# Construction Supply Chain Economic Policy Implementation for Sectoral Change: Moving beyond the Rhetoric

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Construction sector policy makers have the opportunity to create improvements and develop economic, social and environmental sustainability through supply chain economics. The idea of the supply chain concept to improve firm behaviour and industry performance is not new. However there has been limited application and little or no measurement to monitor successful implementation. Often purchasing policies have been developed with sound strategic procurement principles, but even these have had limited penetration into the processes and practices of infrastructure agencies. The research reported in this paper documents an action research study currently being undertaken in the Australian construction sector which aims to explore supply chain economic policy implementation for sectoral change by two government agencies. The theory which informs this study is the emerging area of construction supply chain economics. There are five stages to the project: demand analysis, chain analysis, government agency organisational audit, supplier strategy and strategic alignment. The overall objective aims towards the development of a supplier group strategy map for two public sector agencies. Two construction sub-sectors are examined in detail: construction and demolition waste (C&DW) and pre-cast concrete (PCC). Both of these sub-sectors are critical to the economic and environmental sustainability performance of the construction sector and the community as a whole in the particular jurisdictions. The local and state government agencies which are at the core of the case studies rely individually on the performance of these sectors. The study is set within the context of a sound SPP that has, however, had limited application by the two agencies. Partial results of the study are presented and early findings indicate that the standard risk versus expenditure procurement model does not capture the complexities of project, owner and government risk considerations. A new model is proposed in this paper which incorporates the added dimension of time. The research results have numerous stakeholders; they will hold particular value for those interested in regional construction sector economics, government agencies who develop and implement policy and who have a large construction purchasing imprint, and the players involved in the two sub-sectors. Even though this is a study in Australia, it has widespread applicability as previous research indicates that procurement reform is of international significance and that policy implementation is generally problematic.

**Keywords:** supply chain economics, policy analysis, action research, policy implementation.

## INTRODUCTION

The improvement of the performance of the construction industry through the improved performance of the supply chains that make up the various sectors is a difficult task and one that has been subject to considerable international debate (London, 2005). The idea of using the supply chain concept as a normative model to improve firm behaviour and thus ultimately industry performance through the development of supply chain clusters or integrated supply chains has been discussed in many public sector policy documents and in the academic research community since the late 1990s (London, 2005). However, it has been difficult to see any real examples where this concept has had any major impact, or where the improvements have been measured and/or monitored.

Governments have always understood their role as a key purchaser and the impact that they can have on firm behaviour in an industry. Procurement and purchasing policies with sound principles have been developed. However, one of the greatest difficulties is the lack of implementation of these policies in the construction industry. Many of these policies focus particularly on supplier management, which is a very useful first step. However, there is still a lack of understanding of the interdependency between firms and the role that the interrelationships between firms have on the overall performance of the industry. Deep structural and behavioural change is about large groups of firms and not simply the first tier of suppliers who supply to the government.

Governments can, however, play a significant role in changing the structural and behavioural characteristics of industries through the use of the supply chain concept - even if to date it has had limited understanding, support or implementation. But this then raises three key questions to consider in relation to industry performance and productivity:

- How do we develop sector productivity and innovation performance through existing structural and behavioural characteristics in an industry with a large number of interdependent firms?

- What role does the government play in improving sectoral performance as both a large client and a regulator or policy maker?

- What are the difficulties related to public sector policy development and implementation?

The empirical study described in this paper involves two detailed case studies clustered around two major industry players: a state government infrastructure agency and the largest local government infrastructure agency in Australia. This paper discusses their interactions with the various players in the two sectors to explore the three key issues highlighted above. The general research question that the study addresses is:

*How do public sector clients develop sustainable supplier group strategy maps?*

A supplier group strategy map is the approach that construction industry policymakers and procurers of capital works public sector clients undertake to achieve sectoral change to develop sector productivity and innovation performance. The development of a supplier group strategy map for the C&DW

and PCC supply chains will result from five key activities: demand analysis, chain analysis, strategic alignment, supplier strategies and organisational audit.


