The Limits of Competition in Defense Acquisition
Defense Acquisition University Research Symposium, September 2012

Keywords: defence, industry, capabilities, priorities, acquisition

DEFENCE INDUSTRIAL POLICIES AND THEIR IMPACT ON ACQUISITION OUTCOMES: A COMPARATIVE ANALYSIS OF THE UNITED KINGDOM AND AUSTRALIA

Peter Hall
Emeritus Professor, School of Business, University of New South Wales, Canberra, Australia.

Andrew D. James

Senior Lecturer, Manchester Institute of Innovation Research, Manchester Business School, Manchester, United Kingdom

Abstract

The aim of this paper is to compare and contrast a key aspect of the defence industrial policies of the United Kingdom and Australia and reflect on the extent to which those defence industrial policies have had implications for acquisition outcomes.

Both Australia and the UK articulate explicit *defence industry priorities or preferences* (i.e. capabilities the government regards as "essential"). In Australia, their latest incarnation is the so-called Priority Industry Capabilities (PICs). In the United Kingdom, those industrial capabilities were expressed in the 2005 Defence Industrial Strategy and the UK MOD's Defence Innovation Strategy. In the UK, changes in defence industry priorities are likely in 2012.

We hypothesise that defence industry policy in the form of pursuing the creation or preservation of stated industry capability priorities can indeed influence procurement decisions and acquisition outcome. We argue:
(1) If governments stand by their rhetoric on local preference, they will often have to pay a price premium compared with cost-efficient overseas sourcing
(2) If shrinking defence budgets lead governments go for cost-efficient supply, they may - probably will - have to renege on their rhetoric about local work.
We explore the procurement implications of the tension between policy to sustain domestic defence industrial capabilities, given its costs and budgetary implications, and acquisition that optimises price, quality and delivery, however and wherever achieved.

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
SEP 2012		**00-00-2012 to 00-00-2012**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Defence industrial policies & their impact on acquisition outcomes: a comparative analysis of the United Kingdom & Australia	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Institute for New South Wales,School of Business,Canberra, Australia,**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
Presented at The Limits of Competition in Defense Acquisition, Defense Acquisition University Research Symposium, 18-19 Sep 2012, Fort Belvoir, VA. U.S. Government or Federal Rights License

14. ABSTRACT

The aim of this paper is to compare and contrast a key aspect of the defence industrial policies of the United Kingdom and Australia and reflect on the extent to which those defence industrial policies have had implications for acquisition outcomes. Both Australia and the UK articulate explicit defence industry priorities or preferences (i.e. capabilities the government regards as ?essential?). In Australia, their latest incarnation is the so-called Priority Industry Capabilities (PICs). In the United Kingdom, those industrial capabilities were expressed in the 2005 Defence Industrial Strategy and the UK MOD?s Defence Innovation Strategy. In the UK, changes in defence industry priorities are likely in 2012. We hypothesise that defence industry policy in the form of pursuing the creation or preservation of stated industry capability priorities can indeed influence procurement decisions and acquisition outcome. We argue (1) If governments stand by their rhetoric on local preference, they will often have to pay a price premium compared with cost-efficient overseas sourcing (2) If shrinking defence budgets lead governments go for cost-efficient supply, they may - probably will - have to renege on their rhetoric about local work. We explore the procurement implications of the tension between policy to sustain domestic defence industrial capabilities, given its costs and budgetary implications, and acquisition that optimises price, quality and delivery, however and wherever achieved. The empirical core of the paper traces the nature and evolution of and reasons for priority-oriented industry policy in the cases of Australia and the UK. Our paper examines: (a) how defence industrial capabilities are expressed; (b) what the priorities actually are in each country; (c) why each country says it has such priorities; (d) whether the priorities have changed; (e) how the priorities were determined; (f) what evidence there is of conformity between the priorities and the location of defence work procured; (g) what evidence there is of the price-premia or cost-penalties incurred by conformity to such priorities; (h) if there has been divergence from the rhetoric and why this happened. Finally, we reflect on the extent to which the defence industrial policies in question have had implications on acquisition outcomes. In what ways, if at all, have they affected procurement choices and outcomes? What, if anything, can the United States and other allies learn from the UK and Australian experience?

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**36**	

The empirical core of the paper traces the nature and evolution of and reasons for priority-oriented industry policy in the cases of Australia and the UK. Our paper examines: (a) *how* defence industrial capabilities are expressed; (b) what the priorities actually *are* in each country; (c) why each country *says* it has such priorities; (d) whether the priorities have *changed*; (e) how the priorities were *determined*; (f) what evidence there is of *conformity* between the priorities and the location of defence work procured; (g) what evidence there is of the price-premia or cost-penalties incurred by conformity to such priorities; (h) if there has been *divergence from the rhetoric* and why this happened.

Finally, we reflect on the extent to which the defence industrial policies in question have had implications on acquisition outcomes. In what ways, if at all, have they affected procurement choices and outcomes? What, if anything, can the United States and other allies learn from the UK and Australian experience?

Two-line summary

The paper analyses with case studies the consequences for defence acquisition costs of government policy to pursue priorities in defence industry capability development.

Introduction

Governments may announce industry capability priorities - i.e. the industry capabilities it would like to ensure are available in country - without there being, logically, any necessary implication that those capabilities require budgetary support. In the *absence* of governments being prepared to offer support of some kind (from direct purchase and provision to rescheduling purchases to maintain ongoing operations), announcing priorities is no more than the publication of a wish-list - information on what government would like to see industry have or do but unaccompanied by financial incentives or disincentives to shape its investment decisions.

However, industry incentives and disincentives are neither necessary nor sufficient to establish the industry capabilities a government wants. They are not *necessary* if such capabilities already exist in country, are known to be efficient/effective in their operation, and are likely to be maintained into a relevant future. This will be the case if the capabilities a government seeks are found in world competitive segments of its national defence industry with the prospect of ongoing orders. In general, larger countries with extensive recent experience of combat operations may be expected to have more and more diverse industry capabilities than smaller countries with little or no recent combat experience. But from the point of view of whether a country has industry capabilities that a government *anticipates* that it will require, a small country may be just as well positioned as a large one, if its capabilities - however modest in scale and scope - are consistent with meeting those requirements. In general, if actual and anticipated requirements, in terms of both quantity and quality, can be effectively met as a result of commercially oriented investment decisions and competitive local operations, government may *label* certain industry capabilities as

priorities but, in actuality, need not take any action beyond keeping watch. Industry incentives and incentives are not *sufficient* to bring about desired outcomes if the industry capabilities government prioritises simply cannot be implemented because of technological infeasibility, institutional barriers or prohibitive cost. Note that such constraints may not be perceived at the outset or for a long time - in which case priorities bring large costs that may not have been fully foreseen.

What follows from this discussion are implications for the prices governments may have to pay for new defence assets, in particular in relation to cost-efficient supply. Assigning priority to the establishment and maintenance of domestic industry capabilities will lead to price premia compared with cost-efficient supply prices if:

(a) governments incur costs in applying inducements they believe necessary to establish or maintain industry capabilities when in fact the capabilities *already existed* and would have been maintained in country, or market players would in any case have invested in them in country, *without policy inducement*. Costs incurred to reflect the priority given to such capabilities were clearly avoidable. If the capabilities support, or would have supported, world cost-efficient production locally, prioritisation allows a higher price (price premium) to be charged, implying higher producer profits and/or reduced production efficiency. If the capabilities were or would have been inefficient by world standards, any price premium will be a reflection of the relative cost-inefficiency (by world standards) of supporting their continued employment or creation locally[i].

