Remodelled and Restyled e-Procurement – New Power Relationships Down Under

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Abstract: This paper analyses the way in which a major public sector organisation undertakes its high tech e-procurements and its power relationships at the interface with its private sector suppliers. This is undertaken by examining the corporate governance of significant high tech e-procurements by the Australian Department of Defence. Comparative case study data of 106 e-procurements were undertaken by the author over the key client development period from concept to contract award, with a view to determining 'best practice' e-procurement process. The best practice model links technological developments with e-procurement power frameworks, and provides a public sector client with knowledge to realize new power relationships at the public/private interface through the remodelling and restyling of its e-procurement arrangements.

Keywords: e-governance, e-transactions, e-procurement, e-transparency, e-trust, e-project management

1. Introduction

Public sector organizations spend billions of dollars procuring products when implementing their concepts and strategies. The Australian Department of Defence (Defence) is no exception. The Australian DoD is a Federal Government Department with a FY 2007/8 spend of AU$23.4bn on products (goods and services), their support and maintenance, from almost every industry sector, on a global basis. Defence land, sea and air capability e-procurements are highly complex and technically sophisticated. The Department is the leading and most experienced public sector procurer of high tech capabilities in Australia. However, such high tech capabilities are often not able to be completely, clearly or satisfactorily defined at contract award – there often remain many unknowns. This leaves a public sector organization such as Defence vulnerable to misunderstandings, failure to achieve perceived outcomes, and vulnerable to contract claims. A client supplier relationship can deteriorate rapidly in this environment. But it is during the pre-contract award period that a public sector client organization such as Defence has the most power to orchestrate its required outcomes so as to lessen the likelihood of future poor outcomes. The paper aims to analyse Defence e-procurement pre contract award to provide a basis for consideration by other public sector organisations interested in remodelling and restyling their e-procurement power relationships with providers.

2. Unit of analysis

The unit of analysis selected is the transaction. While transactions may differ in attributes, they differ in their cost and competence, and so provide a comparative measure of their economy (Williamson, 2002b). The Defence e-procurement process is undertaken on a whole of life basis, from concept to contract award, thence to contract management to completion, bringing the product into service, and finally to exit of the product from service (Figure 1).

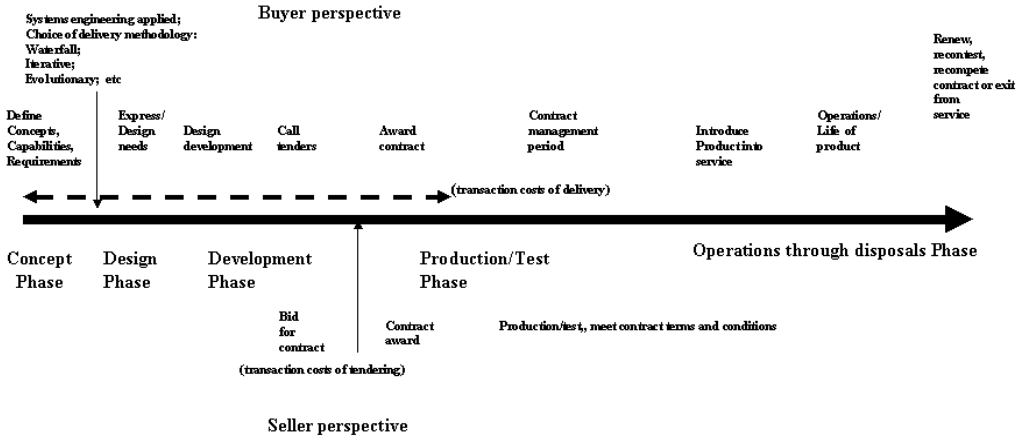

Figure 1: The defence 'through life' e-procurement governance process

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3. The public sector organisation as a governance structure

A public sector organisation such as Defence is reconceptualized 'as a governance structure' (Williamson 2002). Defence e-procurement governance structural arrangements are complex. They are project based within a matrix organization, which itself resides within a divisional structure. Divisions are then grouped within functions. While this governance structure appears complex, it is surprisingly flexible, adaptive and responsive. Emphasis is placed on concept, strategy and capability development, which involves significant research and development. For a major defence capability such as a submarine, ship or aircraft, it can take from ten to fifteen years or more to progress from concept to contract award, and similar periods from the start of a contract to its completion. There has however been a significant functional organizational gap between the concept phase and the design and development phases which has caused, and continues to cause, Defence governance concerns. This is because some of the intellectual property developed during the concept phase is lost in the transition across functions to the design and development phases. As a result of this loss of knowledge, there is also loss of power at the interface with prospective suppliers - 'doctrina vim promovet' – learning promotes strength (Horace 13BC).

4. Transaction cost economics relies on competition to sort between modes of governance

Transaction cost economics operates in many alternative modes of governance - markets, firms, bureaus, and has an effect on the strengths and weaknesses of each (Williamson 2002). It relies in a general way on competition to perform a sort between more and less efficient modes of governance (Williamson 2000). Thus, Defence as a public sector organization uses its power to choose competition to 'perform the sort', with some protection of the choices of supplier made by Defence being provided by 'selection of the fittest' supplier to survive in a particular environment (Darwin 1859). But this subscribes to a weak-form of selection since 'in a relative sense, the fitter survive', so 'there is no reason to suppose that they are fittest in any absolute sense' (Simon 1983, p. 69).

