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Defence Reform in the United Kingdom

A Twenty-First Century Paradox

John Louth

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Ifri
27 rue de la Procession
75740 Paris Cedex 15 – FRANCE
Tel : +33 (0)1 40 61 60 00
Fax : +33 (0)1 40 61 60 60
Email : ifri@ifri.org

Ifri-Bruxelles
Rue Marie-Thérèse, 21
1000 – Bruxelles – BELGIQUE
Tel : +32 (0)2 238 51 10
Fax : +32 (0)2 238 51 15
Email : info.bruxelles@ifri.org

Website : www.ifri.org

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The author

Dr. John Louth is Senior Research Fellow and Director for Defence, Industries and Society at the Royal United Services Institute for Defence and Security Studies. His work has included the audit and governance of the UK strategic deterrent, the implementation of risk-based governance regimes into energy businesses, UK Ministry of Defence and industry partnering initiatives. He spent part of his career in the Middle East running separate national programmes to develop commercial and defence capabilities across a number of Gulf States. Dr Louth has also worked as a senior adviser to the European Defence Agency on the development of pan-European procurement policies and practices. He teaches at Roehampton University Business School in London and is also a specialist adviser to the House of Commons Defence Select Committee.

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Abstract

The context of budgetary constraint offered a strong incentive for the 2010 Coalition Government to improve its management of defence equipment. Before that, the previous Labour governments already focused on smart acquisition so that the procurement process could reach a trade-off between military performance, the R&D costs and the purchase value. Thus, several smart acquisition reforms aimed at importing private sector skills and behaviours into the defence public domain. By building its logic around public-private partnership (PPP), smart acquisition can be apprehended as an interlocking of three factors: organisation, the high level of process and body of knowledge, and the people who promoted and enacted its processes, behaviours and objectives. Due to organisational confusion, ineffective project management and unclear objectives, successive UK governments have failed to manage operational and financial risks, cost overruns and diseconomies.

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Le contexte de restriction budgétaire a poussé le Gouvernement de Coalition de 2010 à améliorer sa gestion des équipements de défense. Auparavant, les gouvernements travaillistes successifs avaient mis en avant la « *smart procurement* » afin que le processus d'acquisition puisse atteindre un compromis entre la performance militaire, les coûts de R&D et la valeur d'achat. Des réformes successives ont visé à introduire les compétences et les comportements du secteur privé dans le domaine public de la défense. En construisant sa logique autour du partenariat public-privé (PPP), la « *smart acquisition* » peut être appréhendée comme l'emboîtement de trois facteurs : l'organisation, le haut niveau du processus et du corpus de connaissances, ainsi que les acteurs qui encadrent le processus d'acquisition. En raison de confusions organisationnelles, d'une gestion de projets inefficace et d'objectifs imprécis, les gouvernements britanniques successifs semblent finalement avoir échoué à gérer les risques opérationnels et financiers, les dépassements de coûts et les déséconomies.

Introduction

The practice of defence in the United Kingdom seems to be swathed in an omnipotent collective narrative of managerialism, transformation and reform. The Coalition Government of 2010 unleashed yet more change in the quest for a prize of efficiency, effectiveness and affordability – none of which were new themes or ambitions. Indeed, much of the intent for change had been articulated in the previous decade under the banners of smart procurement and smart acquisition.

This paper explores this constant narrative for change and seeks to understand the impact, seemingly, constant change programmes have on the constituent elements of defence – the military, defence industrialists and civil service communities. Addressed, initially, is the transformation agenda of the Coalition Government and the reforms undertaken since 2010 and those still planned. Thereafter, the paper unpacks the changes made by smart acquisition (and its' predecessors and derivatives) from 1997 to 2010, and explores the constant demand for yet more and better management of defence.

To do this, the paper is framed around four distinct sections. The first discusses today's narrative of reform. Section two explores the road to the Coalition Government's reforms of 2010, associated with the Strategic Defence and Security Review. The third section unpacks the physicality of the smart acquisition reforms up to 2010 that preceded the strategic review, whilst section four introduces a number of lessons that might be applicable to other states seeking to reform their defence policies and processes.

The Narrative of Reform

The UK's publication of its National Security Strategy and the Strategic Defence and Security Review (SDSR)[1] in 2010 confirmed that the UK budget for its national defence had to contract by about 7.5 percent to 2015, and that military capabilities would need to be reduced and rationalised. This led to platforms such as *Harrier* and *Nimrod* MRA4 being removed immediately and completely from the UK battle plan. The UK Parliament Defence Select Committee in 2011 heavily criticised UK government policy for defence, claiming that UK forces will in future struggle to meet its commitment in Afghanistan and elsewhere over the short term to 2015. Moreover, the Committee asserted that capability gaps will emerge in the short to mid-term, such as Carrier-Strike capabilities and maritime patrol, and that in the mid to long-term the UK would no longer be a full-spectrum defence capable nation.[2] The chairman of the Defence Select Committee, James Arbuthnot MP, went so far as to say that SDSR "is a clear example of the need for savings overriding the strategic security of the UK and the capability requirements of the Armed Forces. The Government needs to outline its plans to manage the gap left by the loss of these capabilities."[3]

Moreover, a number of recent National Audit Office reports[4] have argued that substantial systemic and behavioural issues around the management of UK defence equipment, relationships and personnel has bequeathed a cycle of unrealistic requirements setting, planning, competition policies, budgeting and contractual practices. This has led to substantial cost overruns, delays to equipment in-service dates, and the necessity for the UK Ministry of Defence (MoD) to find significant short-term budgetary savings. Overlap the Western age of austerity onto this organisational and financial dysfunction and, according to the defence ministry's senior political leadership, at the beginning of the Coalition Government's term of office the UK had a hole in its defence budget to the tune of £51 billion. This was comprised of an 'unfunded liability' of £38 billion recorded in the SDSR, a further £8 billion to potentially renew

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[1] HM Government, *Securing Britain in an Age of Austerity: the Strategic Defence and Security Review* (SDSR), Cm 7948, London, The Stationery Office, October 2010.

[2] House of Commons Defence Committee, *The Strategic Defence and Security Review and the National Security Strategy*, HC 761, Sixth Report of Session 2010-2012, London, The Stationery Office, August 2011, available at: http://www.publications.parliament.uk/pa/cm201012/cmselect/cmdfence/761/761.pdf.

[3] *Ibid*., p 54.

[4] National Audit Office, *Ministry of Defence: Major Projects Report 2009*, London, The Stationery Office, December 2009, available at: http://www.nao.org.uk/wp-content/uploads/2009/12/091085i.pdf.

the nuclear deterrent in some form and a £5.5 billion revaluation of the core equipment programme ordered by Bernard Gray, the Chief of Defence Materiel: a ten-year funding gap of £51 billion from 2010/11 to 2020/21.[5] The uncertainties associated with budgetary constraints, the need for economies, changing requirements, an operational drawdown from Afghanistan by 2014, and the ongoing organisational restructuring of the military itself[6] dominated the UK defence and national security environment.