(b) governments correctly believe that inducements are necessary to establish or maintain industry capabilities that would otherwise *not* have been generated in country or would have *disappeared*. In this case, a government cannot avoid the costs of inducement if they wish to create or maintain such capabilities in country. When governments incur costs in this case, there is a price premium relative to globally least-cost purchases if such capabilities exist elsewhere and are being employed at a level of efficiency that production in the industry of the local prioritising government cannot surpass. Even if locally generated industry capabilities match or surpass world efficiency, that difference must exceed any initial set-up costs for new capabilities if a price premium is to be avoided. The price premium increases with the extent to which governments incur greater costs than were necessary to bring the industry capabilities into existence locally, and/or maintain them.

(c) governments believe inducements will be sufficient to bring industry capabilities into existence or to maintain them in operation when such outcomes are, in fact, *unachievable* (though this may not be known in advance). In this case, the cost to government is equal at least to what it spends on attempting to create the capabilities in country. If it purchases defence products overseas of the kind that it sought to produce itself with these capabilities, the cost of its failed attempt must be added to the price it pays to the overseas supplier and thus, again, takes the form of a price premium.

"Type-(a)" cases arise if governments: (i) are imperfectly informed about the characteristics and operation of their domestic industry capabilities and the realisable investment plans of firms that operate them, or (ii) overestimate or misjudge what they need, and will need, from industry players. Clearly, there is scope for the latter since service chiefs in particular tend to be risk-averse (to use, perhaps, a euphemism) and, in any case, it is always open to debate what the nation's future operational commitments will be and whether there will need to be domestic industry capability to support them. "Type (b)" cases occur when governments insist on developing new local capabilities even though they recognise that it will involve costs that would have been avoided by making overseas purchases produced with existing capabilities elsewhere. Particularly where new capabilities are involved, all players can be wrong about the relevant set-up and maintenance costs, or government alone might be wrong, when there are misperceptions about the potential behaviour and performance of industry players. "Type (c)" cases arise when: (i) governments fail to understand the technological and managerial difficulties that arise in seeking to bring new systems into operation; (ii) governments take insufficient account of the implications of circumventing institutional restrictions on technology transfer.

Ideally, we would like to find examples of each of these cases. In practical terms, this is hard to do. Type (a) cases are potentially visible if capabilities given priority-related support already existed but *not* so if such capabilities would have been the outcome of independent industry investment decisions - since industry-players' intentions are not usually observable with certainty. Type (b) cases require comparisons between local and overseas costs as well as between government costs actually incurred and the costs that would have been sufficient to achieve the desired outcome. The former is observable in principle but rarely in practice; the latter is not an observable and calls for difficult judgments about how industry players *would* have behaved in the absence of government action. To identify Type (c) cases, we would need to show that a government could reasonably have known that insuperable difficulties stood in the way of successfully establishing a specified priority industry capability, whatever the source of those difficulties might have been.

In what follows, we follow an instructive but less demanding agenda. We first explore industry capability priorities in the Australian and UK environments: how they are defined, the rationale for their existence, their identification, and the mechanisms deployed to pursue them. In the next section we examine the challenges that have arisen in seeking to establish and maintain such priorities in each country, and penalties incurred or anticipated in addressing the challenges. Our conclusion reflects on lessons to be learned.

1) Defence industry capability priorities

Australia

(a) Definitions

The domestic defence industry base has for many decades been viewed by Australian policy-makers as the "fourth arm of Defence" - or "not an end in itself but rather a component of the broader support base for (Australia's) defence force" (Dept. of Defence, 2007:4). Within

that base, *industry capabilities* are distinguished from the firm or firms in which they do or might reside (DMO, 2009: 2) but the notion of "capability" itself in this context is rarely explicitly defined. Language such as "industrial capability to adapt, repair and maintain ... combat capabilities" (e.g. Department of Defence, 1992:14) gives the general flavour. Consistent with usage in strategic business management, such language implies possession of or access to the knowledge, technology, skills and equipment required to perform a specified task, and the ability to deploy or manage such resources successfully in performing the task.

Documents detailing what Defence needs from Australian industry have equated the notion of industry capabilities with industry *functions* (Department of Defence 1997 and subsequent years: *Defence Needs of Australian Industry*). For a given class of defence systems (e.g. aerospace or maritime), sub-systems (e.g. air-to-air refuelling for aerospace platforms, or propulsion for maritime vessels) depend for their operation on certain technologies, skills or products (e.g. fluid systems like fuel tanks and airborne pipework for air-to-air refuelling, or engines and batteries for naval propulsion). To support any defence sub-system, industry capabilities are required to ensure Defence has available or accessible for its use the technology, skills or products that enable the sub-system to operate effectively. In relation to any defence sub-system, such industry capabilities (or functions) might include research, design, development, manufacturing, assembly, project management, systems integration, maintenance, repair, modification, provision of trained labour, training systems or infrastructure support. In one obvious sense, therefore, industry capabilities generate inputs into defence strategic capabilities.

In some of the most recent policy documents, however, Defence (through its Defence Materiel Organisation) betrays, even now, a degree of uncertainty in what, exactly, it means by capability. In its 2009 *Priority Industry Capabilities Fact Sheet*, the term in one part of the text appears in quotation marks (p.2) and elsewhere is presented in the larger phrase "capability area" or "capability discipline" (p.1). Examples, however, suggest an ongoing consonance in usage with the industry functions usage noted above: development and validation (of electronic warfare countermeasures); integration of complex system (on board weapons platforms); adaptation and upgrading (of software); support and maintenance (of naval vessels). Each of these capabilities or functions requires its own set of skills, knowledge, equipment resident in industry itself, potentially spread across two or more organisations.

The idea of *prioritising* defence industry capabilities for policy and potential financial support has been a force in policy thinking in Australia for at least the last forty years, though it has sometimes been unclear whether the prioritisation was viewed as applying to a sub-industry within defence industry (such as "electronics" or "aerospace") or the capabilities within that part of industry. (See, for example, Dept. of Defence, 1992: Figure 3.1, p.15.) The term "priority" in this context was used somewhat generically for many years before being embedded in the specific formulation "Priority Local Industry Capabilities" (PLIC) in the *Defence Industry Policy Statement* of 2007. (See, especially, p.4 and Ch 3.) PLICs were defined there as "industry capabilities that confer an essential national security and strategic

advantage by being resident in-country" (p.4). With a change of government in 2008, the term was modified to take its current form, Priority Industry Capabilities (PICs), defined as:

> "those capabilities that confer an essential strategic advantage by being available from within Australia and which, if not available, would significantly undermine defence self-reliance and Australian Defence Force operational capability" (Department of Defence, 2009: 1).

b) Priorities in practice

In the 1970s, high priority was given to industry capabilities supporting repair, maintenance, modification and adaptation to the Australian environment, and the manufacture of high-volume consumables and general equipment items (Dept. of Defence, 1976: 50-4). This prioritisation underpinned industry support through Defence spending on local production, some elements of which, it was judged, would not have been economically viable commercially. Examples of areas for which support was recommended included aircraft, electronics, ship modernisation and munitions. By the 1980s, priorities directed towards achieving higher local content in procurement were reflected in industry policy to support, for example, domestic assembly of the F/A-18 Hornet, building of the Collins Class submarine, and development of Over-the-Horizon Radar (Dept. of Defence, 1987). By the 1990s, priorities had subtly shifted with technological change to emphasise industry capabilities to support equipment modification and adaptation in connection particularly with electronic warfare, sensors and precision weapons, communications and information systems (Dept. of Defence, 1994: 114), foci that survived unchanged in the next white paper of 2000.

