The UK Offset Model
From Participation to Engagement

Ron Matthews
**Contents**

*Acknowledgements*  iv

**Introduction: The Rise and Demise of Offset**  
I. Paradigms, Policies, Problems and Performance  15  
II. Industrial Participation Policy Framework  37  
III. The Impact of the Industrial Participation Policy on the UK Defence Economy  44  
IV. UK Industrial Participation Policy: ‘Fit for Purpose?’  67  
V. From Participation to Engagement  77  
**Conclusion: Back to the Future?**  89  
*About the Author*  97
Acknowledgements

Grateful acknowledgement is made to Robert Regan and Warren Bayliss, respectively, the former Head and Assistant Head of the MoD International Relations Group, Defence Equipment and Support, for sponsorship of the research programme. Appreciation is also expressed to Adrian Dalton, former Head, MoD Industrial Participation Unit, for expert advice and constant encouragement. A vote of thanks also to Fitri, my long-suffering Associate Research Fellow, for her unwavering research support.
Introduction: The Rise and Demise of Offset

Over the last two decades, the global defence market has changed dramatically. An increased emphasis on hi-tech weapons systems has profoundly impacted upon the global defence-industrial order. Only the rich industrialised nations are now able to afford self-sufficiency in the development and production of weapons. The high cost of technology-intensive armaments has in turn constrained scale, making acquisition even more costly. The US has been almost alone in maintaining defence-industrial autarky. The changed economic landscape has meant that even European countries have struggled to afford national defence-industrial and technology capabilities, obliging them to engage in regional collaborative acquisition (as with the Tornado and Eurofighter), to partner with the US as subcontractors on global multilateral programmes (as in the case of the F-35 Joint Strike Fighter consortium), or to procure existing weapons systems off-the-shelf from the US. The latter option is attractive because it both avoids the heavy investment burden of development and creates the opportunity for ‘offsetting’ investment; that is, through demanding the local production of the system or, at least, of some of the sub-systems being purchased. The impact of offset, however, depends on the stage of defence-industrial development a country has reached. Industrialising states view offset as a catalyst for creating manufacturing capacity, whilst advanced countries, such as the UK, see it as a means of keeping production lines ‘warm’. Either way, in the absence of local R&D, increased technological dependence on the overseas supplier is likely inevitable. In a sense, then, offset offers a paradox: it can be viewed as a means for both constructing and destructing indigenous defence-industrial and technological capacity.

Driven by affordability challenges, the UK has increasingly moved away from defence-industrial sovereignty goals and towards the collaborative, global consortium and offset options. These acquisition paths inevitably erode sovereign defence-industrial capability, and the UK Ministry of Defence (MoD), recognising these challenges, has been energetic in trying to balance short-term cost savings with the longer-term strategic benefits of security of supply. The British policy approach towards the more controversial of these acquisition models – the offset model – has been to highlight the importance of competition in the procurement process, whilst extracting work placement from offshore vendors.

Offset is controversial because it elicits a multiplicity of stakeholder perspectives – some good and some bad. Yet despite all of the adverse publicity and institutional attempts to remove this trading ‘imperfection’ from the global arms market, offset remains a feature of defence acquisition, although there remain differing rationales for, policy approaches to, and policy outcomes of its implementation. For arms contractors, including those
in the UK, it is near-impossible to conclude a sale without a requirement for offset from the purchasing country. Nevertheless, a concerted effort is now being made by arms-purchasing governments in advanced countries to reduce the prevalence of offset as a method of acquisition.

**From a Suppliers’ to a Buyers’ Arms Market**

The first official use of offset in the modern era was Europe’s licensed production of the Lockheed F-104 Starfighter combat aircraft in the 1950s. Yet the use of offset as a trading quid pro quo pre-dates the nomenclature by almost 100 years. Employed originally by defence industrialising states as a means of extracting technology from advanced countries, the offset mechanism has now evolved to incorporate all countries, rich and poor, that are seeking to obtain economic, industrial and technological benefits from offshore arms vendors. Indeed, in the present era almost all major arms-export deals are tied to offset arrangements, primarily because of the widespread perception that they offer an effective method of leveraging technology from foreign defence contractors. Conceptually, the process is uncomplicated, reflecting a purchasing country’s linkage of a foreign arms purchase to a reciprocal demand for investment in its domestic economy, where reciprocity means that an arms-purchasing government demands additional benefits from the offshore contractor over and above the supply of military equipment, as agreed in the primary defence contract.

The purchasing government’s demands only have traction because the twenty-first-century arms market is a buyers’ market, marked by a multiplicity of global defence contractors vying for limited numbers of major arms contracts. This imbalance of market forces in an increasingly tight international defence market offers defence ministries and other government departments the opportunity to extract ‘offsetting’ benefits from defence-related original equipment manufacturers (OEMs) desperate to secure arms contracts. If the imbalance favouring the arms-purchasing nation were to disappear, so too would offset. However, since the late 1980s, a number of developments, including the collapse of communism and the end of the Cold War, have coalesced to ensure the continuation of offset. The demand side of the global arms market has dramatically diminished,

whilst the supply side has expanded due to the rising numbers of emerging nations seeking to export defence equipment. For the few arms-purchasing states engaging in serial high-value defence imports, these opposing trends have afforded tremendous market leverage in extracting technology transfer through offset from foreign vendor companies.

The persistence of a buyers’ market over the last two decades has focused policy-makers’ minds, leading to a proliferation of new and revised official buyer-country offset guidelines, including those set out by India (in 2005) and Malaysia (in 2006). These guidelines comprise economic imperatives that underpin the rationale for a national offset strategy, including the maximisation of local employment opportunities; the generation of highly skilled jobs; the sponsorship of domestic industrial clusters; participation in offshore vendor global supply chains; and the fostering of indigenous technological development. Such considerations were a major factor in South Africa’s controversial acquisition of JAS-39 Gripen combat aircraft, corvettes and submarines in 1999, enabling Pretoria to argue that offset arrangements represented four times the 35 billion Rand acquisition cost. There may also be geostrategic motives behind offset deals. These constituted at least a partial driver behind India’s 2011 decision to acquire ten US Globemaster strategic heavy-lift aircraft, following close on the heels of New Delhi’s decision to down-select European rather than American contenders for the huge order of 126 medium, multi-role combat aircraft. In this case, acquisition of the US Globemaster aircraft, including the associated offset package, could provide India with the opportunity both to secure potential access to high-end American defence systems, and to further advance the growing Indo–US rapprochement, bringing additional diplomatic and economic advantages. This strengthening geostrategic union will also, it is believed, act to complement emerging alignments between India and Europe, as well as the country’s long-term alignment with Russia, all principally aimed at containing the rising Chinese threat.

Finally, there may be operational reasons to employ offset, especially for those developing countries still pursuing the goal of military self-sufficiency. Yet whilst licensed production can create some degree of supply security, it can only act as a partial panacea to higher levels of defence-industrial sovereignty. This is because the poorer states will be constrained to licensed

2. The offset guidelines of these two countries signify the dynamic nature of such policies, with regular revisions changing the shape of policy in subtle but important ways.

3. South Africa’s offset-package value, at least for some of the projects, was 400 per cent; that is, four times larger than the acquisition cost. See Marianne Irene Camerer, ‘Corruption and Reform in Democratic South Africa’, unpublished PhD dissertation, University of Witwatersrand, Johannesburg, South Africa, March 2009.

production and offset arrangements often targeted at the production of lower-technology assemblies and components, rather than the high-technology systems that tend to be ‘black-boxed’ and continue to be sourced from the foreign OEM.

**Defence Globalisation**

Complicating the study of offset is its entanglement with arms acquisition, an area of defence economics that attracts disquiet and controversy. Here there are two sets of challenges. First, at the programme level, the UK’s ‘smart’ acquisition policy has proven almost impossible to achieve – the notion of bringing complex weapons projects in on time, to budget and to the specified quality remains an elusive, ‘will-o’-the-wisp’ goal. Secondly, at the sectoral level, defence, perhaps uniquely, continues to benefit from high levels of protectionism. This is especially the case since the launch of the December 2005 *Defence Industrial Strategy* and February 2012 *National Security through Technology* White Papers, where selected key defence-related technologies would be identified and protected. Protectionism is the antithesis of both national and global competition, the MoD’s stated overarching policy goal. Notwithstanding the official emphasis on competition, the push for defence-industrial autarky should come as no surprise. Defence is more than just a ‘public good’; it is a public good under sovereign protection. This is because arms production represents an important component of national security and, traditionally, state control ensures that capacity is compromised by neither commercial requirement nor foreign ownership.

However, the world is changing and both commercialism and globalisation are playing an increasingly important role in addressing the scourge of arms cost escalation. Defence capability has always been expensive, but since the 1980s it has become more so, with the cost of inter-generational weapons systems held to be rising by more than 10 per cent per annum, an inflationary expansion that even the richest nations find unbearably painful. The result is that cost-effectiveness trade-offs have become common practice, driven by the search for affordability.

Additionally, the radical post-Cold War Revolution in Military Affairs (RMA) has forged a dramatically changed global defence-industrial community. The US defence economy has become the only show in town, its $711.4-billion defence budget (including incremental expenditure on Iraq and

---


Afghanistan)\(^7\) dwarfing the defence expenditure of nearly all other countries combined in 2012. Such heavily skewed international defence spending brings with it a number of important impacts. First, the huge US defence budget – including the world’s largest defence research and development (R&D) spend of almost $90 billion in 2010 – represented, at that time, a remarkable 75 per cent of defence R&D funding worldwide, and 81 per cent of total government R&D spending,\(^8\) placing the US firmly at the helm of the development of radically new and expensive RMA weapons technologies. Secondly, the mammoth US defence budget generates huge scale effects in every area of defence procurement. This high scale of production reduces unit costs and raises international competitiveness to unparalleled levels, rendering all other defence-industrial bases ‘small’ in comparison. Thirdly, because of rising acquisition cost and the associated enhancement of technological infrastructure, including both defence lines of development and investment in the capabilities required to develop and produce modern weapons systems,\(^9\) a trend is emerging which has seen countries paring down their defence-industrial capacity to focus solely on ‘core’ competences. Such a process reinforces the view that defence-industrial self-reliance has become unaffordable, with even the F-35 – the archetypal affordable combat aircraft – now suffering incessant and accelerating cost increases.\(^10\)

Indeed, the F-35, produced through a global acquisition consortium, signals that technology-sharing has moved beyond bilateral and multilateral arms

---


9. The UK Ministry of Defence’s approach to efficient and effective defence-acquisition planning is to emphasise capability management through integration of key functional activities. These are categorised under defence lines of development (DLoD) and cover training, equipment, personnel, information, concepts and doctrine, organisation, infrastructure and logistics.

10. The US Government Accountability Office (GAO) has repeatedly expressed concern about the escalating costs and long-term affordability of the F-35 programme. Development and acquisition costs were predicted to reach $233 billion when the programme commenced in 2001, but are now estimated to hit $397 billion by 2037; similarly, unit costs have increased from an affordable $81 million in 2001 to $161 million in 2012. See Louisa Brooke-Holland, ‘The F-35 Lightning II Joint Strike Fighter’, House of Commons Library, SN06278, 12 April 2013, p. 11. Equally disconcerting is the anxiety over the F-35’s limited capability to conduct combat. There is a view that the F-35s that become operational in 2015 ‘will not only be ill-equipped for combat, but will likely require airborne protection by the very planes [F-16s] the F-35 was supposed to replace’. See Adam Ciralsky, ‘Will it Fly?’ Vanity Fair, 16 September 2013. Such cost-effectiveness uncertainties have led some partner countries to reconsider their acquisition plans. Canada, for instance, is reconsidering its plan to procure sixty-five of these planes. See Ian Austen and Christopher Drew, ‘Canada Reviews Plans to Buy F-35 Fighter Jets’, New York Times, 12 December 2012.
collaboration, with the appeal of such defence-development partnerships the fact that all participating countries share the cost burden, leading in turn to a strengthening of strategic alliances. Moreover, the typology of international co-operative acquisition models is expanding, reflecting the pervasiveness of defence globalisation – the process of liberalising global defence trade – and moving the focus away from the conventional objective of self-sufficiency. For most states, then, it is clear that the conventional acquisition route of ‘national’ production has become untenable.

Meanwhile, the process of globalising defence acquisition has spawned a rapid growth in offset requirements, encouraging, in the process, a search for lower-cost and higher-quality acquisition solutions beyond national boundaries. The uneven structure of the global arms market means that market leverage rests with the buyer country. This market power imbalance brings into play the major distinguishing characteristic of offset in relation to other forms of international partnership, namely the fact that the vendor is coerced into the arrangement. It is not the best way to start a commercial relationship, and certainly does not augur well for the success of offset-driven technology transfer. For offset to work as intended, compliance must lead to competitiveness and commercial sustainability, to the benefit of both the recipient country and the vendor company. If this goal is not achieved, the offset will not be viable and the vendor will struggle to secure future sales in that market. The stakes are high and for offset to work, stakeholders must work together. Yet scales of production in the recipient defence economy are nearly always low, and complexity, risk and cost invariably high. Furthermore, compounding the challenges of securing stakeholder harmony, the chances of accessing the technological ‘crown jewels’ of offset vendors are slim: while offset recipient economies are desperate to exploit high-technology ‘quick-fixes’, vendors are naturally reluctant to give away their core technologies, as they define, in large part, their competitive advantage.

As such, globalisation has led to the dilution of self-reliance, but the process has not been uniform, with some states, such as China, continuing to have the resources to spend billions of US dollars creating capabilities in strategically significant technology sectors. Yet whilst China is embargoed

---

11. The rationale of workshare on the F-35 programme is competitiveness, unlike the Eurofighter, for which it is based on juste retour; that is, inputs are tied to outputs (aircraft procured). Thus, neither of these acquisition models can be called offset.

12. There are no statistics on offset activity. Publication of country guidelines can act as a proxy, however. In the 1970s, only a handful of countries had formal, published offset guidelines, whilst today around eighty countries have official policies, with up to 130 employing some form of offset requirement.

from buying US equipment, most other states are not, and the lure of proven, cost-effective US combat systems has shown itself to be irresistible. American arms sales now dominate the global market. In 2011, American arms exports were valued at almost $14.9 billion, representing 30 per cent of global export sales. Linked pari passu with this sales expansion has been the growth in offset demand. For instance, in 2011, twenty-one US firms reported 745 offset transactions with thirty-one other countries, with a contract value of $4.01 billion and an offset credit value of $5.18 billion. Moreover, from 1993 to 2011, sixty-two US defence firms reported 12,100 offset transactions with fifty countries, this being linked to a cumulative export contract value of $122.7 billion and an associated offset credit value of $83.7 billion, averaging almost 70 per cent of the contract value of the export sales. During 2011, US offset credit targets ranged from a low of 25 per cent of defence export sales contracts to a high of 100 per cent. Due to the Pentagon’s heightened concern regarding the sovereign capability of the US’s defence-industrial base, the Department of Commerce is required to maintain a statistical base on US offset transaction. Outside of the US, however, precise information on the level and growth of offset demand is harder to come by. The paucity of data is due not only to the absence of official statistics, but also to corporate sensitivity. Overseas defence contractors fear that divulging offset information may undermine painstakingly built-up market positions and strategies, thus eroding competitive advantage. Such widespread sensitivity over offset has meant that the subject has come to be regarded as a ‘black art’, where even subject analysts, academics and policy-makers misunderstand and consequently misrepresent pertinent, but

14. Since the 1989 Tiananmen Square incident, China has been embargoed from importing weapons systems from Western countries. This ban has hampered local development, especially of high-end military aircraft engines. However, even in the aviation sector, the sensitivity of advanced engines means that the likes of Rolls-Royce and GE are reluctant to allow technology transfer to China. Accordingly, the huge state-owned Aviation Industry Corporation of China is investing 100 billion yuan ($160.7 million) to galvanise the country’s commercial and military aircraft-engine research and development effort (see Lague and Zhu, ‘Unable to Copy it, China Tries Building Own Jet Engine’).


17. Ibid., p. 3.

18. Ibid. US offset values are high in relation to defence trade, but are low when compared to total commercial trade. In 2011, for instance, American defence-related merchandise exports hit $14.9 billion, whilst merchandise exports amounted to $1.4 trillion; a ratio of 1 per cent. Ibid., p. 6.
complex, issues. Hence, a folklore surrounding offsets has evolved, based on flimsy or non-existent empirical verification.

**Competitiveness: The Driver for Defence-Industrial Sustainability**

Although the offset process may not be straightforward, the premise is clear: that of contributing to the economic, industrial and technological development of purchasing nations, irrespective of whether development is targeted at the civil or defence sectors. For industrialising nations, the primary motive is the creation of fresh capacity and capabilities. Often, however, offset simply provides the opportunity to maintain capacity. Work packages may create jobs, contribute to the honing of skills and promote high-technology exports, but such benefits are not automatic. The relationship between the foreign offset provider and the recipient economy is often fraught, with each having different agendas. Specifically, the offshore vendor will be motivated by profit and market expansion, whilst the recipient government is focused on maximising economic benefit, including technology transfer, economic diversification, job creation, and the growth of indigenous development and production capabilities. The differing transactional imperatives can lead to creative opportunities but, equally, can result in short-term and superficial development outcomes. These opposing pressures raise the question of which ingredients are required to ensure offset success.

Convergence between offset-supplier and recipient-country objectives distils down to the achievement of mutual benefit. For the offshore vendor, profit, market presence, and a durable and substantive partnership are the main objectives. In a complementary way, the recipient country will be searching for competitiveness and cost-effectiveness by both broadening and deepening local technological absorptive capacity. Yet whilst convergence between supplier and recipient objectives is necessary, it is not sufficient. Equally important is the need for the recipient economy to implement a smooth-running and effective offset policy. This is critical in fostering trust between stakeholders in the offset arrangements and managing the flow of work and technology into the recipient economy. Yet little empirical work has been undertaken to establish the optimal offset policy for maximising economic return. For emerging countries with impoverished defence industries, constrained defence expenditure and rudimentary technology capacity, it may be necessary during the early stages of defence industrialisation to implement a prescriptive offset policy to induce viable investment outcomes, including the use of credit targets, multiplier incentive models and non-
The UK OffseT MOdel

By contrast, for advanced countries, a more open and trusting approach is arguably preferable since, through partnership, it will be easier to secure convergence of objectives, inducing mutually beneficial outcomes.

One of the few industrialised countries where offset convergence and policy flexibility have co-existed is the UK. The UK has one of the world’s most expansive defence-industrial bases, built up through centuries of accumulated investment in development and production infrastructure. Yet, since the 1990s, the spectre of affordability has affected the country’s ability to fund a viable and comprehensive defence-industrial base. The UK government’s policy response has been to strengthen the competitiveness of its defence economy in the face of both budget and procurement shrinkage. Defence globalisation has been actively promoted as a means of breaking the ‘monopoly-monopsony’ feature of the local defence market, with this open-market approach reinforced by the principle adopted in the 2002 Defence Industrial Policy that the location of defence industry, rather than the nature of its ownership, should be the overarching strategic consideration in defence-industrial planning. This open-trading regime has had two important impacts. First, the UK defence economy has become one of the most globalised in the world. Its credentials in this regard are evidenced by the fact that BAE Systems is ranked number one in terms of sales in the UK, with the majority of its employment, sales and profit generated outside the domestic economy. Further, as shown in Figure 1, only four of the UK’s ten largest defence companies are locally owned, with foreign shareholders dominating the equity.

