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**UK DEFENCE ACQUISITION PROCESS FOR NEC: TRANSACTION
GOVERNANCE WITHIN AN INTEGRATED PROJECT TEAM**

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by

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UK Defence Acquisition Process for NEC: Transaction Governance within an Integrated Project Team

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Abstract

Using a 3-tier framework for a study of the acquisition of an Advance Military Vehicle (AMV), we explore the shaping of the buyer-supplier relationship in the context of the UK defence acquisition process. This relationship encompasses the Ministry of Defence (MoD), a monopsonist, partnering with a monopolistic defence industry. The transition from an oligopolistic to monopolistic defence industry is a result of a number of government policies that



have created a consolidated defence industrial base. Defence industry relationships have historically been adversarial, making defence acquisition in the past inefficient. We identify Integrated Project Teams (IPTs) as being central to the institutional level aims of creating a collaborative industrial relation. IPTs characterise relational contracting practices at the governance level, which demands communication, collaboration and trust. However, difficulties at the process level in utilising relational contracting because of a lack of definition, communication and mutual gain within the day-to-day business of the IPT limit the benefits of this approach. This failure to create an effective partnership between the MoD and its prime contractors highlights the major challenge facing the UK defence sector in its transition towards capability acquisition, such as Network Enabled Capability (NEC). NEC demands a more collaborative, through-life approach to defence acquisition.

Introduction

Defence acquisition has undergone profound changes in recent years as the consolidation of the supply sector, the shift towards the acquisition of capability rather than platforms and the development of systems-of-systems technologies have generated major challenges for both demand and the supply sides. Through a case study of an Advanced Military Vehicle (AMV) and the Integrated Project Team (IPT) that is delivering it, we propose in this paper to explore these issues using a three-tier model that captures how institutional policies are experienced within the project team and how, in turn, those experiences shape institutional policies. Our conceptual framework for this analysis are drawn from Giddens's (1984) work on structuration and Williamson's (1975,1985) work on transaction cost economics (TCE) as a model of understanding managers' behaviour in an economic environment characterised by a complex and shifting mix of market and hierarchy in relationships between organisations. The model framework aims to provide an analysis of the institutional, governance and process levels of a transaction.

At the *institutional level*, we aim to understand the current acquisition policy of the buyer, the MoD, and how this impacts its suppliers in the defence industrial base. An historical review of defence industrial relations is therefore presented. It is shown that the MoD is shifting its acquisition policy from being platform-centric to capability-centric; coinciding with this modernisation programme is a gradual change in the structure of the defence sector. In the *governance level* section, we use a transaction cost approach to examine the choice of relational contracting, demonstrating how the IPT structure and ethos favours relational contracting practices. The discussions will emphasise the bidding process, contract award stage, and the demonstration phase, and the impact each has on the long-term relationship between the MoD and its prime contractor. The final level of the three-tier model is the *process level*. In the process level section, we consider the organisational structure of the IPT. We look closely at how the IPT works as a team, how they deliver the tasks for each phase in the context of the routines on the project. In our discussions, we emphasise the importance of cross-level interaction. We begin the paper by explaining our conceptual framework and method.

Conceptual Framework

Our conceptual framework for investigating the processes of the acquisition of military vehicles is derived from the general sociological work of Giddens (1984) on "structuration," which has been more recently developed as the "tectonic approach" to organisation (Winch 1994). Applying the tectonic approach to the management of projects identifies three levels of analysis that interact with each other in a recursive cycle of constraint and change (as illustrated



in Figure 1). In the tectonic approach, the institutional level of analysis shapes and is shaped by decisions made at the governance level. Decisions at the governance level select the organisational structures within which the project process flows, but those processes also shape governance-level decisions. The process level is where the project is implemented through a flow of information, which initiates and controls a flow of materials.

The institutional level covers the wide range of issues around the features of the national and sectoral business systems, but in the defence sector, the principal institutional manifestation is the current defence ministry acquisition policy, and so it is this institutional aspect upon which this paper will concentrate.

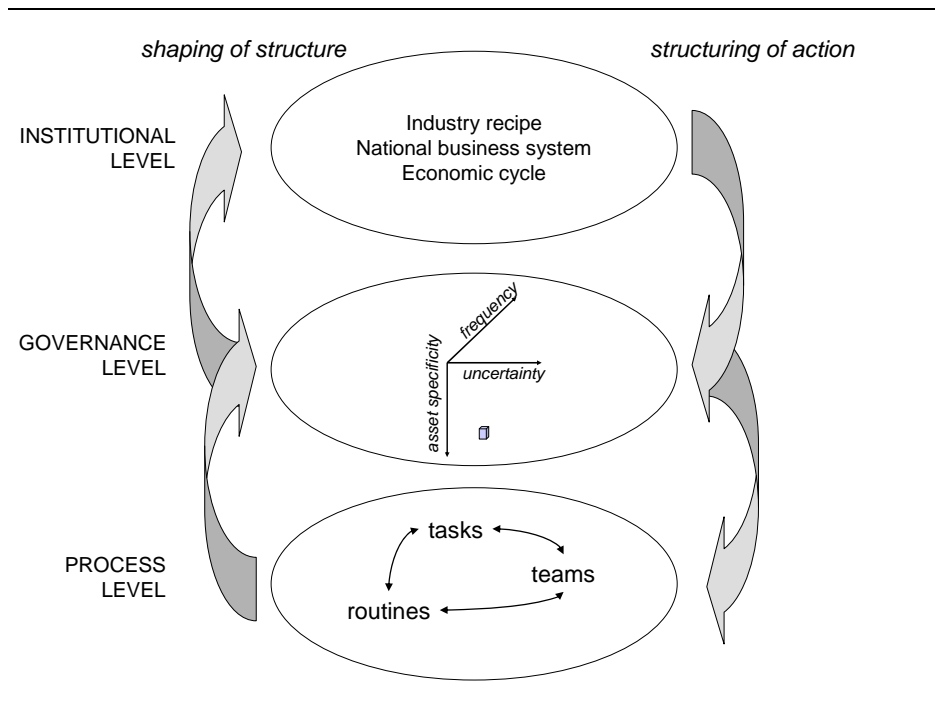


Figure 1. The Tectonic Model
(Winch, 2009)