**Fig. 1: Five stages towards the development of a supplier group strategy map.**

The underlying assumption within the study is that groups of firms in sectors have a degree of influence over each another and it is this interdependency between the client and suppliers at various tiers that can improve or hinder the overall performance of the industry. However, governments have little real awareness of the intricacies of these interdependencies. This paper reports the preliminary findings of the study, which attempts to reveal clients' perspectives of the respective sectors and of themselves. The study is an action research study and as such has begun to raise even deeper research questions worthy of future study. Our early data collection involved the research team developing an understanding of the sector and the agency's involvement in the sector. The research team also began to expose issues to the agency about themselves that they were unaware of – issues that they should address if they are to be serious about policy development and implementation and market intervention.

The paper is outlined as follows:

- Brief outline of the context of the problems related to the C&DW and PCC sectors.
- Brief discussion on construction supply chain economics theory and an outline of the difficulties related to policy implementation.
- Discussion of the difficulties related to the implementation of the risk versus expenditure procurement model.
- Conclusions and implications for sectoral change and future research.

## CONTEXT

The underlying theme of the investigation is economic sustainability towards productivity and innovation performance. A literature review previously conducted for the study has identified that worldwide there have been many policies, initiatives and programs developed in the past two decades that in some way could contribute or impact upon the economic sustainability of the C&DW and PCC sectors, and the environmental sustainability of the built environment (London & Chen, 2005). In particular, purchasing procurement guidelines have been developed in the state under investigation. This approach takes an economic perspective towards suppliers – not specifically a holistic or sector-wide supply chain perspective.

Efforts to encourage improved performance and productivity in the two sectors through the implementation of various initiatives, programs and policies by numerous governments and interest groups globally appear to have had minimal success. There needs to be a holistic understanding of the structural and behavioural characteristics of all players and of the nature of linkages between the supply chains for the successful implementation of policies related to improving the performance and productivity of the desired specific sector. The success and areas where further improvement could be made in these types of purchasing policies need to be explored in detail, as they represent a positive way forward. Therefore it is proposed that a public sector supply chain economics approach can lead to enhanced performance in various markets, including the C&DW and PCC sectors. The following section will provide a brief consideration of the supply chain concept from an industrial economics perspective.

## SUPPLY CHAIN ECONOMICS THEORY

The supply chain is the firms involved in upstream and downstream contractual relationships, who deliver a commodity (product and/or service) related to the core business of a construction project. The supply chain, once formed, creates a flow of commodities, cash and information. The creation of the supply chain is impacted upon by the location of the individual firm within its competitive market, which has unique economic, structural and behavioural characteristics. The upstream and downstream linkages are affected by the nature of these markets and then by the countervailing power, which occurs between subsequent markets at adjacent levels in the chain (London, 2005).

The supply chain management concept has gained the interest of the construction research community and policymakers through its successful implementation by manufacturing sectors to resolve firm performance problems. The general approach towards supply chain management to improve industry performance has been through either of the following two types (London, 2005):

- normative models: based on the assumption of a homogenous industry, but one which is fragmented and composed of numerous small to medium-sized firms.

- positive models: accepts that the industry is specialised and heterogenous with varied structural and behavioural characteristics across individual markets.

Whilst it seems that policymakers are seeking positive economic models, existing policies are not based upon an explicit understanding of the nature of the varied structural and behavioural characteristics of the industry. According to London,

> *the greatest difficulty with supply chain management in terms of construction research theory and practical application is that currently too little is known about the structural and behavioural characteristics and how to describe them* (2005).

London (2005) developed a positive economic model to aid mapping industry structural and behavioural characteristics which will be used for this study. The model was tested in seven major sectors, which did not include PCC and C&DW. Whilst it served to highlight structural and behavioural characteristics, the model did not explicitly align this with performance measurement across entire sectors. The present study builds upon this to describe and map the underlying structures

and behaviour specific to the C&DW and PCC market sectors in order to develop an innovative supply chain management strategy for government. It attempts to explore ideas about the government's role in economic sustainability of sectors at a much deeper level.

The supply chain concept has long been considered an important idea for public sector governance; however it has proven difficult for all governments globally to implement. There have been varying levels of supply chain management policy development and implementation across various jurisdictions, whereby examples of good public sector supply chain management policies have already been developed. However, this has had limited success in the construction sector. Existing literature has identified that policies often do not translate into practice, and as a consequence may not lead to the achievement of intended policy outcomes. The next section will identify some of the difficulties associated with policy implementation as revealed by literature.