The basics of Williamson's (2002) model are the attributes of the transaction, the possible modes of governance and the purposes they serve. For Defence, the attributes of the transaction apply to the completeness of the specification of the required capability, made difficult or impossible at contract negotiation and award because of rapidly developing technologies in a turbulent environment (Emery and Trist, 1965). There are many possible modes of governance serving different purposes, but which will serve Defence best? Emery and Trist (1965) and Myer, Goes and Brooks (1993) assert that in turbulent environments, individual organizations however large, cannot cope successfully in isolation but must establish cooperative relationships. Cooperative relationships between Defence and a supplier rely upon Defence, as the client, to be able to maintain the balance of power in the contractual relationship. This requires both parties to be knowledgeable, responsive and trustworthy, and to contractually rely on bilateral dependency expressed through a mutually equitable contract. But is this achievable? Incentive intensity, administrative control, and contract law define a governance structure where markets and hierarchies differ (Williamson 2002). Defence chooses markets, where competitive and incentive intensity is greater, administrative controls are less and hence Defence transaction costs are less, but dispute resolution can mean the expense of going to court (Williamson 2002b). Going to court is a rare occurrence because it can be unpredictable and very expensive. Also, suppliers do not wish to lose Defence or other's patronage as a result of being perceived to be litigious.

Capability developments build and deepen capability specificity over time (Williamson 2002). But complete capability specificity at contract award is difficult if not impossible because of the nature of high tech Defence capability requirements and the hyper turbulent technological environment in which these are currently taking place (Figure 2).

Transactions align with governance structures in an economizing efficient way - the governance branch of contract differs from the incentive branch (Williamson 2002b). Defence prefers the incentive branch to the governance branch, concentrating on contractual incentives with respect to adaptation, cooperation and reward during contract implementation (Williamson 2002). Incentives are used by Defence to lower its governance and administrative transaction costs, to maintain cooperative relationships, and to minimize supplier's rent seeking activities (Smith 1776).

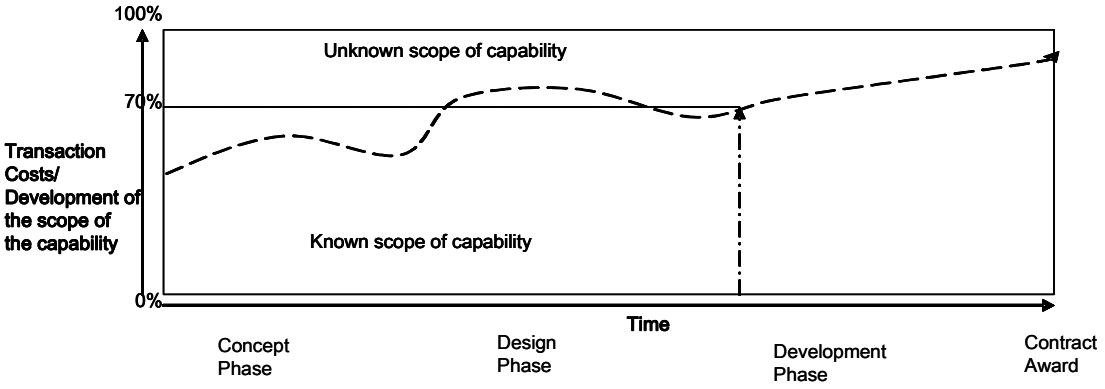

Figure 2: Known/unknown transaction costs/development of a capability over time

5. Concept, design and development phases account for 20% of a capability's life cycle costs

The firm as governance approach (Williamson 2002) maintains that capability delivery structure arises mainly from 'economizing on transaction costs'. This approach appeals to law and organization theory in use of incentive intensity, administrative control, and contract law regime as three critical attributes (Williamson 2002) in the development of capability. Research indicates that the concept, design and development phases account for twenty percent of the cumulative percentage of a capability's life cycle costs; that the transaction costs to extract defects increases considerably with time; and that the concept and design phases commit seventy percent of costs with the development phase adding a further fifteen percent to committed costs (Figure 3). According to this research, the most important phases are those pre contract award ie the concept, design and development phases, because if these are poorly done, the transaction costs to extract defects are significant. This becomes complicated and risky where the complete scope of an asset cannot be specified prior to contract award.