The conceptual framework for the analysis of the governance level is derived from institutional economics, particularly the work of Williamson (1975, 1985) on transaction cost economics, as adapted for project organisations by Winch (2001). Williamson’s basic proposition is that total costs of supply are derived from two main components—production costs and transaction costs. Production costs are well understood and, in essence, involve the efficient transformation of inputs into outputs, where prices are used to signal the most efficient choice of technology. Transaction costs are the costs of co-ordinating any complex production process and occur when a good or service crosses a “technologically separable interface.” He argues that there are two basic options for co-ordinating—or governing—transactions. A *market transaction* is where independent buyers and sellers meet in the market to negotiate a price for the supply of a good or service in a spot contract—prices are set by what Adam Smith called the “invisible hand” of the market. An *hierarchical transaction* is one in which the transaction is governed internally by administrative means—prices are determined by what Alfred Chandler called the “visible hand” of management through an authority relation. Between these two polar forms of transaction governance lay a wide variety of mixed forms of *relational contracts*.

What determines the most efficient governance mode on a project? Williamson argued that there were three main characteristics of transactions that influenced the choice of how they are governed: uncertainty, frequency and asset specificity. Uncertainty affects transactions because it creates *bounded rationality* for decision-makers. This bounded rationality makes writing a complete and unambiguous contract between the parties impossible because of uncertainty regarding the precise conditions under which the contract will be executed and also makes it impossible to measure fully the performance of the contract. Asset specificity is the condition in which either the buyer or supplier is limited in its choice of transaction partner due to the specific nature of the resources to be supplied. This asset specificity may be pre-contract (in which case, the problem is one of monopoly or monopsony in the market), or it may be generated post-contract because contract-specific investments are made by one or both of the parties in the hold-up problem (Masten, Meehan & Snyder, 1991). This generates the possibility of *opportunism* on the part of one of the parties as they exploit the other's disadvantage—which often takes the form of withholding information from the other party. Frequency affects transaction governance because one-off transactions provide no opportunity to learn about the other party, while repeated transactions allow *learning* about the behaviour of the other party and hence the generation of trust. Thus, the most appropriate choice of transaction governance mode can be thought of as occupying a three-dimensional space in the manner indicated in the middle level of Figure 1.

Governance has two distinct aspects:

- The *contractual*, which captures the underlying legal basis of the relationship. While the precise formulation of these legal relationships varies significantly between countries, there is a large degree of functional equivalence in all developed economies between these formulations.
- The *relational*, which captures the interpersonal and interorganisational aspects (processes and behaviours) of the governance arrangements around issues such as trust and perceived equity in governance.

Within this perspective, the extremes of the governance continuum can be considered to be tending to zero on relationship aspects at the market end (pure spot contracting) and tending to zero on the contractual aspects at the hierarchy end (pure autocracy). Although some have argued that the contractual aspects can undermine the development of the relationship aspects, recent research has shown that they are more complementary than antagonistic dimensions of transaction governance (Poppo & Zenger, 2002).

The process level in Figure 1 is shaped by the institutional and governance levels and in turn shapes those levels, which shows how, for a given project mission, riding the project lifecycle is a dynamic interplay between routines, tasks, and teams (Manning, 2008):

- *Routines* are the learned practices developed within the industry recipe that are carried from project to project and then adapted to meet the needs of particular projects (Feldman & Pentland, 2003; Nelson & Winter, 1982). Routines therefore specify the *how* of riding the project lifecycle; they are an essential element of managerial activity, yet their implementation is contradictory in that they both constrain and enable managerial action.
- *Teams* are the *human resources* allocated from the resource bases mobilised on particular projects, providing the *who* of riding the project lifecycle.



- *Tasks* are the *what* of riding the project lifecycle—the set of tasks that has to be completed in order to realise the particular project mission, typically captured in the work breakdown structure.

Routines, tasks and teams are negotiated and renegotiated for a particular project chartered by its project mission. As the project moves through the lifecycle, the tasks change, and hence different teams that deploy different routines are mobilised. However, prior choices of routines also shape which teams are selected by which criteria and which tasks are deemed to be in scope to the project. The coordination routines used by project managers to organise task execution teams need to be continually adapted to the needs of the particular project, while retaining enough overt good practice to serve as a legitimation for the actions of the project manager. Thus, the project process is indeed a negotiated order in which “the bases of concerted action (social order) must be reconstituted continually; or [...] worked at” (Strauss, Schatzman, Ehrlich, Bucher & Shabshin, 1971, p. 104), and routines provide the raw material for this work in the context of governance and institutions.

Method

Our research method to explore the dynamics of defence acquisition is a case of the acquisition of an Advanced Military Vehicle (AMV) by the UK’s Ministry of Defence (MoD). Our data on the institutional level come largely from a review of MoD policy documents complemented by a number of strategic-level interviews with key informants. Our data on the governance and process levels come from a case study of the AMV project organisation, which is delivering it for MoD, and consists of 19 field interviews with project participants and the collection of documentary data. The informants interviewed for this research are identified in Figure 3. This field research is still in progress, so the data reported here represent only a preliminary statement of our findings. The AMV is presently at the demonstration phase of the CADMID process presented in Figure 2.

The Institutional Level

The institutional level is represented by an evolving defence sector, characteristically dependent on national defence policy from successive governments. The UK defence sector is reliant on the buying behaviour of its largest single buyer (a monopsonist), the MoD. It is the MoD’s buying power that enables it to “determine the size, structure, conduct and performance of defence industries” (Hartley, 1991, p. 79). To understand the complexity of the UK defence acquisition process, it is important to comprehend the specific nature of the defence industry, the defence business system (the defence industrial base), and the economic policies that have shaped the defence sector. This narrative will develop the institutional level analysis by charting evolutions: from privatisation to prime contracting, from a competitive industrial sector to a consolidated, monopolistic one, and from protectionism to liberalisation.