In addition, despite a history of indigenous defence industrial capabilities stretching back over epochs, there is a growing unease in relation to defence industrial policy under the UK Coalition Government. It is UK government policy to have a complete range of defence capabilities to meet seven key strategic tasks[7] ranging from the defence of the UK and overseas' sovereign territories, through an ability to project power via expeditionary interventions, to the support to civil authority in response to natural, and other, emergencies. Likewise, it is government's responsibility to align resources to required capabilities in order to meet these goals. If resources are not there, or savings are required in pursuit of other considered government policies that have a higher priority than defence, then the defence capability demanded has to be reduced. It seems a legitimate concern that the current UK government, like those before it, fails to understand, or chooses to ignore, the causal relationship between capability demanded and resources needed.

The White Paper on Technology, Equipment and Support[8] hinted at an ambition for much of the UK's military hardware needs to be procured in future 'off the shelf' (OTS). For advocates, this policy is often perceived as a cheaper and less-risky option than researching and developing new

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[5] This estimate is based on the assumption that the defence budget under a Labour Government from 2010 would have remained level in real terms, compared against the forecast budget needed to finance MoD known forward plans from 2010 to 2020/21. See Malcolm Chalmers, "Capability Cost Trends: Implications for the Defence Review," *Future Defence Review Working Paper*, No. 5, London, RUSI, January 2010, available at: http://www.rusi.org/downloads/assets/FDR_5.pdf.

[6] Lord Levene has conducted a wide-ranging review of the Ministry of Defence. See Lord Levene of Portsoken (ed), *Defence Reform: An independent report into the structure and management of the Ministry of Defence*, London, The Stationery Office, June 2011, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/27408/defence_reform_report_struct_mgt_mod_27june2011.pdf.

[7] The seven Defence tasks are: the defence of the UK and overseas territories, the provision of strategic intelligence, the provision of nuclear deterrence, support to civil emergencies, the projection of power through expeditionary interventions, the provision of defence contribution to UK influence and the provision of security for stabilisation.

[8] Ministry of Defence, *National Security Through Technology: Technology, Equipment and Support for UK Defence and Security*, Cm 8278, London, The Stationery Office, February 2012, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/27390/cm8278.pdf. See also, Ministry of Defence, "Equipment, Support and Technology for UK Defence and Security: A Consultation Paper", Cm 7989, *Defence Green Paper*, London, The Stationery Office, December 2010, available at: http://www.official-documents.gov.uk/document/cm79/7989/7989.pdf.

defence equipment within the UK. However, most OTS packages would inevitably mean 'off-shore' purchases leading to questions around intellectual property (IP) transfers. Without fully owning or even understanding the IP, British military practitioners would not be able to completely exploit the equipment in question; a most unsatisfactory scenario. Moreover, the costs of through-life upgrades of military OTS equipment can be prohibitive, undermining any initial value-for-money assessments. Also, in times of national crisis it is very difficult to possess a surge-capability within a national industrial base if that national industry base no longer exists. This represents, of course, a probable consequence of reliance on OTS procurement.

This sense of the early stages of reformation of government defence industrial policy is highly significant. In the UK, nine companies were paid more than £500 million by the MoD in 2010. For the same year, seven companies were paid between £250 million and £500 million. Thirteen companies were paid between £100 million and £250 million, whilst twenty two companies were paid £50 million to £100 million. Eighty percent of these companies were British listed or private businesses.[9] These are sizeable sums that many of the companies in question rely upon in order for them to remain viable commercial entities. The twin challenges of budgetary constraints and OTS purchases may well drive some companies from the market. Indeed, one senior industrialist commented privately that his company could substantially reduce operations in the UK, perhaps even relocating and listing elsewhere, if a more involved and proactive UK defence industrial policy failed to emerge.[10]

The importance of government policies to the defence industrial sector cannot be overplayed as the UK defence industries make a significant contribution to the UK economy. By way of an example BAE Systems, the UK's largest listed defence company, employs over 95,000 people worldwide, of which 35,000 reside in the UK. Of the latter, half of these are professional engineers, either in practice or qualifying, making this company the largest private employer of engineers in the UK. The British part of the business generates annual revenues in the region of £9 billion and net exports of £4.8 billion. It pays direct taxation to the tune of £653 million and accounts for £900 million in terms of company and contract research and development. Moreover, it spends annually over £4 billion on the procurement of equipment, components, support and services from other UK businesses, supporting 125,000 jobs in the UK economy.[11]

The UK economy would be dealt a heavy blow if companies such as this were to conclude that the uncertainties within the UK marketplace, coupled with unfriendly government policies, made other markets more

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[9] Defence Analytical Services Agency (DASA), *United Kingdom Defence Statistics 2010*, Ministry of Defence, London, September 2010, available at: http://www.dasa.mod.uk/modintranet/UKDS/UKDS2010/pdf/UKDS2010.pdf.

[10] Private interview, 1 June 2011.

[11] Oxford Economics, *The Economic Contribution of BAE Systems to the UK in 2009*, Oxford, Oxford Economics, April 2011, available at: http://www.oxfordeconomics.com/publication/open/222581.

attractive. Asian economies, for example, are set to grow by about seven percent in contrast to stagnant economic growth projections for the West.[12]

As discussed above, whilst Britain's SDSR reduced the scale and scope of the UK's military posture, the country was still able to generate and project substantial sea, air and land forces and a continuous at-sea nuclear deterrent. Trevor Taylor points out[13] that these were capabilities in 2010/11 beyond the scope of emerging powers such as India, China and Brazil. Under the guiding hand of the SDSR, the Coalition Government continued its sweep of reform by commissioning a report into the optimum organisational solution for the Ministry of Defence itself. The Levene Report[14] emerged in the autumn of 2011 which, in turn, launched its programme of 'Defence Transformation' embracing forty seven change initiatives and the proposed elimination of approximately a third of the civilian workforce. These reforms, to date, have not clarified whether the Department is to be run on a defence capability basis or through single-Service lines of responsibility. As a consequence, there remains significant organisational confusion as to the role of the Departmental head office in relation to single-Service commands and how budgeting and transfer payments between Services for the generation of defence capabilities actually work. These ambiguities continue to drive resistance to change from those working in defence and give observers a reinforced sense of 'drift' within defence decision making.[15]

In short, the UK's defence ambition is just not clear. Both in terms of intent, in relation to defence industrial sustainability, and delivery of full-spectrum capability and effective defence reform, the dominant feature in the UK is a mystified incredulity.[16] So the question is how to deliver national security and replace disbelief with optimism. The previous Secretary of State for Defence had this to say: "I don't know how, but I anticipate it will emphasise open competition in the global marketplace, buying off-the-shelf where we can, and only using single-source suppliers where we must."[17]

Yet it must be questioned whether this is a political assertion rather than a policy directive. UK defence procurement practice and the industrial base it shapes, influences and, in truth, is profoundly dependent upon, seems to mix international industrial partnerships, UK-only programmes and government sector primacy, especially in certain areas of research and development. What has not been witnessed, so far at least, is significant OTS procurement.