19. The offset credit target is the percentage offset requirement measured against the primary defence contract value and can range from 30 per cent to, exceptionally, 400 per cent. An offset multiplier exists where a country policy offers multiplied credits for targeted sectoral investment: for example, 5:1 for offset investment in science and technology. Some country offset policies stipulate that a percentage penalty will be imposed on offset targets unfulfilled by the offset-programme completion date.

20. BAE Systems is also ranked the second-biggest defence company in the world, earning global sales revenue of $32.8 billion in 2010.
Secondly, in part due to this globalisation effect, the UK has built up one of the most open and competitive defence sectors in the world. As shown in Table 1, in modern times its arms exports have consistently outstripped imports. These continuing defence-trade surpluses confirm the UK’s export competitiveness and also, indirectly, suggest that the recent phenomenon of defence globalisation has probably led to a national offset deficit, whereby the outward flow of offset linked to UK exports has surpassed the inward flow of offset tied to its arms imports. This net offset deficit likely reflects a loss in British manufacturing capacity, although probably in low-skill, low-value and low-profit operations.
Table 1: Value of UK Arms Exports against Arms Imports.

<table>
<thead>
<tr>
<th>Year</th>
<th>Exports</th>
<th>Imports</th>
<th>Trade Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>2,247</td>
<td>94</td>
<td>2,153</td>
</tr>
<tr>
<td>1955</td>
<td>4,980</td>
<td>315</td>
<td>4,665</td>
</tr>
<tr>
<td>1960</td>
<td>2,072</td>
<td>29</td>
<td>2,043</td>
</tr>
<tr>
<td>1965</td>
<td>1,448</td>
<td>152</td>
<td>1,296</td>
</tr>
<tr>
<td>1970</td>
<td>915</td>
<td>60</td>
<td>855</td>
</tr>
<tr>
<td>1975</td>
<td>2,230</td>
<td>308</td>
<td>1,922</td>
</tr>
<tr>
<td>1980</td>
<td>1,688</td>
<td>549</td>
<td>1,139</td>
</tr>
<tr>
<td>1985</td>
<td>2,193</td>
<td>331</td>
<td>1,862</td>
</tr>
<tr>
<td>1990</td>
<td>1,891</td>
<td>117</td>
<td>1,774</td>
</tr>
<tr>
<td>1995</td>
<td>1,451</td>
<td>497</td>
<td>954</td>
</tr>
<tr>
<td>2000</td>
<td>1,648</td>
<td>837</td>
<td>811</td>
</tr>
<tr>
<td>2005</td>
<td>1,042</td>
<td>27</td>
<td>1,015</td>
</tr>
<tr>
<td>2010</td>
<td>1,133</td>
<td>601</td>
<td>532</td>
</tr>
</tbody>
</table>


National Security through Technology

The UK’s defence economy is liberalised and highly competitive, but the government’s approach is not completely ‘hands-off’. The 2005 Defence Industrial Strategy represents the most profoundly interventionist policy footprint of recent times, identifying strategic defence-industrial sectors where ‘protection’ would apply and linking this to the concept of ‘appropriate sovereignty’, defined as the ‘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’.\(^{21}\) A key element in this approach is the UK’s need, first, to sustain selectively the critical technologies required for end-to-end design, development and manufacturing and, secondly, to modify systems when appropriate.\(^{22}\) This approach to sovereignty was refined in a series of subsequent White Papers.

\(^{21}\) As stated in Ministry of Defence (MoD), Defence Industrial Strategy, Cm 6697 (London: The Stationery Office, December 2005), p. 7, the criteria for determining appropriate sovereignty are strategic assurance (that is, capabilities to be retained onshore); defence capability (including the capacity to ensure intellectual-property – IP – protection and the capacity to meet urgent operational requirements); and strategic influence (the ability, for example, to play a role and influence the nature and process of international arms collaboration programmes).

\(^{22}\) MoD, Defence Industrial Strategy, p. 10.
For instance, the 2006 *Defence Technology Strategy* is notable because the MoD, for the first time, openly published its priorities for defence R&D. More recently, the 2012 *National Security Through Technology* was published, superseding the *Defence Industrial Strategy*, albeit with a continuing emphasis on open competition aligned with a need to ‘protect’ UK ‘technological advantage’ (defined in terms of a narrower version of ‘appropriate sovereignty’), focusing on capability essential to British national security. As such, this White Paper emphasises the need to maintain operational advantage and freedom of action, independent of influence from other states. Freedom of action implies that UK industry has a deep understanding of all aspects of critical technology systems and sub-systems, providing assurance of the UK’s ability to sustain and modify the equipment in its inventory. The logical corollary of this position, of course, is that foreign acquisition should not be undertaken in the absence of assured knowledge transfer. However, this brings to the fore the autonomy–globalisation dilemma currently facing the UK government: that is, the fact that reliance on the national defence industry and the degree of protectionism that this implies will likely encourage complacency and ‘feather-bedding’, but that the converse policy of maximising the benefits of competition will lead to extensive dependence on external – mostly US – suppliers, reducing freedom of action. Meanwhile, over and above the emphasis on sovereignty, the White Paper highlights the importance of the defence economy to the UK, sustaining 300,000 highly skilled jobs, with £18 billion ($28.6 billion) targeted at domestic manufacturing and services and an additional demand impulse derived from the substantial value of defence exports, amounting to £5.8 billion ($9.2 billion) in 2010. Thus, to maintain, and indeed enhance, the vitality of the defence and security sector, the White Paper recognises the need to take account of the ‘wider policy objectives’ of promoting greater civil-military integration, job creation, skill enhancement and income generation. These economic objectives will be secured, first, through policy support to specialist small and medium enterprises (SMEs) critical to indigenous innovation and, secondly, through greater investment in science and technology.

However, such wider economic considerations are not the primary objective of the defence and security budget. The White Paper states that the sole objective of the budget is to ‘provide the UK’s Armed Forces and national...

---

27. With the aim of achieving such investment at a minimum of 1.2 per cent of the defence budget. *Ibid.*, p. 9.
security agencies with the best capabilities that can be afforded, enabling protection of the UK’s security in such a way as to provide the best possible value-for-money. To achieve this objective, the importance of ‘open’ competition in both domestic and global markets is emphasised, but this is qualified by an acknowledgement of the need, when necessary, to ensure sovereign technological capability, defined as technological advantage. Figure 2 illustrates how this process is to work in practice. An open, globalised acquisition track will operate for the acquisition of off-the-shelf, non-critical items, including the (direct or modified) acquisition of systems, sub-systems and components. In parallel, there will be a closed track geared towards the local development and production of complex critical technologies. This track targets bespoke, complex product systems, and addresses the strategic need to protect defence-industrial capability, including the preservation of a lean but vital high-technology skills base. The military imperative of ‘operational advantage’ (that is, battle-winning capability) and ‘freedom of action’ (namely, strategic independence premised on the possession of intellectual property rights to ensure technology refreshment) necessitates protectionist policies of pre-determined critical defence-technology domains – for example, low observables, complex weapons, and high-grade cryptography to secure or maintain technological advantage.

Figure 2: Globalisation versus Autarky: Parallel Tracks to Arms Acquisition.

The thrust of the 2012 White Paper, as well as the two earlier defence-technology White Papers, has been to embed into policy thinking the importance of maintaining a competitive and high-technology UK defence sector, where financial stringency is at a premium. Significantly, the 2012 defence-technology model has resonance with the European approach, as laid out in the 2009 EU Defence and Security Procurement Directive. Both policies seek open competition in defence (characterised by open procurement of off-the-shelf, non-critical items), and both have exemptions based on national-security grounds (for complex critical technologies).
Moreover, offset is not mentioned in the UK’s 2012 White Paper. This is deliberate, reflecting the fact that within the EU, offset is viewed as an impediment to competition, and was thus outlawed in 2009 without any reciprocal action by its global arms-trading partners.

The Structure of this Whitehall Report
This study examines the rise and demise of offset from the perspective of one European country, the UK. The UK’s Industrial Participation policy was deliberately crafted as an open and liberal regime, and was thus strikingly different to most other countries’ more prescriptive offset frameworks. MoD officials have long argued that the policy’s distinctive emphasis on competitiveness and open-market processes has proven the catalyst for successful outcomes, yet no study has been undertaken to verify this assertion. This report is therefore the first attempt to evaluate whether Britain’s offset policy is ‘fit for purpose’.

In pursuit of this goal, the report is structured around three themes. The first, outlined in Chapter I, offers a critical review of the theoretical and policy dynamics of offset developments over recent decades, focusing, in particular, on the ramifications of the 2009 EU Defence and Security Procurement Directive on country offset policies, given the official removal of formal offset arrangements across all European member states. The second theme, covered in Chapters II, III and IV) seeks to identify and analyse the principal characteristics of Britain’s IP policy, with reference to three major case studies. The third and final theme, elaborated in Chapters V and the Conclusion, provides perspectives on the transition process, especially in the UK, following the passage of the controversial EU Defence and Security Procurement Directive. The view is advanced that Britain’s competitive and flexible policy framework has provided the basis for a successful transition from industrial participation to the new policy of ‘voluntary’ engagement. More generally, it is argued that the new engagement policy may act as a possible template for other European states in their transition from an offset to an ‘offset less’, post-directive European defence trading environment.
I. Paradigms, Policies, Problems and Performance

Offset is a reciprocal trading mechanism that exists because the international arms market is imperfect – specifically linked, as noted in the Introduction, to the imbalance between supply and demand. Offset comes to the fore when the arms market moves in favour of buyers. This may be caused by macroeconomic exigencies, such as the onset of global recession, leading to trading illiquidity. It may also be due to structural factors, whereby supply capacity exceeds shrinking demand, as occurred in the 1870s during the second of Kondratieff’s long economic waves, when the global economy sank into recession.¹ During this difficult trading period, it was Meiji Japan that first engaged in defence offset to sponsor the build-up of its fledgling defence industries. Flush with export revenue from the country’s thriving silk industries, Japan procured British warships, but demanded after the first of the series was delivered that the remainder be built under licence in Japanese dockyards. The British had little choice but to acquiesce since, in a tight market, sales represented the corporate lifeline. Turnover represented a far greater imperative than technological sovereignty, though with the caveat that the engineering ‘crown jewels’ remained unshared.

The next global economic downturn occurred during the twentieth-century inter-war years. Once again, this period saw Japan exploiting the international buyers’ market, with its companies negotiating with US defence contractors to licence-produce strategically important manufactured goods, such as radio equipment and aircraft systems. Market pressures appeared immune to rising diplomatic tensions and, whilst the US government was busily exhorting the need for trade embargoes against Japan, American electronics and aerospace companies were extracting substantial royalties from Japanese firms through the licensed production of US proprietary equipment. More recently, during the post-Cold War era, the global collapse in demand for military equipment occurred at a time of expanding supply,² creating the conditions for a resurgence in offset activity. Today, the international arms market remains favourable to buyer countries, and there is no sign, as yet, of the offset phenomenon abating. In fact, the opposite is occurring. Rising numbers of countries are embracing offset, with Mexico (in 2012) and Indonesia (in 2013) becoming the latest countries to announce the

¹. Kondratieff’s long waves have created much controversy and a voluminous literature base. The duration of the Kondratieff wave is around sixty years and is driven to its peak by major technological innovations by lead countries. Market saturation of the technology then leads to global recession, until the next cataclysmic innovation occurs. See, for instance, Tessaleno C Devezas (ed.), *Kondratieff Waves, Warfare and World Security, Vol. 5: NATO Security through Science Series: Human and Societal Dynamics* (Amsterdam: IOS Press, 2006).

². This reflects both the collapse of post-Cold War defence spending and the expansion of the defence-export endeavour in emerging states, such as China and India, as well as established exporters, such as South Africa and Ukraine.
launch of official offset policies. The durability of offset, especially when set against rising international demand for arms, is perhaps surprising, and the reason lies in the structure of this demand. Indeed, rather than a balanced expansion in demand for arms across many countries, the growth has come from just a few major players. As illustrated in Table 2, the major arms-importing states are the principal nodes within the global offset network, ensuring the sustainability of this phenomenon. Specifically, over the long term (from 1950 to 2011), India and China have been the world’s major arms producers. Meanwhile, over this period, the US ranks 13th as a global arms importer (in absolute values) and relative to its acquisition budget, its $40-billion spend on foreign weapons represents an insignificant sum.


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>29,614</td>
<td>India</td>
</tr>
<tr>
<td>2</td>
<td>USA</td>
<td>11,593</td>
<td>India</td>
</tr>
<tr>
<td>3</td>
<td>France</td>
<td>10,121</td>
<td>South Korea</td>
</tr>
<tr>
<td>4</td>
<td>Poland</td>
<td>9,210</td>
<td>Greece</td>
</tr>
<tr>
<td>5</td>
<td>Canada</td>
<td>8,396</td>
<td>UAE</td>
</tr>
<tr>
<td>6</td>
<td>Germany (FRG)</td>
<td>8,074</td>
<td>Turkey</td>
</tr>
<tr>
<td>7</td>
<td>Czechoslovakia</td>
<td>6,841</td>
<td>Australia</td>
</tr>
<tr>
<td>8</td>
<td>USSR</td>
<td>6,477</td>
<td>USA</td>
</tr>
<tr>
<td>9</td>
<td>Netherlands</td>
<td>6,107</td>
<td>Egypt</td>
</tr>
<tr>
<td>10</td>
<td>Belgium</td>
<td>5,568</td>
<td>UK</td>
</tr>
<tr>
<td>11</td>
<td>Italy</td>
<td>5,404</td>
<td>Israel</td>
</tr>
<tr>
<td>12</td>
<td>North Korea</td>
<td>4,975</td>
<td>Pakistan</td>
</tr>
<tr>
<td>13</td>
<td>Japan</td>
<td>4,713</td>
<td>Singapore</td>
</tr>
<tr>
<td>14</td>
<td>UK</td>
<td>4,580</td>
<td>Algeria</td>
</tr>
<tr>
<td>15</td>
<td>India</td>
<td>4,472</td>
<td>Japan</td>
</tr>
<tr>
<td>16</td>
<td>Turkey</td>
<td>4,344</td>
<td>Saudi Arabia</td>
</tr>
<tr>
<td>17</td>
<td>Taiwan</td>
<td>4,153</td>
<td>Chile</td>
</tr>
<tr>
<td>18</td>
<td>Australia</td>
<td>3,936</td>
<td>Malaysia</td>
</tr>
<tr>
<td>19</td>
<td>East Germany (GDR)</td>
<td>3,529</td>
<td>Canada</td>
</tr>
<tr>
<td>20</td>
<td>Sweden</td>
<td>3,424</td>
<td>Poland</td>
</tr>
</tbody>
</table>


The emerging mega-economies of India and China seek offset to pursue their defence-industrial ambitions, and enjoy market leverage from the substantial acquisition volumes they provide. India, for instance, is engaged in a huge...
arms spending spree. Its 2011-12 defence budget increased by nearly 12 per cent on the previous year, reaching $36 billion, and New Delhi has budgeted to spend $120 billion on defence acquisition in its 2012–17 Five Year Plan. Some $30 billion of this will be spent on the acquisition of 250–300 Russo-Indian fifth-generation fighter aircraft, while the country is also purchasing 272 Russian Sukhoi Su-30MKI fighters, nearly 200 Tejas lightweight combat aircraft, and is involved in a $10-billion deal for 126 medium, multi-role combat aircraft – a number which may potentially rise to 260. China’s arms imports from Russia (and earlier from the Soviet Union) and Saudi Arabia’s defence programmes are similarly high in volume. The latter, for example, signed a contract in 2007 for seventy-two European Typhoons, and another contract in 2010 for eighty-four US F-15SA jets. Yet the Kingdom’s shallow defence-industrial base means it employs offset selectively to promote commercial undertakings, as well as defence-related maintenance, overhaul and repair facilities. Meanwhile, the more industrialised, albeit small, arms-importing countries, such as those located in Scandinavia and Australia, have arms-import volumes that justify offshore vendor investment (whether through offset or partnering arrangements), but the degree of market leverage they can exert is diminishing since the scale of acquisition is relatively modest. However, because these arms-importing countries possess relatively robust and mature defence-industrial capabilities, the offset benefits have in most cases proven commensurately greater.

From Countertrade to Offset: Delineating Definitional Boundaries

Clearly, the efficacy of offset investment will be influenced by a recipient country’s level of industrial development, both with respect to the defence sector and the broader civil economy. Based on an array of factors, such as a country’s strategic posture, defence alliances, economic capacity and historical heritage, offset investment will likely flow towards sectoral destinations in line with the recipient-country government’s policy. The British offset policy, for instance, has traditionally focused on supporting defence-industrial activity. Malaysia, by contrast, directs its offset investment towards the middle ground of both defence and commercial opportunity. At the other extreme, whilst no country limits offset solely to civil investment, a number of countries will accept 100 per cent civil offset. These policy options are illustrated in Figure 3, offering an offset typology within a broader countertrade conceptual framework. The framework depicts the most-common forms of reciprocal trading mechanism, with nearly all involving

transactions devoid of monetary exchange. However, it should be recognised that alternative definitional frameworks also exist. Whilst the UK, the rest of Europe and much of the rest of the world adopt the typology shown in Figure 3, North America employs a model in which offset represents a broad umbrella term and countertrade refers to the sub-categories of barter and counterpurchase.

**Figure 3:** The Countertrade Paradigm.

As shown in Figure 3, there are three main forms of countertrade. The first is barter, which can be further divided into three parts. Simple barter represents an exchange of goods for other goods. It is based on a mutual exchange of wants that may be difficult to achieve in practice, often creating transaction costs due to the need for market searching. Barter is also risky and prone to delay, and whilst money is not required to service the transaction, an exchange rate to effect the exchange remains an imperative. Clearing arrangements represent the second form of barter trade, distinguishable from simple barter by the lapse of the time required to ‘clear’ the liability. This form of barter relates to major contracts, such as those which have been commonplace in the Middle East, involving substantial ‘arms-for-oil’ deals. Here, the high value of the primary defence contract demands that oil shipments to the arms vendor span several years before the liability is
cleared. Finally, the third form of barter is switch trade. These arrangements are sometimes referred to as swaps, and can be either bilateral or multilateral, the latter potentially embracing tens of countries in a web of international trading activity. The essence of switch trading is that trade credits or actual merchandise trade is swapped amongst an expanding network of nations until all participants’ trade requirements are satisfied, and the loop closed.

Counterpurchase represents the second principal form of countertrade activity. Counterpurchase trade is categorised separately from barter because this is the one case in the countertrade paradigmatic framework in which monetary exchange occurs. In fact, this involves two contracts, the first being the primary defence contract, whereby the arms-purchasing country uses ‘hard’ currency to acquire weapons systems from the foreign vendor, the second being the counterpurchase contract, through which the purchasing country requires the foreign contractor to ‘counterpurchase’ a negotiated volume or value of local goods and services as a quid pro quo for the award of the defence contract.