We begin our analysis of the defence sector at a critical point in UK defence history—the era of privatisation heralded by the Conservative Government of Margaret Thatcher. Of the five largest defence companies in 1979, four were state owned: British Aerospace, British Shipbuilders, Royal Ordnance Factories and Rolls Royce. The exception was General Electric Company (GEC) (Smith, 1990). The government favoured a free market policy in which the MoD could engage in competitive tendering. The newly privatised firms and new entrants in the defence sector would bid for defence contracts, and the invisible hand of the market would regulate the price of the bid. However, post-privatisation there was minimal evidence of competition because:

- Newly privatised firms were the recipient of vital technical and managerial knowledge, making the playing field unbalanced for new entrants;
- Protectionist policy that favoured domestic defence companies meant there was minimal competition from foreign-owned companies.

The lack of competition on the supply-side meant that the existence of monopolies was common in the defence sector, post-privatisation. The bargaining positions of the monopsonist buyer and monopolistic supplier were levelled by the buyer having regulatory powers and the supplier possessing monopoly powers. Furthermore, defence contracts predominantly incorporated cost-plus payment terms under which the MoD retained significant levels of project risk (Cullen & Hickman, 2001). Because of the complexity and uncertainty evident in defence projects, it is difficult to assess the efficiency of a cost-plus contract. A key part of cost-plus contracts is the cost-reimbursable aspect of the agreement, making costly investments attractive to contractors (Williamson, 1967) and it was, therefore, a common feature of defence acquisition projects.

The early days of privatisation were fraught with conflict between the MoD and the defence industry. “By the early 1980s there was considerable dissatisfaction with such traditional procurement policies. Lack of competition had, it was argued, created inefficiency in the defence sector, while cost-plus contracts created little incentives to keep costs down” (Bishop, 1995, p. 175). The MoD recognised that it had to change the nature of its role in the defence sector from its traditional monitoring and auditing function to a more stringent administrator role. It also acknowledged a desire to transfer the risk of defence projects to suppliers (Smith, 1990). Peter Levene, the MoD Chief of Defence Procurement (1984-91), was responsible for the implementation of the MoD’s new policy of “competition and collaboration.” The procurement reforms, more commonly known as the Levene reforms, targeted the “promotion of competition and the transfer of risk from the MoD to industry” (Macdonald, 1999, p. 6). The MoD was able to transfer the risk in procurement by replacing the cost-plus contracts with firm- or fixed-price contracts let by competitive tender. “Since 1983, MoD has become more conscious of the need to obtain better value for money in equipment procurement. As a result, it has become a more demanding customer, with competition as the central element in its more commercial approach” (Hartley, 1991, pp. 75-76).

As the Cold War neared its end, in the late 80s, the UK defence budget was reduced from its peak in 1985 by a gradual decrease of 18% in real terms between 1986-87 and 1990-91 (McIntosh, 1993). In addition, the MoD opened up defence contracts to foreign competition in a partial liberalisation of the defence sector: partial because the MoD continued to implement protectionist policies. The UK manufacturing sector was dependent, in supporting local economies and employment, on the defence sector; awarding defence contracts to foreign companies was politically sensitive. The Thatcher Government signed up to the Independent European Programme Group, which was geared towards opening up the European defence equipment market to greater international competition. Theoretically, overseas defence companies could compete for procurement contracts tendered by the MoD (Smith, 1990). However, it was evident that the MoD was not ready to pressure the domestic defence industry with competition from established foreign companies. In 1987-88, the only foreign-owned company belonging to the top 15 companies to receive a contract worth over £100 million was Boeing (Smith, 1990). The argument for the continuation of protectionist policies by the MoD was also due to the fear that key technological knowledge would be lost to foreign-owned companies. The prevailing view was this would damage the domestic defence sector and make the UK reliant on foreign technology.



Foreign-owned firms entered the UK defence sector in the more “acceptable” form of alliances, joint ventures and, mergers: safeguarding local jobs and preserving the domestic defence industries. The combination of competition, divestitures and liberalisation brought about the restructuring of the UK defence industry. The larger defence companies moved to consolidate their positions by acquiring smaller firms.

1988-89 saw major changes in structure and corporate strategy in the European Defence Industries. The GEC-Siemens bid for Plessey, the Daimler-Chrysler acquisition of [Messerschmitt-Bölkow-Blohm], the merging of Aerospatiale’s avionics interests into Thomson CSF, were among the most notable of a range of acquisition and divestments, national and international, which have tended to increase concentration. (Smith, 1990, p. 200)

The restructuring of the UK defence sector transformed the defence industrial base from oligopolies to monopolies. Contrary to its own objectives of creating competition, the MoD was partly responsible for the creation of “industry champions.” When GEC moved to acquire Ferranti and VSEL, the Monopolies and Mergers Commission recommended against the acquisition. The MoD, however, intervened to encourage the acquisition in an overall aim to protect defence industrial capabilities, to ensure domestic demands were met, and support defence contractors to compete in the international defence exports market (Macdonald, 1999). Ironically, in 1999, GEC’s board decided to divest its defence business (Alenia Marconi Systems) to British Aerospace, which created the UK’s largest defence company, BAE Systems.

During the 1990s, competitive tendering was more evident in defence contracting. This, however, was counteracted by the increase in monopoly defence industries, which to a large extent was counter intuitively supported by the MoD. The MoD, in effect, created a defence sector with few players controlling their own specialist component industries. UK defence companies began expanding their activities internationally, e.g., BAE Systems North America, and reducing their reliance on their domestic market. The UK defence procurement supply-chain relationship in the late 90s was characterised by “global market conditions (concentration) and increased customer (MoD) sophistication to change” (Humphries & Wilding, 2004, p. 261). The restructuring of the defence sector combined with the introduction of firm and fixed price contracts had major effects on the once cosy relationship between the defence industry and ministry. The MoD moved to control the monopolistic supplier by introducing greater competition in the tendering process and by creating strict conditions on non-competitive contracts with monopoly suppliers. The “No Acceptable Price, No Contract” initiative was implemented in 1992 in non-competitive defence contracts. This initiative was introduced to ensure that contractors would abide by the “value for money” principles. Target Cost Incentive agreements were predominantly used for non-competitive defence contracts. The contracts stipulated that the MoD and its contractor would share the risk of cost-overruns or the savings accrued (Macdonald, 1999). In placing these stringent controls on their suppliers in terms of costs and performance, the MoD was entering into a more adversarial relationship with the defence industry. “There was also a decline in mutual co-operation as civil servants adopted more hostile attitudes during contract negotiations in order to secure the lowest prices possible” (Macdonald, 1999, p. 18).