## BARRIERS TO POLICY IMPLEMENTATION

Most existing literature surrounding the field of public policy has focused on the theory related to the development, implementation and evaluation of policy. However, less research has been performed to determine the factors that help or hinder the implementation of innovative policies, processes and practices in real world environments (Wilkinson, 1997). Most theoretical models of the policy process are largely based on the assumption that the organisations or government agencies responsible for implementing policies have simple machine-like characteristics; ie. their actions are rational and there are simplistic chains of cause and effect (Ryan, 1996; Wilkinson, 1997). There is a failure within these models to recognise that in actual practice, government agencies do not necessarily implement policies based on these strictly rationalised models (Goggin *et al.*, 1987; Mazmanian and Sabatier, 1989; Goggin *et al.*, 1990).

The key barriers to the successful implementation of policies in the real world environment that have been identified in the literature include:

- Conflicting objectives and directives at different levels of government, agencies and/or implementing actors (Pressman and Wildavsky, 1973; Gunn, 1978; Anderson, 1994; Fenna, 2004; Bridgman and Davis, 2004).
- Limited competence (Fenna, 2004).
- Insufficient resources (Anderson, 1994; Fenna, 2004).
- Incomplete specification (Patton and Sawick, 1993; Fenna, 2004).

The present study is set within the context of a State Purchasing Policy (SPP) that has had limited application by the two agencies at the core of the case studies: Brisbane City Council (BCC) and Queensland Department of Main Roads (QDMR). The real issue proposed is that the SPP is well grounded in principle but is difficult to translate to situations (including the construction sector) where there are particularly complex and historical procurement scenarios that have been solved by those agencies in one form of another for decades.

Therefore there is a need in this action research study to examine the following:

- The extent of the relevance of the four key impediments highlighted previously to effective policy implementation.

- The concept of the 'transition space'; ie when policy is developed by one agency and then implementation is taken up by another specialised agency.

Towards this end, a process model for policy implementation is proposed for the development of a supplier group strategy map for the property and construction sectors - in particular the two sectors which form the case studies. This will be undertaken through an explicit, detailed exploration of the structural and behavioural characteristics of the two sectors. As highlighted earlier, an action research methodology is adopted, working with government agencies to evaluate the supply chain policy implementation process model to achieve economic sustainability. The proposed integrated model (London and Chen, 2006a) attempts to address the problem of high-level policy being developed without due consideration for the complex realities of the real world practice, in relation to markets that government agencies have to engage with in an iterative manner when attempting to implement the policy (see Figure 2).

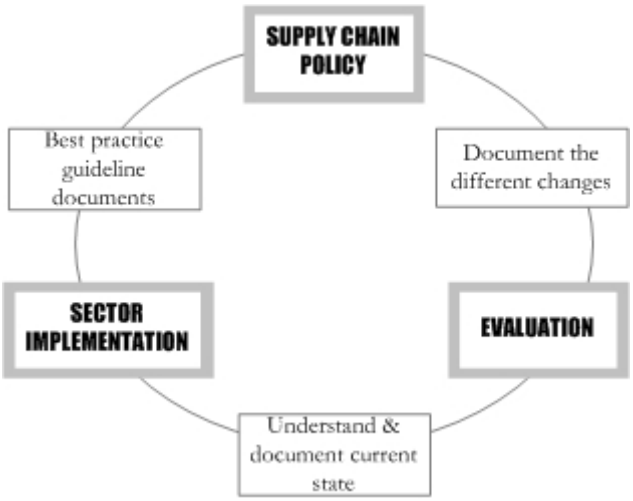


**Fig. 2: Supply chain policy implementation process model.**

The following section will discuss the preliminary findings of the study, which have resulted from analyses of the SPP documents and interviews with the two case study agencies intended to implement the policy. A comprehensive coding of the various themes that have emerged from the various interviews and document analyses has been completed and this study's report represents a 'snapshot' of the results to date.

## DISCUSSION

A previous document analysis (London and Chen, 2006b), performed on the State Purchasing Policy (SPP) as part of this study, demonstrated that it is a comprehensive and fairly harmonised policy with sound principles in relation to both its process and content. Perhaps the key gap of the policy is the lack of real examples where the policy has been implemented successfully within the construction industry. Further to that, an interview was conducted with the SPP group, who has been heavily involved with the development and implementation of the policy. The aim of this interview was to identify successes the group has had in relation to the implementation of the policy directly into any sectors in the construction industry. The interview highlighted that the SPP implementation has been problematic in the two case study organisations and the related sectors

under investigation. It also further confirmed that there have been no real examples or case studies where the policy has been implemented, documented or monitored explicitly.