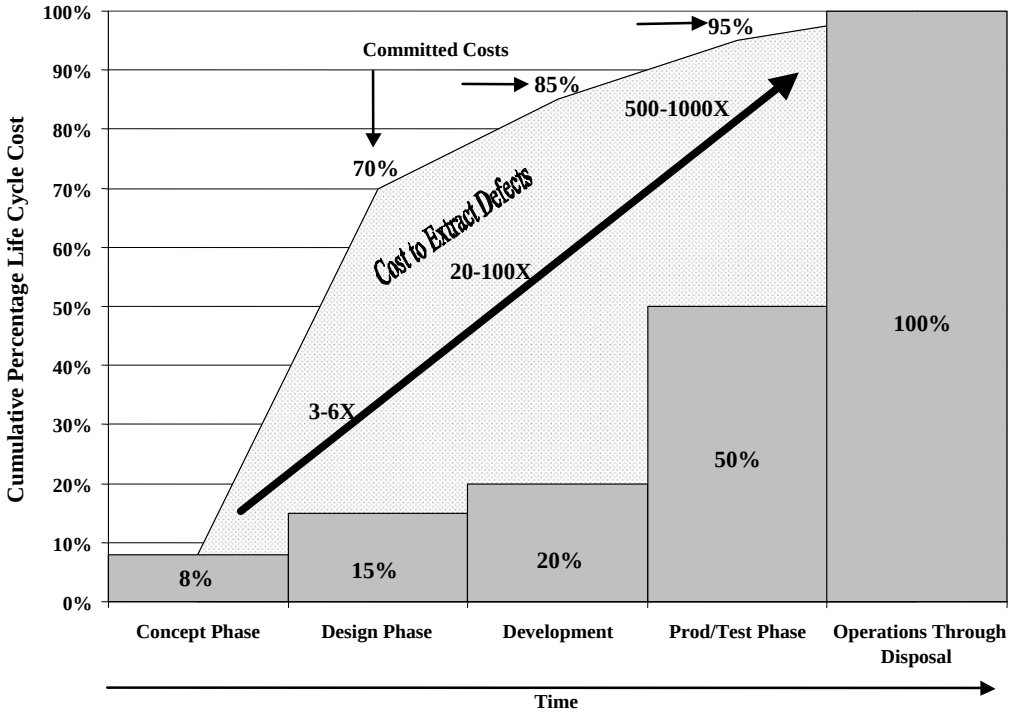

Figure 3: Cumulative percentage life cycle costs over time

Source: Sturgess, J., 2008, 'Defense Systems Management College 9/93', in 'DoD SW Engineering S&T', Lockheed Martin Corporation)

6. Incentive intensity and alignment

For Defence, a fundamental difference applies to that subset of e-procurement transactions for which large numbers of qualified suppliers are, over time, transformed into small numbers of suppliers prior to contract or at contract renewal. For Defence, the identity of suppliers is important where continuity of the relationship may have significant transaction cost and other consequences. The key factor is whether a transaction involves specialised investments. Defence specialized investments may be physical, human, site specific, dedicated, intellectual property, security, technology, capital assets, or many others. Suppliers to Defence are vulnerable in that Defence cannot easily turn to alternative sources of supply, and suppliers can redeploy specialized assets to their next best use or user only at a loss of productive value (Klein, Crawford, and Alchian, 1978). Defence contracts include powerful penalties for premature termination, information disclosure and verification mechanisms, specialized dispute settlement mechanisms, and the like. While unified Defence ownership (vertical integration) may well be theorized as contract risks increase (Williamson 2002), this is not an option for Defence because of a history of poorly performing and inefficient ('make') State owned enterprises, which have now been closed down. These are unlikely ever to be reconstituted.

7. The power of adaptation, cooperation and reward

Continuity of relationships are a necessary part of the e-procurement of specialized Defence procurements from the marketplace. For commodity purchases from the marketplace, Hayek (1945) emphasized 'spontaneous' adaptation through markets. Barnard (1938, p4) emphasized cooperative adaptation of a 'conscious, deliberate, purposeful' kind for specialised investments. Transaction cost economics makes provision for both (Williamson 1991a,b). These approaches enable Defence commodity purchases (low value, high volume) to be 'spontaneous'. These can be differentiated from its 'conscious, deliberate, purposeful' procurements (high value, low volume). Identification of these different transactions is shown in Table 1. 'Conscious, deliberate, purposeful' procurements of AU$2,000 or more represent less than 20% in number but more than 80% by value (Pareto 1897), when compared to 'spontaneous' commodity item purchases. Table 1 provides details of two of the seven financial years captured in an e-procurement data base developed for this purpose (Thomson 1996).

Table 1: Value and number of transactions

	Value Bracket of Procurements	FY 1 No of Transactions	FY 1 Value (AU$m)	FY 2 No of Transactions	FY 2 Value (AU$m)
1	$150m and over	4	1404	2	1515
2	$100m to 150m				
3	$50m to $100m	3	178	4	306
4	$20m to $50m	7	195	6	187
5	$10m to $20m	18	241	12	177
6	$5m to $10m	28	191	28	197
7	$1m to $5m	193	395	253	549
8	$100k to $1m	2221	590	2205	583
9	$30k to $100k	4746	250	4410	231
10	$2k to $30k	43769	327	42035	309
11	Less than $2k	150,000-200,000	50 est	150,000-200,000	50 est
12	Total > $2k	50,989	3,768	48,955	4,054

Source: Thomson, JD. 1996, 'Defence Purchasing Statistics Bulletin 1989/90 to 1996/96', Commonwealth of Australia

8. Buyer and supplier power applied to the global marketplace

Figure 4 describes global marketplace power arrangements between Defence and its suppliers.

Quadrant 1 describes the 'spontaneous' commodity marketplace – Defence is one of a large number of buyers in a sea of many sellers, neither having much transaction power, and each transaction being small in value with very low e-transaction costs, usually less than a dollar in value. Defence's power over its suppliers in this quadrant is minimal and vice versa, and both buyer and seller have no option but to accept the market's 'invisible hand' arrangements (Smith 1776).