Prime contracting was introduced as the mechanism for transferring risk from the customer (MoD) to the supplier. In the past, the MoD was responsible for integrating the separate components and systems of the platform (end product). The responsibility of systems integration was passed onto the main supplier (prime contractor) in the supply chain, and the



prime contractor was responsible for overall supply chain management. In security-sensitive areas, the MoD maintained control over the selection of subcontractors. The prime contractor was given project milestones, such as technical demonstrations or systems delivery, linked to payment terms in either firm- or fixed-price contracts (Mathews & Parker, 1999). The allocation of a prime contractor to a defence project can be a complex issue.

The challenge of allocating a prime contractor rather than retaining systems production in-house (make-or-buy decision) is explainable using a transaction cost approach. The aim of prime contracting is to minimise the project risk. The risk is not always easy to identify, or cost, due to the complexities and uncertainties in defence contracting. The MoD is affected by information impactedness problems (Williamson, 1975), as a result of the uncertainty/complexity being combined with bounded rationality. “MoD does not routinely obtain data on which to base an assessment of comparative costs” (Mathews & Parker, 1999, p. 36) making it difficult to choose the most cost-effective prime contractor. For the suppliers prime contracting was, at the beginning, a risky venture in terms of the costs or profits that could be recouped. Prime contractors responded by adding premiums for risk acceptance. When performance and budget milestones were achieved, the prime contractors gained premium payments on top of their profits. If the risk of overspending was not mitigated, then the contractor was damaged by the costs/penalties: thus the gamble. These uncertainties and complexities have, over time, become manageable: “Arguably, the UK defence industry is now more capable of developing weapon systems, rather than individual subsystems, than was previously the case” (Mathews & Parker, 1999, p. 37), through the advantages of what Winch (2001) terms the learning effects on transaction costs.

The introduction of prime contracting was part of the MoD’s strategy to position itself as an “intelligent buyer” in the defence industry. This was achieved through the transfer of project risk to the suppliers, the introduction of more stringent contractual agreements—such as firm, fixed-price and incentive-based contracts—and competitive tendering as well as non-competitive controls. The MoD, on the other hand, needed to address the adversarial nature of its relationship with industry. The introduction of the Strategic Defence Review (MoD, 1998) commenced the process of addressing the challenges in these relationships. It highlighted three areas in which defence procurement was failing to achieve efficiency (despite the changes mentioned above): poor value for money; poor project management; and poor industrial relationships. In order to tackle these issues, the MoD introduced the “Smart Procurement Initiative.” The initiative was a joint exercise with defence suppliers to identify a new set of procurement processes that would improve the way the MoD procured defence equipment. The changes were brought about with consultation from the Defence Industries Council and the Trade Associations.¹ The MoD restructured its organisation as a result. In 1999, the three single service logistic organisations for the Royal Navy, Royal Air Force, and Army, were unified to create the Defence Logistics Organisation (DLO). In the same year, the Procurement Executive was given agency status, and became the Defence Procurement Agency (DPA). The responsibilities of the DLO and DPA are shown in the lifecycle process CADMID (Concept, Assessment, Disposal, Manufacture, In-Service and Disposal) in Figure 2. “The CADMID cycle has been used since 1999, when it was devised as part of the ‘Smart Procurement’ initiative to

¹ The Defence Industries Council is chaired by the Defence Secretary and constitutes representatives from the defence industries and the four major trade associations (the Society of British Aerospace Companies, Defence Manufacturers Association, Federation of the Electronics Industry and British Naval Equipment Association). The purpose of the council is for the MoD to consult the defence industries on matters of common interest (MoD, 1998).

deliver equipment capability within agreed performance, cost and time parameters” (MoD, 2006, p. 13). The DPA was given responsibility for the procurement phase of the lifecycle (Concept-to-Manufacturing) with the DLO providing support for the operational phase (In service-to-Disposal).

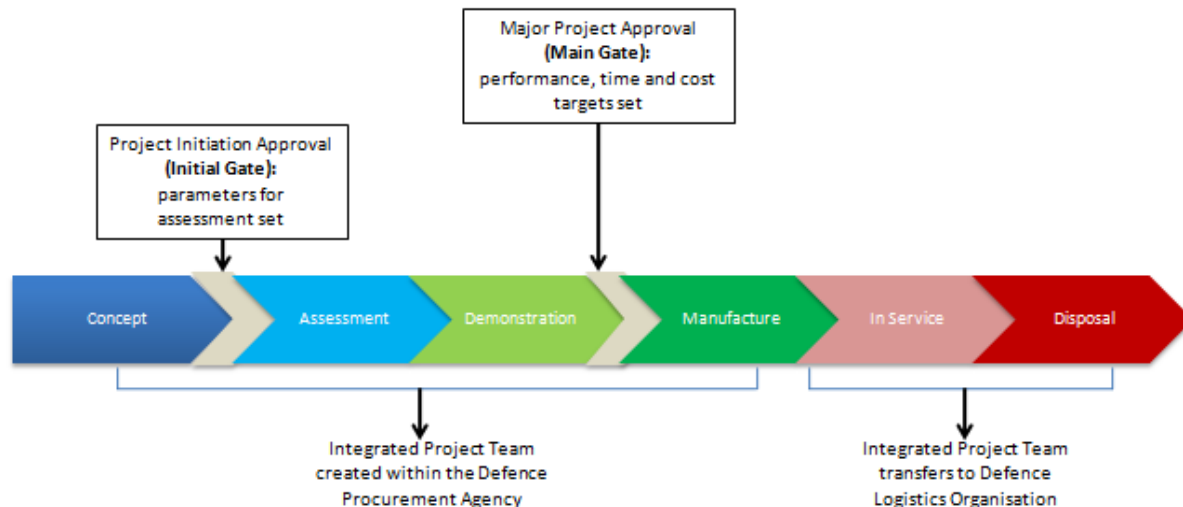


Figure 2. CADMID
(Adapted from NAO, 2004, p. 29)