The third and final trading mechanism under the countertrade umbrella is offset, which has two major sub-categories, defence and civil. Defence offset, first, can be broken down into a number of further discrete categories. As shown in Figure 3, indirect offset takes place where the arms-purchasing country seeks ‘compensatory’ commercial investment from the offshore vendor. Indirect offset might cover such variegated areas of civil investment as the construction of research laboratories at technological universities (as in Singapore), sugar-refining and pharmaceutical factories (as in Saudi Arabia), and fish farms and Russian space flights (as in Malaysia). Indirect offset normally only applies to developing countries with a constrained defence capacity, which therefore place greater emphasis on civil development objectives.

Developed economies, by contrast, will likely prioritise direct offset, since these states possess advanced defence-industrial capabilities and, accordingly, will be more inclined to channel offset work to their defence industries to enhance their long-term sustainability. The pursuit of direct offset may also be a goal of developing countries, both to keep basic production capacity warm, and as a fundamental policy objective to create fresh capacity by embarking on ‘new’ production. The offset is direct in the sense that it relates directly to the primary defence contract against which the offset liability arose. Thus, if the UK MoD acquires C-130J heavy-lift aircraft, direct offset would focus on that particular defence programme. It covers a gamut of defence-related investment activities, including work packages from the offshore prime contractor and, if feasible, work packages are awarded under competition, representing contractual arrangements with subcontractors of the purchasing country. If the latter is an advanced,
industrialised economy, contracts may be for high-precision production work. However, an incontestable, though often unpalatable, truth for offset recipient countries is that the lower their industrial and technological maturity, the lower the sophistication of the production contracts offered by the offshore prime contractor. Moreover, this presupposes that developing countries are able to negotiate programme-related work packages; in fact, this cannot be guaranteed, and will depend on numerous factors, including acquisition scale and the existence of in-country enhanced engineering skills and high-quality production capacity. If such technological capacity exists, offset has the potential to assist countries in ascending the value-added development ladder. On the other hand, if local production capacity is inadequate or non-existent, the prime contractor will inevitably agree an offset package based around maintenance, repair and overhaul. All this differs from indirect defence offset (sometimes called ‘semi-direct’ offset), which applies to the provision of work on any defence programme, rather than on the specific primary defence contract against which the offset obligation arises. For example, if the primary defence contract relates to the acquisition of combat aircraft, the indirect defence offset might embrace other military production programmes, such as heavy-lift aircraft, but could equally apply to land and naval development or production projects.

Finally, there is civil offset, which, as with defence offset, may be broken down into two component parts. The first relates to civil–civil offset arrangements – that is, the acquisition of expensive foreign commercial investments, triggering commercial offset obligations. This is a field of endeavour that generates much policy interest, because for developing countries – the only beneficiaries of this type of investment\(^6\) – it is a policy that considerably broadens the scope in capturing work packages and technology transfer in such diverse civil sectors as passenger aircraft, commercial shipping, power-generation equipment and, indeed, any civil investment carrying ‘big-ticket’ acquisition value. The second form of civil offset is indirect offset, where the policy goal is to broaden the investment opportunities open to offshore vendors through the placement of work in civil sectors unrelated to the primary commercial programme giving rise to the offset obligation.

---

6. The Agreement on Government Procurement (GPA) of the World Trade Organization’s (WTO) 1994 Uruguay Round addresses the issue of offset within the broader field of countertrade. Article XVI determines the official WTO position on offset, prohibiting countertrade and offset arrangements in civil trade. However, based on infant industry arguments, developing countries can be exempted from this requirement. For an excellent discourse on this issue, see Travis K Taylor, ‘Countertrade Offset in International Procurement: Theory and Evidence’, in Murat A Yülek and Travis K Taylor (eds), Designing Public Procurement Policy in Developing Countries: How to Foster Technology Transfer and Industrialization in the Global Economy (New York, NY: Springer, 2012), pp. 15–34.
A common feature of both direct and indirect offset programmes is the clamour by arms-purchasing states for technology transfer. Nearly all countries explicitly state the requirement for technology transfer in their offset guidelines, but even those without formal policies harbour technology-transfer ambitions. India’s initial 2005 offset policy, for example, made no mention of a technology-transfer requirement. However, the ‘sting in the tail’, as it were, was that the technology-transfer requirement was articulated outside the policy. This represented a double hit for offshore vendors, causing much pain and resentment amongst the defence-contracting community. Thus, since 2012, India’s offset policy has been amended explicitly to include technology transfer, enabling – and indeed encouraging – the infusion of innovation, blueprints and skill enhancement through eligibility for offset credits.

In offset negotiations, technology transfer is the one agenda item that is guaranteed to generate tension between the contracting parties. Developing arms-purchasing countries in particular view offset as a lever to extract technology transfer and are therefore insistent on acquiring access to meaningful foreign arms technology to reduce the technological gap between themselves and more advanced nations. By contrast, offshore vendors are reluctant to part with their technological inheritance – that is, the intellectual property accumulated over generations of expensive R&D investment. Foreign prime contractors are disinclined to give away core proprietary knowledge, risking as this does both diluting their brand and damaging their competitiveness. To resolve this impasse, the two parties might adopt ‘halfway’ strategies, whereby older, lower-value or more labour-intensive technologies are transferred, including designs, tooling and subcontract work. Examples of such transfers abound, and include composite work on aircraft wing flaps, necessitating the installation of new facilities, machining processes, and tailored-cutting and -shaping equipment and associated dedicated training. If such investment does occur, the foreign vendor is likely to seek offset credits under technology transfer, in part because it may attract ‘multiplied’ offset benefits.

**Offset Policy**

Offset multipliers are but one of a number of policy approaches within a country’s distinct offset strategy, and the offset authority will logically seek to mould a composite policy to best fit the needs of its unique (defence) economy. Accordingly, and even if only in subtle ways, every country’s offset policy paradigm will differ, as indeed will the results of that policy.

---

7. Often termed transfer of technology (ToT) in offset agreements. The GPA also includes the all-important ‘opt-out’ for ‘national security’ or ‘national defence purposes’. It is also important to note that most of the world’s countries have not signed the GPA. See Nackman, ‘A Critical Examination of Offsets in International Defence Procurements’, p. 519.
Fundamentally, the policy objective is to identify the appropriate mix of measures to allow the fullest achievement of offset development goals.

The notion of designing a national offset policy aimed at optimising focused development objectives is a relatively new approach. Here, ‘development’ might relate to broad economic development, or to the development of the local defence economy, or to simultaneous civil–military development. A set of overarching offset strategies has evolved in just two decades, from a position where offset was viewed simply as, say, the demand for local warship production, to a point where a multiplicity of other considerations enter the equation, including whether the offset should be military or civil; whether an offset credit target should be specified; whether offset multipliers should be included; whether ‘buy-backs’ should be involved; whether ‘banking’ of offset credits for future offset contracts should be allowed; and whether technology transfer should be integral or extraneous to the formal offset policy. Moreover, an issue not often discussed is whether an offset strategy should be prescriptive or flexible in its approach. Offset policy is rarely a binary choice, with numerous intermediate positions between the two extremes representing the spectrum of national offset strategies that can be adopted in efforts to maximise development opportunities. The purpose of offset strategy is to map the path towards successful industrial and technological development, and to achieve this goal a range of national offset strategies exist, as illustrated in Figure 4. Although this categorisation is somewhat imprecise, it nonetheless offers a conceptual framework for analysing discrete offset strategies. It is an approach that is arguably more useful than the current practice of generalising the offset mechanism, as if a one-size-fits-all interpretation is applicable to every defence-economic environment.

8. Buybacks relate to offshore vendor contractual procurements or sub-assemblies of weapons systems produced under licence by the purchasing country’s industrial beneficiary.

9. Where the offset investment value exceeds the agreed offset target, the excess can be ‘banked’ for credit against future offset programmes.

10. Matthews, Lozano and Payne, ‘India’s Medium Fighter Purchase’.
As illustrated in Figure 4, the national offset policy spectrum has two extremes: first, the ‘closed’, protectionist model represented by Russia – with almost 100 per cent self-sufficiency in arms production, a remarkable feat making offset irrelevant in the absence of arms imports – and, secondly, the ‘open’, flexible partnership model, symbolised by Australia’s liberal approach, which saw offset abandoned in the late 1990s and replaced by industrial co-operation rather than coercion. These two extremes are not entirely compartmentalised: Russia recently procured two French Mistral-class landing platform dock naval craft, and Australia ‘encourages’ foreign defence companies to partner with designated local strategic enterprises. Nevertheless, the two countries’ offset policies represent a reasonable approximation of, on the one hand, a closed offset model characterised by extreme protectionism and a negation of the use of offset and, on the other, an open and competitive acquisition process, without the imposition of offset requirements.

Located between these two policy extremes are a series of intermediate offset strategies reflecting varying levels of determinism. Moving away from the far left – from the extreme position of full sovereignty and the refutation of classical trade principles – is the US position, which asserts that ‘Offsets for military exports are economically inefficient and market distorting’11 and yet, at the same time, paradoxically imposes a severely restrictive ‘Buy America’ legislative requirement ensuring that every acquisition of a foreign weapons system is license-produced in the US. Importantly, this ‘protectionist’

---

The approach to defence acquisition was also adopted by the UK to justify its first offset policy. The MoD’s 1990 positioning paper on offset, notably, referred to the US insistence on ‘seek[ing] offset (in the form of co-production) when making purchases overseas’ as a partial justification for proceeding with a UK IP policy. Furthermore, notwithstanding the fact that the ‘Buy America’ policy looks suspiciously like an offset policy, US licensed production of the UK’s Hawk and Harrier jets – the Goshawk and AV-8B aircraft, respectively – led to substantially improved versions of the original British aircraft. Therefore, aside from the fact that licensed production adds considerably to cost when compared to off-the-shelf acquisition, the US experience suggests that this mode of offset does have its benefits.

Arguing that increased foreign demand for offset has led to a haemorrhaging of American jobs and high-technology capability, the current US administration has been strident in its calls for the abandonment of defence offset. In its stead, it has proposed a global partnership business model, bringing with it a new set of challenges, to which the Joint Strike Fighter global defence-industrial partnership bears testament. Here, development and production work is meant to be allocated via a competitive bidding process amongst the nine partners, yet the reality is that the US and UK have dominated the programme, together accounting for over 90 per cent of the project value. These two partners possess large defence economies, with high levels of defence technological expertise. By contrast, the other seven partners possess mostly small defence economies and suffer from a relative paucity of world-class defence-industrial capability. The American and British governments’ view is that offset is a trading mechanism which works against free trade, promoting bilateral rather than multilateral trade relations and inducing higher risk. Nevertheless, both countries have used offset policies to ‘compensate’ local defence industry when seeking offshore arms acquisition.


13. Estimates indicate that British companies hold about 15 per cent of the work on the F-35 programme. Lockheed Martin reports that the system development, demonstration, production and support phase will earn UK industry more than £20 billion. If export projections of up to an additional 3,000 aircraft are included, then a further £24 billion over the life of programme can be anticipated. It is expected that the F-35 work will create 25,000 highly skilled jobs across 120 UK defence companies, located mostly in the northwest aerospace cluster, but also in the southwest and East Midlands. These economic benefits accrue from an initial Tier 1 membership investment fee of £2 billion; see Simon Michell, ‘F-35 – Getting the UK’s Largest Defence Export Opportunity on Track’, RUSI Defence Systems (Vol. 15, No. 1, July 2012), p. 60; Barbara Opall-Rome, ‘Israel Reaps Work Share Bonanza for F-35’, Defense News, 23 August 2010.

14. Australia, Norway and the Netherlands are three countries participating in the Joint Strike Fighter consortium that have expressed dissatisfaction with the value of subcontracts awarded to their defence industries.
In the case of the UK, specifically, the government supported a defence IP policy, because it recognised that UK defence companies operate in an imperfect global defence market characterised by reciprocal investment and trading regimes, and institutional constraints on access to key markets.\textsuperscript{15}

In spite of the inherent weaknesses involved in offset implementation, published country offset guidelines have proliferated over the last twenty years, from just a few in the 1980s to around 130 today.\textsuperscript{16} Yet, paradoxically, offset policy and its implementation remain highly problematic. First, at the heart of the anti-offset debate, and as promulgated by the US Department of Commerce, the European Commission and the European Defence Agency, is the theoretical argument that offset is trade-distorting, trade-discriminatory and bilateral rather than multilateral, thus working against the resource-optimising precepts of free trade. Secondly, offset adds a cost premium to the international transaction price, due to vendor recovery of additional overhead costs, such as those incurred in searching for local suppliers and other miscellaneous costs. This offset premium is likely to represent a single-figure percentage of the overall acquisition cost, although it can be higher.\textsuperscript{17} Thirdly, arguably the most important offset vehicle for many arms-purchasing countries is licensed production, but whilst this mode of offset facilitates the creation of local ‘assembly’ capacity involving the creation of basic engineering skills and rudimentary maintenance, repair and overhaul capabilities, it is obviously not a cost-neutral exercise. A new factory will need to be constructed, or an existing

\textsuperscript{15} This is essentially the case made for an offset policy in the June 1990 MoD positioning paper, pp. 3, 5.


\textsuperscript{17} Note that cost premiums vary widely from country to country. The country case studies in Jurgen Brauer and J Paul Dunne (eds), \textit{Arms Trade and Economic Development: Theory, Policy, and Cases in Arms Trade Offsets} (Abingdon: Routledge, 2004) indicate a cost premium of 7–10 per cent generally (see chapter by Ann Markusen, ‘Arms Trade as Illiberal Trade’), and 10–15 per cent for Finland (see chapter by Björn Hagelin, ‘Nordic Offset Policies: Changes and Challenges’). For Malaysia, the cost premium ranges from 4–15 per cent; see Kogila Balakrishnan and Ron Matthews, ‘Defence Industrialisation through Offsets: A Case Study of Malaysia’, \textit{Journal of Peace and Defence Economics} (Vol. 20, No. 4, August 2009), p. 353.
facility reconfigured and retooled. The training of workers will be essential, and a costly learning period will be incurred, requiring production quality to rise as defect levels fall. If transport costs of sub-assemblies from overseas suppliers are also factored into the equation, it is clear that further costs will act to bloat the premium charged. The premium will also be influenced by licensed production of attenuated local volumes of output, compared to the far higher scales of production enjoyed by foreign vendors. It is for this reason that local licensed production is generally held to be several orders of magnitude more expensive than off-the-shelf acquisition. Finally, offset-induced investment carries an inordinately higher risk of short-term capacity redundancy. There are numerous examples of countries establishing domestic manufacturing capacity through offset arrangements, only for the enterprise to cease production once the acquisition programme has been completed. Weak survivability of offset companies is usually down to poor planning of post-offset operations, both by the local offset authority and the offshore vendor.

Following the US model, and towards the less extreme end of the range of deterministic offset strategies, as shown in Figure 4, comes India’s 2005 prescriptive offset model. India has a specified offset credit target of 30 per

18. For instance, in 1996 the MoD purchased sixty-seven Boeing AH-64D Apache Longbow helicopters. The acquisition involved establishing an assembly line at Westland Helicopters, in Yeovil. The first eight Apaches were produced in the US, whilst the remainder were ‘produced’ by Westland. The reported manufacturing cost was £2.5 billion, though the overall programme cost was £4.1 billion. Therefore, each Apache cost the British taxpayer nearly £40 million. By comparison, Israel ordered twenty-four Apaches direct from the US in 1999 and paid less than £12 million per helicopter. Thus, even accounting for possible qualitative differences between the Israeli and British Apache helicopter acquisitions, there is no doubt in this case that licensed production incurs a higher unit cost. See Lewis Page, *Lions, Donkeys and Dinosaurs* (London: William Heinemann, 2006), pp. 85–86. However, weighed against this financial cost are the strategic benefits of keeping domestic production lines ‘warm’, skilled labour forces intact and local value chains vital and dynamic.

19. Note a 1992 Philippine example of offset ‘failure’, when UK defence contractor GKN sold 150 Piranha (Simba) armoured personnel carriers to the Philippine Army. The deal was worth around $100 million, with eight vehicles built in the UK and the remaining 142 assembled in the Philippines. The problem was that as soon as the contract was completed, the factory closed, leading to the loss of capacity and all of the jobs created. From Agaton Villalon, ‘Philippine Defence Industrial Development and Offsets’, MDA dissertation, Cranfield University, 1998. Malaysia has suffered similar offset woes. Capacity was created in a local company, CTRM, to produce carbon-composite launch rails for modular suspension composite bridges procured from a British defence contractor. However, after the order was completed, no further orders materialised. Similarly, as part of an offset deal, Malaysia DEFTECH assembled sixty-five units of an order for Turkish ACV300 armoured personnel carriers. However, yet again, as soon as the completely knocked-down kits had been assembled, and the offset contract completed, the Pekan Plant was abandoned. See Balakrishnan and Matthews, ‘Defence Industrialisation through Offsets’, pp. 352–53.

cent of the primary defence contract value, with mandated penalties for non-performance. Whilst recent legislation has liberalised the policy, establishing for the first time the inclusion of multipliers and the extension of banking credits, India’s offset policy remains highly bureaucratic. Yet, notwithstanding initial implementation problems, the long-term prognosis for New Delhi’s offset policy with respect to securing positive outcomes looks positive. This is because a pivotal lever for India’s anticipated long-term success hinges almost exclusively on the desperation of foreign defence contractors to gain entry into India’s burgeoning defence market, where the scale of acquisition is exploding.

The ‘hybrid’ model represents ‘middle-way’ offset strategies. These refer to the broad swathe of national offset policies articulated via formal, published guidelines, resulting in both variability and flexibility in prescriptive policy requirements. The policy focus may be either civil or military, and offset credit targets may be contractually binding or based on what is sometimes called ‘best endeavours’, where contractors simply do their best to achieve the offset target. Saudi Arabia offers a good example of a country following an eclectic approach to offset policy; that is, the US Peace Shield and French Al-Sawari offset programmes both incorporated defence (direct) offset, whereby non-fulfilment left the vendor company contractually liable. By contrast, the country’s UK Al-Yamamah offset programme was characterised as a commercial (indirect) ‘best-endeavours’ model. The hybrid offset model sits appropriately at the midway point between the inflexible and prescriptive models on the left of Figure 4 and the more flexible offset models on the right – these latter, more ‘open’ strategies being based not only on voluntary market access, but also on partnership.

Following the hybrid model in this direction, the next sequence of offset strategies are those of Japan and Singapore. These models are widely debated, with anecdotal evidence validating the argument that their offset strategies have proven effective. Yet the offset requirements of Japan and Singapore are not subject to published guidelines. Instead, they are based on case-by-case evaluations, with flexible offset credit targets, and industrial and technological agreements negotiated according to what is technically feasible and financially viable. Indeed, on the basis of this model, the offset strategies of Japan and Singapore appear to have successfully contributed to the development of highly capable defence-


industrial bases, in which offset has both contributed to and benefited from the development process. Without doubt, the perceived success of case-by-case offset programmes is positively calibrated with the possession of high-tech absorptive capacity.