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[12] BBC News Channel, 24 August 2011.
[13] Trevor Taylor, "The Limited capacity of management to rescue UK Defence Policy: A review and a Word of Caution," *International Affairs*, Vol. 88, No. 2, London, The Royal Institute of International Affairs, March 2012, pp. 223-242.
[14] Lord Levene of Portsoken (ed), *op cit.*
[15] Private interviews with UK Defence officials, January to March 2013.
[16] Private interview, 15 July 2011.
[17] Previous Defence Secretary Dr Liam Fox speaking at the Reform Think Tank, 1 Whitehall Place, 27 June 2011. Speech available at: https://www.gov.uk/government/speeches/2011-06-27-reforming-defence.

UK Defence Industrial Procurement Policy: an Uncertain Response

It is worth pausing to briefly consider a number of current, major UK defence procurement programmes. The A400M aircraft design, procurement and in-service maintenance initiative is a European collaborative programme involving a number of European governments and corporations. The UK maritime programme to provide a replacement attack submarine capability is, essentially, a national programme dependent upon BAE Systems as the platform integrator, prime contractor and design authority, whilst the F-35 combat aircraft programme is essentially a US-led joint programme of partner nations. I shall deal with each of these separately but, initially, it is worth pointing out that each is overtly bespoke and contingent to the political, industrial and environmental conditions present at their inception. They do not, on the face of it, represent a discernable example of either a sense of policy consistency or coherence in government decision-making.

There is little doubt that the A400M military aircraft programme is a European initiative, with the British acting as both contributor and beneficiary. Whilst past delays and continuing cost escalations have challenged the core programme for this strategic lift aircraft, European governments and the pan-European defence industrial base have come together to reform and finalize a new and on-track delivery schedule. The seven launch nations, Belgium, France, Germany, Luxemburg, Spain and Turkey, along with the UK, have reached an agreement with EADS/Airbus Military to generate deliveries of the aircraft from 2014. Moreover, Airbus Military holds orders from these nations and others, such as Malaysia, and is in negotiation with other states for the provision of additional aircraft.

This is significant, for export orders were a constituent part of the partners' agreement for the programme. This presents an opportunity for nations and industry to address long-running constraints associated with national export controls, ITAR (International Traffic in Arms Regulation) issues and civil/military air certification regimes. For many, consequently, A400M, and perhaps Airbus Military itself, is viewed as a major European partnering success story as well as a significant contribution to successful UK national military procurement and future capability delivery.

In contrast, Britain's quest for a future attack submarine and deterrent fleet could be characterised as robustly national and "on-shore". BAE System's Barrow shipyard is recognised around the globe as a submarine centre of excellence, and is the UK's only builder of submarines. It employs some five thousand people across a wide spectrum of skills and competencies. The *Astute* class attack submarine, as a replacement for the *Trafalgar* class, was ordered in 1997 with the first boat, HMS *Astute*, launched in 2007 and commissioned into the Royal Navy in 2010. HMS *Ambush*, the second boat, will contain the twenty-seventh submarine nuclear power plant to be designed, constructed and commissioned at Barrow. A testament indeed to the national, and deep-held, skills set residing in sovereign capability in the Barrow shipyard.

In addition, BAE Systems Submarine Solutions at Barrow is at the heart of the programme to design a "successor" submarine to the *Vanguard* (Trident) class of boats to carry the UK strategic deterrent. HMS *Vanguard*, itself, is expected to decommission in 2024; the successor programme, consequently, began its "concept" phase of procurement in 2007 with political approval anticipated sometime during the 2015 Parliament.

The F-35, or *Lightning II*, programme, a US-led international air collaboration, started its life in the early 1980s as a US-only procurement, essentially designed to meet the needs of the US Marine Corps. In its early phase the UK was the only level-one procurement partner, with Denmark, the Netherlands and Norway at level-two, Canada and Italy at level-three, and Turkey, Singapore and Israel at level-four. The Concept Demonstrator Phase gave way to the System Development and Demonstration Phase when the US partnered predominantly with the UK, the Netherlands and Italy.[18]

The collaboration between LM and BAE Systems to generate the F-35 is a truly multi-national initiative, at both government level and corporate level, with the aircraft offering quite profound technological advantages over its potential competition. However, the unit cost may be such that its deployment becomes not so much an operational risk as a financial risk. Consequently, the numbers required by each nation appear to be constantly revised downward, though the core programme remains robust.

So, it can be argued with some confidence that future capabilities are generated and retained through a variety of contractual and commercial solutions, both international and collaborative and through national programmes. There is a complexity that government policy seems neither to recognise nor seeks to influence.

[18] David M. Moore (ed), *Case Studies in Defence Procurement and Logistics – Volume I: From World War II to the Post Cold War World*, Cambridge, Cambridge Academic Press, 2011.

The Road to Smart Procurement

Of course, the policies and processes governing the procurement of military equipment have to address a number of imponderables and unknowns such as future political and military alliances, the pace, effectiveness and impact of emerging technologies, the nature of future threats, and political will. In addition to all of this, the military procurement process must successfully project, manage, design, construct and deliver programme lines that are acknowledged to be amongst the most complex in the world in an environment that is far from conducive to the deployment of oft-perceived best practice acquisition competencies and processes.

Perhaps driven by the complexities of military procurement, as early as 1958 it was found that the actual costs of equipment programmes for UK defence were almost three times the forecast projected values of these programmes at their inception.[19] Indeed, as early as 1961, the British government attempted to improve a failing defence procurement process by requiring every major programme to state the capability required of the equipment being purchased, the main technical risks to delivery, and the key performance parameters.[20] The Gibb-Zuckerman reforms, as the changes arising from the 1961 report came to be known, were reviewed in 1968 revealing the following insights. Costs and delays had continued to rise during the 1960s, and the defence procurement process was far from under control. Indeed, complex systems that had consumed vast resources, such as the Seabug missile, were pronounced obsolete in the mid-1960s, the programme scrapped and the investment lost.[21]

Government's response to a defence procurement process which was overspending was to establish a committee. Chaired by William Downey, a civil servant, this standing board was known as 'The Steering Group on Development Cost Estimating.' This committee established the Downey reforms, as they became known, which "governed all significant projects for the next 30 years. Downey recommended that each phase must be fully completed before the next phase began […] so that full

[19] House of Commons Defence Committee, *The Strategic Defence Review*, HC 138 (volumes I-III), Eighth Report of Session 1997-1998, London, The Stationery Office, September 1998, available at: http://www.parliament.the-stationery-office.co.uk/pa/cm199798/cmselect/cmdfence/cmdfence.htm.

[20] Office of the Minister for Science, *Report on the Committee on the management and Control of Research and Development*, London, The Stationery Office, 1961.

[21] Lewis Page, *Lions, Donkeys and Dinosaurs*, London, William Heinemann, 2006.

development could be launched with confidence that projects would meet performance, cost and timescale targets."[22]

The Downey agenda was to come to dominate defence acquisition thinking from the end of the 1960s to the mid 1990s. Closely associated with the Downey process reforms of the late 1960s was the formation of the Ministry of Defence Procurement Executive (MoDPE). Since the end of World War II, defence procurement had been split between the three Service Ministries of the Royal Navy, Army and Royal Air Force, the front-line commands, the Ministry of Supply, the Aviation Ministry and the Ministry of Technology. A report in 1971[23] concluded that bringing the functions and activities of these widespread and, often, competing organisations together would generate savings and offer consistency and coherence.