The reforms within the Smart Procurement Initiative were aimed not only at restructuring the MoD but also at looking to create a partnership with prime contractors in which competition would create better value for money and customer service. “This introduces a ‘whole-life approach’ to acquisition, and has as one of the main tenets, the use of MoD Integrated Projects Teams to work closely with all contractors and their suppliers in order to identify ‘Gainshare’ opportunities” (Cullen & Hickman, 2001, p. 525). Gainshare is the mechanism by which the MoD promotes cooperation with its prime contractor and incentivises them to identify possible savings which can then be inserted into the contract agreement. IPTs² were created as an embodiment of the collaborative relationship between the MoD and its prime contractor. “The overriding objective of the IPTs is to reduce the costs of procurement by developing more open relationships with their contractors promoting innovation and monitoring all operations within a ‘shared data environment’” (Cullen & Hickman, 2001, p. 527).

The Smart Procurement Initiative, while having many advantages, was restricted in scope. The MoD recognised that in order to reform its supply-chain strategy it needed to look beyond procurement and encompass the entire acquisition process. The effective acquisition and support of defence capability incorporates initial procurement and on-going support as integral parts of the overall acquisition process. The Smart Procurement Initiative was renamed Smart Acquisition in 2000. The aim of Smart Acquisition is “to enhance defence capability by

² IPTs consist of MoD personnel from key specialisations (such as finance and defence requirements office) working alongside business unit representatives from the prime contractor to deliver defence acquisition from concept-to-disposal.

acquiring and supporting equipment more effectively in terms of time, cost and performance” (MoD, 2001, p. 4). Smart Acquisition seeks to improve the relationship between the MoD and the defence sector based on seven principles:

- A whole life approach, typified by applying through life costing techniques
- Integrated Project Teams (IPTs) with clearly identified customers
- A better, more open relationship with industry
- More investment in the early phase of projects
- Effective trade-offs between system performance, through-life costs and time
- New procurement approaches, including incremental acquisition
- A streamlined process for project approval

With these principles, the MoD is making an implicit change in the way it wants to do business with its industrial base. The MoD wants to move away from the adversarial relationship which has typified defence equipment acquisition and create a partnership approach (MoD, 2002). The issue of responsibility for project risks was an important driver of the changes made to the acquisition process. With Public Private Partnerships and Private Finance Initiatives, becoming more evident in defence equipment projects (MoD, 2002), risk management has become central to how projects are managed and delivered. The MoD is intent on placing the risk on the prime contractor; however, this means that it has to relinquish the propriety rights, which provide the returns on risk. This affords prime contractor the chance to exploit opportunities in the export market (depending on regulatory rules imposed on defence exports) using their proprietary knowledge and products. The MoD loses the technical know-how that comes with development and is thus more reliant on its industrial base, making the relationship it has with its suppliers ever more important. Smart Acquisition attempts to apply a range of principles to create an efficient and effective defence acquisition process. The MoD continues to restructure its organisation so that it can improve the acquisition process. The latest of these restructures was the merger of the DLO, DPA and the DCSA (Defence Communication Service Agency) in April 2007 to create Defence Equipment and Support (DE&S). The DE&S has assumed all responsibilities of the previous departments and agency—the main aim of the integration being to create a coherent organisation and remove dual accountability problems inherent in the past configuration (MoD, 2007).

Central to the changing nature of defence industrial relationships is the formation of IPTs. The structure of the IPTs has slightly changed (with the restructuring of the MoD), but the vision remains the same as originally conceptualised. IPTs originally were dually accountable to the DPA and DLO, as shown in Figure 2. In the current DE&S structure, this dual accountability has been removed, however the day-to-day activities and the people working in IPTs remains the same as before (MoD, 2007).

Although the main function of IPTs—the delivery of equipment and support to the Front Line—will remain fundamentally unchanged there will be differences to the ways in which they fulfil this role. In fulfilling these responsibilities, team leaders and their staff will, as now, be required to work within the overall DE&S governance framework and in accordance with its key processes. (MoD, 2007, p. 16)

The vision remains to create better engagement between the MoD and its supplier(s) through the IPT mechanism. This is a policy vision, which has been espoused in numerous MoD policy papers and publications (MoD, 1998; 2002; 2005). For example, at the institutional level,



IPTs possess a policy context. On the governance level, they are identified in terms of the relational contracting approach they engender, and in investigating the day-to-day activities of IPT members, we can identify the “teams, tasks and routines,” which characterise the process level. This does not, however, suggest that the levels are inherently synergetic. As we shall discuss in the following sections, there are stark differences in the vision outlined at the institutional level, the purpose at the governance level, and the reality at the process level.

A major development in UK defence acquisition in the last decade has been the transition towards “Capability Acquisition.” IPTs are responsible for delivering the capabilities required by the end-use customer, the Armed Forces. As early as 1998, the UK viewed its acquisition policy in terms of capabilities rather than platforms. In the *Strategic Defence Review*, the MoD (1998) states its desire to change its equipment acquisition from a “one for one basis” towards a more collective acquisition policy offering a “new level of battlefield capability.” “While the concept is still at a relatively early stage, we are now describing our Military Tasks in more generic terms using the language of effects. This supports a future force development process focussed on capability—able to contribute to delivering a range of effects—rather than like-for-like platform replacement” (MoD, 2003, p. 10). The transition towards an acquisition policy based on capabilities has transformed the scope of defence acquisition towards a whole-life and integrated systems approach. Through-life capability management (TLCM) was introduced as a way of managing capability acquisition.