Currently 12 instances of industrial activity have been identified as PIC *areas* including electronic warfare, high frequency and phased array radars, "high end" system and "system of systems" integration, through-life and real-time support of mission and safety critical software, anti-tampering activities, signature management, in-service support of Collins Class submarine combat systems, acoustic technologies and systems, ship dry-docking facilities, ballistic munitions and explosives, infantry weapons and remote weapons stations, and combat clothing and personal equipment. In some cases, the element of industry capability designated as a priority in a PIC area might be a particular skill set or specialised body of knowledge (*PICs Fact Sheet*: 1), for example those associated with developing and validating EW countermeasures as noted in one of the examples above.

c) Rationale

Designating industry capabilities as "priorities" in a policy framework implies that such capabilities should be marked out potentially for special treatment. As is clear from the definition of PICs, justification for supporting industry priorities is intimately linked to the notion of defence self-reliance more generally. Self-reliance was most clearly defined in the defence white paper of 1987, *The Defence of Australia*, in the following terms:

> "[D]efence self-reliance gives priority to the ability to defend ourselves *with our own resources.*" (1987:1. Italics ours.)

But as the influential defence analyst Paul Dibb notes (using the term "capacity" for what we would call "capability"):

> '"Self-reliance' is not a prescription for Australia to have the full range of industrial capacities. Its applicability to industry is limited to the extent to which indigenous industrial capacity is necessary for defence purposes, there will almost certainly be some dependence on overseas sources for components. " (1986: 107. Italics ours.)

Clearly, Australian industry has and maintains some of the industrial capabilities required for the nation's self-defence and combat operations: the result of investments made in the past in response to defence (and other sources of) demand, and in some cases a reflection of current competitive advantage. But there can be no guarantee that local industry will currently have or plan to establish all of the capabilities that the ADF might seek to draw on in future, given its current and anticipated operations.

The capabilities realistically "necessary for the effectiveness and sustainability in combat" of the ADF are likely to lie somewhere between Dibb's "full range" of industrial capabilities that even the most risk-averse in Australia might prefer to have in-country and the actual range available at any time. Identifying the industrial capabilities required as priorities allows comparison with what is currently available in Australia and indicates the need to analyse whether - or not - policy action should be taken to establish those that are *not* currently available domestically but thought necessary. Among the existing PICs, for example, may well be many industry capabilities believed essential but currently available in country in a healthy state and for which policy action would be redundant. On the other hand, if a PIC were not currently available in Australia, or available but floundering, consideration would be given to policy action to establish, rescue or support it.

d) Identifying priorities

Australia's geographical position imposes a "tyranny of distance" from overseas supply and support and renders its access to external supply vulnerable to disruption. In some cases, foreign suppliers might be unable or unwilling to deliver ADF requirements at acceptable levels of cost and reliability, especially in cases where the Australian environment leads to unique requirements. These factors have, historically, motivated the criteria for determining priority capabilities used in policy documents, for example in *Defence Needs of Australian Industry* (2000). This publication ranked priorities in descending order from "strategically important" through "highly desirable" to "desirable" (or not prioritised at all). Highest priority was to be given to industry capabilities:

- that would support weapons platform subsystems of the greatest operational importance in potential conflict
- most likely to be needed to develop, repair, maintain and adapt future ADF assets - especially where modifications were required to meet the demands of an anticipated operating environment or where such capabilities offered the prospect of enhancing the ADF's "capability edge"
- most likely to be necessitated by interruptions to overseas support and supply.

In addition, prioritisation paid attention to the potential "cost-of-ownership" implications for the ADF if it drew on Australian industry capabilities. In many cases, however, the level of priority assigned by such criteria to specific capabilities (especially if prospective capabilities), has not only been contestable but highly dependent on subjective judgements about the threats to supply, to Australia itself and anticipated ADF operations - as well as the costs of establishing and/or maintaining locally-based capabilities which are recognised as potentially very high. (See *Defence and Industry Policy Statement*, 2007: pp 10-11.) Prioritisation has also been the subject of intense industry lobbying.

e) Implementing priorities

Defence has relied heavily on the procurement process to address capabilities issues in the industry base. From the 1970s to the early 2000s, procurement negotiations carried with them Australian Industry Involvement (AII) obligations which have reappeared recently in the guise of the Australian Industry Capability (AIC) program. AII was implemented, inter alia, through the Australian Defence Offsets Program (ADOP), the Government Purchasing Preference Policy (offering a notional discount of 20% of the value of local content in the tendered price) and local content quotas. Other actual or proposed procurement actions have included rescheduling or bundling projects, or directly contracting for a prioritised capability (such as ammunition or submarine maintenance). But the industry capability logic has also been applied in a more general way to justify locating in Australia major projects which might have been undertaken overseas. We examine examples below.

It has always been recognised that pursuing industry capabilities can come at a cost. The 1976 defence white paper, *Australian Defence* , noted that selectively directing Defence procurement into Australian industry would involve "accepting any higher costs and delays that may be legitimately incurred" (p.52). And the 1987 defence white paper, *The Defence of Australia,* recognised explicitly that prioritising higher local content in procurement could come with penalties of cost, delivery scheduling and performance, requiring judgment calls to be made on a case by case basis (p.78). Such statements built into policy anticipations of possible price premia, long-dated delivery schedules and sub-standard quality if contracts were awarded locally. More recent policy documents have been less willing to make such concessions, however. In the 2010 document *Building Defence Capability: A Policy for a Smarter and More Agile Defence Industry Base*, industry is told "it can no longer expect the Government to use offsets or local content quotas to help protect Australian defence industry from overseas competition" (p.7).

The last paragraph suggests Australian governments have learned that supporting industry capabilities can be a costly business, and one whose costs they are increasingly reluctant to bear. We now turn in a later section to an assessment of how they might have reached that conclusion.

United Kingdom

In contrast to Australia, the idea that the UK Ministry of Defence should publish a defence industrial strategy that articulates defence industry capability priorities is of relatively recent

origin. During the Thatcher Governments of the 1980s there was a tension between the role of MOD as oligopolistic customer to the defence industry and Conservative Party opposition to the idea of industrial strategy and government intervention in any sector of the economy.

After 2000, an explicit public debate began on what defence industrial capabilities were critical to UK defence. This was prompted by increasing pressure on defence budgets, increasing consolidation of the UK defence industry through mergers and acquisitions (often by foreign companies) and explicit pressure from large defence contractors for a clearer indication of the future demand for defence equipment in the UK. The growth of foreign ownership of the UK defence industry was in large part responsible for the publication by the Ministry of Defence of its 2002 *Defence Industrial Policy* (DIP) which set out MOD's support for foreign ownership and its view that: "The UK defence industry *embraces all defence suppliers that create value, employment, technology or intellectual assets in the UK*. This includes both UK and foreign-owned companies" (emphasis in the original).

In 2005 the MOD published its Defence Industrial Strategy (DIS). The MOD emphasised that the Defence Industrial Strategy was a capability-driven process that was designed to contribute towards the overriding aim of ensuring that the capability requirements of the Armed Forces could be met, in the present and future. The DIS process was primarily sector focused and made clear that it saw industrial capabilities as including; "[the] infrastructure, skills, tacit knowledge, Intellectual Property (IP) and capacity needed to ensure appropriate sovereignty and/or contribute to co-operation with allies, to ensure our national security…".