In Quadrant 2, where there are few suppliers but many buyers, a supplier's power may be described as an oligopoly or monopoly. Such situations present themselves to Defence where there are one or a few suppliers of specific or unique high tech defence capabilities, and there are many defence buyers. This presents a difficult marketplace situation for Defence, where options may be to counter supplier power by assisting to create new entrants, or by finding a substitute product (Porter 1990).

In Quadrant 3, there are few buyers but many suppliers. Defence power in this quadrant may be described as a monopsony (Robinson 1933). Defence may develop a monopsony in certain industries simply because of its buying power for specialized defence products. This is the best possible e-procurement situation for a client organization to be in. This may occur for example, in the construction industry, where there are many suppliers contending for specialized Defence contracts.

In Quadrant 4, there are few buyers and few suppliers. Defence has a unique capability to be developed and there is only one, or a few, possible suppliers. In this quadrant, both Defence and supplier need to pursue a cooperative and strategic alignment. However, while each may depend on the other, each may try to dominate the other. This can lead to considerable tension between the contracting parties, and needs to be carefully considered by the client in the pre-contract award period.

Thus the power position for Defence with each its suppliers can be better understood, defined and acted upon to minimize Defence transaction costs for each of its e-procurements – the larger the e-procurement, the larger should be the potential transaction cost saving. However, there may well be an unavoidable and continuous tension between Defence and its suppliers because each will want to move towards its most favourable power position (Fig 5). Defence will want to move from Quadrants 1, 2 and 4 and into Quadrant 3, and its suppliers will want to move from Quadrants 1, 3 and 4 towards Quadrant 2.

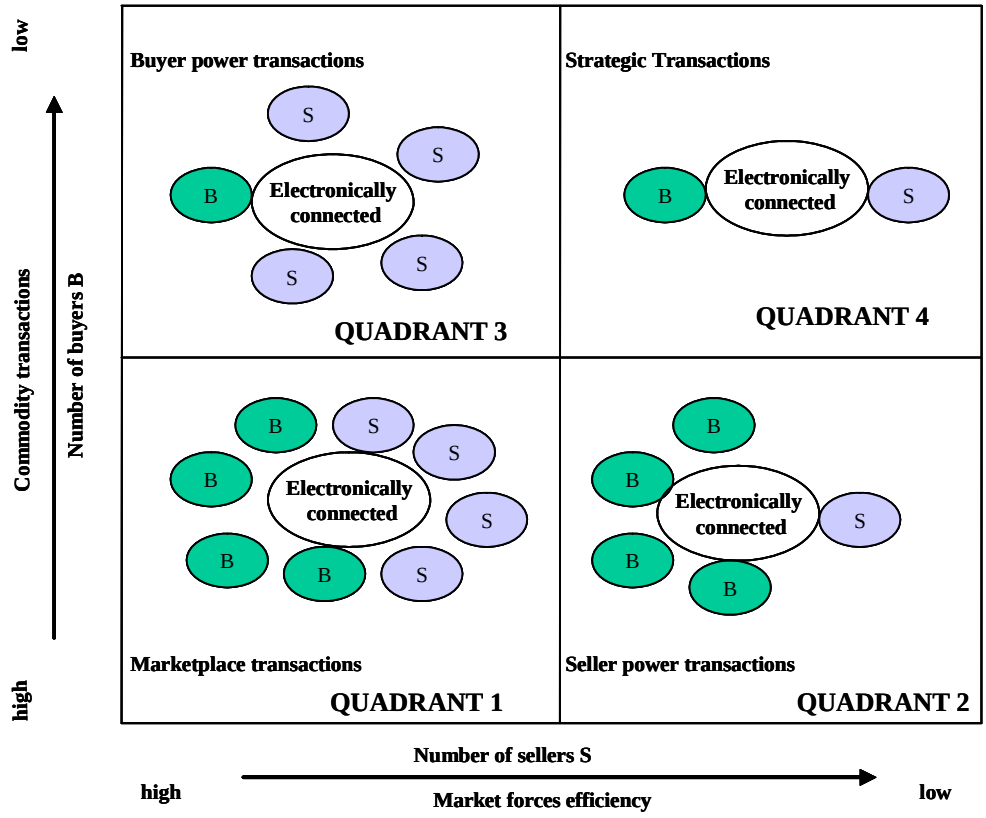

Figure 4: Sellers and buyers, market forces efficiency and commodity transaction relationships

Adapted from: Thomson, JD, Wilmot, J., Harch, W., Johannes, G., and Lyons, M., 1992 'Defence Policy and Industry Report', Canberra, Australian Government Publishing Service, November