MoDPE: Early Managerialist Reform

The MoDPE was established to manage all defence procurement programmes. A customer/supplier relationship was deliberately created between it and the three Armed Services, and when Peter Levene was appointed Chief of Defence Procurement – the functional head of the MoDPE – in 1985, he instigated greater competition amongst contractors for almost all defence contracts, and the replacement of cost-plus contracts with fixed-price contracts linked to milestone delivery. The simple question, of course, was: had it worked?

The creation of the MoDPE, coupled with Levene's insistence on greater competition and commercial openness, were intended to prevent cost overruns, delays in programme delivery and to assure value for money for the United Kingdom. An internal Ministry of Defence report in 1987 concluded that this whole exercise in reform, running through the preceding 20 years, had been an abject failure.[24] The Downey process procedures had not been vigorously or universally implemented, project management was still poor, and underpinning development work within the research programme was unsatisfactorily performed.

Whilst defence reforms had essentially been undertaken in private away from external scrutiny, the UK Parliament in the 1980s insisted on greater oversight.[25] From 1983 onwards, the Public Accounts Committee insisted on a Major Defence Project Review from the National Audit Office (NAO). Henceforth, the NAO was to produce annually a report examining the top 25 defence projects, which were viewed as having the greatest expenditure profiles over the following ten years. The NAO reports of the

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[22] Bill Kincaid, *Dancing with the Dinosaur*, Oxford, Alden, 1999.
[23] HM Government, *Government Organisation for Defence Procurement and Civil Aerospace*, London, The Stationery Office, 1971.
[24] Ministry of Defence, *Learning from Experience: A Report on the Arrangements for managing Major Projects in the MoDPE*, London, 1987.
[25] House of Commons Public Accounts Committee, *Ministry of Defence: Major Projects Report 2004*, Third Report of Session 2005-2006, London, The Stationery Office, 2004, available at: http://www.publications.parliament.uk/pa/cm200506/cmselect/cmpubacc/410/410.pdf.

1980s and 1990s revealed a Ministry of Defence that could not prevent projects significantly failing on cost and time criteria. The 1998 report shows that for the ten common projects from 1993 to 1998, cost overruns increased from an average of 3.2% to 13.7%, and that delays grew from an average 32 months in 1993 to 43 months in 1998.[26]

The NAO also repeatedly argued over these years that the competition reforms championed by Levene could, potentially, make the UK defence industry of the 1990s and beyond a non-viable proposition without massive public subsidy. The reasons for this perception are twofold. First, British defence and security companies would be increasingly exposed to overseas competition which, some observers believed, could 'hollow-out' capacity in the UK equipment providers. Second, fixed-price contracts meant that industry would have to demonstrate effective project management, pricing and scheduling skills if it was to make money – a set of competency risks that would have to be carried by shareholders. There is a delicious irony to be found in the fact that the defence smart acquisition reforms were predicated at one level of understanding on an assumption that superior private sector skills and behaviours could be beneficially imported to the defence public domain, when those very industry skills seemed to be in question during the long sunset of the twentieth century.

This is a key point, for the narrative is set in a period pre-dating the 1997 election. The Labour Opposition targeted the MoD as wasteful and ineffective[27] and the Conservative Party government as inept. Labour announced its intention, if elected in 1997, of initiating a strategic defence review to totally reinvigorate the defence procurement process whilst refocusing on a partnership with industry. What this represented, and how it was to be done, would become the smart acquisition change initiative. Yet, if smart acquisition was conceived of the specific time-bound environment of the latter part of the twentieth century, it is worth reflecting that military equipment procurement, within the UK and elsewhere, has always been difficult and success far from assured. Prior to World War I, the First Sea Lord, Admiral Jackie Fisher, oversaw a revolution in warship design and operational planning. The *Dreadnought* class of battleship made the various older steam-driven types obsolete due to the thick armour plating of its design. It was believed at the time that nothing could counter a fleet of such battleships with the exception, of course, of a comparable fleet.

However, at the first major fleet-on-fleet clash of the First World War at Jutland in 1916, Admiral Jellicoe famously commented that there was "something wrong with our ships today." The firepower anticipated from *Dreadnought*-derived ships was neither superbly accurate nor decisive. Moreover, the Admiralty Board and War Cabinet were both loath to commit these forces to battle. They were so valuable, given their enormous costs, and strategically important that nations and admirals tended to be reluctant to risk them in combat.

[26] Bill Kincaid, *op. cit.*
[27] Labour Party, *Strategy for a Secure Future: Labour's Approach to the Defence Industry*, London, Labour Party, 1995.

This procurement compromise between massive cost and operational capability is a theme that still dominates the military acquisition agenda today. Indeed *The Smart Acquisition Handbook*[28] issued by the MoD described the procurement process as such a trade-off between military performance, the time necessary to develop equipment and its cost.

Historical Insight: Managing Risks

The development of the *Dreadnought* class was an argument conducted in public between the Royal Navy, politicians and industrialists, often couched in the narrative of managing military and national risks and threats.[29] That is, if Britain failed to develop these weapons, then the country's prestige would be damaged and militarily the home nations would be exposed to greater, unanswerable firepower. The same debate, of course, which would be had in the British press from 2007 onwards, when it came to decide on the future of replacing the Trident nuclear weapon warhead and delivery system.

It seems clear though, that this concern with addressing risk is something which has been prevalent in defence procurement from before World War I to the present. The NAO Major Projects Report[30] characterises this today as 'operational risk' and 'financial risk'. The former is concerned with the risks associated with military outcomes, whilst the latter is the term for risks and issues found within input costs to projects. The procurement of the *Apache* attack helicopter at the start of the twenty first century is an example of the difficulties associated with risk-centric procurement. *Apache* is an American aircraft that the British Army procured in the attack-helicopter role; that is one that is intended to carry air-to-surface weapons and attack enemy ground forces.

The price of an *Apache* helicopter purchased from the US was £12m per aircraft. We know this from the Israeli purchase of a batch of 24 in 1999. For the British purchase, however, there was a concern – identified through the procurement practice of attempting to manage operational risk – that US factory lines and associated lead times may prevent re-orders and minimize spares availability. The decision taken, consequently, was for Westland Helicopters, in Yeovil, to manage this risk on behalf of the MoD. An engineering line was established at the company's headquarters to produce sixty-seven *Apache* helicopters under licence from the US, for use by the British Army.

The trade-off in managing the operational risk in this manner is, not surprisingly, an increase in cost. The overall cost of the programme was in the region of £2.5bn, or approximately £40m per aircraft.[31] In cash terms

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[28] Ministry of Defence, *The Smart Acquisition Handbook*: *A Guide to "Faster, Cheaper, Better and More Effectively Integrated,"* 5th Edition, London, MoD, 2004.
[29] Lewis Page, *op. cit.*
[30] Comptroller and Auditor General, *Ministry of Defence: Major Projects Report 2005*, The National Audit Office, London, The Stationery Office, November 2005, available at: http://www.nao.org.uk/wp-content/uploads/2005/11/0506595_I1.pdf.
[31] *Ibid.*

this is more than 300% per aircraft greater than the equivalent sold to Israel.