The Ministry of Defence followed this up by publishing a Defence Technology Strategy in 2006 which – for the first time – openly stated MOD priority science and technology areas for R&D investment, the critical technologies where UK capabilities needed to be maintained to ensure operational sovereignty and security, and the technology areas where MOD would rely on international defence cooperation or open global technology markets (Ministry of Defence (UK), 2006).

b) Priorities in practice

The Defence Industrial Strategy was constructed sector-up. Sectors were agreed along what were judged to be the industry structure and there was a focus on key sectors which had a direct impact on defence outputs and where it was anticipated that potential restructuring would need to take place and/or which were strategic priorities for future capabilities. The sectors were maritime; armoured fighting vehicles;fixed wing including UAVs; helicopters; general munitions; complex weapons; C4ISTAR; CBRN force protection; and, counter terrorism. Systems engineering was also examined as a key cross-cutting capability. In their published form, each of the DIS sector studies considered:

• Strategic overview (relationship to military capability requirements)

• Current and future equipment programmes

• Indicative planning assumptions (i.e. future budgets)

• What was required for retention in the UK industrial base

• Overview of the global defence market

• Overview of the UK defence market

• Sustainment strategy

The issue of whether to include future budgets in the published comment was the subject of intense debate between the MOD and the Treasury. The Treasury strongly opposed any indication of future budgets arguing that this was against UK budget practice and would commit future Governments to spending decisions. MOD sought (and failed to get) a 10 year budget horizon. In the end the DIS included "illustrative spend profiles" – a graphical representation of potential future spending in a sector - and even they were heavily contested by the Treasury which sought to minimize the detail contained in the graphs. The issue of budgets was – as we will go on to note – a key issue for the implementation of the DIS.

c) Rationale

The aim of the Defence Industrial Strategy was to provide a clear strategic view of defence industrial capability requirements to allow industry and government to better plan for the sustainment of critical defence capabilities. It should be emphasised that MOD was under considerable pressure from leading UK defence industrial companies who had threatened that they might exit the UK defence market in favour of investments elsewhere (not least the United States) unless they received assurances of future MOD priorities. The DIS explained that its objectives were to give:

- … a strategic view of defence capability requirements going forward (including new projects, but also the support and upgrade of equipment already in-service), by sector2. Part of the strategic view is specifying, in order to meet these, which industrial capabilities we would wish to see retained in the UK for defence reasons. We aim to communicate the overall view to industry as clearly as possible, recognising that plans change as the strategic or financial environment changes;
- … further detail on the principles and processes that underpin procurement and industrial decisions;
- where there is a mismatch between the level of activity our own plans (and export/civil opportunities) would support and that required to sustain desired capabilities, investigates how we might with industry address that gap, within the bounds of affordability.

d) Identifying priorities

At the heart of the DIS and the key criteria used by DIS to identify industrial capabilities that MOD required to sustain in the UK was the notion of "Appropriate Sovereignty". The DIS explained: "We must maintain the appropriate degree of sovereignty over industrial skills, capacities, capabilities and technology to ensure *operational independence* against the range of operations that we wish to be able to conduct"(para A1.21, emphasis in the original). The DIS stressed that this was *not* about procurement independence and total reliance on national

supply but instead was focused on operational requirements. The DIS set out four types of industrial capabilities that could be critical to Appropriate Sovereignty:

- Strategic assurance: the DIS noted that there were industrial capabilities that would need to be retained onshore as they provided technologies or equipment that were critical to safeguarding the state. Such technologies included high-grade cryptography, technologies associated with the UK's nuclear deterrent or counter terrorism.
- Defence capability: the DIS observed that the retention of certain equipment and technology within the UK industrial base would be necessary since the UK's Armed Forces required particular assurance of "continued and consistent equipment performance".
- Strategic influence: the DIS also noted that there might be instances where industrial capabilities might need to be retained where specific UK industrial capabilities gave important strategic influence in military, diplomatic or industrial terms including in international collaborative programmes.

The DIS also noted a fourth category of what it called technology benefits where investment by government may have broader benefits to the UK economy beyond defence. However, the DIS added that "In practice, we have not found any capability which was important to retain only for this reason" (para. A2.14).

e) Implementing priorities

The Defence Industrial Strategy had a direct impact on defence procurement priorities and defence procurement policy. Most notably, it led to the establishment of a number of Long Term Partnering Agreements with selected companies to sustain key capabilities and procurement contracts were let with an eye to their consequences for sustaining selected UK capabilities. Research programmes have also been influenced by such considerations. The DIS identified alternatives to competitive procurement, including long-term partnering arrangements. The MoD has announced a number of such arrangements which, because of limited opportunities for competition within the UK, are let with monopoly suppliers. Significantly, in order to sustain key industrial capabilities, the DIS announced the MOD's decision to enter strategic partnering arrangements in a number of sectors (see Table: Long-term partnering Arrangements) . The aim of these strategic partnering arrangements was to guarantee security of supply to the MOD and to use target cost incentive fee contracts to provide incentives to industry to improve its performance in exchange for financial returns.

Table: Long-Term Partnering Arrangements

Sector	**Long-term Partnering Agreement**	**Anticipated net benefits (£)**
Maritime Change Programme	A 15 year Terms of Business Agreement ("TOBA") with BVT Surface Fleet Limited, a Surface Ship Joint Venture between BAE Systems and VT Group, to focus on both current production and long-term	£700-1,100m over 15 years.

	support. A 15 year TOBA with Babcock Marine that agrees scope share as UK's sole provider of submarine support services An alliance between BVT and Babcock Marine for efficient delivery of surface ship support in the UK. Submarine Enterprise Collaboration Agreement that includes BAE Systems Submarines, Babcock Marine and Rolls-Royce. .	Anticipated efficiency savings of £600m in submarine and surface support over 11 years ?? ??
Fixed Wing	2007, signed Fixed Wing partnering agreement with BAE Systems	??
Armoured Fighting Vehicles	December 2005, signed Partnering Agreement with BAE Systems Land Systems.	??
Helicopters	June 2006, signed Strategic Partnering Arrangement and Business Transformation Incentivization Agreement with AgustaWestland	Successful in implementing a number of innovative solutions, particularly focusing on through life cost savings, for helicopter support, future upgrade and development.
Complex Weapons	July 2008, Partnering Agreement signed with Team CW: MBDA (UK), QinetiQ, Roxel (Rocket Motors UK) and Thales UK	It is estimated that over 10 years Team CW will deliver over £1bn of benefits
General Munitions	August 2008, Munitions Acquisition Supply Solution signed with BAE Systems Land Systems Munitions	??

(Source: Gray, 2009)

2) The costs of prioritising industry capabilities

Australia

Because policy prioritisation of industry capability has been around for so long in Australia (see above), we may in certain cases track the implications it has had for procurement processes and decisions and, more importantly, the cost and performance outcomes which routinely take decades to become fully apparent. In this section, we examine these consequences in a selected sample of illustrative cases, noted above in the history of priorities in practice. They are the F/A-18 jet fighter; electronic warfare self-protection for the F/A-18 and other aircraft (consistent with references to aircraft and electronics in the 1970s and an increasingly specific focus with the passage of time); and Over-the-Horizon Radar (OTHR), put to work in the Jindalee OTHR Network (JORN).