Representing a further step along the flexibility path is the UK’s offset strategy. This has been characterised by a formal, but limited, set of guidelines established in 1990, when an offset target of 100 per cent of the primary defence contract value was posited (though this was regarded by the authorities as a ceiling rather than a strict requirement, with negotiated offset targets often agreed below 100 per cent). The offset arrangements were never legally binding, nor were they ‘directed’. Thus, offshore vendors holding commitments were simply encouraged to ‘search’ the UK defence supply base to find competitive subcontractors. UK policy-makers at the time argued that the British approach reflected a mutually beneficial position – one so often heralded in offset deals, but difficult to achieve in practice. Additionally, it was claimed that the UK’s ‘open’ model of offset-linked acquisition had the potential to reduce costs vis-à-vis off-the-shelf procurement, engendering in the process long-term and mutually beneficial defence-industrial partnerships. Further, UK policy-makers contended that UK subcontractor competitiveness would prove sustainable, and all the more so if the subcontractors’ demonstrable industrial competence allowed access to the offshore vendor’s global supply chain.

This open and voluntary IP policy ran from 1990 to 2012, with the launch of the 2009 EU Defence and Security Procurement Directive leading to the abandonment of the policy. Indeed, ‘participation’ has now evolved to become ‘engagement’, signifying a movement away from even the limited direction and persuasion that had formally characterised the UK model, to solely voluntary engagement and partnership between offshore defence contractors and companies within the UK’s defence supply chain. This saw the 100 per cent IP credit target disappear, as well as the directives on the value and quality of work packages and technology transfer. All that now remains is the fact that the nature and value of offshore defence contractor investment is monitored and recorded, representing an entirely voluntary partnership between foreign defence companies and the MoD’s newly established Industrial Engagement Unit.

Finally, at the right-hand extreme of the offset policy spectrum is the aforementioned, liberal ‘offset’ strategy pursued by Australia. The Australian experience represents the only recorded case of a country voluntarily abandoning offset. The country pursued a protectionist approach to

---

domestic arms production in the 1960s, complemented in the 1970s by the employment of both direct and indirect offsets, and then in the 1980s by the Australian Industry Participation Plan. Yet government vacillation during the 1980s and 1990s in supporting the evolution of a focused offset policy arguably contributed to a growing emphasis on broader local content requirements, as well as a growing disenchantment with the fruits of a half-hearted offset policy. Consequently, in the late 1990s, Australia revoked its offset policy in the face of what were deemed to be diminishing benefits to the local defence industry.\textsuperscript{24} The policy was eventually replaced in 2007 by the Australian Industry Capability Program (AICP), which prioritised the delivery of industrial capability in the absence of offset. A vital aspect of the model was its support for the development of a commercial and competitive domestic defence environment, in which local suppliers would be given the opportunity to openly compete for local and international defence contracts. The goal would be partially achieved through tenderers submitting detailed strategies for the industrial involvement of Australian industry in supplying foreign military equipment. Yet, whilst the 2007 policy was based on an open and competitive acquisition model, the continuing requirement to maintain and enhance defence-industrial sovereignty could act to justify interventionism, especially in the event of market failure on the part of a major local supplier.

Australia’s 2009 defence White Paper introduced Priority Industry Capabilities (PICs) to influence the search for strategic advantage in the development of Australia’s defence-industrial base. These included critical technologies, such as acoustic technologies, electronic warfare and ‘system-of-systems’ integration. Additionally, Australia’s AICP highlighted the need to integrate small- and medium-size industries into the global supply chains of major prime contractors, with Canberra’s move away from protectionism and local content requirements a recognition of the importance of globalisation and the imperative of securing value for money through competitive drivers. The subsequent publication of the 2010 defence-industrial policy \textit{Building Defence Capability: A Policy for a Smarter and More Agile Defence Industry Base} reinforced the government’s commitment to achieving industrial competitiveness, innovation, skill generation and export penetration, but without recourse to offset policy. Thus, the AICP framework, the identification of PICs and the 2010 \textit{Building Defence Capability} policy have become the principal vehicles for encouraging partnerships between local industry and foreign prime contractors in the development of Australian capability. Significantly, a select number of PICs have been identified as a means of securing long-term acquisition certainty and enhancing sectoral self-reliance, including composite and exotic materials, guided weapons

and naval shipbuilding.\textsuperscript{25} The jury is still out as to whether Australia’s open approach to encouraging foreign defence investment will prove successful, but it is clearly of profound policy interest, not least since the UK’s recently launched Industrial Engagement Model appears to mirror Australian’s open, non-prescriptive policy framework.

The Problems with Offset
Defence offset has attracted criticism in recent years, due mainly to the lack of data and hence uninformed debate on offset trade and development impacts. Defence contractors are understandably coy about offset, since a covert approach is essential if it is to succeed in providing a competitive edge. This lack of transparency has spawned increased intellectual and policy debate about the role of offset, with critics raising three principal concerns: first, that offset distorts price and trade signals, thus adding to cost and economic inefficiency; secondly, that the ‘murky’ world of offset encourages corruption; and, thirdly, that offset programmes suffer from high levels of economic risk, and hence struggle to deliver intended outcomes. Each of these criticisms will now be examined in turn.

Theoretical Asymmetries
A defence offset represents a ‘reciprocal’ international trading agreement, but as it is more likely to be bilateral than multilateral, there is a danger that the deal will be trade-distorting. Inefficiencies may arise from switching costs; that is, from the diversion of trade from established cost-efficient suppliers to others which are unproven, and therefore risky.\textsuperscript{26} Subsequent increases in acquisition cost will be welfare-diminishing rather than efficiency-enhancing.\textsuperscript{27} Moreover, an offset will likely involve associated increases in economic opportunity cost, since offset requirements necessitate the inclusion of an overhead charge in the defence-acquisition price to constrain overall defence spending. Offset and IP programmes are also held to raise transaction costs through the additional expense of local supplier searches and logistics, training, tooling, risk-reduction measures and related overhead costs.\textsuperscript{28} These costs have the potential to be sizeable, depending on the nature of the particular offset agreement. The concern is that offshore defence vendors will build this cost premium into their equipment bids, thereby raising arms-acquisition prices.

\textsuperscript{26} Interview with MoD Chief Economist Neil Davies, London, 21 May 2010. Note, of course, that risk increases the nearer the offset policy is positioned to the deterministic end of the offset spectrum.
Yet policy-makers’ attempts to view the modern defence market with reference to classical economic precepts are problematic. Adam Smith’s notion that competition is based solely on the price of homogenous products is completely unrealistic in the twenty-first century, if, indeed, it ever was realistic. Product demand is determined by both price and quality – that is, by the cost-effective performance of the weapons system driving the sale, with a panoply of other ‘product-surround’ considerations also existing, including brand recognition and after-sale requirements, especially levels of through-life costs. An additional product-surround element that characterises defence – and, increasingly, also civil markets – is offset, and notably technology transfer. In fact, nearly all major contemporary defence sales incorporate an offset requirement as part of the sales package, and the cost of providing offset, as with other product-surround elements, will naturally form part of the price of the product or service. However, as discussed in Chapter IV, there is no standard cost premium applied to defence contracts, and the value of this varies according to a contractor’s marketing strategy. Variables influencing whether the cost premium will be high, low or negative include the long-term impact of a defence market on vendor profitability, the buyer’s scale of procurement, and the breadth and depth of technological absorptive capacity.

Some, though not all, policy-makers and practitioners accept the classical economic thesis against offset, but also recognise that the contemporary global defence market is not comparable to the conceptual models of Adam Smith and David Ricardo. The real world, and particularly the defence market, is imperfect, reflecting both national monopoly – monopsony market conditions and international oligopoly – oligopsony structures. Indeed, the reality is that barriers to trade do exist. Information flows and transparency are restricted; global brands and product differentiation are the norm; technology gaps prevail (and in most cases are widening); and interventionist government policy is prevalent across both developed and developing countries. In this sense, then, and given the absence of anything near an optimal, theoretically efficient, ‘ideal’ defence market characterised by perfect competition and free trade, a strong case can be made for the adoption of a ‘second-best’ approach.29 This judgement appears to echo the view of Travis J Taylor, who argues that offset has been shown to support multiple objectives, including technology transfer; the penetration of foreign markets; the acquisition of reputational capital and access to subcontracting networks; the maintenance and development of defence-industrial bases; and economic development not directly related to the base transaction.30

Corruption Risk

The argument that offset encourages corruption is unproven. Transparency International UK has spearheaded such criticism, having published an anti-offset report in 2010 arguing that offset deals are linked to corruption.31 ‘Secrecy’ is the antithesis of transparency, but offset should not be condemned in the absence of proof that corruption is endemic in such deals. While the 2010 report has a section entitled ‘Empirical Evidence’ that purports to show data on corruption in offset deals, the three case studies listed (South Africa, Portugal and Greece) all refer to ‘allegations’ rather than proof. Other charges concerning the link between offset and corruption are made, but these are ‘red herrings’, reflecting irregularities in the arms-procurement process, the failure of selected offset deals to deliver on the promised economic benefits and, simply, ‘questions’ over the nature of selected offset deals. Based on this ‘evidence’, the report’s authors state that offsets are ‘an ideal playground for corruption’,32 but conclude, somewhat grudgingly, that ‘there does exist a possibility for offsets to produce beneficial outcomes to importing countries if they are correctly constructed and if the true cost of offset is acknowledged and taken into account’.33 The challenge is to establish what is meant by ‘correctly constructed’. Moreover, the question of whether the ‘true cost’ of offset can be revealed remains a moot point, dependent entirely on the commercial integrity of the offshore vendor. As a final point, the potential for offset-related corruption will likely be higher in defence environments where offset policies are overly prescriptive and operate under closed regimes. By contrast, in countries where offset is negotiated and implemented in a more open and competitive environment, corruption and malpractice are marginalised. The experience of the UK’s former IP model is telling in this regard: between 1990 and 2012, when this policy was in operation, there was never any suggestion of corruption.34 Indeed, the lack of evidence that

33. Ibid., p. 43.
34. Author correspondence from 5 December 2012 with the Defence and Security Industrial Engagement Policy (DSIEP) unit, UK Trade and Investment/MoD, suggests that there were numerous checks and balances in place to assuage corruption. The more significant of these were in place, first, in the MoD contract letting process, whereby the industrial-participation process ran in parallel with the acquisition process, with corruption requiring the collusion of officials in three separate organisations, including the Defence Equipment and Support Integrated Project Team, senior MoD staff evaluating the business case, and, of course, executives within the Industrial Participation Unit (IPU); second, in the pre- and post-database process, whereby circumvention or falsification in the recording and auditing of purchase orders would have required collusion on a massive scale between the offshore vendors, UK companies and the IPU; and last but not least in the voluntary and competitive nature of the UK IP model.
offset deals cultivate corrupt practices suggests that this criticism is overplayed, maligning unnecessarily the vast majority of offset executives across the world. Of course, corruption does occur in offset, just as it does in arms and other areas of procurement more generally, but there is no evidence that it is endemic. Further, it is probably more prone to take place in developing states suffering from low levels of industrial capacity. In these countries, it will be near-impossible to fulfil direct offset commitments, creating the temptation for obligors to bribe recipient company management and forge evidence of compliance.35

As noted, Transparency International’s research into the link between offset and corruption is flawed because of the superficial methodology employed and the flimsy evidence offered. Yet the work has attracted widespread media interest and reinforced a negative perception of offset amongst government officials, civil servants and defence analysts. Compounding this widespread negativity is the complexity of the offset concept. Most observers are uninformed, possessing only a schematic understanding of the subject field. Of course, the dearth of ‘empirical’ literature is mainly to blame, but the degree of ignorance is dangerous, because offset policy is then assailed on the basis of folklore and myth, rather than factual evidence.

Economic Risk
Offset authorities view offset primarily as a lever for industrial development. It facilitates job creation, skill enhancement and technology transfer, and is held to lead to indigenous technological development and export promotion. In some cases, an interventionist strategy is adopted, with offset employed to initiate and sustain clusters of high-technology industry in, for example, the aerospace, shipbuilding, and information and communications technology (ICT) sectors.36 Here, offset is viewed as a strategic vehicle to foster the formation of what have been variously described as ‘pillar’, ‘strategic’ or ‘champion’ industries, aimed at industrial and technological development. Thus, increasingly, countries are creating bespoke defence-industrial strategies, with long-term policy direction viewed as essential to fostering local defence-industrial capacity, especially in targeted critical industrial and technology domains. The development of indigenous capability is a challenging and expensive process, but offset is held to be able to facilitate this process through the crafting of policies that encourage the channelling of offset-related investment in designated critical technology fields deemed vital for defence-industrial sovereignty.

35. I am indebted to Alma Lozano for bringing this point to my attention.
However, the implementation of offset policy is not straightforward and innumerable challenges face both the obligee and obligor in attaining a positive outcome. For instance, although technology transfer is one of the principal goals of recipient-country policy, this is challenging to achieve, with the technologies transferred likely to be rudimentary, ensuring the persistence of the technology gap between the offshore vendor and country beneficiary. As a consequence, a widely held view is that offset fails to create highly skilled jobs, facilitate the growth of local defence supply chains or expand export opportunities. Offset programmes are also seen as short-term in character, not least because the offshore vendor’s only interest is to fulfil the offset requirement, thereafter shifting resources to accommodate competing offset obligations incurred through arms sales to other countries. This short-term feature of the offset process is particularly troubling, because it suggests that once local production and buybacks of the agreed offset deal are complete, the offset-induced manufacturing facility will close. Unfortunately, this reflects reality all too often, signalling a lack of strategic vision and planning by both the offshore vendor and the recipient country’s offset authority.

**Offset and its Discontents**

Policy-makers and the broad array of other interested observers will either be for or against offset – they are unlikely to be ambivalent. Those actors in favour of it often emphasise the attractiveness of offset packages and the positive influence these may have on a government’s arms-acquisition decisions. While this may be the case, the arguments in support of offset need qualifying for two reasons. First, the latter assertion regarding the potential positive influence of an offset policy has never been empirically tested. If governments act rationally, then cost-effective arms acquisition will always be the priority. Secondly, uninformed observers persist in proclaiming offset to be a ‘win-win’ arrangement, which sees the foreign OEM securing big-ticket sales and the recipient country receiving ‘free’ technology transfer, work placement and associated investment benefits. However, given the paucity of data noted previously, definitive judgements on offset performance are likely to prove elusive. Moreover, beyond the difficulties involved in conducting an accurate assessment of the net benefits (or, indeed, costs) of offset, it is clear that the protagonists’ view that offset represents a ‘free lunch’ or a win-win arrangement for both arms vendors and offset recipients

37. The lack of substantive opportunities for job creation through offset is confirmed through empirical study; see Matthews, ‘Saudi Arabia’s Defence Offset Programmes’, pp. 233–51; Balakrishnan and Matthews, ‘Defence Industrialisation through Offsets’, pp. 341–58.

38. The isolated case studies that exist, confusingly, offer judgements both for and against the proposition that offset works, and works for the mutual benefit of both the vendor and recipient. See, for instance, Martin (ed.), The Economics of Offsets; Jurgen Brauer and Paul Dunne (eds), Arms Trade and Economic Development: Theory, Policy and Cases in Arms Trade Offsets (Abingdon: Routledge, 2004).
is an overly simplistic standpoint and, as a generalisation, almost certainly untrue.

Notwithstanding reservations regarding the hyperbole that offset attracts, there is a small but growing body of evidence to suggest that it can be successful in facilitating industrial and technological development. The point to emphasise, however, is that success – normally measured against technology transfer, job creation, skill enhancement, local value-chain development and export opportunity through access to OEM global supply chains – is likely to be positively associated with the stage of absorptive technological capability of the offset-recipient country. If procurement scale, engineering skills, industrial capacity and technological infrastructure are already in place, the obligor can be expected to exploit the commercial incentives arising from such mature defence economies. Conversely, if defence-economic infrastructure is rudimentary, offset programmes will be characterised by lower-order value-added activities. Of equal importance to the existence of a critical mass of appropriate defence-economic capacity is the design and implementation of an offset policy conducive to the development of a harmonious industrial partnership between the offshore vendor and the country recipient. If such industrial harmony exists, the likelihood is that offset will work.

Indeed, even emerging countries at the lower end of the technological scale have enjoyed pockets of offset success through the transfer of technology. In Malaysia, for instance, the local company CTRM has developed capabilities in the manufacture of composite materials, leading to contracts won competitively on European Airbus commercial-aircraft programmes and the A400M heavy-lift military programme. Similarly, the Indonesian aerospace company Dirgantara Indonesia possesses a modern composite manufacturing facility that was built up through offshore-vendor offset obligations, allowing the Bandung-based company to become a certified supplier of composite wing flaps on Airbus A320 and A380 commercial passenger aircraft. Comparable offset successes, albeit at a higher level of technological achievement, have been secured in advanced defence economies. For instance, there is no doubt that offset programmes have made a positive contribution to defence industrialisation, as noted in the earlier examples relating to Singapore and Japan, both of which have substantial defence-industrial and technological capability and adopt flexible offset regimes (neither having published formal offset guidelines).

---

Yet, notwithstanding the above examples, the fact is that minimal empirical work has been conducted on the impact of offset in advanced economies. This report’s assessment of the British experience, detailed in Chapters II, III and IV, is an attempt to address this deficiency.
II. Industrial Participation Policy Framework

The aim of this chapter, as well as Chapters III and IV, is to offer a focused evaluation of the UK IP policy since its inception in 1990. In doing so, the chapters build on the theoretical arguments, policy frameworks and institutional interventions that have characterised the global defence economy in recent years. These years have seen both the number of countries introducing offset policies increase, and the policies themselves become contorted as ideological positions have shifted and economic power has evolved and strengthened. A market-based ‘tug of war’ is ongoing at two levels: operationally, between offshore contractors and purchasing governments; and strategically, between both governments and supranational authorities seeking to either enhance or eliminate offset regulatory frameworks. In this regard, Britain’s erstwhile IP policy provides an interesting reference point. British policy was neither too ‘open’ nor too ‘closed’, with policy-makers preferring encouragement rather than diktat. Meanwhile, lessons learnt from empirical investigation of the country’s flexible offset model provide a number of valuable insights for policy-makers: first, with regard to Britain’s transition from promoting an offset model of ‘participation’ to a non-offset approach of ‘engagement’, and complete liberalisation of offshore vendor–MoD relations; second, with regard to the dilemma faced by EU states in terms of compliance with the EU Defence and Security Procurement Directive, while at the same time keeping production lines warm; and, third, with regard to other states – especially Middle Eastern and Asian – seeking to craft optimal offset policies to leverage technology transfer in pursuit of greater defence-industrial dependence.