This perceived management of risk is significant and worthy of a moment's reflection. The UK MoD has in place procedures to ensure that the management of risks, including the transfer of operational and financial risks to industry as defined previously, delivers value for money. Indeed, this risk transfer was at the heart of the smart acquisition change agenda. However, value for money is seldom overtly defined and quantified within projects, and is usually qualitatively associated with the '3Es' of economy, efficiency and effectiveness. Yet of all these, input costs or economies are often the only factors which can easily be measured, often in the form of discounted cash-flows over the lifetime of a project.

In practice, it is extremely difficult to transfer risk to industry based on projected discounted cash-flows. The value for money element of the business case for a defence, or indeed any public-sector, programme is invariably based on estimating future costs and revenues, and is relevant only at the decision point for the procurement. Given the length of most programmes, this practice could not be described as mathematically rigorous. Edwards and Shaoul[32] identify that in public sector contracts, it is almost impossible to transfer the costs associated with identified risks. First, generating a risk mitigation net present value[33] that is contractually robust is hard to achieve. Second, there is a profound challenge within the public sector to generate robust risk knowledge. The consequent ability to derive effective mitigation strategies that can be costed and factored into a manufacturing or development programme simply does not arise. Moreover, it appears reasonable to assert that if the costs associated with risks are not contractually enforceable on an industry prime contractor, than the risk has not been transferred.[34]

Smart acquisition was derived from the need to respond to perceived significant failings in defence procurement abilities and attributes after World War II and to manage, or is it to mitigate, what were perceived as risks. But much of these perceived failings – the inability to manage and transfer self-described operational and financial risks, cost overruns and diseconomies – are historically consistent with the defence experience throughout the ages.

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[32] Pamela Edwards and Jean Shaoul, "Partnerships: for Better, for Worse?," *Accounting, Auditing and Accountability Journal*, Vol. 16, No. 3, 2003, pp. 397-421.

[33] In investment appraisals, cash income and expenditure are discounted by the cost of capital to generate the net present value of a particular programme or project option, thus allowing alternative courses of action to be compared within a business case.

[34] Julie Froud, "The Private Finance Initiative: Risk, Uncertainty and the State," *Accounting, Organisations and* Society, Vol. 28, No. 6, 2003, pp. 567-589, available at: http://193.146.160.29/gtb/sod/usu/$UBUG/repositorio/10290493_Froud.pdf.

The Physicality of Smart Acquisition

Smart acquisition was comprised of three distinct and interlocking factors – what could be described as the physicality of smart acquisition – that were derived from this recent history of UK defence procurement. The first of these factors was organisational. The defence acquisition agenda of the Labour government in 1997 led to three specific new organisations for the defence sector in government. The first of these, the Defence Procurement Agency (DPA), was introduced to procure new defence equipment. The second, the Defence Logistics Organisation (DLO), was designed and introduced to manage and maintain the new equipment procured by the DPA; and the Defence Equipment Capability (DEC) customer organisation, a new department within the Ministry of Defence itself, was charged with identifying the military requirement for new equipment, and sourcing the monies for its development and delivery.

The second of these distinct factors, drawn from and linking together these organisations, is the self-styled 'body of knowledge' ascribed to smart acquisition. This body of knowledge is comprised of the high-level processes, management tools and techniques and behaviours required of and valued in defence procurement professionals.

The third distinct factor is what could be labelled as the guardians of the body of knowledge. These are the people who formed the membership of the development schemes from which future smart acquisition professionals were to be drawn, developed and tested. The two main schemes that were introduced were the Acquisition Leadership Development Scheme (ALDS) and the Acquisition Stream (AS).

Smart Acquisition as Organisations

The DPA was formed on 1 April 1999 as an executive agency of the Ministry of Defence, replacing the MoD's Procurement Agency. The mission statement for the new organisation was to procure new equipment for the armed forces in response to approved requirements for the projection of military capability. At the same time, the DLO was established as a tri-Service body to provide joint logistics to the UK armed forces. In a simple sense, the DPA bought the equipment, and the DLO deployed it, maintained it, upgraded it, trained men and women within the military to use it, and disposed of it at the end of its life.

Between these two organisations some £20-30bn a year would be spent procuring and distributing equipment. To complicate matters, the MoD set up the DEC to be the central customer for the equipment before it was delivered to the armed forces for use. This virtual customer held the purse-strings through a mechanism known as the Equipment Plan. This is a planning tool used to re-cost and adjust the content of the defence equipment programme over a rolling ten-year horizon. The costs featured in the equipment plan were those incurred by the DPA, while the content of the plan was the management responsibility of the DEC.

This is complex and confusing. Under these arrangements, the customer of military equipment was not the soldier, sailor or airman/airwoman but a technocrat within the MoD. Also the maintenance costs, which for long-life military equipment will necessarily be a huge and a significant proportion of the defence budget, did not feature within the Equipment Plan.

Smart Acquisition as Body of Knowledge

The Smart Acquisition Handbook[35] described this body of knowledge as residing within the Acquisition Management System (AMS), the established knowledge management tool of the defence acquisition community. It purported to provide a one-stop shop for all authoritative guidance and expertise supporting the management of defence acquisition. The AMS at its inception in 1999 replaced all existing instructions on procurement to defence teams.

The objectives of smart acquisition and the purpose of the body of knowledge were to deliver projects within performance, time and cost constraints approved at the time a major investment decision was taken by the MoD. By 'programmatising' equipment delivery, defence equipment would, in theory, be potentially delivered progressively and at lower risk within the optimisation of trade-offs between equipment performance, procurement time and research, development and construction costs. Moreover, this project approach was thought to enable technologies to be introduced more quickly to the front-line, generating military and commercial advantages.

The principal process was contained within the CADMID cycle (Concept, Assessment, Demonstration, Manufacture, In-service, Disposal), a six-stage project cycle for defence procurement. The *Concept* Stage is designed to baseline the results and outputs users require from the equipment procurement in question. The next phase is *Assessment*, which seeks to identify the most cost-effective technological and procurement solution to meet the end-user requirement. The third phase is *Demonstration*, which is said to progressively eliminate development and design risks and uncertainties in order to fix performance and cost targets for manufacture within the industrial base. It does this through a range of programmatic and synthetic simulation modelling techniques that are prevalent throughout the defence industrial community and understood,

[35] Ministry of Defence, *The Smart Acquisition Handbook*, 4th Edition, London, MoD, 2002.

perhaps, by very few people. The next phase, *Manufacture*, addresses production and delivery, whilst the fifth phase, *In-service*, generates effective spares and support to the equipment in use by the military. The sixth and final phase, *Disposal*, deals with the efficient, safe and cost-effective disposal of the equipment.