F/A-18 Jet Fighter.

The mainstay of Australia's air defence capability has for decades been the McDonnell Douglas F/A-18A Hornet aircraft, almost all 75 of which were assembled in Australia between 1984 and 1990. Australian procurement of the F/A-18 provided for extensive Australian industry involvement aimed at, among other things, ensuring local industry could undertake the required engineering maintenance and spares provision support during the service life of the aircraft. The government's objectives in giving support the F/A-18 were to "provide industry capability to undertake ... engineering, maintenance and spares provision support ... during the service life of the aircraft" and "establish, maintain or enhance the defence industry capabilities in general", (Dept. of Defence, 1994: 21-2). The F/A-18 industry program also provided for "designated work": industry activity underpinning Australia's self-reliant operation of the aircraft that would not otherwise have been undertaken in Australia, and for which the Government was prepared to pay a cost premium (op. cit: 23).

It has been estimated that the cost premium paid by the government owing to its insistence on local industry participation was about 29% of the value of additional work required to be done in Australia. The estimate reflects the additional production costs associated with local supply (e.g. loss of scale economies and additional tooling requirements) but does not include investment costs related to updating the machinery and facilities to enable F/A-18 assembly (op. cit.:Annex A, p8). All in, the industry program that provided support is estimated to have represented about 17% of the total cost of acquiring the aircraft (op.cit.: Annex A:p13).

It appears that the government of the day believed the specific industry capability involved in this case did not exist in Australia prior to the project and would not have been established in Australia in the absence of policy influence. Assuming these perceptions were correct, this was not a Type-(a) case and the technical success of the project indicates that it was not a Type-(c) case either. As a Type-(b) case, the F/A-18 project led to the payment of a price premium since the aircraft could have been purchased at lower cost, off-the-shelf, directly from the supplier, had they not been assembled locally. The government's own assessment concedes this publicly but it is unclear whether the price premium was, or was thought to be, *excessively* high. This would be the case if the capabilities created at the time were not subsequently sustained or proved unable to generate long-term benefits.

Electronic warfare self-protection

Fitted to the F/A-18 were AN-ALR 45 radar warning receivers (RWR) which had their origins in the Vietnam War era. While a key element of the F/A-18 designated work involved supply and support of aircraft systems, documentation made no specific mention of local industry involvement in supply, repair, maintenance and adaptation of electronic countermeasures fitted to the aircraft . However, it has become clear subsequently that Australia was anxious to acquire locally based support capability, essentially for strategic reasons associated with "self-reliance" (see Hall and Wylie, 2010, on which these paragraphs draw). The AN-ALR 45 radar warning receivers in Australia's F/A-18A aircraft were configured for operations against Warsaw pact forces and not programmed to detect radar emissions of Western origin aircraft operating in South East Asia. The threat library of AN-ALR 45 radar warning receivers was embedded in the system's hard-wired programmable signal processor and the US Government denied Australian Government requests for access to the algorithms that determined the operations of the processors and, hence, which radar frequencies it could "see" (Hall and Wylie,2009).

Australia responded to the US denial of the above RWR technology by initiating indigenous efforts to develop electronic countermeasures for the F/A-18A and other combat aircraft, focusing on the local development of an indigenous RWR. Looking back, the then Minister for Defence, Kim Beazley described the climate of the times in the following memorable terms:

> "I went to the United States and, for five years, it was up hill, down dale and one knock-down drag-out after another with Cap Weinberger, Dick Cheney and Paul Wolfowitz. I tried to get the codes of that blasted radar out of them. In the end, we spied on them and we extracted the codes ourselves – and we got another radar that can actually identify them, otherwise I would not be talking about it now. We got a radar that was capable of doing the shoot-down and the rest of what we wanted." (Beazley, 2007)

It appears that the Defence Science and Technology Organisation (DSTO) was tasked to determine the feasibility of locally developing a tactically satisfactory radar warning receiver for specified ADF aircraft. By 1992, DSTO had developed a RWR Concept Technology Demonstrator, designated ALR 2002, which it then licensed to the local company AWA Defence Industries (AWADI) for full scale engineering development as a way-station on the road to the RAAF's procedures for acceptance testing and evaluation. This arrangement went forward on the understanding that ALR 2002 would be adapted in versions for use in the F/A-18 and other aircraft.

In November 2006, however, almost a decade and a half later, the decisions was finally made *not* to upgrade the F/A-18A with the Australian-sourced BAE Systems ALR 2002. The Minister for Defence, Dr Brendan Nelson, announced that the Government had decided instead to use the US-sourced Raytheon ALR-67 (V3), equipment fitted to US navy F/A-18C/D aircraft deployed on operations in Iraq. Dr Nelson's announcement stated:

> "BAE Systems Australia has been developing a RWR – the ALR 2002B. This is an Australian developed technology that shows great promise. The Government is not and will not be risk averse in encouraging innovation and in obtaining the best capability.
>
> "However, we have concluded that this technology cannot be delivered within the necessary timeframe. Ensuring the success of the extensive Hornet upgrade and Australia's regional superiority is the most important priority and requires us to progress with another, proven option". (Nelson, 2006.)

La Franchi (2005) has suggested that the decision turned on the acceptability to Defence of cost, schedule and technical risk considerations inherent in building the domestic solution into ADF aircraft. The ALR 2002 had been installed on the C130 fixed wing transport aircraft and Army helicopters - implying that in those cases the cost, schedule and technical risk involved were acceptable to Defence. But integrating the ALR 2002 with the much more electronically complex F/A-18 involved greater cost, schedule and technical risk, and thus came to appear relatively unattractive - especially since Australia could obtain the proven ALR 67 (V3) on acceptable terms and could also draw on US experience, thus reducing risk.

By offering the Raytheon ALR 67 (V3) system for use on Australia's F/A-18s, the US diluted the incentive for Australia to persist with its efforts to develop EWSP for this aircraft, despite 15 years of prior effort. It was to the advantage of the US Government to make the offer, both to ensure that the military assets of a key ally remained interoperable with related US forces and to reduce the threat of competition from a new source. But while at considerable cost, Australia nonetheless gained – and continues to exploit – potentially valuable additional independent capability in electronic warfare innovation. Here, we may never know whether a Type-(c) case arose, i.e. whether the creation of domestic industry capability to build EWSP for the F/A-18 was, in fact, beyond the nation's ability. It does appear that Australia spent more on pursuing this priority than it had anticipated it would have, suggesting a Type-(b) scenario. But the case also draws attention to a more subtle issue. Costs incurred in establishing domestic industry capability may have the strategic effect of persuading overseas suppliers to behave differently than they would have in the absence of the expenditure - which may, in turn, alter domestic decision-makers' views about the basis for declaring the capability a priority in the first place. Here, the priority reflected a response to denial of access by a foreign source. On the other hand, it may be impossible to know, in advance, whether prioritising domestic capability development will have that effect.

Jindalee Over-the-Horizon Radar: JORN

Following many years of research groundwork, the Australian government decided in October 1986 to build a network of Over-the-Horizon Radars (OTHR) to monitor its northern maritime approaches. Based on the indigenously-designed Jindalee experimental radar, the network was christened JORN: the Jindalee Over-the-Horizon Radar Network. Implementation of the project reflected an interest in establishing defence industry priorities

noted explicitly in Defence documents at the time (see above). Only Australian companies were allowed to tender for the work, though the possibility of consortia arrangements with overseas companies was permitted. In 1990, Defence reached a procurement agreement with the state- owned and state-operated national telecommunications provider, then called Telecom Australia (subsequently Telstra after Telecom Australia was corporatised and partially privatised). The contract called for the design and development of a fully-networked radar system, entailing major changes to the DSTO pilot program and including widely spread radar transmitters/receivers and a JORN coordination centre.