This is in no way a reflection on the policy and, indeed, the present study builds upon the principles of the policy. It is, however, validation of why the present research is useful: the SPP is a comprehensive and sound policy but why has it not had wider penetration in the two sectors and agencies? The following section will now discuss the difficulties, as identified by the staff members within the agencies intended to implement the policy. This will be examined in detail through a focused discussion on the problematic standard risk versus expenditure procurement model suggested for use in the SPP.

## DIFFICULTIES WITH IMPLEMENTATION OF RISK VS EXPENDITURE MODEL

To shed light on the problematic standard risk versus expenditure procurement model, findings from a facilitated workshop held with Queensland Department of Main Roads (QDMR) internal staff members will be discussed. The staff members present at the workshop included a senior policy manager, two senior engineers and one inspector. Participants were shown a procurement management tool often used by organisations to map the levels of risks associated with key players within a sector to develop relevant supplier strategies in relation to purchasing and/or selling (see Figure 3). This tool is also suggested for use by all government agencies and departments in Queensland in the SPP:

*using a procurement management tool called supply positioning, goods and services are plotted according to their relative expenditure and difficulty in securing supply. This is a good way to determine where the procurement effort should be focussed in the Corporate Procurement Plan for the year* (Queensland Government Department of Public Works, 2001).

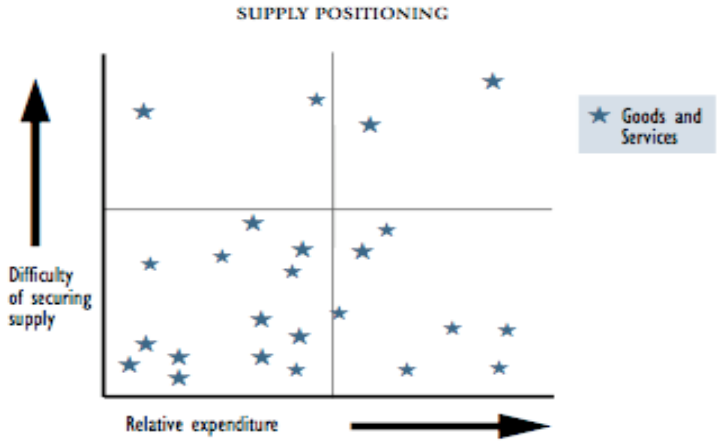


**Fig. 3: Standard risk vs expenditure tool suggested for use in the SPP (QDPW, 2001).**

The manner in which the participants reacted to the procurement management tool suggests that the tool is too generic; therefore its applicability is not suited to the different characteristics of players within the construction industry, including the pre-cast concrete sector (PCC). As a result the tool, in its existing condition, appears to be of little use to the agency as it does not take into account the specialised characteristics of the sector and the complexities of the agency's roles with the associated risks. As such, the participants dismissed the entire

policy, the policy manual and the agency that had developed it. Our discussions in the workshop then progressed to what was wrong with the tool and how it could be enhanced. Contributions were particularly useful from the senior engineer and they are highlighted in the following text.

The positioning of the agency within the supply chain adds a layer of complexity to the risk dimension, as demonstrated by the reactions of the participants:

*"There's long-term risks and short-term risks. With a pipe, there's the short-term risks where if the pipe doesn't fit then we could just get another one and refund it…then there's the long-term risk where if in 20 years time the pipes are no good then we've got to dig it up and put in a new one." (Senior engineer 1)*

*"Because of where we sit in the industry and on the supply chain…We're not just buying or selling, we're buying, building and owning…so there are different levels of risks…" (Senior engineer 1)*

Key themes emerged from the data analysis, including the added dimension of risk related to time. Figure 4 was developed in response to this, illustrating long-term risk versus short-term risk related to time:

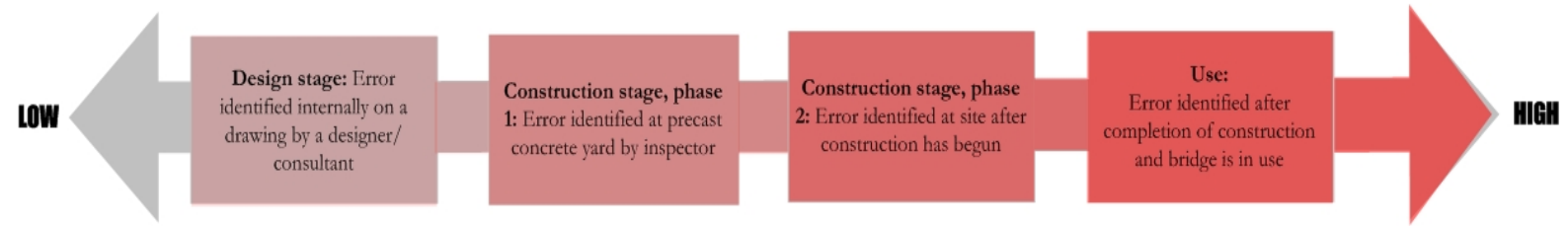


**Fig. 4: Risk-time-expenditure spectrum.**

More specifically, regarding the use of the tool it was highlighted that it could perhaps be modified through a closer examination of the risk dimension:

*"I'm just wondering if there's another dimension to the risk part of it…as an owner, there just may be another dimension to it…may be it needs to be tailored to this particular project…" (Senior engineer 1)*

The quote clearly demonstrates that implementing agencies require solutions that are specific to the problems of the respective sectors. The understanding of sector specificity is largely absent from the broad objectives of the agency/department that develops the policy. In other words, for the effective utilisation and implementation of policies there is a need to 'tailor' policies. When the agency that had developed the policy was interviewed, a clear desire emerged to assist and develop deeper penetration of the policy into the particular agencies that were core research participants. The agency which had developed the policy could not cite any successful implementations of this purchasing policy across the entire state in the property and construction industry, and yet it is the bulk of government sector purchasing activity. This, in turn, requires a greater understanding of the characteristics of the implementing agencies and sectors for increased specifications to elements, such as the standard risk vs expenditure tool (refer to figure 3) and alignment of objectives at different levels of government, between the agencies developing and implementing the policy. Despite the good intentions of the objectives stated within the SPP of "advancing government priorities, achieving value for money and ensuing probity and

accountability for outcomes" (Queensland Government Department of Public Works, 2001), it does not capture the specific objectives of QDMR in relation to the PPC sector, which is quite focused towards achieving a good quality product that "lasts a 100 years":

*"Most of the industry's focus is always on the short-term, can we build it fast, make more money and get it done quicker. Whereas when it comes to concrete structure by cutting off the hydration process you're making something that lasts a 100 years last 50 years because you didn't do it right to start with." (Senior engineer 2)*

These findings also suggest that whilst these staff members have a very good understanding of the issues related to the PCC sector through a long history of working in the sector, they lack the required knowledge and skills related to implementing the policy in question.

The following diagram is a preliminary conceptual diagram relating the three key dimensions of risk, expenditure and time. An agency has a certain level of expenditure in relation to different segments of the PCC sector (categorised as high, medium or low) and the risk of failure in relation to the supply of that item is also high, medium or low. The matrix then provides four segments and they are often referred to as tactical purchasing (low expenditure/low risk); leverage (high expenditure/low risk); strategic security (low expenditure/high risk) and strategic critical (high expenditure/high risk). We can located suppliers in one of the fours segments but over time this can shift. This 3-dimensional matrix then needs to be considered in relation to a project, client or government risk. The most significant point is that risk and expenditure may change over time, and therefore there is a risk and expenditure trajectory.