AWACS Acquisition: The Catalyst of the UK’s Industrial Participation Policy

The UK’s Industrial Participation policy had its origins in the MoD’s 1970s acquisition of the US Harpoon missile. At the time, and throughout most of the subsequent decade, UK policy was fragmented, ad hoc and less than sophisticated, with policy flaws exposed, notably, during the 1988 acquisition of seven Boeing Airborne Warning and Control System (AWACS) aircraft. This $1.5-billion defence acquisition was contentious because a foreign system was replacing the indigenous Nimrod programme, the latter having proven voracious in its appetite for funding and inadequate in technical capability. To ease the decision to buy foreign, off-the-shelf military equipment, the MoD pressed Boeing for a ‘compensatory’ placement of work in the UK defence-industrial base. After negotiation, Boeing offered a 100 per cent work placement, measured against the value of the primary defence contract. However, the final contractual agreement stipulated that offset would constitute 130 per cent of the purchase price, to be fulfilled over an

2. Ibid., p. 339.
eight-year period.\(^3\) This remarkably high level of offset compensation was then the highest in history, both in the UK and global worldwide.

The AWACS acquisition provided the policy seed from which grew the UK’s formal 1990 IP policy. This was a policy designed to address the weaknesses that were revealed by the earlier Boeing offset deal, with four principal problems subsequently identified.

First, there was the challenge of determining whether the offsets were actually offsets. Here, problems had arisen because, in the period immediately prior to the signing of the 1988 AWACS contract, Boeing had placed contracts worth $1 billion with British industry and during the later AWACS negotiations requested that ‘follow-on’ contracts from these earlier deals be eligible as credits against the 130 per cent offset obligation.\(^4\) The MoD agreed that 60 per cent of the follow-on work in relation to contracts signed before the AWACS contract could be counted as credits against the offset target, prompting concern in British defence-industrial circles that much of the offset work was not, in fact, new business.\(^5\)

Secondly, it was argued that the work Boeing had placed in the UK was low both in value and in technological terms. Here, fears arose around the MoD’s decision to allow aircraft galleys and lavatories to be counted as offset credits, on the basis that such items would have been required for the aborted British-produced Nimrod. Yet a House of Commons Defence Select Committee enquiry expressed concern that ‘such relatively low technology work might constitute a disproportionate share of offset approved work’.\(^6\)

Thirdly, as part of the follow-on work, Boeing was further allowed to claim Rolls-Royce civil aircraft engines that had been supplied to customers of Boeing commercial aircraft. Claims would be entertained up to a $800-million ceiling, suggesting that potentially more than 50 per cent of Boeing’s offset commitments were satisfied by ‘civil’ rather than defence obligations.\(^7\)

Finally, the MoD justified its decision to acquire the AWACS aircraft by arguing that ‘job losses resulting from the cancellation of Nimrod would be equalled, if not exceeded, by the job gains in firms all over the country resulting from Boeing’s offset proposals’.\(^8\) However, analysis of job-creation data on Boeing offset work undertaken by Stephen Martin, Richard White and Keith Hartley

\(3.\) Ibid.
\(4.\) Ibid., p. 340.
\(5.\) Ibid.
\(7.\) Ibid., p. viii.
\(8.\) Ibid., p. xv.
calls into question whether positive net employment or even equivalence in relation to jobs lost on the Nimrod project were attained, due to the revealed weaknesses of the UK offset arrangements, as listed above.9

The putative failure of the AWACS offset regime set the scene for a rigorous re-evaluation of the British position on defence offsets, and resulted in a move away from ad-hoc policies, towards the 1990 issuance of the Industrial Participation policy. Yet the IP document, somewhat surprisingly, specified no overarching policy aim. What it did state, however, was that the aim of MoD procurement was ‘to equip the armed forces by purchasing from domestic and overseas sources, effective, reliable and supportable equipment that is cost-effective’,10 implying that IP was a secondary consideration to the main priority of cost-effective acquisition.

Policy Building Blocks
The purpose of the IP policy, then, was clearly to support the achievement of military effectiveness. By inference, the search for cost-effectiveness required a competitive approach and an ‘open’ defence-trading regime, but the danger was that this carried the risk of reducing access to business by the local defence industry. This line of reasoning formed the policy basis of the AWACS offset arrangements, according to which offset was initially viewed as a mechanism for compensating British defence contractors for the loss of work caused by the cancellation of the indigenous Nimrod programme. Based on this ‘opportunity cost’ argument, it was both rational and consistent that the 1990 IP policy invited 100 per cent reciprocal investment: that is, the full value of the defence work that had been placed offshore.11

The IP policy guidelines also included an ‘essential features’ section, reflecting a focus on addressing the opportunity cost of placing defence work abroad, instead of opting for local acquisition. The six ‘essential features’ of the IP policy are listed in Table 3.

Table 3: Six Essential Features of the UK MoD’s Industrial Participation Policy Guidelines.

1. Work must be defence or defence-related and ordered from a recognised UK defence manufacturer or senior provider. Defence products are deemed to be those for use by, or intended to be incorporated in products for use by, the armed forces of the country concerned. It should be noted that standard commercial equipments provided without modification to military

11. IP policy invites 100 per cent reciprocal investment in the UK, but will accept less, depending on the ability of the offshore vendor to achieve that target.
specification to armed forces will not be deemed credit worthy for IP purposes.

2. Civil work is not admissible for IP purposes except where it is deemed defence-related (as described in 1, above).

3. To qualify for IP credit the work placed with UK companies should be new, placed as a result of the IP agreement and consist of products not previously purchased, products purchased from new suppliers or new contract purchase orders for existing business valued at £35,000.

All claims for work containing offshore content will be individually assessed. Work should be placed as a result of the IP agreement and comprise either:

- Products/services purchased from a new UK supplier.
- New products/services from an existing UK supplier.
- Purchase orders/contracts for existing products/services from a UK supplier that have been the subject of re-competition or re-evaluation.

4. The work should have as high a technology content as possible, and at least be commensurable with the equipment in the MoD procurement contract to which the obligation relates.

5. The work should be placed with UK companies through competition.

6. MoD will not pay a premium for IP.


Note: Item 3 evolved since the original 1990 IP guidelines document was launched. Over time, more detail was provided on what qualified for IP credit, defining what was considered new work – effectively reflecting the causality principle.

Items 1 to 4 of the IP policy guidelines represented a direct response to the weaknesses identified in the Boeing AWACS offset package. The conditions of the offsetting package were therefore that the work should be defence or defence-related; new, in the sense of constituting additional work; the direct result of offset requirements; and high-technology in nature. Significantly, there was no mention of job creation or job maintenance. Moreover, a novel, and possibly unique, characteristic of the UK’s IP model was that offsetting work had to be awarded competitively. This ensured that all subcontracts eligible for IP credits would be competitively bid for, and won, by UK suppliers (as stipulated in Item 5). This required competition and market pressure result in cost and price minimisation, with Item 6 indicating that the MoD would not pay a premium for IP. Indeed, in a pure
trading transaction, where IP or offset does not apply, the price paid for military equipment is the market price; and in the UK IP model, where work contracts were awarded to UK defence suppliers on a similarly competitive basis, the view of the MoD’s authority for agreeing and monitoring IP credit applications from offshore defence contractors – the Industrial Participation Unit’s (IPU) – was that a premium was unwarranted. The thrust of IP policy was that it sought to raise the visibility of world-class UK defence suppliers, potentially allowing them to become part of an offshore OEM’s global supply chain. By explicitly mentioning non-payment of the premium in the IP policy guidelines, the IPU was highlighting the distinction between the ‘directed’ approach characteristic of most other countries’ guidelines and the UK’s ‘hands-off’ competitive approach. Accordingly, the UK IP policy left the composition of an IP proposal entirely to the bidder. In doing so, it did not insist on certain levels of involvement in a MoD programme (either direct IP or offset); specify a minimum overall percentage of offset; direct work towards specific companies, geographical regions or industrial capabilities; impose penalties on IP performance; or require a contractual IP agreement.

Yet whilst the IPU rejected the notion of a cost premium, the issue remained controversial. IP credits were eligible on UK-based subcontract work destined for offshore assembly of a MoD-acquired platform, while credits would also be granted for subcontract work by UK suppliers on local licensed production of foreign weapons systems (for instance, British assembly of the Apache Longbow helicopter). Transaction costs, including those relating to risk contingencies, were applicable to both forms of acquisition arrangement, though they were likely greater for licensed production, given the higher risks to the offshore commitment holder. The decision to opt for licensed production would have been made by the platform’s or system’s Integrated Project Team on politico-strategic grounds independent of any IP policy remit.

Additional costs caused by licensed production could be divided into two types. First there would be the extra costs involved in relation to an off-the-shelf purchase, caused by the reduced local scale of output; incremental investment in tooling and training of local workers; as well as the ancillary logistical costs associated with producing or supplying sub-assemblies and components from offshore sources. The second form of additional cost associated with licensed production, as mentioned previously, would be that of managing the incremental risks incurred when an OEM relocates production away from its established domestic defence economy. Licensed
production, therefore, has the potential to substantially increase acquisition prices compared to off-the-shelf delivery.\textsuperscript{12}

\textbf{Policy Implementation}

The role of the IPU in approving, monitoring and providing oversight of the IP implementation process commenced in the mid-1990s. The policy was always owned by the MoD’s International Relations Group, although its implementation was transferred to UK Trade and Investment in 2008. IPU staffing levels have varied, but in 2010 the staff complement comprised a lead civil servant and two executive staff engaged in monitoring IP commitments on MoD programmes. The value of IP commitments has proven considerable. From 1997 to 2010,\textsuperscript{13} the total value of IP generated from all defence programmes amounted to £10.7 billion, distributed amongst over 2,000 firms within the UK defence economy.\textsuperscript{14}

The IPU was a small operation, but its size belied its strategic importance, at the heart of policy interpretation, implementation and oversight activities. It represented a repository of accumulated knowledge in a complex field of endeavour, providing a crucial, neutral policy bridge linking offshore vendors with UK defence suppliers. However, the office represented just one element in the chain of acquisition decision-making determining the nature and impact of IP provision. The ‘business case’ for the acquisition of defence systems captured a multiplicity of stakeholder-driven imperatives, but of paramount importance were the cost-effectiveness comparisons of competing systems. These reflected the outcomes of Combined Operational Effectiveness and Investment Appraisal (COEIA) analyses. These procedures provide the basis for the authorisation of each phase of a major defence-equipment acquisition programme, with the aim of meeting UK military requirements with solutions that are the best possible value for money through the ‘combined’ assessment of equipment options; that is, military effectiveness and the total acquisition life-cycle net benefit (or cost) of the systems. Also evaluated will be the broader defence-economic aspects including local employment impacts and export potential, as outlined in the MoD’s 2005 \textit{Defence Industrial Strategy} in the ‘Wider Factors’ section. Ultimately, however, the decision to acquire a major defence system will always involve a political element; this was true both before and after the launch of the IP policy, and remains true under the present ‘engagement’ regime.

\textsuperscript{12} Evidence is hard to come by on the additional costs of licensed production compared to off-the-shelf acquisition. However, see Michael W Chinworth, \textit{Inside Japan’s Defence: Technology, Economics and Strategy} (New York, NY: Brassey’s, 1992) on the raised costs of Japanese license-produced US weapon systems in relation to procuring direct from a US defence contractor.

\textsuperscript{13} IP values are only available from 1997.

\textsuperscript{14} Author’s correspondence with the IPU, 9 June 2010.
In the UK, as in most other advanced defence economies, acquisition strategy encompasses a spectrum of options, including local development and production; international arms collaboration with European, US or other global industrial partners; licensed-production programmes; work relocation through subcontracting procedures, such as the UK’s erstwhile IP arrangements; and, finally, off-the-shelf acquisition of foreign systems. Due to the unrelenting expansion of R&D costs and reduced scale effects, the indigenous acquisition option for major platforms has increasingly become unaffordable, albeit qualified by the 2005 Defence Industrial Strategy and the superseding 2012 National Security Through Technology White Papers, specifying that UK defence-industrial solutions for critical systems would be relevant where ‘technology-advantage’ requirements dominate.\textsuperscript{15}

The UK’s IP policy did not apply to international arms collaboration, such as the European Tornado and Eurofighter/Typhoon collaboration programmes where workshare is determined by juste retour (fair return); nor did it apply to negotiated agreements with US partners, nor competitive contracting in global consortia such as the F-35 programme. Licensed production is the option favoured by developing countries – and, indeed, many advanced nations as budgetary constraints have bitten (noting that whilst it is a more costly option compared to off-the-shelf acquisition from a foreign contractor, it is most definitely less expensive than the indigenous development and production of an equivalent system). Indeed, licensed production holds the dual advantages of enabling countries to acquire foreign weapons systems whose production is technologically and financially beyond their capacity, whilst also providing them with the benefits of employment, skill enhancement, the potential for technological access to cutting-edge products and processes, and the prospect of developing local value chains. Licensed production, therefore, may have the benefit of keeping existing design and production capabilities warm, whilst at the same time enhancing the potential for further local development through access to frontier technological developments fostered overseas. However, as with arms collaboration, a decision to opt for licensed production by the MoD Integrated Project Team (IPT) meant that the work fell outside the jurisdiction of the IP policy.\textsuperscript{16} This is because production – or, more correctly, ‘assembly’ – would ‘not be subject to IP requirements’, as it would take place on UK soil. Any decision to opt for licensed production would be taken by the IPT responsible for the weapons system’s acquisition.


\textsuperscript{16} The IPT comprises a group of stakeholders, such as MoD officials, the military user and defence-industry executives, who manage the equipment acquisition from cradle to grave, balancing the trade-offs between performance, cost and time.
III. The Impact of the Industrial Participation Policy on the UK Defence Economy

The UK’s IP policy ran from 1990 until it was abandoned in 2012. Its purpose was to invite offshore commitment holders to place work competitively within the UK defence economy, and applied to subcontracts awarded to UK defence suppliers for work on platforms assembled abroad. The policy question arising from this process was whether the £10.7 billion-worth of IP credits translated into real value for the British defence economy and, ultimately, for the British taxpayer. The policy applied to all acquisitions of foreign military equipment exceeding £10 million – the value threshold when IP requirements kick in.¹

The methodological approach adopted by this Whitehall Report to evaluate the impact of IP on the UK defence economy was to examine case studies of the UK’s biggest offshore commitment holders. Lists of foreign defence suppliers were reviewed and the three offshore contractors possessing the highest IP values selected for study. Given the fact that UK acquisition of US military equipment dominated IP commitments over this period, representing approximately 75 per cent of acquisitions, it is unsurprising that the three biggest commitment holders were large, US-owned defence and aerospace businesses, namely Boeing, Lockheed Martin and General Dynamics. Their commitments endured for a fourteen-year period, from 1997 to 2010, and generated total UK IP values of around £2.4 billion, £1.7 billion and £2.4 billion, respectively.² These US defence contractors’ IP-related investments were diffuse, however, and to obtain the best sense of their worth, the three biggest contemporary IP programmes – the Boeing C-17, Lockheed Martin C-130J and General Dynamics’s Bowman contracts – were selected as case studies. The characteristics of these programmes are detailed in Table 4 (on the next page).

¹. The Trident programme is not included because it is a government-to-government arrangement rather than a direct commercial sale attracting an IP invitation.
². Data supplied by the MoD/Industrial Participation Unit, 2 July 2010. Note that the General Dynamics data incorporate both its UK commitments and the US IP Bowman commitments.
Table 4: Selected IP Case Studies.

<table>
<thead>
<tr>
<th>Company</th>
<th>IP Commitment</th>
<th>Year Commenced</th>
<th>Year Concluded</th>
<th>IP Value (£)</th>
<th>IP Percentage (%)</th>
<th>Number of Contracts to UK Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boeing UK C-17 (1-7)</td>
<td>2000</td>
<td>Ongoing (Nos. 5–7) No. 7 due 2014</td>
<td>950m</td>
<td>100</td>
<td>90 (227 individual entries)</td>
<td></td>
</tr>
<tr>
<td>Lockheed Martin UK C-130J</td>
<td>1994</td>
<td>2004</td>
<td>1.1bn</td>
<td>100</td>
<td>145 (497 individual entries)</td>
<td></td>
</tr>
<tr>
<td>General Dynamics UK Bowman (GD) Bowman (GD, Harris, ITT &amp; Rockwell Collins)</td>
<td>2005</td>
<td>2008</td>
<td>2.4bn</td>
<td>63</td>
<td>13 (15 individual entries) 53 (97 individual entries)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Industrial Participation Unit, UK Trade and Investment, 2 July 2010, gained through author correspondence with Adrian Dalton, head of the IPU.

The IP programmes detailed in Table 4 were important in terms of both acquisition cost and the associated IP programme value. Indeed, the aggregate value of these programmes was close to £4.5 billion, representing 50 per cent of the value of all IP programmes undertaken since 1997. Moreover, the selected US defence contractors were powerful global defence players, and because of the breadth and depth of UK defence industrial and technological capability, they viewed operations here as strategically important, with the potential for substantial future growth. The benefit of considering these case studies is therefore the fact that, given the abundance of competing global manufacturing options, often driven by offset requirements, the success or otherwise of US offshore commitment holders in long-term developmental partnerships with UK companies might act as a barometer of performance across the broader range of UK IP agreements.

The selected case studies comprise two defence aerospace programmes (Boeing’s C-17 and Lockheed Martin’s C-130J heavy-lift aircraft) and one military tactical communications programme (General Dynamics’s Bowman Combat Infrastructure Programme – CIP). The three US offshore vendors provided contact details of dominant UK-based suppliers in relation to each of the respective IP programmes. Table 5 lists the names of these suppliers.

3. Data supplied by the MoD/Industrial Participation Unit, 2 July 2010.
against the IP programme, along with other relevant information. Although only a small number of suppliers participated in the survey undertaken for this report, they were nearly all first-tier suppliers, with the Bowman suppliers, for example, accounting for 30 per cent of that programme’s total IP value. There is no reason to believe that the other case-study suppliers were any less significant.

Table 5: UK Defence Suppliers on Selected IP Programmes.

<table>
<thead>
<tr>
<th>Companies</th>
<th>IP Category</th>
<th>Defence Contract Value (£m)</th>
<th>IP Value (£m)</th>
<th>IP Commitment (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lockheed Martin UK C-130J</td>
<td></td>
<td>1,100</td>
<td>1,100</td>
<td>100</td>
</tr>
<tr>
<td>GKN Aerospace</td>
<td>Direct</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dowty</td>
<td>Direct</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE Aviation</td>
<td>Direct</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boeing UK C-17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GKN Aerospace</td>
<td>Direct</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMRC (Sheffield Uni)</td>
<td>Indirect</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IVHM (Cranfield Uni)</td>
<td>Indirect</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Dynamics UK Bowman</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITT Defence</td>
<td>Direct</td>
<td>300</td>
<td>1,500</td>
<td>63</td>
</tr>
<tr>
<td>AgustaWestland</td>
<td>Direct</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rockwell Collins UK</td>
<td>Direct</td>
<td>90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Data supplied by offshore commitment holder executives and the IPU, UK Trade and Investment (March–May 2010).

Note: The General Dynamics IP value includes both General Dynamics UK and US commitments.