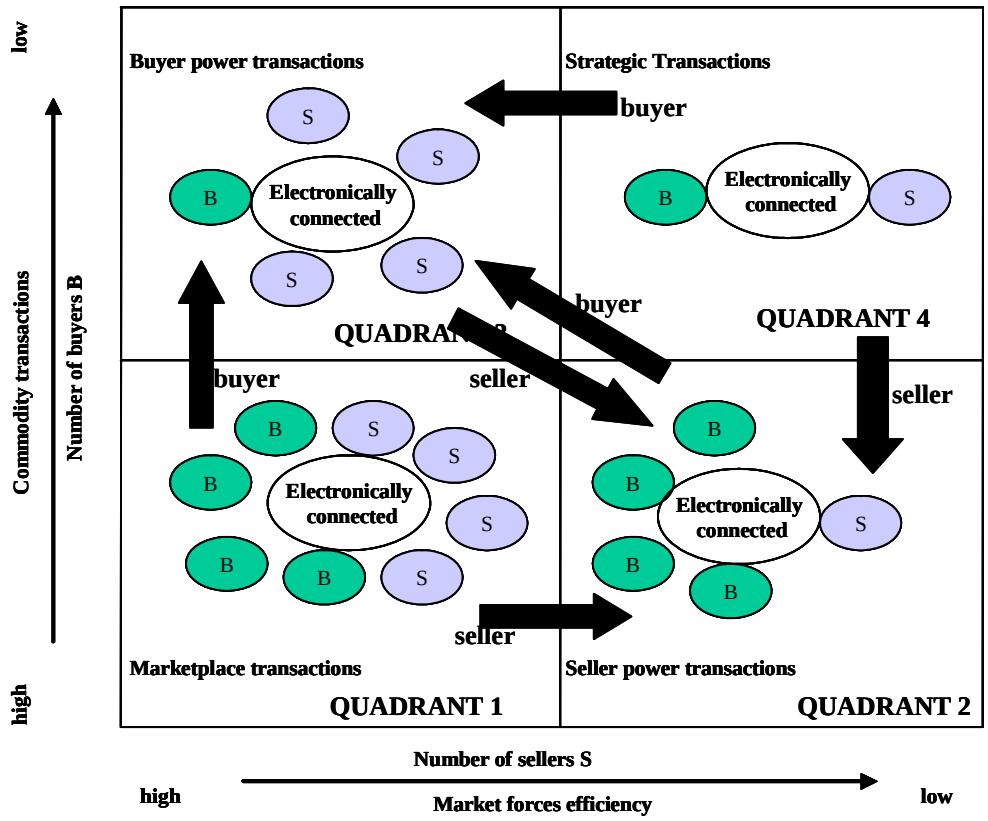

Figure 5: Buyers and sellers seek their most advantageous power position

Adapted from: Thomson, JD, Wilmot, J., Harch, W., Johannes, G., and Lyons, M., 1992 'Defence Policy and Industry Report', Canberra, Australian Government Publishing Service, November

Some private sector organizations have already applied this to their e-procurements to assist them in improving their understanding of their buyer/supplier power arrangements. This has been done with a view to extracting transaction cost savings, and for an improved strategic sourcing plan to be put in place. As can be seen from Figure 6, Tenix (the ANZAC Frigate Shipbuilder) has few transactions taking place in Quadrant 4, those of greatest value taking place in Quadrant 3, a number of lesser value in Quadrant 2, and low value numerous transactions taking place in Quadrant 1.

9. Some capability delivery governance structures have superior adaptive properties

Transaction cost economics holds that the chief lesson of bounded rationality for the study of economic organization is that all complex contracts are unavoidably incomplete (Williamson 2002c). An unavoidably incomplete Defence complex contract can cause costly losses. For example, Defence's Seasprite helicopter project had considerable unknowns at contract signature. Committed costs were of the order of AU$1.25bn before the contract was cancelled. Corrective action by Defence or its suppliers can be delayed or defeated by bargaining over the potential gains. If some Defence delivery governance structures have superior adaptive properties than others, then the mitigation of contractual hazards through the ex ante choice of a better mode of governance should yield efficiency gains (Williamson 2002c). It is therefore suggested that use of Defence transaction cost data may provide guidance as to a best choice of e-procurement governance for other than commodity purchases. To obtain the necessary transaction cost data, it is necessary to case study (Yin,) randomly selected representative Defence high tech projects.