The task of converting a scientists' prototype into a working system on the ground threw up problems that pointed to substantial weaknesses in Australia's defence innovation system. The problems included:

- the absence of a clear customer-supplier understanding about JORN's engineering specifications;
- a lack of accountability for cost and schedule in relation to subcontractors undertaking software development;
- the absence of an effective system integration plan, leading to substantial under-estimates of the time, financial and management attention needed to integrate the system satisfactorily;
- overall, a lack of effective risk identification and risk management.

In June 1996, the Australian Auditor General noted that Defence had spent 80% of the JORN prime contract price, that 80% of the original schedule had elapsed but that less than 20% of the JORN configuration items had passed the critical design review stage (ANAO, 1996: xiv). This and other evidence that Telstra lacked the skills required to manage JORN effectively, culminated in Defence replacing Telstra with RLM, a joint venture between Lockheed Martin (who had purchased General Electric's OTHR business) and Tenix (an Australian-owned and controlled company then primarily engaged in building ANZAC frigates for the Australian and New Zealand navies). The national composition of the RLM joint venture reflected Defence insistence that the capacity to supply and support the JORN component of Australia's maritime surveillance capability remain Australian controlled. To recover JORN, RLM retained the 50 best subcontractors, established a dedicated software integration laboratory and assembled a team comprising the best of the existing JORN engineers and software specialists (some 350 people), augmented by over 50 secondees from Lockheed Martin and an additional 40 recruits from the UK. RLM finally handed the operational JORN system over to the Royal Australian Air Force (RAAF) in April 2003, 13 years after signature of the original contract.

According to the Australian Nation Audit Office (ANAO), the final approved budget for JORN was AUD1.24 billion and, separately, the Defence Science and Technology Organisation (DSTO) has estimated that it invested 1,300 scientist years in JORN R&D, 1976-2003, equivalent to about AUD108 million. On this basis, a conservative estimate of

JORN's cost to government is AUD1.3 billion, a figure that excludes the substantial losses incurred by Telstra before it relinquished the project. In the four years to 2007 RLM continued to provide system support and achieved 99% availability of JORN, compared to a contractual requirement of 96%. In 2007, RLM secured a contract to upgrade JORN (designed and built to specifications set in the early 1990s) to harvest experience accumulated in operating the system and in on-going research and development. The upgrade is scheduled for completion in 2012-13.

We would argue that, for a long time, JORN looked like a Type-(c) case: Australia had "bitten off more than it could chew". Ultimately, however, JORN was brought to fruition and is an operating system. But the costs of establishing the domestic industry capability to facilitate this appear excessive: had Lockheed Martin been employed from the outset, the costs would have been (much) lower. In the end, JORN appears to be a Type-(b) case, but one in which the local country, Australia, paid much more than it should for the product of industry capability that most certainly would not have been created in country in the absence of the project.

United Kingdom

The costs of prioritizing industry capabilities proved to be substantial and – as we noted earlier – Treasury opposition meant that the Defence Industrial Strategy was essentially uncosted. The MoD's estimate of the cost of implementing the DIS did not include the cost of funding the equipment programme that was critical to the commitments that the DIS implied. Assessing the progress of the DIS in 2007 the House of Commons Defence Committee commented:

> "103. The MoD estimates that the costs of implementing the DIS in 2006-07 and 2007-08 will total just over £50 million. However, these costs only cover the MoD internal costs, and do not include the costs which will be incurred in the move away from competitive procurement in many areas, and from sustaining technological and industrial capabilities in the UK. We look to the MoD to estimate the overall costs of implementing the Defence Industrial Strategy.
> 104. The DIS has, in the MoD's own words, the potential for "major pay-off". However, to realise the pay-off, the required funding must be made available to fund the future equipment programme. We would consider it a real missed opportunity if adequate funding for the MoD to realise the full benefits of the DIS were not provided." (House of Commons Defence Committee, 2007).

The following years were to see increasing pressures on the defence procurement budget and growing anxiety over the scale of the defence budget crisis facing the UK. The causes of the UK's defence budget problems were varied and related to broader pathologies of the defence procurement process rather than the Defence Industrial Strategy in particular. The causes of the UK's "overheated" defence procurement budget were analysed in detail in the 2009 Gray Report which noted that:

> "Although consideration of the Defence Industrial Policy is outside the remit of this Review, it does have bearing on the affordability and costing debate. The DIS essentially mandates certain industrial strategies to be implemented by the Department in fulfilling its requirements. These have cost implications for the Equipment Programme, in a similar way to capability requirements arising from strategic defence planning dictates. At present, DIS is still relatively recent, but there is likely to be a case for regular review of this strategic framework, potentially synchronised with future SDRs" (Gray Report, 2009: 78-79).

A 2010 Ministry of Defence report on acquisition reform emphasises some of the challenges raised by long term partnering to maintain industrial capabilities and highlights that the costs of sustaining industrial capabilities go beyond their budgetary implications. The 2010 report comments:

> "The move in recent years by MOD into more long-term partnering arrangements with suppliers has meant industry becoming more deeply involved in Defence activity, including providing services on operations. These agreements maintain essential industrial capability through an agreed and sustained level of work, in return for reduced costs… But these new kinds of relationships bring risks if they do not have sufficient flexibility built into them to deliver increasing value for money or meet our changing needs… there are risks to safety if we do not establish and manage such relationships properly (Ministry of Defence, 2010)

This is an important point. MOD efforts to sustain UK defence industrial capabilities have had wider implications. Long term partnering agreements have established single source supplier relationships that – critics argue – exclude others from supplying to MOD and stifle innovation. The long term partnering agreements require monitoring for compliance and it is unclear as to whether MOD has the capabilities or willingness to do so (there is a classic principal agent problem here).

Faced by the an overheated defence budget and broader fiscal austerity, the Coalition Government (formed in 2010) has taken a rather different approach to defence industrial capabilities and its 2012 White Paper *National Security Through Technology* signals a potentially significant change in UK defence industrial policy.

The White Paper emphasises that in the future the default position for UK defence procurement will be Off The Shelf procurement "wherever possible". The White Paper replaces the DIS emphasis on Appropriate Sovereignty with talk of "operational advantage" – the ability to find and maintain an edge over potential adversaries and "freedom of action" – the ability for the UK to determine its internal and external affairs free from intervention by other states or entities. The White Paper emphasises talks of "technology advantage" and says that "We will take action to protect our operational advantages and freedom of action, *but only where this is essential for national security*" (Ministry of Defence [UK], 2012, p.25, our emphasis).

This emphasis that MOD will only take action to protect operational advantage where it is essential to national security is in reality a continuation of the policy set out in the DIS. What

is different is that the 2012 White Paper explicitly rejects any idea of identifying those capabilities that are critical to national security. The Foreword contrasts the White paper's approach with that of the DIS saying:

> "Many companies wanted a list of areas that we will protect, similar to that set out in the Defence Industrial Strategy of 2005…. At a time of constrained budgets and unpredictability of threat, we believe it is more appropriate to set out our understanding of what operational advantages and freedom of action we need to protect, and what steps we will take to preserve the minimum elements necessary to protect our national security" (Ministry of Defence, 2012: p.6).