There is a general shift in defence acquisition away from the traditional pattern of designing and manufacturing successive generations of platforms—leaps of capability with major new procurements or very significant upgrade packages—towards a new paradigm centred on support, sustainability and the incremental enhancement of existing capabilities from technology insertions. The emphasis will increasingly be on through-life capability management, developing open architecture that facilitates this and maintaining—and possibly enhancing—systems engineering competencies that underpin it. (MoD, 2005, p. 19)

TLCM provides those in charge of delivering defence capability (IPTs and DE&S) with a holistic way of viewing current and future capability requirements, with incremental acquisition being a central part of the approach (MoD, 2006).

TLCM will consider a much wider range of options for meeting capability needs, examining both new and in-service equipment solutions, exploring opportunities and implications for trading across all DLODs [Defence Lines of Development]—Equipment (including Support), Personnel, Training, Logistics, Infrastructure, Concepts—while considering capability delivery on a much longer term, programme basis. (MoD, 2007, p. 7)

“At the heart of the force structure and capabilities modernising programme is Network Enabled Capability (NEC)” (MoD, 2005, p. 20). The changes that are being planned at the operational level with Network Enabled Capability (NEC) has a direct effect on the overall strategic relationship between the MoD and industry. The MoD has identified, on the operational level, that it needs to use its information communication technology capability more effectively if it is going to meet the changing threats to national and international security. “NEC is crucial to the rapid delivery of military effect. The SDR New Chapter recognised NEC as being fundamental in counteracting terrorism abroad, with its ability to deliver precise and decisive military effects, with unparalleled speed and accuracy through linking sensors, decision-makers and weapon systems” (MoD, 2003, p. 11). Furthermore, NEC is the main focus of the response



to the changing nature of warfare: “Network Enabled Capability comprises three core elements: sensors (to gather information); a network (to fuse, communicate and exploit the information); and strike assets (to deliver military effects)” (James, 2004, p. 15). The aim is to use embedded ICT systems to create a network which will follow C4ISTAR (Command, Control, Communication and Computers, Intelligence, Surveillance, Target Acquisition and Reconnaissance) capabilities.

Thus, the current dynamic in the UK defence sector is shaped by three different (and not always complementary) factors:

- Arrangements to cope with the effective bilateral monopoly in the markets for individual platform types by moving from competition to collaboration;
- Changes inherent in the transition to acquiring capability rather than platforms via long-term contracts
- Adapting to the opportunities offered by NEC integration across platforms to create systems of systems.

The MoD’s response to these challenges is that:

the nature of acquisition is evolving and we face an increasingly demanding and complex environment. Closer collaborative engagement between us and our industrial suppliers will be vital if we are to continue to deliver the improvements that the Armed Forces and UK taxpayers demand. (MoD, 2005, p. 131)

Our preliminary research aims to identify how these institutional dynamics shape actions on the governance and process level, and consequently how actions at the process level shape the structure of governance, and in turn, the institutional level.

The Governance Level

The acquisition policies at the commencement of the project shaped significantly the governance arrangements. The feasibility stage in the mid-1990s involved 5 consortia; they are now all part of a single company. Of these proposals, 2 were taken forward and competing full proposals were submitted in 2001; the contract was awarded to the successful bidder in 2002. By 2004, these two former competitors had merged. This restructuring of the UK defence sector is experienced from the point of view of the governance level as a significant escalation of pre-contract asset specificities thereby increasing the risks of opportunism. As we shall see, the growing risk of opportunism is being mitigated by a shift towards more collaborative transaction governance arrangements. This is one example of the way in which acquisition policies at the institutional level that are based on competitive tendering—in principle, in the absence of pre-contract asset specificities—are being reshaped by changes at the governance level as the sector consolidates.

Economic theory would predict vertical integration in such a situation—see the classic Fisher Body/General Motors case (e.g., Klein, 1996)—but this is rendered nugatory by the low transaction frequency. The MoD will only purchase around 65 vehicles from a one-off design in a single contract. The MoD has, therefore, been trying to develop more collaborative relationships with its suppliers, which are institutionalised in the concept of the Integrated Project Team (IPT) which from the perspective of the governance level can be conceived as a governance mechanism.



In addition to rising pre-contract asset specificity due to reduced competition at the governance level, uncertainty is increasing because of the shift from the procurement of platforms to the acquisition of “capability.” Unlike the platform it replaces, the contract for the AMV has an expected life of 37 years. From the in-service date, the Contractor Logistic Support contract will run for 5 years before it is renegotiated for the subsequent period. Considerable uncertainties surround the operational environment for the AMV over that period. The renegotiation process 5 years hence will also involve high levels of asset specificity as neither party has a viable alternative customer or supplier. This combination of uncertainty and asset specificity is likely to make negotiations difficult in the absence of high trust.

Thus, one informant argued that

[T]he evolution will be more towards a partnering relationship. If we [company] get it right we get to the point where there is no competition, we are automatically seen as the preferred source [...] against this backdrop of technology insertion, relieving equipment as opposed to replacing equipment we have to place ourselves in the position where we do become the customers best friend [...] Ultimately [this company] are going to have to go to TLCM.

In order to set out the more collaborative aspirations of the IPT from the outset, one informant told us that

The thing we did very early on when we signed the contract, is we got a joined IPT industry-MOD, we have a joint charter with a joint set of values [...] and the statement that we use collectively and the Project Manager from MOD coined at the time is we are wedded together in this, we all stand or fall together in success, if this doesn't work there are no winners. And that has been the whole mentality behind it. So everybody is striving to make it work.

This charter is presented in Panel 1.