This chapter will consider each IP programme in turn, profiling the attributes of the respective UK-based US defence contractors and carrying out a detailed, empirical evaluation of their impact on the UK defence economy from the discharge of their IP commitments. The data underpinning the IP impact analysis were obtained through interviews of executives from both the US offshore vendors and selected UK defence supplier companies.
The UK OffseT MOdel

Boeing C-17

Boeing is a defence and aerospace enterprise with a global staff of 175,000 people, based across forty-nine US states and seventy countries. The company’s Defense, Space and Security Division has operations in twenty-one US states and four countries. It was formed in 2002 and integrates Boeing’s defence, space, and intelligence and communications capabilities. The division’s 2009 workforce numbered 68,000, declining to 60,500 in 2012, in relation to a fall in business turnover from $33.7 billion to $32 billion.

The company enjoys close business relations with the UK dating back seventy years. It currently has defence and aerospace operations – although no production facilities – across the country, with the work primarily focused on collaborative research, training and support operations, such as the through-life contract-support programme for the RAF’s fleet of Chinook helicopters. In 2009, Boeing employed around 600 people in the UK, including an unspecified number of expatriates; this figure rose to 1,300 in 2012. The company’s operations extend to over 250 supplier sites, generating many more thousands of jobs through Boeing’s multimillion dollar accumulated expenditure. This expenditure extends beyond manufacturing, also impacting on academic and specialised research establishments, including, for example, a major research establishment in Yorkshire – the Advanced Manufacturing Research Centre (the AMRC – profiled later in this report). The company has also made a broad array of other investments, including collaborative work on a 5-metre wind tunnel (with QinetiQ), intelligent systems and information security (with Cambridge University), additive manufacturing technologies (with Loughborough University), advanced forging (with Strathclyde University), aircraft design and development, and vehicle health management (with Cranfield University), as well as the provision of multiple training and professional centres at Boeing’s own Leadership Centre.

Thus, the principal purpose of Boeing’s UK IP strategy was not simply to liquidate its obligations, but to cultivate added value in the local research base and supply chain. Importantly, in a highly competitive

9. Ibid.
10. Author interview with Brian D Moran and Tim Wheeler.
global defence market, Boeing views the ‘mining’ of capability as a major goal of its UK commercial strategy.11

Whilst the 1980s acquisition of the Boeing AWACS aircraft proved controversial, the MoD’s acquisition of the C-17 tactical airlift aircraft was an operational success story. The aircraft’s origins date back to June 1993. Designed to replace the less capable C-141 Starlifter, the C-17 was required by the US Air Force to provide strategic capabilities, allowing it to fly between continents on short, austere runways. Following the UK’s 1998 Strategic Defence Review, the MoD also sought a short-term strategic airlift capacity, and after a stuttering tendering process, the C-17 emerged as the RAF’s preferred choice. The principal alternative was the European A400M heavy-lift aircraft, but this was a new programme and had experienced delays, whilst the C-17 was a mature platform and thus less risky. In 2001, the MoD therefore agreed to lease four C-17 aircraft at a reported cost of £100 million per annum over a seven-year period.12 Later, in 2004, it was announced that these four C-17s would be purchased at the end of their lease. Additionally, the decision to buy two further C-17s was made in 2004, with the aircraft delivered in 2008, and a seventh C-17 remains to be delivered in December 2014.13 The total cost of the C-17 acquisition programme is £1.1 billion, with an equivalent IP value,14 and with the IP programme providing defence-related work to several major UK-based defence and aerospace companies, including GKN Aerospace Services.

GKN (based in Cowes on the Isle of Wight) is a major UK defence supplier on the Boeing C-17 programme. As will be discussed, the company had also won contracts on Lockheed Martin’s C-130J programme, with the C-17 and C-130J work packages undertaken in separate buildings at the Cowes facility. According to company officials, the C-17 design, development and build work was tied to the leasing contract, which recognised the company’s expertise in producing metallic parts for the flight control system on the US MD-11 passenger aircraft.15 Boeing’s IP commitment continued and grew

---

11. Ibid. It should be noted that the MoD required Boeing, along with other offshore vendors holding IP obligations, to create ‘fresh’ work opportunities. This requirement is based on the principle of causality – that the additional workflow must derive directly from the IP obligation placed on the foreign defence company.


13. E-mail correspondence with Adrian Dalton, Head MoD Industrial Participation Unit, 17 June 2010.

14. E-mail correspondence with Adrian Dalton, Head MoD Industrial Participation Unit, 9 June 2010.

15. Author interview with Nigel Cheverton, GKN Aerospace, Cowes, Isle of Wight, 26 May 2010.
the existing business relationship, manifested by GKN’s development of composite parts for the flight-control system on the C-17 military aircraft.\textsuperscript{16}

GKN has benefited from IP-driven subcontracts that have proven sustainable in the long term. Indeed, the C-17 represents a durable work package, accounting in 2010 for around 7 per cent of the company’s capacity,\textsuperscript{17} and with GKN now Boeing’s sole global service supplier for work on the C-17. As a result of the C-17 IP programme, ‘fresh’ (but limited) employment has also been created, as shown in Table 6, with the programme also contributing to the maintenance of existing jobs.

**Table 6:** GKN Aerospace: Employment Created by the C-17 IP Programme, 1989–92.

<table>
<thead>
<tr>
<th>Post-Contract Awards</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress engineers</td>
<td>4</td>
</tr>
<tr>
<td>Design office engineers</td>
<td>15</td>
</tr>
<tr>
<td>Weight engineer</td>
<td>1</td>
</tr>
<tr>
<td>Manufacturing engineers</td>
<td>2</td>
</tr>
<tr>
<td>Test engineers</td>
<td>1</td>
</tr>
<tr>
<td>Design engineers</td>
<td>5</td>
</tr>
<tr>
<td><strong>1991 Onwards</strong></td>
<td></td>
</tr>
<tr>
<td>Composite operators</td>
<td>10</td>
</tr>
<tr>
<td>Procurement officers</td>
<td>2</td>
</tr>
<tr>
<td>Commercial officers</td>
<td>1</td>
</tr>
<tr>
<td>Quality engineers</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Author interview with Nigel Cheverton, GKN Aerospace, May 2010.

Note: The lease agreement for the first C-17 was signed in 2000 and other leases followed. There was no single contract, therefore, and IP commitments simply rolled on. The seventh C-17 was the last aircraft captured by IP requirements, with this aircraft purchased rather than leased.

Aside from subcontracting production work to UK defence suppliers, Boeing has also participated, under the auspices of the IP policy, in innovative frontier research ventures. Boeing’s association with the Sheffield-based AMRC is a good example of the company’s creative approach to industrial participation. Boeing’s partnership with the AMRC began in 1999. With the co-founder of the AMRC formerly having sold engineering equipment to Boeing, professional relations had already been established, along with an understanding of the US company’s corporate culture. The AMRC’s business

\textsuperscript{16} Ibid.
\textsuperscript{17} Ibid.
concept is ‘to identify, research and resolve advanced manufacturing problems’, with Sheffield-based AMRC researchers working with individual partner companies – such as Rolls-Royce, BAE Systems, Carpenter, Messier-Bugatti-Dowty and Boeing – on specific projects, as well as collaborating on generic projects for the benefit of all member companies. AMRC’s research themes are determined by a board of industrial partners to ensure that the work is focused on commercial endeavour. AMRC’s other co-founder – Keith Ridgway – is a professor of Design and Manufacture at the University of Sheffield; indeed, AMRC is a department of the University’s Faculty of Engineering. However, whilst benefiting from the faculty’s accumulated academic expertise, AMRC has remained financially independent, gaining funding from partner companies’ annual subscriptions, enabling them to access AMRC’s technical resources. There are over twenty first-tier members that fashion cutting-edge research agendas, as well as around thirty tier-two industrial members that subscribe for a lower fee to enjoy data access to AMRC’s generic research projects.

Boeing, along with another twenty-three first-tier member companies, subscribes for £200,000 per year, committing itself to a total investment of £10 million over a ten-year period. Other funds have also been made available, including European grants channelled through the Yorkshire Regional Development Agency, and almost £6 million sourced from Lord Sainsbury’s long-term strategic funds to foster an advanced engineering and materials industrial cluster. Boeing’s investment has also contributed to the development of the Advanced Manufacturing Park, a 100-acre former open-cast mine, reclaimed to house high-technology specialist suppliers ‘clustered’ around the AMRC. This investment was accepted by the IPU as an IP project, and Boeing accordingly claimed credits on the £10 million.

Boeing has also created ten globally distributed centres of excellence using the AMRC model in functionally differentiated fields of specialisation, such as avionics and repair technologies. The particular focus of the AMRC itself is manufacturing science, with respect to introducing aerospace-related materials into the local supply chain. It seeks to achieve a competitive advantage for partner companies through the adoption of an interdisciplinary approach to technological development, embracing economics, engineering and the environmental dimensions of new materials. This approach has pushed the envelope by promoting applied research into new technologies, tools and processes, through the pursuit of enhanced engineering precision,

18. Author interview with Adrian Allen, 17 March 2010.
20. Author interview with Adrian Allen, 17 March 2010.
21. Ibid.
22. Ibid.
whilst securing cost savings through substantial reductions in material wastage.

The AMRC’s overarching imperative has been the creation of sustainable wealth and jobs in the UK. Boeing’s initial investment supported the attainment of such a goal and, equally importantly, added to the credibility of the AMRC’s marketing profile. Boeing is a first-tier industrial partner of the AMRC, and intends to continue its association with what it views as a dynamic, advanced research enterprise. Indeed, the AMRC has seen its staff expand from a handful of workers at the end of the 1990s to 130 highly skilled workers in 2010, over fifty possessing postgraduate or doctoral degrees in engineering, computing and science more broadly. In 2007, the AMRC earned the distinction of winning the Queen’s Anniversary Award for Higher and Further Education, just six years after its launch. More recently, the AMRC has achieved significant customer diversification by winning funding to establish a Nuclear Advanced Manufacturing Research Centre within the AMRC industrial cluster, with the aim of rejuvenating the UK civil-nuclear supply chain, and assisting constituent firms to access a significant proportion of the UK’s nuclear new-build programme. Thus, whilst Boeing’s IP claim related only to defence-related investments, the company’s investment and endorsement clearly brought important marketing advantages, as well as wider technological spin-offs of benefit to the wider UK economy.

Similarly linked to the IP mechanism, Boeing Defence UK has invested in another advanced engineering research organisation – the Integrated Vehicle Health Management (IVHM) Centre, based at Cranfield University in Bedford, specialising in generic solutions for diagnostic, prognostic and health monitoring of vehicle technology systems. Though launched in 2008, Boeing’s research sponsorship dates back to 2002, when IVHM activities were dispersed across the university. The asset base of the IVHM Centre was valued at around £9 million in 2010, with the East of England Development Agency (EEDA) contributing launch funds of £3 million, and Boeing, Rolls-Royce, Meggitt and BAE Systems supplying the remaining funds. Each of the above core partners is also committed to investing £1 million over five years, up to 2013, with the centre’s research investment leveraged across different high-technology domains, including aerospace, energy, the environment, and the automotive, bioscience, and defence and security sectors.

23. Author e-mail correspondence with Adrian Allen, 13 July 2010.
24. Ibid.
25. Boeing has decided to wait for the build-up of its investment before claiming IP from the IPU.
26. Author interview with Jim Angus, Commercial Director of the Integrated Vehicle Health Management Centre, Cranfield University, 14 May 2010.
Since 2008, the centre has expanded to employ twenty-five research staff, spanning the spectrum of principal investigators, postdoctoral researchers, adjunct professors and interns. Its applied research programmes are targeted at Technology Readiness Levels (TRLs) 4–6, higher than normal university levels. The centre is also required, under the terms of the EEDA grant, to promote SMEs, and has therefore been active in cultivating supply chains, including those in aerospace. Indeed, the generic technologies generated by IVHM offer cross-fertilisation of innovation across different sectoral supply chains, and whilst a specialised subcontracting base can take decades to establish, the centre’s incipient supply chain already supports local SME suppliers, including one local firm supplying smart fibre technology, and another in Australia sharing specialist, beta-release software technology. The centre’s director argues that Boeing’s involvement has proven a critical factor in the accelerated development of the IVHM centre. It is a partnership that has created value for both parties: as a partner company, Boeing enjoys access to the centre’s knowledge base, while its technical requirements complement the centre’s related technological activities. Further, a significant strategic outcome of the technological synergy engendered is the exposure enjoyed by Boeing to local SME products, creating potential opportunities for these SMEs to qualify for aerospace work.

**Lockheed Martin C-130J**

Lockheed Martin is another US defence and security contractor with a major global presence. It specialises in the integration and sustainment of advanced technology systems, products and services in the space, aeronautics, electronics and information-technology markets. In 2009, corporate earnings were over $45.3 billion, rising to $68.7 billion in 2011. Lockheed Martin opened its first UK office in 1993, with the aim of expanding its share of the local defence market. By 1996, the company’s business-development activities had led to the creation of twenty staff positions. In 1999, Lockheed Martin UK was created, and the company has enjoyed rapid expansion. The company’s UK work focuses on systems integration with bespoke manufacturing in niche areas and by March 2010 the company employed 1,500 workers across twelve UK sites. Some 90 per cent of these workers are British, the rest being US expatriates. And while there has been some

27. Ibid.
28. Ibid.
29. Boeing’s investment in this programme did not qualify for IP credit because it was not defence-related.
32. Interview with Nigel Strutt, 16 March 2010.
33. Ibid.
buy-in from abroad of specific skills, including project-management and systems-integration expertise, this has been caused by local labour scarcity. Wherever possible, indeed, Lockheed Martin seeks to indigenise its UK-based defence activities. For instance, when the company became the prime contractor for the Merlin anti-submarine warfare helicopter programme in the early 1990s, around 90 per cent of the development and production work was conducted using US expatriates based in the UK. Yet after a lapse of only five-to-six years, the intensive training of local labour had led to a reversal of this situation, with just 10 per cent of skilled labour sourced from the US, meeting Lockheed Martin’s IP commitments to the UK MoD.34

Similarly to Boeing, Lockheed Martin UK’s business model emphasises the importance of partnering – a term used to signify primes and subcontractors working together to achieve mutually beneficial outcomes. Lockheed Martin has forged around 300 global partnerships, with Lockheed Martin UK alone participating in around 100 of these ventures.35 Over the previous five years, Lockheed Martin’s partnering approach has led to the establishment of business relationships with some of the UK’s premier defence companies, including AgustaWestland, the Dowty Group and Smith’s Industries (both of the latter now having been acquired by GE Aviation). One of the benefits of such partnerships to the UK defence economy is that Lockheed Martin has invested some £250,000 in local partner-company facilities, given the need both to minimise costs through the application of ‘lean’ techniques and to maximise sales revenue per employee.36 Lockheed Martin has adopted from the automotive industry the prime contractor–supplier relational model, which seeks to invest in clusters of supplier SMEs ‘mentored’ by a first-tier supplier. The source of the defence subcontracts is Lockheed Martin, but the facilitating vehicle is IP, with work- and skill-generation opportunities percolating down from the local first-tier supplier to lower-tier supplier SMEs. This model has worked well, with around $6.26 billion in Lockheed Martin purchase-order commitments raised with British defence industry over the four-year period 2005–09.37

Beyond the normal production-based IP subcontracts to UK defence suppliers, Lockheed Martin has also sought to cultivate a local R&D capability through investment in the UK defence base.38 This investment has been aimed at relatively high-technology work, but Lockheed Martin has signalled that it also intends to tap into lower-order innovation. As such, it is currently

34. Ibid.
36. Interview with Nigel Strutt, 16 March 2010.
37. E-mail correspondence with Nigel Strutt, 13 July 2010.
38. Interview with Nigel Strutt, 16 March 2010.
working with UK Trade and Investment on five seed-corn projects at TRLs 2, 3 and 4, valued at $1.2 million. These R&D projects include work on nanotechnology, materials and climate research at Cambridge University, and unmanned and autonomous systems at Cranfield University. Moreover, the company’s interpretation of the dynamics of the UK defence economy has changed: whilst initially the strategic aim was solely that of gaining market access, the IP policy mechanism has obliged it to consider the additional industrial, technical and commercial benefits of investing in the UK science and innovation environment.

One of the principal media for this strategic shift was the IP obligation deriving from the RAF’s acquisition of the C-130J Super Hercules aircraft, first ordered in 1994. The airlifter represented a substantial improvement on earlier models, incorporating a digitised flight deck, more powerful Rolls-Royce engines, Dowty six-bladed composite propellers and a head-up display. The RAF was the lead customer for the aircraft, taking delivery of twenty-five units. The first of these was supplied in November 1999 and the last in June 2001. The IP policy fostered British industrial participation in C-130J production, initially for the RAF aircraft, and subsequently for the aircraft’s global customer base. As a consequence, the UK-based supply chain for the C-130J has expanded to include around 150 companies. As of June 2010, Lockheed Martin reports that the C-130J programme had generated substantially more business for UK defence and aerospace contractors than the IP commitment, supporting in excess of 24,000 man-years of employment. The list of participating companies includes some of the UK’s leading first-tier subcontractors, such as Rolls-Royce (for engines), AgustaWestland (for engine nacelles), Goodrich (for digital engine controls), GE Aviation (the erstwhile Smith’s Industries, for electronics) and Dowty Propellers (for power generation), as well as a myriad of SMEs.

The case of one of these companies – Dowty Propellers – is instructive, this Cheltenham-based aerospace company having played a vital role in ensuring the success of the UK C-130J programme since its launch in 1999. Dowty’s origins go back to 1937, when a joint venture company, ROTOL, was formed between the Bristol Aeroplane Company and Rolls-Royce, specialising initially in military-aircraft propellers. After the war, ROTOL supplied propellers for civil aircraft, such as the Fokker F-27 and Avro/Hawker Siddeley HS-748. In 1960, George Dowty acquired ROTOL, and over the ensuing decades Dowty Rotol produced propellers for commercial aircraft, such as the Fokker 50 and the Saab 340/2000. However, during the 1990s, the production of these aircraft ceased, leaving Dowty in a weakened commercial position.

39. Ibid.  
41. E-mail correspondence with Nigel Strutt, 13 July 2010.
Employment fell from over 300 to around 260, with the company surviving on sales of spare parts and customer support. In 1992, Dowty signed a contract to supply propellers under Lockheed Martin’s C-130J programme, and this proved critical in keeping Lockheed Martin afloat during the late 1990s. As the RAF was the launch customer for the C-130J aircraft, the propeller system also helped Lockheed Martin to achieve its IP requirements. Meanwhile, the C-130J programme experience helped Dowty subsequently to win a contract to supply, in the early 2000s, the propeller systems for the Bombardier Q400 civil regional aircraft, with these two programmes becoming the mainstay of Dowty’s original equipment output.

At the start of the 2000s, Dowty was supplying one set of four propellers per month to Lockheed Martin for the C-130J; by 2009, the volume requirement had risen to two sets per month, and plans are in place to further increase production to three sets per month. Tied to this growth in output, employment has expanded to 320 workers, most of whom are highly skilled. For Dowty, IP has served as a survival mechanism, enabling the company to enter into Lockheed Martin’s global production supply chain. Moreover, as Dowty is the OEM for the propulsion system, it has further benefited from C-130J through-life support contracts, providing a rich vein of follow-on maintenance, repair and overhaul work on all C-130J aircraft supplied to Lockheed Martin’s customers.