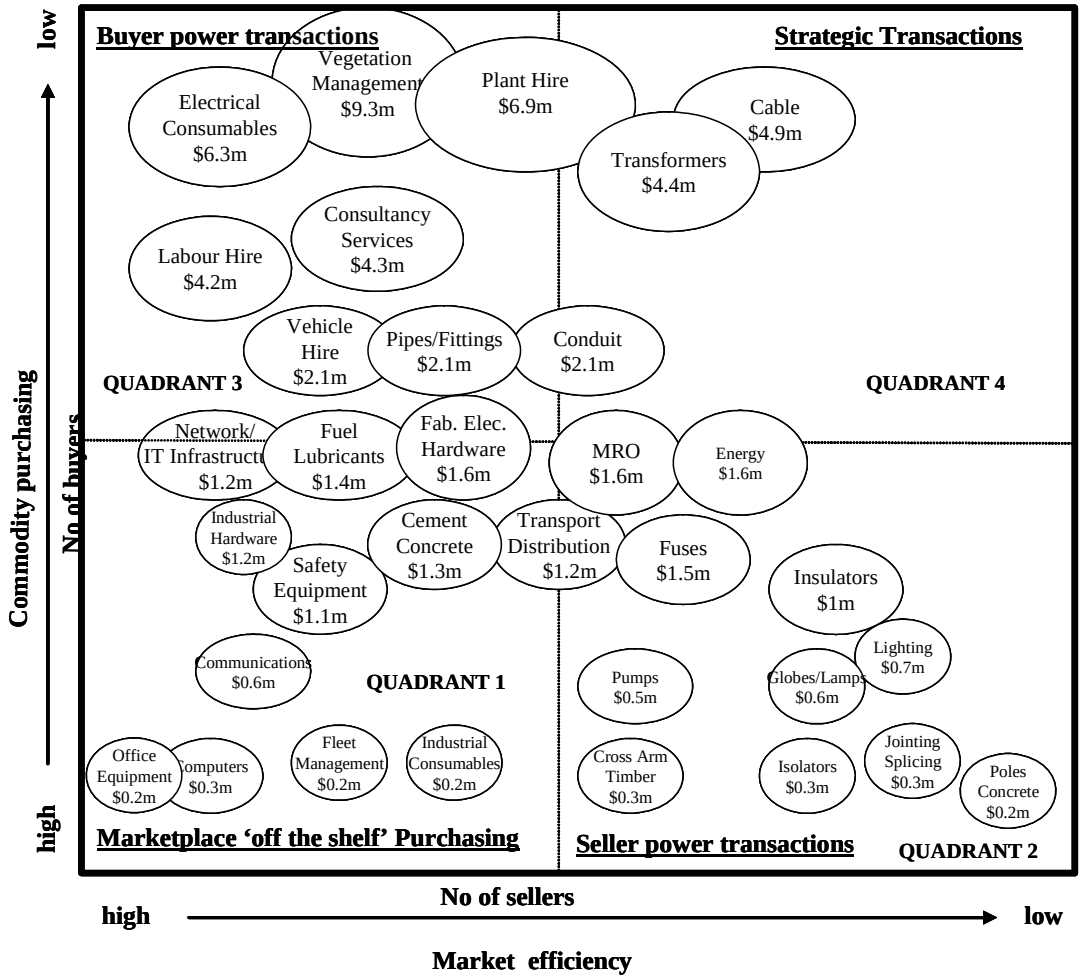

Figure 6: Tenix aggregated e-procurement data for transaction cost savings and improved strategic sourcing

10. Standardization of quantitative performance stages and measures

Over the selected Concept, Design and Development Phases, there can be many sub-phases. There is some, though not complete, standardisation as to which of these sub-phases are used for any particular e-procurement (Figure 7).

11. Transaction cost data drawn from 106 defence e-procurement case studies

Defence e-procurement case studies, from which pre-contract award transaction cost data based on the sub Phases have been drawn, include twenty eight from the RAN, seven from Army, twenty five from the RAAF, and forty six from logistics, in all one hundred and six. Of particular interest were those Defence e-procurements where there were significant unknowns at time of contract award. This included multi billion/million e-procurements such as Collins Class Submarines, ANZAC Frigates, Minehunters Coastal, Field Digital Trunk Communications, Australian Army Tactical Command Support System, Single Channel Radio System, and Very Low Level Air Defence Weapons System, to mention but a few (Thomson 1994).

12. Direct e-procurement transaction costs collected

Defence pre-contract award e-procurement transaction costs collected include direct transaction costs incurred by Defence and its suppliers - human resource salaries and overheads such as superannuation, training and so on; travel and accommodation expenses; consultants and contractors fees; and committee meeting expenses. Indirect costs were not included because of the randomness of their attribution and lack of precise quantification. Direct transaction costs were determined from the commonly available Defence Costing Program and all were brought to the same time base using

the Australian consumer price index. The phase and sub-phase durations over which the e-procurements took place were also measured.

Possible Sub-Phases are:

1. Capability concept developed from policy/strategy
2. capability endorsed;
3. capability office established;
4. major capability submission considered;
5. Materiel acquisition strategy endorsed;
6. Major capability submission agreed;
7. Capability included in Investment submission;
8. Capability approved;
9. Statement of capability requirements completed;
10. Invitation to Register Interest issued;
11. Invitation to Register Interest closed;
12. Capability Definition Study issued;
13. Capability Definition Study closed;
14. Request for Tender issued;
15. Request for Tender closed;
16. Tender evaluation;
17. Source selection;
18. Contract approved; and
19. Contract awarded and implemented.

Figure 7: Defence capability development phases and sub-phases pre contract award

12.1 Three one hour interviews based on a standardised questionnaire

A standardised questionnaire was developed which ensured consistency and ease of information collection, collation and compilation, and provided a basis for comparison of the capability development transaction cost from concept to contract award. The data was collected on the basis of three, one hour interviews with each Defence capability manager or managers and selected staff. On the first visit, the reason for the research and the questionnaire was explained and fully discussed, and the questionnaire completed as far as possible. A week or two later, the questionnaire so far completed was forwarded to the capability manager for confirmation of accuracy and completion of any outstanding matters. A further week or two later, a third and final visit was made to collect the completed questionnaire and to have a discussion with the capability manager and staff. The data was collated and compiled into a summary table for each of Navy's largely incentive based contracts (US DoD 2005), and Army, Air Force and Logistics predominantly behaviour based/method and material contracts (Newell and Jeffrey 2002).