It was presented as remarkably straight-forward and linear in design and implementation, but defence equipment is complex and usually possessed of a long life. The *Tornado* aircraft, for example, from concept to disposal could have a life of sixty years. Measures of military and financial effectiveness, let alone input efficiencies and economies at inception, may be profoundly challenged by project lifecycles such as these.

The key features and behaviours of smart acquisition stated within the AMS can be categorised into the following elements. Firstly, the CADMID cycle represented a whole life approach embodied in one single equipment project team. This team existed for the life of the equipment and, when the organisations were separate, moved from the DPA to the DLO at the equipment's particular in-service date with the military. Industry was also one of the stakeholders represented within the project team.

This open and constructive relationship and ongoing partnership with industry was a further key feature of smart acquisition. The AMS promoted industry involvement through notions of partnering and the opportunity of common goals, underpinned by competition whenever this might provide best value to the Exchequer. There was something seemingly incongruous in promoting both public/private partnership and contractor competition which smart acquisition never properly addressed. Lastly, smart acquisition processes were said to promote streamlined and unambiguous project approvals, along with a willingness to identify, evaluate and implement effective trade-offs between system performance, whole-life costs, annual costs of ownership and time. Again though, a key question was how trade-offs can possibly be effective or even intellectually robust over such lengthy programme time-lines as those featured typically within defence equipment cycles.

The Smart Acquisition Guardians

In a simple sense, the guardians of smart acquisition were those people who promoted and enacted its processes, behaviours and objectives. The AMS stated quite unequivocally[36] that smart acquisition placed a strategic emphasis on the development, training and sustainment of people in acquisition – both those employed within the public sector and those in defence industries. Central to this commitment and investment was the Acquisition Stream and Acquisition Leadership Development Scheme (ALDS).

The Acquisition Stream was launched in February 2001 to create a stream of people in acquisition who were highly committed, skilled and well-trained in smart acquisition and project management. Membership was

[36] *Ibid.*

voluntary and open to all military and civilian staff and members of industry. The scheme operated through the development tools of an Acquisition Competence Framework (ACF), a personal development record, training and development directory and development route-maps. Through these tools there was expressed a clear and robust methodology for working, behaving in the workplace and developing one's career. This could be perceived as 'best-practice' in name, perhaps, but 'one-practice' in design, roll-out and execution.

The ALDS operated for the perceived elite of the MoD and defence industry, as an extension of the Stream, and was designed to develop existing and future leaders in acquisition. The scheme was divided into three stages, foundation, core and expert, with the primary differentiation being the competencies which an individual was expected to possess and the progress that they were said to have made against ALDS route-maps. The ALDS was limited to 400 members, selected by competition against, once more, a pre-described competence framework. Consequently, smart acquisition people were selected and developed against heavily prescribed requirements and procedures.

These elements of smart acquisition: the organisations, the high-level process and body of knowledge, and the people, realigned notions of defence procurement into a highly rational and managerially competent set of activities. Moreover, this rationalism of smart acquisition – change itself, commonality of business tools and processes, commitment to management practices, and partnering between the MoD and industry – was set within the revised structures of clear customer and supplier relationships, both internal to the Ministry and between MoD and industry.

Public-Private Partnerships

Interestingly, *The Smart Acquisition Handbook,*[37] somewhat belated after the smart acquisition launch of 1997, placed public private partnerships (PPP) at the heart of the smart acquisition toolkit as well, arguing that with industry involved in the provision of long-term services and resources to the MoD, partnering and exclusivity relationships were often the best way of delivering the required outputs. This is significant as the National Audit Office estimated that 30% of procurement for defence was undertaken under the umbrella of PPP schemes.[38] Yet key strands of the public-private commercial relationship[39] are poorly understood and badly managed.

The macroeconomic argument for PPP is the provision of finance for investment from the private sector that the public sector cannot afford. The microeconomic argument is the generation of efficiency, or value for

[37] Ministry of Defence, *The Smart Acquisition Handbook*, *op. cit*. in note 28.
[38] Comptroller and Auditor General, *Ministry of Defence: Major Projects Report 2004*, The National Audit Office, London, The Stationery Office, November 2004, available at: http://www.nao.org.uk/wp-content/uploads/2004/11/03041159_I.pdf.
[39] Pamela Edwards, Jean Shaoul, Anne Stafford and Lorna Arblaster, *Evaluating the Operation of PFI in Roads and Hospitals*, Research Report No. 84, London, The Association of Chartered Certified Accountants, 2004, available at: http://image.guardian.co.uk/sys-files/Society/documents/2004/11/24/PFI.pdf.

money, when private sector provision is compared – by way of a public sector comparator – to the costs of public sector delivery. The private sector is said to be more efficient, can generate greater outputs from input raw materials and other resources and, in investment appraisal terms, offers greater economic utility.

The defence community in the UK seems to share a narrative of partnering between the MoD and industry. In 2010, an assessment phase project to test the idea of a Key Strategic Partnership (KSP) was launched – a major partnering programme with industry to manage and sustain Chemical, Biological, Radiological and Nuclear (CBRN) force protection. This concept was presented as a test-case for broader defence acquisition reform.[40]

The Key Strategic Partnership for CBRN sector transformation was, in many ways, a fairly straight-forward proposition.[41] The MoD's CBRN Protection Delivery Team from within the Ministry contracted with Serco Selex (Inform), KBR and QinetiQ to form a joint team to undertake an assessment phase programme throughout 2011. This year-long programme was aimed at testing and evaluating the benefits, opportunities and risks of the partnership concept within the sector. However, just what this concept represented was never satisfactorily explained. Rather the Key Strategic Partnership *concept* became the *activities* within the assessment phase and the *activities* of the assessment phase became the *concept*.

The objective was to submit a business case to the MoD Board at the end of the assessment phase in December 2011 outlining how the joint team of MoD and industry Key Strategic Partners could deliver CBRN capabilities in the long-term more efficiently and effectively than a public sector comparator.

Throughout 2011 team members sought to deliver this partnership through a significant range of activities including extensive industry days, new governance group meetings and briefings to senior officials. Nonetheless, a fundamental question remained: for what purpose? When this was first asked at an industry day in Birmingham on 19 January 2011 the response from MoD officials was that partnering and partnership was one and the same thing, and that partnering between the MoD and industry was a credible outcome in its own right.[42] It was one that, by definition, would deliver economies and efficiencies to the UK. However, the MoD's own unclassified Concept of Analysis for this work described the assessment phase as a project to offer capability management within a

[40] A senior military official from the MoD informed the author in September 2010 that the CBRN Key Strategic Partnership programme was even at that time being perceived as a test-case for broader Defence Equipment and Support (DE&S) reform.

[41] The author was briefly involved in the development of the assessment phase programme at its inception.