Dowty has also benefited from C-130J-derived technological innovation. For instance, blade production quality has improved, primarily as a result of technical enhancements to the composite manufacturing process. As well as engaging Dowty on all design work and manufacturing relating to the blades, as well as on assembly and testing of the propeller system, the programme has also seen other manufacturing work outsourced. For example, a local supplier, Middlesex, produces the hub; several south-coast companies produce precision components; and metal and aluminium machining, as well as cables and slip rings are also supplied locally. Indeed, the partnership with Lockheed Martin has worked to the advantage not just of Dowty, but of industrial ‘partners’ at all levels of the value chain. An example of such ‘trickle-down’ benefits is Lockheed Martin’s joint funding, along with Dowty and the Society of British Aerospace Companies, of a ‘lean’ manufacturing initiative, extending across Dowty’s entire supply chain. Significantly, the training and capability enhancements have targeted C-130J-related work,

42. Interview with Jonathan Chestney, Dowty Propellers, Gloucester, UK, 14 May 2010.
43. Ibid.
44. Ibid.
45. Ibid.
46. Ibid.
47. Ibid.
48. Ibid.
engendering cost reduction and quality improvements across the range of manufacturing activities, so benefiting the broader customer base.\textsuperscript{49}

The C-130J contract has created further beneficial spin-offs, most notably through foreign sales. In 1998, the Italian aerospace company, Alenia, appointed Lockheed Martin as the systems integrator for its C-27J airlifter, and Dowty was selected for the propeller system. Additionally, Dowty won a contract in the early 2000s to deliver a propulsion system for seven US-2 Japanese Flying Boats purchased by the Japan Defense Agency, with the propeller technology drawing heavily on the C-130J system.\textsuperscript{50} The order book in 2010 stood at over sixty aircraft, with Dowty delivering two propellers per aircraft of a similar design to the C-130J propulsion system.\textsuperscript{51} Overall, therefore, Dowty believes that IP has had a positive influence on its operations.\textsuperscript{52}

Another first-tier C-130J supplier is GKN, a cross-supplier on the Boeing C-17 programme. The company specialises in airframe structures, enjoying a manufacturing lineage dating back to the 1950s, when it was heavily involved in the design, development and build of the Princess Flying Boat. Later, in the 1960s, GKN was a leading company in the design and build of Hovercraft. The C-130J work began in 1993, when GKN was contracted to design and develop several of the composite structures. This early design and development work spanned a two-year period and, at its peak, over forty highly skilled design and engineering staff were assigned to the C-130J contract.\textsuperscript{53} Around 10 per cent of the contract’s value added was generated within GKN, with the remaining 90 per cent, including machine shop treatment, carbon fibre and resins, outsourced to local suppliers.\textsuperscript{54} The original C-130J nacelle (engine-housing) contract was won competitively by GKN, based on compelling price and quality considerations. This proven level of competitiveness created the opportunity for overseas sales via Lockheed Martin’s aforementioned involvement in the Italian C-27J project – a re-design of the failed indigenous Italian G-222 aircraft programme. GKN won an initial development contract on C-27J nacelle work, requiring investment in a new Isle of Wight facility for a five-year test programme.

The Italian C-27J project, along with the principal C-130J programme, generated numerous high-technology jobs across two phases, as shown in Table 7 (on the next page). For the C-130J programme, the post-contract

\begin{itemize}
\item \textsuperscript{49} Ibid.
\item \textsuperscript{50} Ibid.
\item \textsuperscript{51} Ibid.
\item \textsuperscript{52} Ibid.
\item \textsuperscript{53} Interview with Nigel Cheverton, Steve Smith and Peter Swallow, GKN Aerospace, Cowes, Isle of Wight, 26 May 2010.
\item \textsuperscript{54} Ibid.
\end{itemize}
cost reduction development work and the new nacelle design created forty-five skilled jobs over an approximate six-year period, commencing in 1994.\(^\text{55}\) Further employment was created on a monthly, recurring basis from 1995 onwards, with the majority of jobs ongoing as C-130J contracts continue and as the work continues to ramp up (see Table 7). As noted, the C-130J programme and the close commercial relationship that GKN enjoyed with Lockheed Martin proved decisive in the winning of the 1998 C-27J nacelle design and build contract.

**Table 7:** GKN Aerospace: Employment Created by the C-130J IP Programme, 1994–99.

<table>
<thead>
<tr>
<th>Post-Contract Development Award</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Job Category</strong></td>
<td></td>
</tr>
<tr>
<td>Stress engineers</td>
<td>8</td>
</tr>
<tr>
<td>Design office engineers</td>
<td>20</td>
</tr>
<tr>
<td>Weights engineer</td>
<td>1</td>
</tr>
<tr>
<td>Manufacturing engineers</td>
<td>3</td>
</tr>
<tr>
<td>Test engineers</td>
<td>6</td>
</tr>
<tr>
<td>Designated Engineering Representative engineers</td>
<td>1</td>
</tr>
<tr>
<td>Lead engineers</td>
<td>2</td>
</tr>
<tr>
<td>Project management team</td>
<td>4</td>
</tr>
<tr>
<td><strong>1995 Onwards (on a recurring, monthly basis for an unspecified period)</strong></td>
<td></td>
</tr>
<tr>
<td>Aircraft fitters</td>
<td>25</td>
</tr>
<tr>
<td>Procurement officers</td>
<td>3</td>
</tr>
<tr>
<td>Commercial officers</td>
<td>2</td>
</tr>
<tr>
<td><strong>Quality officers</strong></td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Interview with Nigel Cheverton, Steve Smith and Peter Swallow, GKN Aerospace, Cowes, Isle of Wight, 26 May 2010.

The GKN management believes that the IP programme has proven a positive experience, particularly in terms of facilitating market access;\(^\text{56}\) the view was that partnering with a global defence and aerospace company such as Lockheed Martin created important, high-technology commercial opportunities. However, downsides were encountered, with one principal difficulty being that Lockheed Martin’s prime contractors needed to shuffle work around the globe to meet offset obligations imposed by other countries. GKN officials believe this to have caused the loss of a number of C-130J subcontracts, including a mid-1990s offset contract to Short Brothers of Belfast; a later offset work package to the (government-owned) Portuguese

\(^{55}\) Correspondence with Nigel Cheverton, 19 May 2010.

\(^{56}\) Interview with Nigel Cheverton, Steve Smith and Peter Swallow, 26 May 2010.
company OGMA (although GKN was nevertheless allowed to produce the nacelle access doors, enabling Lockheed Martin to claim UK IP credits); and, finally, strategic technology work that was transferred to Poland following offset demands by the Polish defence authorities.\textsuperscript{57} GKN acknowledges that there is a clause in Lockheed Martin’s contracts encouraging supplier support in meeting the US company’s offset obligations around the globe. However, non-compliance, in the event that GKN was unable to deliver, was not viewed by the British supplier as a contractual ‘showstopper’.

It is clear, therefore, that GKN benefited greatly from IP work. As illustrated in Table 8, below, the dominance and durability of what are now mature programmes continue to represent defining features of the company’s output today.

\textbf{Table 8:} GKN Aerospace: Share and Duration of IP Programmes in Company Activity.

<table>
<thead>
<tr>
<th>Programme</th>
<th>Share of Company Output (%)</th>
<th>Predicted Work Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-130J</td>
<td>30</td>
<td>2018</td>
</tr>
<tr>
<td>C-17</td>
<td>7</td>
<td>2013</td>
</tr>
<tr>
<td>C-27</td>
<td>16</td>
<td>2020</td>
</tr>
</tbody>
</table>

Source: Interview with Nigel Cheverton, Steve Smith and Peter Swallow, GKN Aerospace, Cowes, Isle of Wight, 26 May 2010.

Also included in the IP survey is GE Aviation, a UK-based supplier to both the Lockheed Martin C-130J and Boeing C-17 programmes. This first-tier supplier provides electrical-power-system solutions to frontier civil-military aerospace programmes, such as the commercial 787 Dreamliner aircraft and the Joint Strike Fighter combat aircraft. GE Aviation is a significant global player: its 2008 revenues amounted to $18.3 billion, climbing to $18.9 billion in 2011, with operations in more than eighty locations worldwide employing over 39,000 people.\textsuperscript{58}

In 2007, GE Aviation created an industrial presence in the UK through the acquisition of Smith’s Industries, the latter then struggling to meet the challenge of capitalising the hugely expensive R&D – and especially the development component – essential to participation in twenty-first-century global aerospace projects. GE Aviation, by contrast, had global market reach; according to company reports, its UK operations alone earned $5 billion in

\textsuperscript{57} Ibid.
2008, generating almost 5,000 skilled jobs.\textsuperscript{59} However, its UK workforce has declined in recent years, due principally to the outsourcing of work and jobs to China.\textsuperscript{60}

GE Aviation’s IP opportunities began in the early 2000s, when Lockheed Martin awarded the then-Smith’s Industries a contract to supply electronic circuit-breaker units (ECBUs) on the UK C-130J programme. This proved a successful venture, with further contracts leading to the continued employment of thirty to forty highly skilled local engineers. These contracts entailed extended work requirements, derived from producing ECBUs for Lockheed Martin’s global C-130J sales, creating flow-down economic benefits to UK suppliers.\textsuperscript{61} Moreover, based on GE Aviation’s position as a proven, high-quality supplier, the company was invited to bid for, and subsequently won, an export contract to supply back-up flight instrumentation for Lockheed Martin’s sale of eighty Block 6 F-16s to Oman.\textsuperscript{62} The GE Aviation management argues that IP was also a factor in creating spin-off work in the fields of unmanned aerial vehicles (UAVs) and new civil and military land systems.\textsuperscript{63}

GE Aviation has also undertaken high-technology work in integrated electrical systems, seeking to advance knowledge from electro-mechanical systems – as used in the Apache Longbow helicopter – to cutting-edge, solid-state power systems, representing the technological solution found in the F-22 Raptor. GE Aviation’s innovative approach has in part been supported by the South West of England Regional Development Agency, through a financial contribution to the development of a £6 million ‘power’ laboratory to provide end-to-end power integration and test capability. Thus, GE Aviation, along with the other US-owned firms surveyed, viewed its UK operations as globally competitive, viable and, hence, sustainable, warranting the forging of close strategic relations with both the MoD and British defence industry. The primary goal of these US IP commitment holders is therefore that suppliers in the UK, as elsewhere, be competitive.

\textbf{General Dynamics UK: Bowman}

General Dynamics is ranked amongst the world’s top five defence contractors. Its global sales in 2009 registered at over $30 billion, increasing to $32.6 billion in 2011, with business units (in the US, Canada, Mexico, Austria, Switzerland, Germany, Spain and the UK) together employing over 95,000

\textsuperscript{60} Interview with Jon White, Senior Executive GE Aviation, Cheltenham, 18 May 2010.
\textsuperscript{61} \textit{Ibid}.
\textsuperscript{62} \textit{Ibid}.
\textsuperscript{63} \textit{Ibid}.
The company has been established in the UK for almost fifty years, but it was only in 2001 that General Dynamics UK was formed. This business expanded substantially over the first decade, such that in March 2010 around 1,600 workers were employed in its seven nationwide facilities and London headquarters. General Dynamics UK is now the fourth-largest defence company and the third-largest defence prime contractor in the UK. According to company reports, it spends over £200 million per annum through subcontracts to British suppliers, and has created over 300 new jobs in its UK-based supply chains. The company focuses on defence prime systems integration and security and resilience markets, both within the UK and across Europe, the Middle East, Africa and Asia. Its turnover reached around £550 million in 2009, rising to £857 million in 2011, with sales centred on information systems and technology (including C4ISR – command, control, communications, computers, intelligence, surveillance and reconnaissance), information assurance solutions, and advanced software and electronics systems. The company is increasingly prioritising investment in intellectual capital, both embodied (via applied R&D) and disembodied (via education and training). Since 2005, it has invested over £14 million as the prime contractor in a world-class, MoD-sponsored Defence Technology Centre consortium, comprising industry and elite British universities, including the Universities of Cambridge and Southampton, Cardiff University, and Imperial College, London. This has allowed advanced data- and information-fusion techniques to be moved successfully up the Technology Readiness Level chain.

The Bowman contract dates from a 1989 General Staff requirement to replace the ageing Clansman radio system. The initial procurement process was chaotic, culminating in the preferred bidder – the Archer Communications consortium – failing in 2000 to deliver on the requirement to time and at cost, and leading the MoD to terminate the contract. In the subsequent rebidding process, CDC Systems UK, now General Dynamics UK, won the prime contractor and systems integrator contract. Under the reconstituted Bowman programme, some 48,000 radios and 28,000 computer terminals

65. Interview with Chris Bentley, Vice President Commercial, General Dynamics UK, London, 4 January 2010.
68. Correspondence with Chris Bentley, 16 July 2010.
69. Comprising the integration of two competing consortia: Yeoman, led by Siemens Plessey Systems, and Crossbow, led by ITT UK Ltd.
were installed in around 13,000 vehicles, as well as on ships, boats, helicopters and in buildings. In 2001, General Dynamics UK entered into a seven-year IP obligation. This committed the company to 90 per cent direct and 10 per cent indirect IP, representing a combined value of £1.5 billion against a Bowman CIP contract value of approximately £2.4 billion. The direct IP requirement was successfully completed in July 2008, with the subcontracts having created or sustained around 2,000 jobs. General Dynamics UK also secured some £60 million of IP credits over and above the agreed 10 per cent indirect IP requirement. In fulfilment of its IP requirements, General Dynamics UK allocated a substantial proportion of the Bowman contract value to UK-based suppliers, with specialist design and manufacturing work subcontracted to such major UK and US defence companies as SELEX Communications, Harris Corporation, L-3 Communications, DRS Tactical Systems, BAE Systems, GDC4S, Thales Group, AgustaWestland and the ITT Corporation.

Another major supplier to the Bowman programme was ITT Defence – a separate, Basingstoke-based company first registered in the UK in 1993, but entirely US-owned. ITT Defence was established to create a defence presence in the UK, positioning itself to secure MoD business from the initial Archer Communications consortium. Under the successor Bowman contract, General Dynamics UK awarded ITT Defence a £300-million contract for the production and assembly of VHF high-capacity data radios (HCDR). The majority of the development work had already been undertaken in ITT’s sister facilities in the US. However, to support local production, some UK development work occurred at ITT Defence in Basingstoke. This involved the development and integration of unique UK cryptographic software, designed specifically for the Bowman system, not least because US components and systems had to be adapted for the Bowman programme. In support of local product development and adaption, all relevant drawings were transferred from the US to Basingstoke, along with the design authority. From just thirteen workers pre-Bowman, the IP-driven subcontract leveraged job expansion in ITT Defence to around 200 employees during peak-output tempo. By March 2010, staff levels at ITT Defence had settled back to 120.

70. Interview with Chris Bentley, 4 January 2010.
71. Ibid.
72. Ibid.
73. Ibid.
74. Dating back to the MoD’s 2002 Defence Industrial Policy, the emphasis has been on location rather than ownership; that is, the need to attract defence investment, job creation and income generation in the UK irrespective of whether the facilities are British or foreign-owned.
75. Interview with Steve Clarke, Commercial Manager, ITT Defence, Basingstoke, 13 May 2010.
76. Ibid.
77. Ibid.
and production as contracted by General Dynamics UK but, importantly, had also benefited from two follow-on support contracts.\textsuperscript{78}

Moreover, prior to the Bowman subcontract, the Basingstoke facility was solely a commercial and programme office, with no production capacity, with IP policy therefore successfully triggering UK manufacturing activity in the strategically critical communications sector. Indeed, in the absence of IP requirements, it is likely that the Bowman subcontracts would have been undertaken at ITT Corporation’s US Fort Wayne plant.\textsuperscript{79} The IP programme also proved the catalyst for the creation of a small but dynamic R&D capability,\textsuperscript{80} with engineers working on the enhancement of Bowman systems, as well as unrelated, new product technologies, at an autonomous R&D centre. Around twenty highly skilled staff continue to be employed in the R&D centre at ITT Defence today.\textsuperscript{81}

This combination of production and development capabilities translated into a high degree of industrial autonomy for ITT Defence from its US parent company in its core fields of expertise. At the same time, outsourcing to local SMEs has been pursued for the purpose of exploiting specialist areas of expertise, inevitably leading to increased capacity-utilisation for the approximately 1,000 suppliers in ITT Defence’s UK value chain.\textsuperscript{82} In turn, the Basingstoke operation has gained from supplier-led, state-of-the-art improvements in HCDR technologies, providing ITT Defence with a sharpened competitive edge in radio capability. Meanwhile, supplemented by this competitive value chain and its increasingly diversified in-house skill-base, ITT Defence has fostered ancillary spin-off benefits. These include involvement in adjacent defence programmes with, for instance, DSTL, QinetiQ, and Defence Equipment and Support (DE&S) IPTs, as well R&D-driven diversification into new defence electronics and communications products, national security and resilience markets, and high-technology force-protection projects, including counter-IED technologies. Furthermore, the Bowman experience enabled ITT Defence to directly bid on tenders put out by other government departments and commercial prime contractors.

Additionally, the Bowman contract proved instrumental in securing overseas sales and international support arrangements. For example, ITT Defence was a supplier to General Dynamics UK’s export of the customised Bowman system to the Dutch Ministry of Defence. Whilst Bowman has been the technological fulcrum for fresh export opportunities, the Basingstoke company also benefited from unrelated Bowman offshore defence business,

\textsuperscript{78.} Ibid.
\textsuperscript{79.} Ibid.
\textsuperscript{80.} Ibid.
\textsuperscript{81.} Ibid.
\textsuperscript{82.} Ibid.
such as a contract awarded by the UK MoD to the section of ITT based in California. The US parent company acted as the prime contractor for the supply of precision approach radar – a radar guidance system used to assist aircraft approaches and landing. This now-completed contract attracted IP requirements which were satisfied by ITT Defence, providing long-term support services for these land-based radars.

ITT Defence operates in a highly competitive international market. Thus, when bidding for any supply contract, including Bowman, all costs have to be absorbed in the normal way. There are no staff dedicated to IP contracts, and thus no additional overhead costs are incurred. The view of ITT senior management is that there was little possibility of loading extra costs into the ITT Defence bid for the Bowman subcontract, because the tender was conducted under conditions of open competition, having also attracted bids from SELEX Communications and Harris Corporation. Without IP, arguably, the work of ITT Defence and that of its UK-based subcontractors would necessarily have been undertaken overseas. ITT Defence is under constant competitive pressure, and the company, along with other communications-equipment manufacturers, must therefore continuously review the commercial viability of maintaining operations in the UK.

