as practiced in construction is a laggard in comparison with practice witnessed elsewhere (Lonngren et al., 2010). However, to allude that the characteristics of the construction sector are comparable to the automotive industry, aerospace or retail is unjust (Green et al., 2005). As a result, the lack of contextual sensitivity “*leaves open the possibility of implied identity*” (Pinder and Bourgeois, 1982 p.642) and misleading generalizations.

Reliance in much of the work has been founded on an assumption that supply chain management practice in other sectors is transferable to construction. Indeed, it is the practice of supply chain management that provides the focus of attention for industry and academia alike. This assumption has largely squeezed out explorations and substantiation of supply chain management theory and how such theory connects with and can be used to interpret or reform and possibly even reflect and/or reinforce practice within organisations in the construction sector. Connecting and building theory of supply chain management with associated practice(s) of the construction industry would undoubtedly inform the wider academic and industry supply chain management forum.

## **4. Discussion**

Three areas of development arguably dominate the supply chain management and construction debate; conceptual immaturity, post-positivist models of research and editorial gatekeepers. First, conceptual immaturity relates to the lack of indigenous theoretical development. Second, post-positivist models of research refer to alternative research methodologies and finally, editorial gatekeepers highlight the key role academic journals play in sponsoring theory building development. The list of three developments in search of a theory is intended to be only suggestive, not definitive nor exhaustive.

### **4.1 Conceptual Immaturity**

Construction is a ‘compulsive borrower’ of theory, including supply chain management. Given the institutional pressure to comply with ‘construction best practice’, construction organizations seek supply chain legitimacy in a number of alternative ways. First, construction organizations may adopt the symbols and ceremony of established supply chain practice. Second, under duress to conform organizations may imitate industry competitors to reinforce their supply chain credentials. Theorizing is not dissimilar. By borrowing the ‘symbols’ and ‘ceremony’ of established theory, the legitimacy and expediency of proposed ‘new’ theory is customarily assured (Pinder and Bourgeois, 1982). Paradoxically, the commercial pressure to borrow both ‘the theory’ and ‘the language’ of supply

chain management especially as observed in manufacturing (Rimmer, 2009) and expedite to construction compromises the development of both 'local' theory building and research vocabulary.

Language is an significant product of research (Astley, 1984) and is fundamental to successful diffusion of discourse regardless of scientific domain. Often slight variations in linguistic phrasing appear non-consequential. However contrary to the notion of light-hearted semantics, the repeated use of metaphors is often skilfully calculated to seduce, resonate and frequently strengthen an often politically infused agenda with a carefully targeted audience. This is not a wholesale criticism of pressure groups, political or otherwise with a vested interest in a particular outcome. It is simply recognition that research language and especially the use of metaphor is a powerful and persuasive tool for the diffusion of supply chain management theory and practice.

The use of metaphors in construction management discourse has not gone unnoticed (Green, 2011). For some, metaphors greatly assist in bridging theory with practice (Prange, 1999). According to Prange (1999) the complexity of social action and interaction can be linguistically framed in figures of speech that will enhance the cognitive development and dissemination of a theory. However, the use of metaphors as a "*way of thinking*" (Prange, 1999 p.37) is also strongly contested. According to Pinder and Bourgeois (1982), repeated use of tropes, undetected or unchallenged will ultimately hamper theory building and severely hinder scientific progress.

The language of supply chain management and construction is not free from ambiguity. In construction the following expressions, 'supply chain management in construction' and 'construction supply chain management' are often used interchangeably to discuss concepts of supply chain management theory and practice. Given the subtle nuances, conflating the two expressions is unlikely at present to cause confusion or misunderstanding. However, it may also be argued that linguistic precision and framing is fundamental to the formation of a robust and coherent theory of supply chain management as applied to a construction setting.

Critically, it may be ascertained that supply chain management in construction is not synonymous with construction supply chain management. The former relates to the theory of supply chain management, founded largely upon principles of economics, law, organization and management studies (Carter, 2011). Writing about supply chain management in construction represents the study of supply chain management theory (as currently understood) applied to the construction arena. The latter, construction supply chain management relates specifically to the policies, procedures and practices of construction. Consequently, writing about construction supply chain management represents the study of construction (as currently understood) and the construction industry's unique translation and construal of supply chain management theory and practice. The lack of; clarity in expression, distinct discipline, relationships and prophecy (see Wacker, 1998) simply discloses key dimensions of conceptual immaturity.

## 4.2 Post-Positivist Models of Research

In research “*the validity or ‘truth’ in findings is paramount*” (Muncey, 2010 p.100). Typically, scientific validation involves a process of hypothesising and testing using deductive research methodologies. However, contrary to the dominant deductive research strategies (Orton, 1997) favoured in construction, alternative inductive methodologies “*start from the position that our knowledge of reality...is a social construction by human actors and that this applies equally to researchers*” (Kaufmann and Whu, 2011 p.64). According to Fawcett and Waller (2011 p.3), “*switching from deduction to induction may bring new light and perspective to common problems and widely accepted theories*”. Given that theorists often “*write trivial theories because their process of theory construction is hemmed in by methodological strictures that favour validation rather than usefulness*” (Lindblom, 1987 p.512), a methodological correction in the study of supply chain management and construction would arguably stimulate critical debate and newfound research opportunities.