13. Data collected

Each case study has an executive summary of the e-procurement as it developed over time. In addition to the transaction cost and time data, it included qualitative data such as contract type, investment, program, process, stages/phases, risk assessment, industry investment and lessons learned. Also included was:

- A brief description of the capability including its title, description, value, manager and contact details, risk assessment, complexity, strategy, comments and contract performance;
- The chronology of events, by month - intervals of one month were found to be adequate for these purposes because of the extended duration of Defence e-procurements;
- The direct costs of each e-procurement's sub-phase development transaction costs, including consultant costs where engaged;
- The costs of meetings and travel; and
- A summary of the suppliers involved at various stages/phases of the e-procurement.

As an example, Figure 8 demonstrates the transaction cost/duration relationship of Defence and industry for the e-procurement of the 'Radar Evaluation Facility'. Total transaction costs over the period from January 1980 (concept identification) to January 1994 (contract award) was AU$755,000, while industry transaction costs amounted to little more than $50,000.

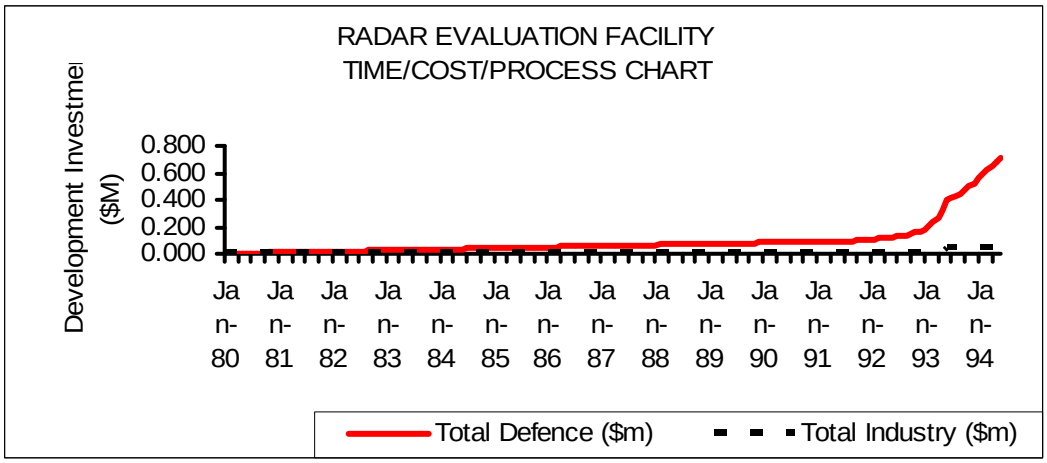

Figure 8: Transaction costs over time for defence and industry for the 'radar evaluation facility'

Figure 9 compares the e-procurement transaction cost and time for the 'Radar Evaluation Facility' with the average e-procurement transaction costs and times for 25 RAAF e-procurements. Similar summary and comparative graphs were developed for Navy, Army and Logistics.

Figure 10 provides a comparison of the e-procurement delivery time from concept to contract award for seven e-procurements by sub-phase. This demonstrates the wide variation in e-procurement process being used within Defence.

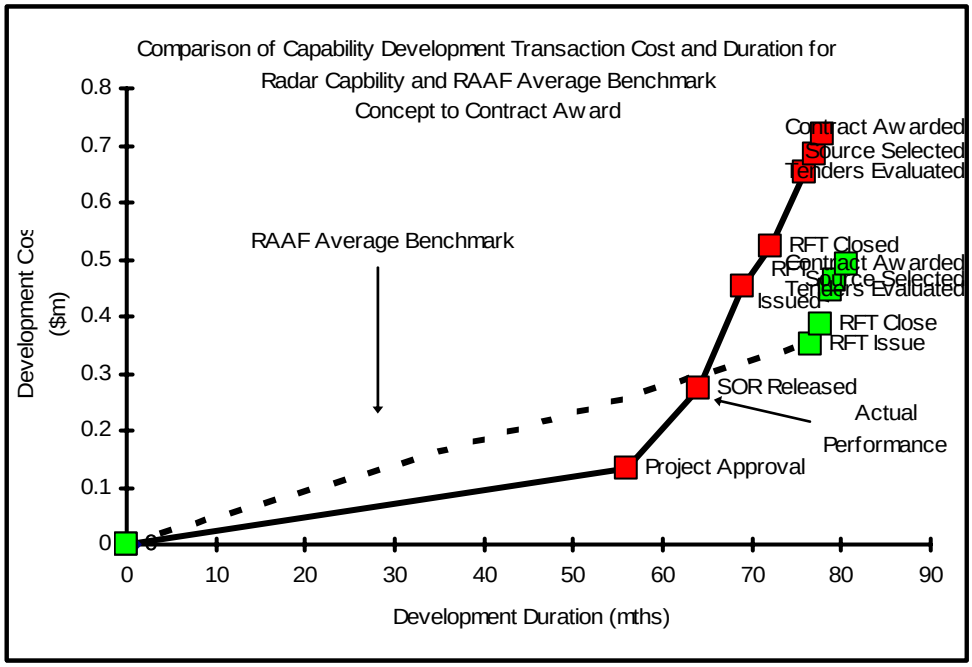

Figure 9: Comparison of capability development cost and duration of one capability (radar) with RAAF average capability development cost and duration.