Instead, the Coalition Government has sought to provide clarity to industry on the future capability requirements through the publication of its ten year equipment plan later in 2012. This is a second departure in UK policy since – in contrast to Australia – it has not been previous UK practice to publish details of expected equipment requirements in this way. The White Paper comments:

> "Our assessment of the affordability of the MOD's ten year equipment plan which will be published later this year will enable UK based industry to focus its investment, technology and development work and manufacturing infrastructure thereby reducing costs and overheads and making its products more competitive for UK and overseas customers. And it will contribute to our wider initiative of publishing procurement pipelines for a range of sectors to give suppliers the confidence to invest for the future…" (Ministry of Defence, 2012: p.8).

Conclusion

Two sorts of evidence have been adduced here to address the issue of whether government support for priority industry capabilities leads to price premia on military acquisitions, and to what extent. In the Australian case, project-based evidence suggests that efforts to establish domestic industry capabilities have raised the price of procurement quite clearly in two of the three cases considered: the F/A-18 jet fighter and Jindalee Over-the-Horizon Radar. In the third case, electronic warfare self-protection for the F/A-18 was simply not made available in the form Australia required. The costs incurred in seeking to develop the capabilities to build an indigenous version might be viewed as a premium on the price ultimately paid to acquire the system. On the other hand, they were unavoidable so long as Australia was denied the relevant EWSP.

In the UK case, there is less history to provide a basis for specific case analysis but an observable pattern of evolution in thinking. MoD initially judged that substantial costs would arise from implementing the 2005 Defence Industry Strategy, with its focus on prioritising industry capabilities. Subsequently, MoD argued that providing suppliers with demand for a

sustained flow of work had enabled it to negotiate long-term partnering arrangements with industry players that will both maintain essential industry capability and keep costs in check. Evidence on outcomes is as yet unavailable and is unlikely to be available for some years. It is revealing, however, that MoD appears to have back-pedalled on identifying priority areas of industry capability in the style of the DIS, invoking constrained budgets as a reason for adopting a different approach, and thus implying that costs are a key issue.

In both countries there is therefore evidence that creating and/or maintaining indigenous industry capabilities comes at a cost. The perceived benefits of creating and maintaining in-country industry capabilities have been shown to include domestic employment, skill development, fostering of R&D and innovation, in addition to the more general claim of enhanced "self-reliance". But such benefits are often harder to quantify with as much certainty as price premia and with defence budgets under continuing pressure, we expect to see less enthusiasm to pursue broader socio-economic goals when their costs are acknowledged. Already, there is a marked trend to thinking and talking more in terms of "off-the-shelf" purchases from least cost suppliers, which may often mean suppliers located in other countries.

As long as governments place a higher priority on reining in the growth and level of government debt than pursuing goals in the area of security self-reliance, it seems to us this trend is likely to continue. Government debt is highly visible, measureable and discernible in its effects on most; self-reliance is of little significance to most at the ballot box and even the more tangible socio-economic effects of industry capability support are only relevant to minorities - albeit potentially important minorities if they inhabit hotly contested or marginal electoral constituencies. Defence spending is a large and obvious target for making budgetary economies and we expect that the rhetoric supporting local defence industry capabilities will either become more nuanced (as appears to be the case in the UK) or limits will be placed on the resources actually devoted to the task.

Author biographies

Peter Hall is Emeritus Professor of The University of New South Wales in the School of Business at the Australian Defence Force Academy (ADFA), Canberra. He was Head of the School 1997-2006. He has undergraduate and postgraduate degrees in economics from Oxford University and has held academic positions at universities in Australia since 1978. He took a position at The University of New South Wales' ADFA campus in 1986 and became Professor in the School of Business in 1999.

Professor Hall has researched and published widely in the areas of defence industry economics and policy, including offsets, defence innovation and procurement. His co-authored book, *Defence Procurement and Industry Policy: A Small Country Perspective*, was published in 2010. Professor Hall has broader research interests in the economics of innovation and innovation policy and his *Innovation, Evolution and Economics* was

published in 1994. He was Associate Commissioner with the Australian Industry Commission on a national inquiry into research, development and innovation.

Andrew James is a Senior Lecturer in Science and Technology Policy and Management and a member of the Manchester Institute of Innovation and Research at MBS. His research and teaching interests focus on corporate technology strategy, innovation management and science and technology policy, as well as business strategy. He has engaged in research and consultancy with companies from a diverse range of sectors including chemicals, industrial electronics and pharmaceuticals but his particular focus is on the industrial and technological dynamics of the defence, security and aerospace sectors.

In the defence and security field, he has held a number of international advisory positions including membership of the European Union Institute for Security Studies Independent Expert Working Group on the European Commission's Green Paper on Defence Procurement and he was External Expert on defence matters and Rapporteur to the European Union Research Advisory. In May 2000, he was invited to brief the US Deputy Under Secretary of Defense for Industrial Affairs on the health of the US defence industrial base and the prospects for transatlantic defence industrial integration. Andrew has been an invited speaker on defence, security and counter terrorism science and technology policy and corporate strategy issues at conferences organised by, amongst others, the Royal United Services Institute, NATO, the Atlantic Council of the United States, the SAIS Center for Transatlantic Relations at Johns Hopkins University, the Stiftung Wissenschaft und Politik/American Institute for Contemporary German Studies, L'Ecole de l'Air, Fondation pour la Recherche Strategique, the Italian Istituto Affari Internationale and the Australian Defence Force Academy. In 2004, he directed a NATO Advanced Research Workshop on Science and Technology Policies for the Anti-Terrorism Era and, in 2005, he organised a European Commission PRIME-funded workshop on Defence R&D in the Innovation System.

References

Beazley, Kim (Member for Brand) in Hansard, House of Representatives, Canberra, Thursday 20 September 2007, pp37-44, available at http://www.aph.gov.au/Hansard/reps/dailys/dr200907.pdf, accessed 19 May 2009.

Brabin-Smith, R. (2005) *The Heartland of Australia's Defence Policies*, Working Paper 396, Strategic and Defence Studies Centre, Australian National University, Canberra.

Department of Defence (1976), *Australian Defence.* Australian Government Publishing Service, Canberra.

Department of Defence (1987), *The Defence of Australia.* Australian Government Publishing Service, Canberra.

Department of Defence (1992), *Defence Policy and Industry*. Report to the Minister of Defence prepared by The Hon Roger Price MP.

Department of Defence (1993), *Strategic Review*. Australian Government, Canberra

Department of Defence (1994), *Defending Australia.* Australian Government, Canberra

Department of Defence, Industry and Procurement Infrastructure Division (1997), *Defence Needs of Australian Industry.* Australian Government, Canberra.

Department of Defence (1998), *Defence and Industry Strategic Policy Statement*. Australian Government, Canberra

Department of Defence (2000), *Our Future Defence Force.* Australian Government, Canberra

Department of Defence (2007), *Defence and Industry Policy Statement*. Australian Government, Canberra.

Department of Defence (2009), *Priority Industry Capabilities, Fact Sheet.* Defence Materiel Organisation, Australian Government, Canberra.

Dibb, P. (1986), *Review of Australia's Defence Capabilities: Report to the Minister for Defence,* Australian Government Publishing Service, Canberra.