[42] A senior project manager from DE&S presented at the Industry Day and reported that 'partnering' and 'partnership' were synonymous concepts for the CBRN KSP team members.

rebalanced MoD.[43] It is not an exaggeration to suggest that there seems to be at best some confusion around what the planning intent for this programme actually was. Moreover, there was ambiguity around the success criteria for the assessment phase. For the industry partners it was the delivery of the business case which would release the funds from the MoD for a long-term partnered solution for UK CBRN capabilities. For some in the department, however, the focus was on industry advice to the MoD and some kind of specialist manpower substitution for skills gaps in government. That this ambiguity continued throughout the programme questions the ability of the MoD and industry to work well together in this sector. Unsurprisingly, no main gate business case submission for the Key Strategic Partnership concept was either offered or passed at the conclusion of the project in December 2011. A fatal lack of clarity over programme requirements, methodology, project management practices and matching resources left this partnering concept floundering.[44] As a test-case for wider defence reform it hardly looks promising.

The Rational Transformation Model for Smart Acquisition

This discussion is significant, as both the macroeconomic and microeconomic arguments for private sector delivery to the Ministry of Defence are couched in terms of economic use – the macro argument – and efficiency – the micro assertion. These arguments are grounded in the traditional, linear transformation model of management and procurement, presented in Figure 1 below.

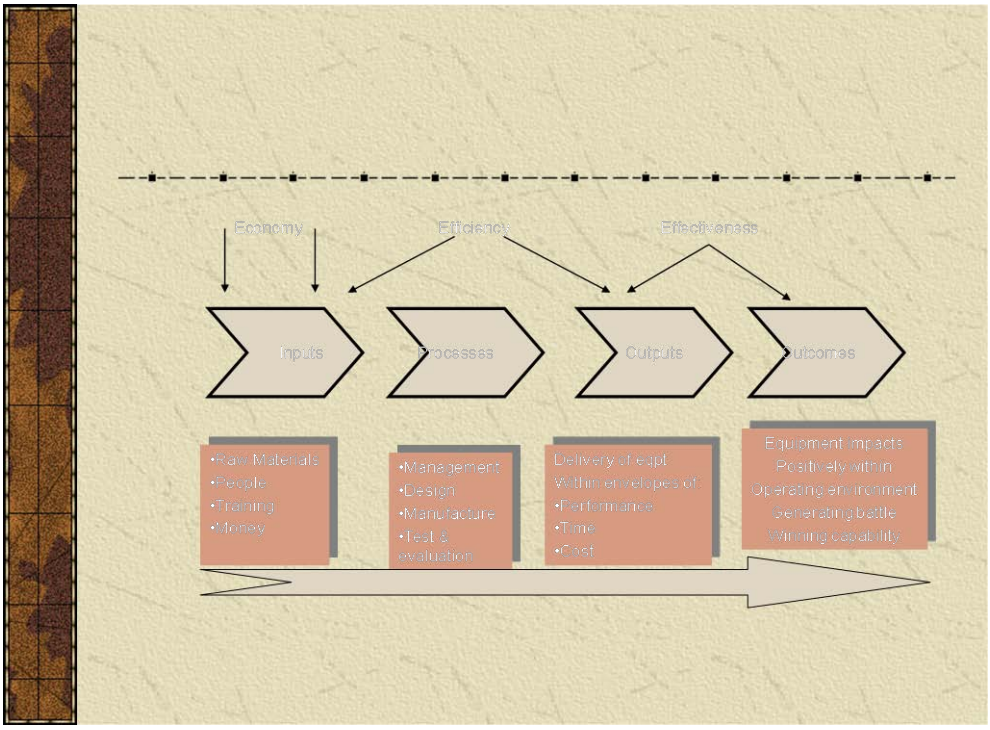

Figure 1: The Linear Transformation Model

[43] An extensive and detailed Concept of Analysis was agreed within MoD during November 2009.

[44] Author interviews with MoD and industry members of the Joint Delivery Team, December 2011 and January 2012.

The linear transformation model of Figure 1 is a well-known articulation of the transformation process of raw materials and skills into goods and services that have an economic purpose. At the left-hand side of the model raw materials, people and financing is provided as the basic ingredients of a transformation process. The cheaper these ingredients can be generated, the more economic and efficient the process is said to be. In terms of public/private partnerships, this represents the macroeconomic argument for their use.

The transformation process itself is where these raw materials are consumed, worked and finished to generate economic goods and services or, in the defence context, military equipment or services. These, in turn, represent the system's outputs. If they are delivered to agreed performance levels, on time and to budget, then the project is seen to be well managed and successful. The comparative relationship of inputs to outputs also represents the microeconomic argument for public/private partnerships, as it is an economic measure of system efficiency. Effectiveness, in turn, is measured by the impact the delivered equipment or services has within the defence environment and how it contributes to the delivery of military capability.

This model is alluded to in both accounting textbooks and in works on management theory and strategy. It drives responses to divergence from plan and forward forecasting and is also the premise for all budgeting activities and financial control systems. Koch[45] uses this simple linear model to help define the different parts of a business and to manage alternatives at sub-system level. It provides clarity around business performance, the achievement of project milestones and drives management concentration and focus. It can also be argued that the work of Senge[46] and subsequent critiques, under the banner of learning organisations, is heavily influenced by this simple model as, at its purest, it articulates systems thinking or how everything within an organisation is connected to everything else, framing personal responses, understandings and values.

When smart acquisition was launched in 1997 under the banner of the smart procurement initiative, the Secretary of State for Defence, George Robertson, stated that:

> This review is going to include a ruthless examination of how value for money for defence procurement […] can be improved. I am therefore launching a major initiative to try to

[45] Richard Koch, *Financial Times Guide to Strategy: How to Create and Deliver a Useful Strategy*, London, Prentice Hall, 2000.

[46] See Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization*, New York, Currency/Doubleday, 1990; by the same author, *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization*, New York, Crown Business, 1994.

eliminate the kind of cost overruns and delays that have characterised some equipment projects in the past.[47]

The consulting company McKinsey defined the systemic problems and recommended solutions through the rubicon of the traditional transformation model from Figure 1. This was driven, principally, by the brief to focus on value for money identification which, in turn, generated efficiency and economy initiatives.

In Figure 2 the high-level acquisition cycle – CADMID – as the dominant defence procurement process is mapped onto the linear model from Figure 1. The results suggest that this cycle and the linear model are, effectively, one and the same. This is to be expected, as the model is part of the dominant discourse of management and transformation that influenced smart acquisition's design and implementation.