<p>We will</p> <ul style="list-style-type: none">• Develop and maintain a team focused on delivering its commitments• Be professional in every aspect of the project• Recognise and celebrate success and progress at all levels of the team• Develop, maintain and enhance communication• Promote co-operation and joint problem solving• Develop trust and openness at all levels of the team to build strong and honest relationships, eliminating secrecy and defensive attitudes• Share knowledge throughout the project, enabling the provision of accurate information at all times
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Panel 1. The AMV IPT Project Charter
(IPT documentation)

This approach has yielded many positive results. We were told, for instance, that

[T]his present MoD IPT in [programme name] is probably the best I have worked with in terms of friendliness, appreciative of our problems, sympathetic and working with us. There is a good work ethic in terms of wishing to work with us and help us help them. and It is very much, let's take the customer along with us, let's have the customer involved, so when we get to the milestone it is almost a rubber stamping exercise.



However, this collaborative approach also encountered a number of difficulties. One important idea behind the IPT was to have a co-located project team that could take advantage of team working, good communication and cooperation. This notion was to be realized through continuous interaction enabled by prescribed tasks, teams and routines. The management of relationships (customer, user, suppliers) was therefore a key tactic in this programme. However, the original bid was won through competitive tendering, and the dynamics inherent in such a process have placed significant constraints upon the IPT's ability to collaborate because of the constraints of a project won by competition, with "a very tight contract, budget and margins squeezed to win the work." For example, the proposed shared data environment (SDE), which would enable improved communication and coordination between industry and customer, was not effectively implemented due to cost and commercial constraints.

The customer³ expectations have their foundation on the key performance requirement specified by the customer as well as industry's offer—what was in the bid proposal. A challenge for the IPT is closing the gap between what was originally offered (the bid proposal) and the technical requirements specifications (TRS). Thus it was argued that

I think there is a need to change in relation to the relationship with the customer. I know industry is in business, it wants to win the contract, it wants to make profits. But sometimes I think defence industry will tell the MOD what it wants to hear rather than what it is actually capable. You know they will promise everything and then there will be delays to the programme, because they can't actually quite meet it.

And that,

There were also occasions where [industry] didn't challenge the customer and say, do you really want this, is there a compromise here, explaining that what was being asked for as a requirement was unrealistic or unachievable or meant compromising something else. Sometimes to their detriment the team sat down and busted a gut to try and deliver what they promised and sometimes that was to their detriment; instead of turning around and saying look we are putting a lot of effort into this and actually it is unrealistic and unachievable.

Thus, at the governance level, there is an understanding of the need to move towards a more collaborative approach as advocated by the IPT governance structure. However, this is constrained by the lingering effects of the competitive bidding process by which the supplier for the AMV was selected. This led to a highly resource-constrained environment, which meant that the appropriate investments in collaboration such as the SDE could not be fully implemented.

The Process Level

The IPT has around 120 members in all. The proposed structure, new to the prime contractor, was a direct response to the need of moving from platform to capability delivery. The IPT was structured around seven "ilities" or sub-system teams (e.g., reliability, mobility, software, C3I, fightability, survivability, Special To Role as highlighted in Figure 3) with a number of specialist functions in support (e.g., finance, contracts, programme, quality, supply

³ In UK defence acquisition, the acquisition agency is known as "customer 1" and the final military user "customer 2."

chain and business development). Each “ility” is led by a Cost Account Manager (CAM) who is responsible for delivering the tasks associated with achieving each sub-system functionality and for ensuring they are “harmonised” when integrated into the larger project. This involves both project management responsibilities such as scheduling and budgeting, project controls and also systems engineering responsibilities. The CAMs report through the Chief Engineer, who is accountable for specifications and requirements, and supported by an integration team. In a classic project matrix, the Programme Manager supported by his own team is accountable for delivery against project objectives. This is illustrated in Figure 3. Commercial functions report outside of both of these. Thus the IPT consists of three main types of team responsible for three different types of tasks—engineering design focused on technical creativity; programme management, focused on team co-ordination; and commercial, focused on external supplier selection and management.

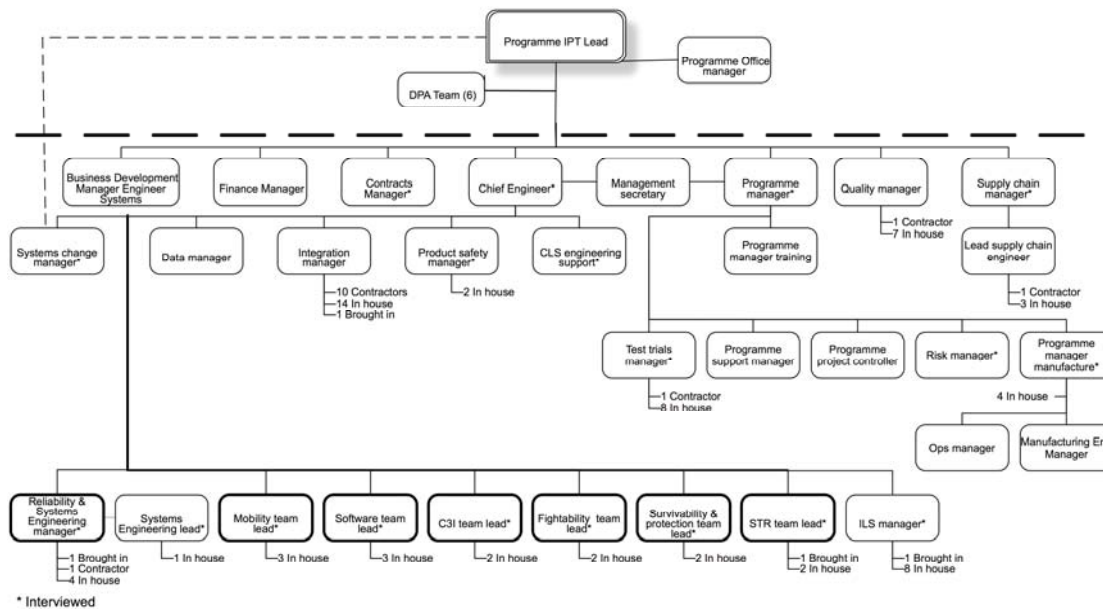


Figure 3. IPT Structure as of End of 2007
(IPT documentation)

The key player in this structure is the CAM, liaising with the Chief Engineer on engineering issues and the Programme Manager on project issues. This is perceived to be putting considerable strain on the CAMs, while there is also a perceived lack of system-level systems engineering to address cross-ility issues and a need for a “stronger systems engineering team.” This perception is a result of two things: first, the new structure to deliver capability means that system level responsibility and accountability lied within each “ility” rather than with a programme level systems engineering team, as had traditionally been the case on other programmes. The challenge was for the IPT to accept, understand and realise this new philosophy. Second, the constraints of the budget and schedule mean that the project was under-resourced. This resulted in not enough systems engineering being carried out at the front end of the project, which eventually had an impact on design development, and in CAMs being overloaded with systems engineering and project management type work.