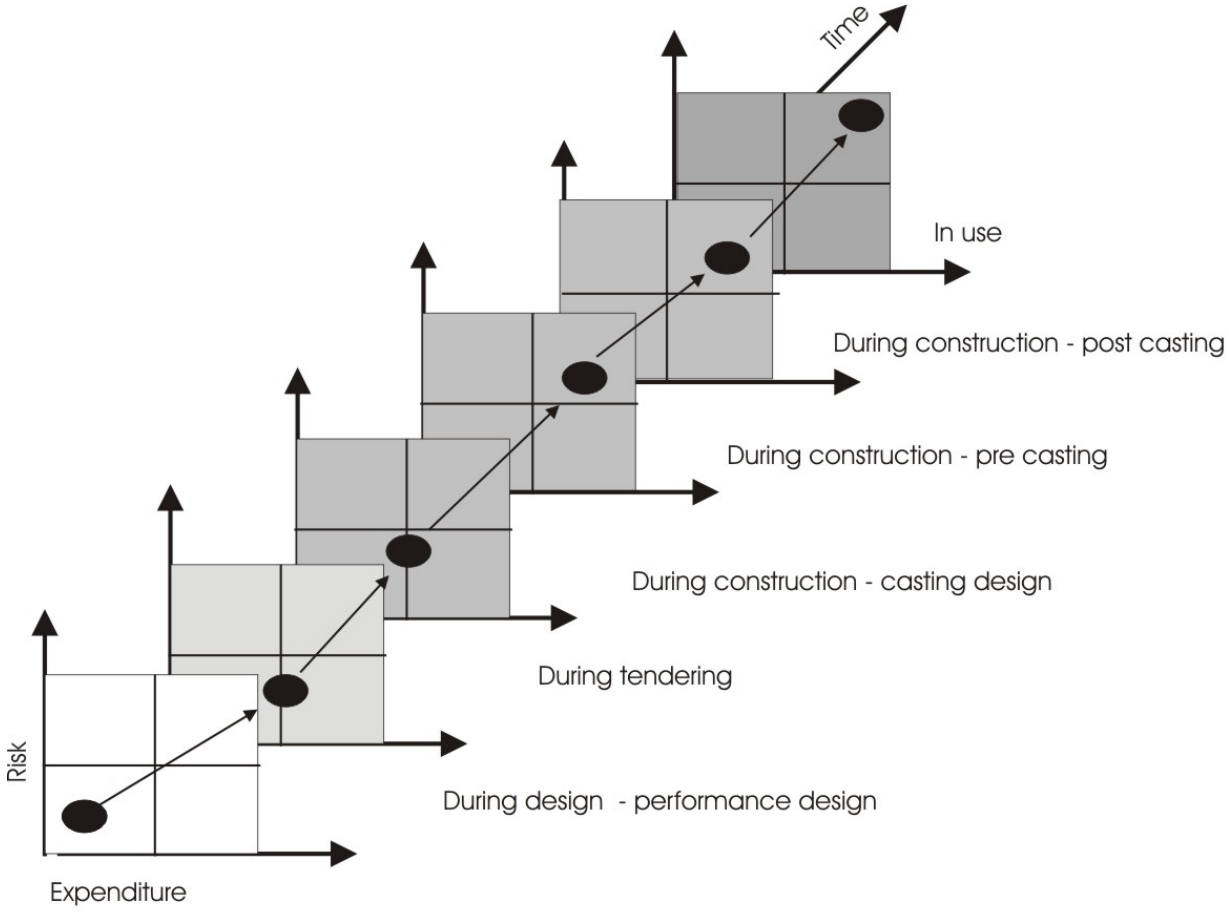


**Fig. 5: RET Trajectory**

## SUMMARY

In summary, findings suggest that the standard risk versus expenditure procurement model suggested for use in the SPP is of little use for the implementing agencies. This is because it does not capture the complexities and specialized nature of the agencies, nor in the case of the analysed case study agency, QDMR, the project, owner and government risk considerations. It is proposed that a new model needs to be developed which incorporates the added dimension of time.

Even though the standard model examined only represents one element within the SPP, it is suspected that the problems associated with this element are largely representative of the underlying reason for which the policy is not being implemented. In summary, the early findings of this action research study have demonstrated the relevance of the four key barriers to effective policy implementation as revealed in literature. Analysis has confirmed that the lack of implementation of the SPP by the two case study organisations can be related directly to the four key impediments identified.

# CONCLUSIONS & RECOMMENDATIONS

It can be problematic when the policy is developed by an ‘whole of government’ generic agency and then needs to be translated into an implementation policy by a specialised portfolio agency. That difficulty has been defined as a ‘transition space’ in this study. A lack of understanding of both worldviews inhibits the adoption of new policies for complex scenarios by construction policymakers.

For the effective penetration of a policy into specialized sectors, it is has emerged that generic policies need a greater level of sophistication to have any impact. Property and construction industry policymakers and procurers of capital works have little regard for tools that do not have direct applicability and do not reflect the underlying structure and behaviour specific to the implementing agencies and the associated sectors.

The recommendations at this stage are that an explicit recognition of the transition space for policy implementation would require the following:

- Directly applicable guideline documents.
- Directly applicable tools related to the specific agency.
- The identification of roles to develop policy implementation strategies, tools and techniques which are meaningful and context specific.

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