Source: Thomson, JD., 1995, 'Best Practice Benchmarks and key performance indicators in Defence Procurement Delivery and Project Management', in 'Defence Project Management', vol 1 pps 25-40, eds Hinge, A., and Markowski, S., Australian Defence Studies Centre, University of NSW, Canberra)

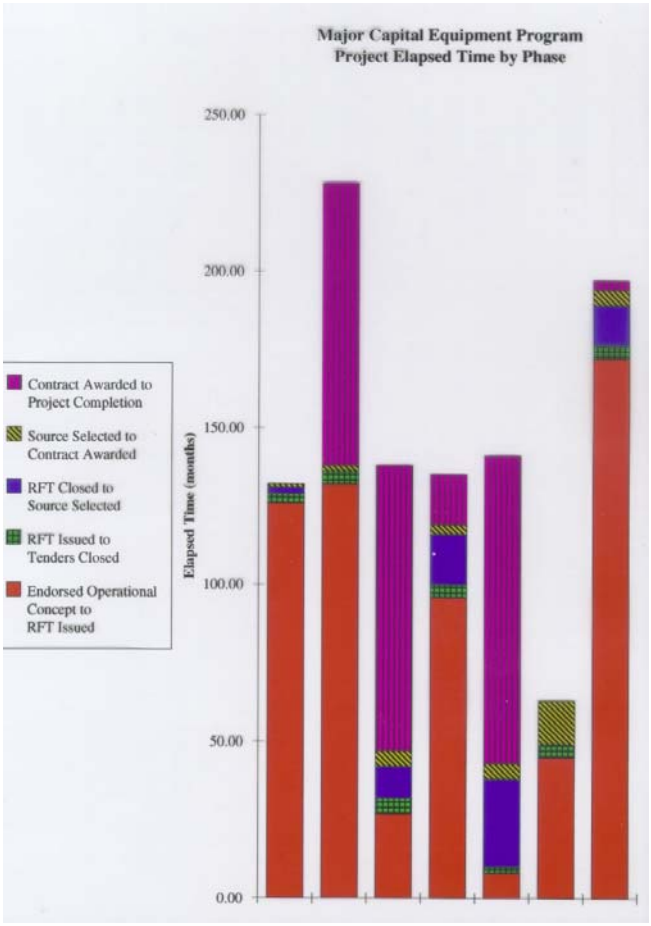

Figure 10: Comparative phase duration data of seven defence capabilities.

14. Pitfalls and pointers

Numerous pitfalls were identified. These included intellectual property ownership difficulties, numerous contract variations, and treating each capability delivery strategy and process as unique when there is much common process delivery ground from which useful quantitative and qualitative comparisons can be made. There was a failure to set up, access and use corporate capability development data that does exist. Despite there being central Defence repositories for such data, it was found that such failure was caused by complex, time consuming, onerous and incomplete data collection, collation and storage arrangements. This was complicated by the lack of continuity of staff, often with a complete staff change-over within three years. Information for predicting capability development times and transaction costs were not in a useful, easily usable format, additionally complicated by the transfer or loss of key staff over the extensive duration of the Defence capability developments. This lead to capability directors and Defence executives not being able to relate capability delivery performance of one capability team to another or to previous, current or future similar capability developments in terms of duration or transaction costs. Thus some poorly performing teams were over resourced and other well performing teams were overlooked, under-resourced, and over worked, much to the chagrin and stress of the efficient capability manager and team. There is a need for capability development performance comparisons to be made. Such comparisons need to be made on an equitable basis for the allocation of resources, and provide the means for identifying by exception when a capability delivery program is over budget or time, or is in trouble for some reason. Without guidance based on quantitative data measurement of transaction costs and time and guided by experience and judgement of qualitative variables, there is little or no basis for estimating the resourcing of capability development teams, over what period, with what sort of ramping up being required. This lack of accountability and transparency has lead to much inefficiency and ineffectiveness, and to high levels of dissatisfaction and stress by all stakeholders.

15. Conclusion

From the data, the best Defence concept to contract award e-procurement process model based on transaction costs was found to be that used for the e-procurement of the AU$5.5bn ANZAC Frigates and the AU$1bn Minehunters Coastal. For these, concepts, options, feasibility, performance and capability studies were undertaken on an incentive, competitive Capability Definition Study basis, jointly and cooperatively by Defence with industry. In both cases, industry was funded to assist in the development of the required capability, on a competitive basis. On completion of the Capability Definition Study, a Request for Tender was made to the marketplace for the development of the so far defined capability. The number of interested parties was reduced to the two or three best contenders who were each contractually tasked (and funded to various extents) to competitively undertake the development of a Capability Demonstrator prototype, with the award of the production contract on the basis of the best prototype so far developed. This research has provided a model for the remodelling and restyling of the power arrangements between the Defence organization and the marketplace, linking technological developments with public/private sector power frameworks. There may be some benefit for other public sector organisations with similar e-procurements to consider the Defence best practice model, so far.

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