However, we were informed of a further issue:

[T]he danger there is because there are different ilities, each of them then develops a way of working that is slightly different from the next ility, and so you carry through with it, it gets more entrenched. And at some point in the programme you are going to say to the ilities people, I'm sorry but you are going to have to align your processes now. And that gets painful. Yeah, this happened. It was all a jumping, because there was always going to be a winner and losers. There is always going to be one process in preference of another. And it is still going on now as we go forward. The issue was not identified until now. The business processes are outside the [name of the programme] team. This should be generated from the business. The business should be saying to us this is how you budget, supply and set up relationships, that is how you construct X, this is how you can manage the requirement. That wasn't there, so we had to generate all that ourselves. And all this was unplanned work.

The dynamics of task and team are structured around a number of best practice routines at both the corporate and IPT levels, yet these are perceived to be inadequate. Those at the IPT level are mandated by the MoD; while those at the company level are mandated by the corporate level. These routines are perceived to constrain the dynamics of tasks and teams but also provide formalised processes that offer assurance for the customer and corporate levels. Generally acknowledged as necessary, they are also considered to be too procedural, constraining new ways of thinking, and to detract focus from systems engineering type work. Therefore decision making processes slow down, which in turn slows the project progress:

The process is a bit formalised, most things that are done here are very structured and very constrained by procedures. It is how the company has developed. I think years ago the company was run by people, now it seems to be run by processes. I think the advantage of having these processes is that everybody knows what they should be doing and it is not left to individuals, it cuts down the number of Mavericks in the business. In the old days, people ran the business and people were allowed to make decisions almost on the hoof. Now we have got a lot more checks and gates before we can go and do something else. The drawback is that it slows everybody down. It sometimes feels like you are just working processes rather than developing a vehicle...I remember in the old business...they said too many things are going wrong, so we have to do all these checks. We have checks in design reviews, but we are going to have far more of this, specific gate reviews. And we would do all that. And I remember thinking, wow! the pendulum has swung the other way, and eventually it is very heavily constrained, very procedural, much more like civil service, and suddenly everything is being clamped down...I thought we would find a happy medium, and I don't think that has happened.

Despite the awareness and availability of these processes and guidelines some processes, which would indicate how certain tasks needed to be done, were not fully developed or were not available at the outset. For example, statements of work or technical requirement documentation, systems engineering processes were not available at a business level for example. This meant that "ility" team members had to develop new processes when required. But the development of these new processes was not aligned across the "ilities." Time spent defining and developing these processes detracted from the systems engineering work and in some cases this contributed to delays in the programme. The non-alignment of processes affected those "ilities" that needed to align their process with the chosen process.

These issues are compounded by the routines within the MoD. Overcoming the impact of change in customer personnel is another challenge for the IPT. The MoD has a policy that



personnel on programmes should stay in post 2-3 years, which affects the nature of collaborative working. For long-term programmes, this means little continuity and stability from the customer, which destabilises the relationship and affects the perception of the quality of the relationship, which in turns affects behaviour and the propensity to work collaboratively because it

[M]eans that new relationships have to be developed, and that common understanding is no longer there. With the change of face you have different interpretations, it can take a new member up to six months to get up to speed, the knowledge, experience and skills differ from the previous person and interpretation of written requirements can vary [...] it is difficult to write a requirement that can only be interpreted in one way.”

We can see, therefore, how the dynamics of tasks, teams and routines at the process level start to shape the level of collaboration that is possible at the governance level, while the lack of resources to support collaborative working is a result of the constraints imposed by how tendering at the governance level was organized.

Conclusions

Through our exploration of the dynamics of the UK defence acquisition, from policy initiatives to programme implementation, our preliminary research has shown how the institutional level dynamics shape actions at the governance and process level and how these in turn can potentially reshape the structure of governance and institutions. The dynamic between the institutional and governance level is exemplified in the way in which acquisition policies at the institutional level, based on competitive tendering, are being reshaped by changes at the governance level as the UK defence sector consolidates. Attempts by the MoD to develop more collaborative working relationships with its supply base have been institutionalised in the governance mechanism of the Integrated Project Team (IPT). This governance structure supports more collaborative approaches but, as we have explained, can be constrained by the effects of bidding process—a value for money approach at the governance level. At the institutional level, the policy shift from procurement of platforms to acquisition of capability influenced the decision for a new IPT structure at the process level. However, the opportunities for capability delivery offered by a new structure were only partially realised due to the highly resourced constrained team, a legacy of the bidding process.

At the process level, the dynamics of task and teams were structured around routines; the demands on the team to implement corporate routines and the lack of resources all had an impact on the effectiveness of task completion. At the same time, human resource routines mandating rotation of staff on the client side undermined the collaborative basis of the IPT. The dynamics of task, teams and routines at the process level can, therefore, potentially strain or enhance the collaborative mindset encapsulated through the IPT at the governance level. As a consequence, dynamics at the process level are continually reshaping the collaborative approach at the governance level.

This research contributes to our growing understanding of the UK defence acquisition process by using a Transaction Cost Economics (TCE) approach in a 3-tier (institutional, governance, process levels) conceptual framework. Through the AMV case, we have attempted to explore how these levels interact dynamically through time. In particular, we have shown how acquisition policy initiatives at the institutional level can be vitiated by operational routines at the process level, and how these routines then shape how the policy initiative is implemented. This



paper is merely a first attempt at elaborating these dynamics and a full analysis will be forthcoming in due course.

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