However, to suggest positive discrimination to advance theory building in construction is likely to provoke deep-seated tensions between advocates of logical positivist research strategies and supporters of reflexive, post-positivist research methodologies (Wing et al., 1998). Thomas and James (2006) caution against the unscientific practice of squeezing a reluctant post-positivist narrative into a positivist canon of verification. However, despite the often entrenched position of academics and researchers alike it is arguably justifiable to have very clear but separate expectations of both theoretical paradigms.

One of the first major methodological attempts at analysing and explaining socially constructed processes in explicit theoretical and empirical statements was grounded theory (Wertz et al., 2011). Grounded theory is described by Fellows and Liu (2003) as the discovery of theory systematically acquired via social inquiry ‘grounded’ in data collection. Although grounded theory is only one of many theory building methodologies, a summation of grounded theory arguably reflects the typical tensions and disquiet evoked within the research community (Bryant and Charmaz, 2010b).

Reservations of grounded theory’s epistemological integrity dwell primarily the iterative-inductive approach to generating so-called ‘scientific’ data. Often judged as largely intuitive by research conformists, they contest grounded theory methodology deviates beyond acceptable boundaries of objectivity, validity, and pragmatism (Astley, 1984). Notwithstanding repeated criticism, over the years grounded theory has established a positive reputation especially within the social science disciplines of education and health (Mills et al., 2006). Proponents argue if carefully managed with a research discipline and rigour characteristic of the traditional positivist doctrine, grounded research and by extension post-positivist, reflexive research strategies may illuminate a highly contextualized interpretation (Fawcett and Waller, 2011) currently beyond the scope of logical positivist methodologies. In addition to clearly defining the scope and expectations of different research strategies, a ‘good’ theory requires access to an audience.

### 4.3 Editorial Gatekeepers

Searching for a theory not only requires participation, encouragement and a range of alternative research methodologies, crucially it also requires sponsorship. In this respect, academic journals, their editorial boards and reviewers all have a key role to play. As gatekeepers of academic rigour and standards, they have the power of censorship (Holt, 2003). Consequently, without the support of enthusiastic journals and reviewers sympathetic to theory building and largely inductive research methodologies, the search for a developed theory of supply chain management in construction is likely to remain vague and arguably undervalued. Given the methodological tensions, the challenge for potential sponsors of theory building is to uphold academic rigour on the one hand and simultaneously encourage inventiveness on the other.

Academic journals justifiably set stringent criteria for publication. The establishment and compliance of both academic rigour and relevance is core to a journal's reputation and standing within the research community. However interpretation of rigour and relevance is undoubtedly influenced by the personal beliefs and bias held by individual reviewers, who act collectively on behalf of the journal as academic gatekeepers of standards and ethics (Ketchen and Hult, 2011). Conversely, in an increasingly post modernist society "*it is surely incumbent on the gatekeepers of research to share perspectives on a variety of research methodologies, styles and representation, and evaluate criteria, rather than privilege the authority of dominant viewpoints*" (Holt, 2003 p.26). As a result, editorial guidance has a central role to play. As potential 'sponsors' of theory building', special issues in particular represent an ideal medium for academic journals and suitably skilled reviewers to encourage participation, share perspectives and ultimately craft new theory.

A review of established construction management related journals disclose limited interest in the notion of theory building. With the exception of a special issue of Building Research Information (Koskela, 2008), theory building in the built environment remains marginalized. Without progressive editorial sponsorship and sympathetic reviewers, the development and diffusion of supply chain management in a construction context will remain hampered and ultimately devoid of a robust and coherent intellectual foundation.

## 5. Recommendations and Conclusion

Despite growing academic and construction industry interest (O'Brien et al., 2009), the theoretical understanding and practice of supply chain management continues to reflect concepts and case studies rooted elsewhere. The borrowing of supply chain management theory and language is arguably an instrumentally driven response to resultant environmental challenges. It is not beyond doubt that adopting the language and metaphor of alternative theories provide academic legitimacy and expediency (Pinder and Bourgeois, 1982). Both qualities are valuable endorsements in an increasingly competitive research marketplace. However, compulsive borrowing of theories complete with language is arguably hampering the maturation of supply chain management theory (Carter, 2011) as applied to the construction industry.



Supply chain management in a construction context is repeatedly expected to mirror performance levels observed in other industries, most notably manufacturing. However, industry efforts to replicate the efficiency and effectiveness of manufacturing, not just in terms of supply chain management practice but also in more general terms "*continue to generate significant differences between expectations and results*" (Fernandez-Solis, 2008 p.43). Given the almost systemic disappointment in supply chain performance, endorsement of theory building in construction management research may help 'plug' the conceptual gap between theories borrowed and the daily realities of construction practice.

Shifting the academic gaze away from theory testing towards theory building requires both strong leadership and an adjustment of research values. To encourage theory building contributions it may therefore be appropriate to purposefully disaggregate theory from practice. This avant-garde approach directly challenges the 'taken for granted' evolution of theory development to industry practice as a core ambition of scientific research. However, temporarily decoupling theory building from the shackles of a research orthodoxy rooted in 'hard facts' as opposed to searching for scientific truths, may promote theory building as a valuable and worthwhile scientific contribution in its own right (Astley, 1984). If the theory is interesting, plausible and sparks an intellectual curiosity, verification will follow and eventually so will practice.

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