Gray Report (2009), *Review of Acquisition for the Secretary of State for Defence,* An independent report by Bernard Gray, October 2009

Hall, P and R. Wylie (2010), "Arms export controls and the proliferation of military technology", in Goldsmith, B. and P. Gangopadhyay (eds), *Economics of Peace and War: How Economic Factors Shape Violent Political Conflict,* Contributions to Conflict Management, Peace Economics and Development (General Editor M. Chatterji). Emerald, 2010.

House of Commons Defence Committee [UK] (2007) *The Defence Industrial Strategy: update* Sixth Report of Session 2006–07, HC 117

La Franchi, P. (2005), "Australia signs EW suites contract", *Flight International* ,22 February.

Nelson, Dr Brendan, Minister for Defence Press Release 149/2006 *Ensuring Australia's Air Combat Capability Edge*, Monday 13 November 2006, available at http://www.minister.defence.gov.au/Nelson, accessed 30 March 2009.

Ministry of Defence, United Kingdom (2010), *The Defence Strategy for Acquisition Reform*, Presented to Parliament by the Secretary of State for Defence, February 2010, Cm 7796.

Wylie, R., S. J. Markowski and P. Hall (2006), "Big science, small country and the challenges of defence systems management: an Australian case study", *Defence and Peace Economics*, 17(3), pp. 257-272.

[i] It is not assumed here that a producer must be world-efficient in order to survive: there is abundant evidence of a *distribution* of production cost levels in most industries. All we are noting here is that capabilities might exist, or come into being, as a result of normal market decisions which are associated with above-average costs for firms in that industry but nonetheless support a positive (or non-negative) level of profit.

The University of Manchester
Manchester
Business School

MANCHESTER 1824

UNSW THE UNIVERSITY OF NEW SOUTH WALES SYDNEY · CANBERRA · AUSTRALIA | Canberra

Defence industrial policies & their impact on acquisition outcomes: a comparative analysis of the UK & Australia

Professor Peter Hall

University of New South Wales, Australia

Dr Andrew James

Manchester Business School, UK

Summary

- Defence industry capabilities: definitions
- Priority defence industrial capabilities: definition & rationale
- Prioritising policies & consequences: Australia
- Prioritising policies & consequences: United Kingdom
- Comparison & conclusions

Industry capabilities

- “Capability” an imprecise term used in different ways – but always implies managing/integrating resources (knowledge, skills, technology, production capacity) to successfully perform a (usually) strategic task

- In defence context, the task is support for military systems/sub-systems enabling that system to work effectively (e.g. maintenance of naval vessels; adaption of software)

- ***Industry*** capability means capability located in industry but not necessarily confined to a single firm (in Australia, industry capability = industry function)

Priority defence industrial capabilities

- Industrial capabilities are assigned priority status if viewed as necessary, in-country, for sovereignty/self-reliance
  - To ensure operational independence against the range of operations we wish to conduct (UK Defence Industrial Strategy, 2005)
  - To confer essential strategic advantage that would be undermined if capabilities not domestically available (Australian PICs 2009)

Identifying industrial capability priorities

- Views vary as to what is “essential” or “critical” for “self reliance” (Australia) or “appropriate sovereignty” (UK) because of varying degrees of risk aversion/perceptions risks to security of supply/cost consideration/path dependence

- (e.g.) UK DIS 2005 emphasised:
  - Criticality to safeguarding the state
  - Necessity for ensuring continued/consistent equipment performance
  - Ability to maintain international strategic influence

- But subjectivity & politics remain important

Implementing priorities

- Procurement process
  - Local industry involvement requirement as quid pro quo i.e. suppliers required to build/maintain locally priority capabilities
  - Offsets/Industrial Participation: suppliers required to transfer technologies, train, undertake R&D in priority areas
  - Long Term Partnering Agreements

- Cost implications: local production may be less efficient; offset costs built into price; partnering may lead to monopoly inefficiencies

- Because of subjectivity in prioritisation costs can be high

Australian examples

- F/A-18 jet fighter:
  - McDonnell Douglas required AII to create prioritised engineering, maintenance & spares provision
  - AII officially estimated to add at least 17% to cost

- JORN:
  - Developed science locally & implemented by industry not involved in early R&D for project
  - Much delayed project & led to higher costs: Telstra/GEC Marconi incurred 80% allocated costs to achieve 20% of progress
  - Lockheed Martin ultimately called in to rescue

The United Kingdom experience

- In contrast to Australia, idea that UK MOD should publish defence industrial priorities a relatively recent development

- Thatcher Governments: tension between role of MOD as oligopolistic customer to the defence industry & Conservative Party opposition to the idea of industrial strategy in any sector

- Growing debate on defence industrial capabilities prompted by increasing pressure on defence budgets; consolidation of the UK defence industry; "globalisation" of UK defence companies & threat of exit in favour of U.S. investments

- 2002 Defence Industrial Policy set out MOD support for foreign ownership of UK defence industrial capabilities

- **2005 Defence Industrial Strategy (DIS):** aim was to provide a clear strategic view of defence industrial capability requirements to allow industry & government to better plan for the sustainment of critical defence capabilities

“Appropriate sovereignty”

- Key criteria used by DIS to identify critical industrial capabilities
- *“We must maintain the appropriate degree of sovereignty over industrial skills, capacities, capabilities and technologies to ensure* ***operational independence*** *against the range of operations that we wish to be able to conduct”*
- Strategic assurance : onshore capabilities needed for the security of the state
- Defence capability: capabilities needed to assure armed forces of “continued and consistent equipment performance”
- Strategic influence: capabilities necessary for strategic influence in military, diplomatic or industrial terms

Implementing priorities:

- Long Term Partnering Agreements with selected companies to sustain key capabilities (& achieve efficiency savings)
- E.g. Maritime Change Programme (BVT Surface Fleet, BAE-VT joint venture) (£700-1100m net benefits over 15 years)
- E.g. Team Complex Weapons (MBDA, QinetiQ; Roxel; Thales UK) (£1 billion benefits over 10 years)
- E.g. Strategic Partnering Agreement with AgustaWestland (through life cost savings for helicopter support)

The costs of prioritising industrial capabilities

- MOD-Treasury conflict over the costing of the DIS meant that DIS did not include indication/commitment to future budget

- *"[DIS] do not include the costs which will be incurred in the move away from competitive procurement in many areas, and from sustaining technological and industrial capabilities in the UK"* (Defence Select Committee, 2007)

- *"The DIS essentially mandates certain industrial strategies to be implemented by the Department in fulfilling its requirements. These have cost implications for the equipment Programme…."* (Gray Report, 2009)

2012 White Paper
National Security Through Technology

- Overheated defence budget & fiscal austerity
- Off The Shelf Procurement "wherever possible"
- *"Many companies wanted a list of areas that we will protect, similar to that set out in the Defence Industrial Strategy of 2005…. At a time of constrained budgets and unpredictability of threat, we believe it is more appropriate to set out our understanding of what operational advantages and freedom of action we need to protect, and what steps we will take to preserve the minimum elements necessary to protect our national security"* (Ministry of Defence, 2012: p.6)
- Publication of ten year equipment plan expected later in 2012 to provide clarity to industry on future capability requirements

Discussion/conclusion

- Concerns about sovereignty/self-reliance /security of supply key influence in identifying priority industrial capabilities

- Views vary as to what constitute “priority” defence industrial capabilities because of varying degrees of risk aversion/perceptions risks to security of supply/cost consideration/path dependence - subjectivity & politics remain important

- Creating/maintaining indigenous industry capabilities comes at a cost – rhetoric supporting local defence industry capabilities likely to become more nuanced and/or limits will be placed on resources available to support those capabilities