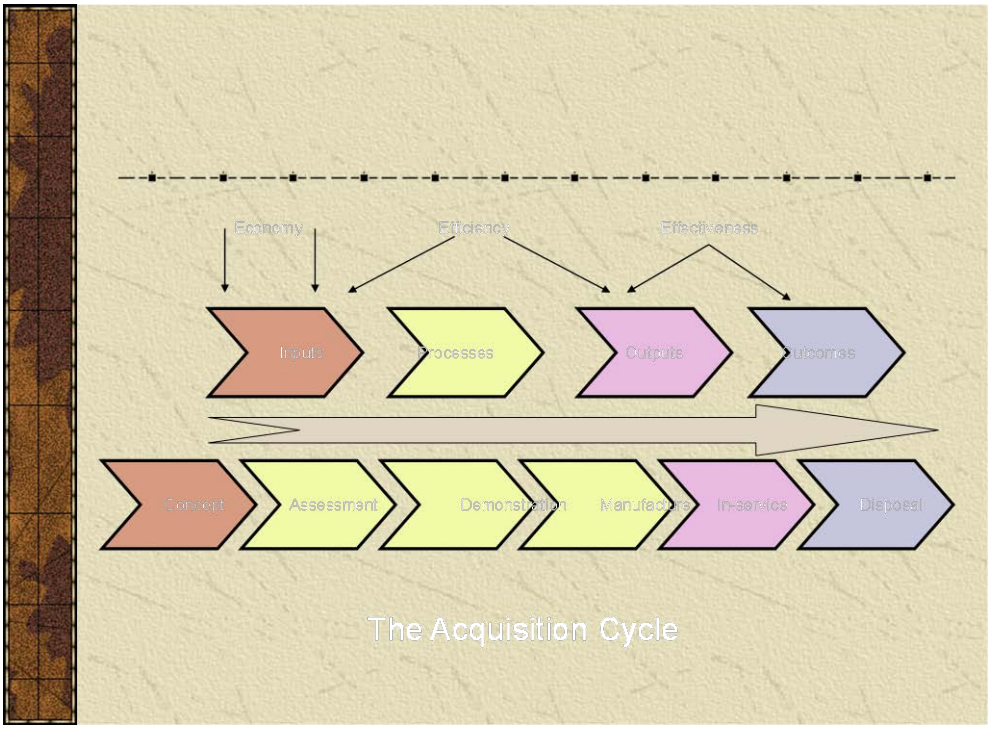

Figure 2: The Linear Transformation Model and Smart Acquisition

Within Figure 2 the concept phase of the defence acquisition cycle relates directly to the identification of project resources, or inputs. The assessment, demonstration and manufacture stages map to the process phase within the linear transformation model, and the delivery of equipment in-service to outputs. Lastly, disposal of equipment post successful deployment to operation theatres equates to the outcome block within the linear model. The acquisition cycle, therefore, has been derived from a

[47] House of Commons Defence Committee, *op. cit.* in note 19, available at: http://www.parliament.the-stationery-office.co.uk/pa/cm199798/cmselect/cmdfence/138/7073002.htm.

conventional managerial view of transformation and manufacture, with this, in turn, underpinned by certain routine management concepts.

Defence reform in the United Kingdom, from 1997 onwards, has therefore been undertaken against this backdrop of managerialist reform, notions of constructed change management and an omnipresent demand for economy, efficiency and effectiveness. Yet still reform and demand for yet more change goes-on. It is as if change itself is both end-state and principal process – an irrational response to perceived difficulties and uncertainties that policy makers can fail to grasp.

Lessons and Insights from Defence Reform in the United Kingdom

It is perhaps inevitable that defence reform and, in particular, defence acquisition reform for any state aspiring to play a major role in world affairs is unavoidably a complicated and uncertain practice. Smart people, though, should be wary of any simple guidelines or conclusions. For the certainties of the change management champion quickly gain traction and suddenly concepts and ideas, at best questionable, gain the credence of being perceived as unavoidable and the conventional wisdom for a nation's defence.

Just as there seem to be common themes or narratives in everyday life so there is an overarching dominant discourse that is applied to defence in the United Kingdom. This discourse permeates discussions around how defence has been transformed in the past and how it is to be reformed going forward. Those who champion these things do so with an almost pseudo-religious passion that sweeps all before it. This language usually features a number of distinct themes or topics that become Orthodoxy's obvious truths.[48] Within the United Kingdom these simple defence truths are associated with the following phenomena that have peppered the preceding pages:

- The benefits of competition;
- The gains from outsourcing;
- The centrality of project management metrics;
- The utility of the idea of Value for Money;
- The availability of both project certainty and technological advantage;
- The belief that defence acquisition projects are particularly prone to failure;
- The endorsement of partnering;

[48] These Ten Sacred Truths were introduced by John Louth and Trevor Taylor to the House of Commons Defence Select Committee for the Defence Acquisition Inquiry of 2013.

- The optimism that change management programmes are transformative;

- The assumption that science and technology and research and development are identical;

- The faith that smaller businesses are inherently flexible and repositories of innovation and untapped knowledge.

Throughout history people have sought to turn lead into gold, seeing it as both desirable and achievable. Since at least the 1980s, the subject of defence within the United Kingdom has been subject to a similar phenomenon. This drive for change as alchemy seems to be still present today. However, defence – and the acquisition of defence capabilities from myriad partners and providers – is a far from simple practice where a readiness to tolerate both uncertainty and failure is not just desirable but essential. Consequently, this paper reaches towards its conclusion with ten statements, drawn from the experience of the United Kingdom, which may offer a sensible guide for future policy making:

- When using competition, a government should calculate the likely effects of a competition on market structure, and should be focussing more attention on how effective procurement can occur without competition being used;

- There is a need to recognise that outsourcing which preserves flexibility is likely to be expensive because of the risks which the supplier must carry;

- Project management metrics of time, cost and performance must be viewed as only part of the longer and wider story of defence capability;

- The subjective term 'value for money' should be outlawed for a period to put pressure on ministers and officials to say precisely what they mean;

- When a state opts for technologically-demanding requirements, all defence stakeholders, including parliamentarians, should recognise a readiness to tolerate significant technological and managerial risk;

- A defence department's performance in major projects should be seen in the context of other departments' efforts and of the fate of major projects in civil engineering and information systems in the global civil sector;

- There should be a recognition of the stresses and even contradictions between working with different partners, say in Europe and North America, on major defence projects;

- There should be more emphasis on stability and the delivery of core business in an ethos of public service within defence, and recognition of the dangers of incessant change efforts;

- The different roles of research and technology and of project de-risking and development should be clear in the minds of ministers and government officials;

- The emphasis on the potential contributions of smaller businesses should be moderated and more attention paid to how they can operate with other companies higher in the supply chain for mutual benefit in developing affordable defence capabilities.

In this manner, society may actually begin to learn lessons from past experiences that are applicable to an increasingly interdependent future.

Conclusion

The practices of defence and national security are, of course, complicated and important for governments and citizens alike; failures can have fateful consequences. Likewise, the organisations, procedures, values and behaviours of those who collude to provide military equipment and services seem equally complex – to the extent that the constituent elements of defence acquisition appear to need constant reform and churn. At least that has been the experience of the United Kingdom, prior to the New Labour governments, during the Blair and Brown years of 1997 to 2010, and throughout the Coalition Government's stewardship of defence. It is as if the act of transformation itself, with its associated managerialism and promise of future efficiencies and economies, is possessed of value and significance.

This paper has sought to unpack the key ingredients of this constant reform, seen through the lens of the Coalition government's response to so-called smart acquisition reforms, and the change agenda that preceded the Coalition's rise to power in 2010. By capturing both reform imperatives within the same critical review it leads, perhaps inevitably, to the sense that the Smart Acquisition change programme and the Coalition's Defence Transformation change programme are one and the same, both promoting activity over substance. So that if the United Kingdom witnesses a new government in 2015, it would be unprecedented for there not to be yet another change programme for defence. With quick reference to this paper, readers could even predict its key ingredients with confidence.

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