The case of the US company Harris Corporation bears testament to such market pressure. The company was initially subcontracted by ITT Defence to produce 10,000 high-frequency radios but, following completion of this order, took the decision to cease UK operations, determining that its UK production base was no longer economically viable. Operations were transferred back to the US, with only support work remaining in the UK. Harris’s withdrawal from the UK is symptomatic of a broader and longer-term trend which has seen ‘footloose’ multinational defence companies shifting resources across national boundaries in the unending search for cost reduction and profit. For instance, when the Bowman contract was live, all ITT Defence suppliers were UK-based, but following the fulfilment of Bowman’s IP obligations, ITT Defence has expanded its suppliers to include offshore subcontractors. This has been driven in part by competitive pressure, but mainly by the need to fulfil IP and offset requirements imposed by overseas defence customers.

Executives at ITT Defence believe that the UK IP policy was advantageous, offering overall net benefits to the UK defence economy. They argue that the MoD managed the policy with great flexibility, recognising that a true commercial partnership does not require financial penalties. This spirit of

83. Ibid.
84. Ibid.
85. Ibid.
86. Ibid.
87. Ibid.
flexibility was also evident in the negotiation process, and particularly in the valuation of credits, and was in stark contrast to the inflexible, rigid and bureaucratic approach exhibited by many other European countries. In sum, therefore, IP is viewed to have worked for ITT Defence, discharging its IP obligations early and in full.

AgustaWestland is another UK-based Bowman supplier that benefited from IP policy. At the time of the Bowman contract, however, AgustaWestland was 50 per cent owned by the Italian Agusta, meaning that only 50 per cent of the initial General Dynamics UK £106 million subcontract awarded to AgustaWestland was eligible for IP credits. The Bowman work, moreover, did not fit with AgustaWestland’s core business of the assembly and integration of helicopter systems – including final assembly, detailed transmission work, composite structures and on-site blade manufacture – with the remaining 80 per cent of work outsourced. However, through AgustaWestland’s helicopter assembly and integration operations, the company was able to develop significant training capacity, with the introduction of a suite of training technologies and systems across all aspects of the company’s training requirements ensuring the provision of elevated customer training packages. Due to AgustaWestland’s evolved training proficiency, General Dynamics UK awarded it the Bowman radio training contract, with the stipulation that all training must be completed before Bowman became operational. Specifically, AgustaWestland was awarded four ‘strands’ of training requirements:

- An air data computer, facilitating communications between air and ground forces, and covering Chinook and Merlin, but not Apache helicopters (for £39 million)
- Training responsibility to radio operatives, cascading through distributed centres across the UK using temporary and fixed classrooms, with a hub at Bicester (for £45 million)
- An integrated logistic-system training package (for £15 million)
- A land-static training system (for £7 million).

The IP programme was close to completion in 2008, leaving a small amount of residual Bowman IP work for completion by 2011. The overall IP work package was substantial and, at its peak, nearly 100 workers were employed on the contract.

Bowman also played an important role in enhancing the delivery of improved training. The contract maintained engineering and operational jobs, as

88. Interview with James Oldfield, Commercial Manager, AgustaWestland, Yeovil, 18 March 2010.
89. Ibid.
90. Ibid.
91. Ibid.
technical staff (fitters) were required to visit RAF airfields, such as Culdrose, Benson and Odiham, to install Bowman equipment. Around ten ex-service personnel were also employed on fixed-term contracts to ‘train the trainers’. Meanwhile, the supporting training technologies and systems required for Bowman, including pop-up computer displays and interactive virtual environments, were capitalised upon by extending the range of training across differing armed-force capability areas.

These training experiences informed the training personnel at the AgustaWestland training academy, creating spin-off business opportunities. For instance, there was a direct export spin-off via the General Dynamics UK contract to supply Bowman-type radios, namely the New Integrated Marines Communications and Information System (NIMCIS), to the Dutch Ministry of Defence, resulting in AgustaWestland winning the training contract.92 The company also benefited from the award of a £2-million Cabinet Office training project known as Gold Standard93 – a computerised, integrated training system providing synthetic training for agencies engaged in the provision of disaster response services. Thus, in civil contingencies such as those experienced in relation to foot and mouth disease, flooding and, potentially, influenza pandemics, Gold Standard would provide a modelling of first-response reactions. AgustaWestland’s investment in this project has now ceased, with another sister, UK-based Finmeccanica company, SELEX, taking on the work. Significantly, however, it was the Bowman-generated training system that provided the foundation for the initial Gold Standard project.

The final Bowman subcontractor surveyed was Rockwell Collins UK, yet another UK-based US company, known for high-technology solutions transcending the civil-military divide, as evidenced by the company’s 50:50 civil-military product structure. With experience of working in the UK since 1955, the company specialises specifically in the development and production of global positioning systems (GPS). In view of its expertise in this area, Rockwell Collins UK was down-selected by General Dynamics UK to provide all GPS technologies on the Bowman programme.

Located in Reading, Rockwell Collins UK has 800 workers on its payroll. Amongst these, some sixty engineers work on R&D activities, particularly development, and around ten highly qualified staff are dedicated to frontier work on Europe’s Galileo global navigation satellite system, a space-based telecommunications system.94 In the 2000s, the company also participated in the European Community’s GIANT Frameworks 6 and 7 focused on high-technology research, especially in those areas devoted to satellite navigation

92. Ibid.
93. Ibid.
94. Interview with George Ballingall, Commercial Manager, Rockwell-Collins UK, Reading, 16 March 2010.
research and to Single European Sky ATM Research (SESAR), designed to overhaul European airspace and air-traffic management. This work centred on what is termed ‘trajectory dynamics’, involving the use of vastly improved computing power to support GPS.

These R&D initiatives have relevance to the broader defence and aerospace portfolio of Rockwell Collins UK, given its specialisation in virtual models for flight simulators, domes, displays and panoramic visual systems which, on the defence side, are linked to the development of joint military air-traffic services (JMATS). This spread of technological endeavour draws heavily on the core GPS technology base, but with navigation solutions moving beyond this base, GPS capability can be interpreted as constituting the ‘enabling’ knowledge. In this respect, the clear preparedness of Rockwell Collins UK to foster locally grown knowledge and embedded skills augurs well for the future development of this sector of the UK defence and aerospace skills base.

General Dynamics awarded Rockwell Collins UK a multimillion Bowman subcontract in 2004 for the design, production and assembly of military-grade receivers, making it the only producer of such technology outside the US.95 Between five and ten additional jobs were created at the Reading site, with subcontract work for – military-spec components fed to a Scottish enterprise, and to other UK companies for further supplies.96 The IP obligations of Rockwell Collins UK were fulfilled in late 2008, but a Bowman support contract continues. Related technologies have been exported to France, Germany and Estonia, with further exports possible outside Europe, including to Saudi Arabia. Moreover, as with other Bowman suppliers, Rockwell Collins UK participated in the export of the Dutch NIMCIS version of Bowman. The intellectual property rights derived from the Bowman contract, however, proved limited, residing with the US company. Yet some of the innovative technologies developed by Rockwell Collins UK have been applied to adjacent UK defence programmes, such as the UK-designed Firestorm system, enabling forward air controllers to ‘light up’ and strike enemy targets. The British Army has employed an Urgent Operational Requirement on this system, which is still under delivery, with likely follow-on contracts. Meanwhile, the company has also assembled other military technologies embodying differentiated software in the miniaturisation of key components, in precision, lightweight GPS receiver engines, for example. Such high-technology engineering skills have also contributed to the development of a precision positioning system (PPS), as well as anti-jamming technology. Although the origins of these technological innovations are not directly linked to the IP commitment, it is likely that the latter provided, at least partially, the scientific and technical foundation to support these developments.

95. Ibid.
96. Ibid.
IV. UK Industrial Participation Policy: ‘Fit for Purpose?’

Chapter IV sought to establish whether the UK’s distinctive IP policy worked as intended. To address that aim, empirical research was conducted to test whether the policy was ‘fit for purpose’. One of the challenges identified was that the policy specified only a generalised aim that IP should seek to compensate UK defence industry for the value of business placed offshore, but lacked any specific objectives. However, the 1990 MoD positioning paper on the formulation of a UK IP policy did state that:¹

If there is a justification for continuing to seek offset it lies in wider considerations, the political difficulties of a major overseas purchase without compensation for UK industry, the economic and employment consequences for the economy as a whole, and the possible technological spin-off to the UK from association with the foreign companies concerned.

At the time, IP had been considered as a ‘wider factor’ in the weapons acquisition business.² Whilst IP was not used as a selection criterion, as this may have been interpreted as impeding freedom of trade, the IP policy, along with other wider factors, was declared to overseas suppliers prior to their tender – with the other factors including supply security; implications for the UK science base and research investment; future export potential; wider policy-framework considerations (including environmental, security, personnel and estate policies); industrial capability and value to the economy; and foreign- and security-policy considerations.³

Thus, a defensible interpretation of the IP policy’s overarching defence-industrial ‘compensation’ rationale was that it was driven by the need to ensure short-term survivability and longer-term sustainability. When the policy was active, the immediate concern was to create business in order to maintain and, possibly, expand the employment of skilled personnel, especially those engaged in high-value manufacturing. The high-technology nature of such production, in turn, would contribute to determining whether UK industry would remain competitive, in terms of both price and quality, in export and adjacent defence markets. Arguably, then, ‘fit for purpose’ necessarily embraced three economic areas, as listed in the wider factors of

¹. ‘Offset’, an internal paper by deputy under secretary of state for defence procurement – DUS(DP), MoD-Procurement Executive Management Board, 11 June 1990, p. 5.
³. Ibid.
The 2005 *Defence Industrial Strategy*: industrial capability, export potential, and UK science base and research investment.

**Evaluating Policy Performance**

Table 9 contains a set of key performance indicators (KPIs) that aid the evaluation of IP’s contribution to UK industrial capability. Overall, the data show that IP made a positive contribution to UK industrial capability. Most importantly, executives from several participating companies indicated strongly that IP contracts brought them back from the ‘brink’, providing work in a testing global economic environment. Dowty Propellers, for instance, would not be here today but for IP. Moreover, there is a sense that IP contracts did account for a sizeable proportion of manufacturing activity for a number of major defence suppliers.

However, although IP contracts proved a key factor in the survival of one or two key defence businesses and provided healthy revenue streams for the majority of companies surveyed, such investments did not lead to the creation of large numbers of jobs. This is in line with the findings of other empirical studies conducted elsewhere.4

This study’s fieldwork covered three major defence programmes, capturing seven key suppliers (see Table 9), but no evidence arose from discussions with executives from any of these firms that substantial numbers of jobs had been created at their plants, or in downstream suppliers. Rather, IP work packages appear to have maintained jobs and defence-industrial capacity. Yet capabilities were nonetheless honed and job security stabilised leading, in turn, to the enhancement of competitiveness through greater skill intensity and generation of value added.

---

Table 9: Summary Results: IP Fieldwork.

<table>
<thead>
<tr>
<th>Company</th>
<th>Industrial Capability</th>
<th>Future Export Potential</th>
<th>Key Tech</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Jobs Created/ Maintained*</td>
<td>IP - High % Share of IP</td>
<td>Follow-On Support Contracts</td>
</tr>
<tr>
<td>Lockheed Martin UK / C-130J</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GKN Aerospace</td>
<td>Y (45)</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Dowty</td>
<td>Y (320)</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>GE Aviation</td>
<td>Y (30–40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boeing UK / C-17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GKN Aerospace</td>
<td>Y (42)</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>AMRC</td>
<td>Y (130)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>IVHM</td>
<td>Y (25)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>General Dynamics UK / Bowman</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITT Defence</td>
<td>Y (&gt;100)</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Agusta-Westland</td>
<td>Y (c. 100)</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Rockwell Collins UK</td>
<td>Y (5–10)</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>


IP therefore contributed to the vitality of local defence and aerospace supply chains, providing the opportunity for UK defence suppliers to demonstrate competitiveness in the production of high-technology components, systems and sub-assemblies. Indeed, offshore vendors recognised the technological capabilities and competitive prowess of a number of local defence suppliers, and IP production proved a stepping-stone to their insertion into OEM global supply chains. Moreover, major defence programmes provided potential opportunities for additional work, such as increases in acquisition volume (for example, the C-17), adjacent defence work, and follow-on support (maintenance, repair and overhaul) contracts. There is therefore evidence that for several first-tier suppliers, IP subcontracts provided the foundation for sustainable development and production work, accommodating mutually beneficial partnerships. In the process, ‘sovereign’ production lines were kept warm, ensuring supply security.5

5. This depends on the meaning of ‘sovereign’, however, as many of the first-tier defence suppliers are US-owned companies.
Table 9 also demonstrates that IP played a crucial role in stimulating local supply chains. While there is no evidence to suggest that new subcontractors were created, existing suppliers derived considerable benefits from IP-related workflows, beyond raising capacity utilisation. In some cases, offshore vendors partnered with UK first-tier defence suppliers to improve supply-chain competitiveness, while the 2005 Defence Industrial Strategy recognised the importance, in terms of innovation, of SMEs in defence supply chains. However, the IPU gave no direction as to the industrial destination of offshore vendors’ investment, viewing this as a purely commercial decision. The MoD was clearly aware of the investment priorities laid out in the Defence Industrial Strategy, encompassing first-tier suppliers and their value chains, but the survey found no evidence that these priorities had influenced offshore commitment holders’ decision-making. Nor was there any evidence that the MoD had formally communicated these priorities, particularly with respect to the critical industrial and technological capabilities to the offshore vendors identified in the Defence Industrial Strategy. Thus, it would appear there had been a policy disconnect between IP and the Defence Industrial Strategy: the former was laissez faire, whilst the latter was interventionist.

Table 9 also offers evidence on export penetration, a powerful indicator of industrial competitiveness. It shows that numerous export opportunities arose, either directly through export products under IP programmes, or indirectly through related systems exports, with a good example of the latter being the Dutch NIMCIS programme and the Italian C-22J heavy-lift aircraft. Exports also arose through participation in global supply chains and adjacent defence contracts from separate divisions within offshore defence contractors’ global industrial networks.

Finally, the survey highlighted several instances in which IP subcontractors stimulated design, development and research investments amongst local defence suppliers, including Dowty Propellers’ development of composite C-130J blades, and Rockwell Collins’ GPS communications technologies and related systems. Additionally, all three offshore commitment holders partnered with local universities and research establishments in high-technology research programmes. Some of these were commercial ventures, but some were IP initiatives, such as the impressive AMRC investment leveraged via Boeing’s name and not-insignificant IP funding.

Although the Defence Industrial Strategy highlighted, amongst the wider factors, ‘value to the economy’ considerations, no attempt was made in this study to calculate IP’s value to the non-defence economy. It is clear, however, that the impact would have been positive.6 The high value of subcontracts

---

6. However, there are methodological issues that need to be taken into account when making such a judgement. See Malcolm Chalmers, Neil V Davies, Keith Hartley and Chris Wilkinson, ‘The Economic Costs and Benefits of UK Defence Exports’, Fiscal Studies (Vol. 23, No. 3, September 2002).
awarded to UK suppliers over the last two decades would, of course, have generated cascading subcontracts to downstream firms embedded in the broader economy. Undoubtedly, this process would have created expenditure multipliers, with beneficial consequences in terms of income, investment and employment. Thus, government revenue would also have benefited from increased corporate and income taxes, and national-insurance receipts.

Overall, then, there is evidence that IP policy did contribute to the UK defence economy in a number of key ways: first, UK defence-industrial capability was expanded; secondly, existing and future export potential was created; and, thirdly, investment in UK research and technology development was increased. Moreover, the success of IP policy was endorsed in stakeholder feedback, as shown in Table 10, highlighting the unanimous view amongst offshore commitment holders and defence suppliers that IP policy had worked in their mutual interest. A particularly interesting point is that many of the interviewees signalled their appreciation of the policy’s flexibility, especially in terms of its operational delivery.

Table 10: Feedback on IP Policy Effectiveness.

<table>
<thead>
<tr>
<th>Company</th>
<th>Positive</th>
<th>Negative</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lockheed Martin UK C-130J</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GKN Aerospace</td>
<td>Y</td>
<td></td>
<td>Positive, especially in relation to overseas market access</td>
</tr>
<tr>
<td>Dowty</td>
<td>Y</td>
<td></td>
<td>IP a positive influence. Minor concerns that IP restricted to UK suppliers</td>
</tr>
<tr>
<td>GE Aviation</td>
<td>Y</td>
<td></td>
<td>Helped forge strategic relations with MoD and British industry</td>
</tr>
<tr>
<td>Sherborne Sensors</td>
<td>Y</td>
<td></td>
<td>Good for the company</td>
</tr>
<tr>
<td>Boeing UK C-17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GKN Aerospace</td>
<td>Y</td>
<td></td>
<td>Flexible interpretation of policy</td>
</tr>
<tr>
<td>ARMC</td>
<td>Y</td>
<td></td>
<td>Very supportive</td>
</tr>
<tr>
<td>IVHM</td>
<td>Y</td>
<td></td>
<td>Worked well</td>
</tr>
<tr>
<td>General Dynamics UK Bowman</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITT Defence</td>
<td>Y</td>
<td></td>
<td>Worthy policy, with flexible implementation</td>
</tr>
<tr>
<td>AgustaWestland</td>
<td>Y</td>
<td></td>
<td>Very happy with IP arrangements</td>
</tr>
<tr>
<td>Rockwell Collins UK</td>
<td>Y</td>
<td></td>
<td>An enabler, facilitating specialist engineering development and engineering and program management jobs</td>
</tr>
</tbody>
</table>

Source: UK IP survey of offshore commitment holders and defence suppliers (November 2009–May 2010).
Cost Premium or Not?
This report has already addressed the question of whether IP generated economic benefits to the defence industry. Yet this is just one aspect of the value equation. Also important is an examination of the difficult issue of whether IP was of ‘net’ benefit to the UK defence economy overall. Such an analysis requires substantial quantitative data on costs as well as benefits, with time and cost constraints precluding this being undertaken in the present report. However, with the support of executives from the three major offshore contractors participating in the study, an attempt has been made to explore the existence, extent and nature of the controversial IP cost premium – a key factor on the cost side of the value (to the economy) equation. Table 11 highlights the research findings relating to this issue. Significantly, two of the three offshore commitment holders indicated that a premium is charged on IP and offset contracts, with the premium ranging from 2 to 5 per cent.7 The responses show this cost premium spread across both forms of IP arrangement – subcontracts and licensed production – the latter, of course, additionally burdened by the considerable costs of relocating production, including tooling, training and logistical factors, to the UK, as well as the diseconomies associated with diminished learning and scale economies.

Table 11: The Existence and Nature of the IP Cost Premium.

<table>
<thead>
<tr>
<th>Offshore Commitment Holder: A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of the IP Cost Premium: 2–3 per cent</td>
</tr>
</tbody>
</table>

Elaboration by Senior US Company Executives regarding the Existence and Nature of the IP Cost Premium

‘I would not argue against the proposition that the use of IP raises acquisition cost, but this has to be taken in context. The “cost” of IP – viewed in an international context, although the UK should not be too different – is traditionally held to be somewhere between 2 and 3 per cent. This represents the costs to go into market and purchase the necessary IP credits, should a company not want to go through the time-consuming process of allocating work to in-country vendors. However, most companies tend to eschew credits and seek in-country vendors, although credits might be used in circumstances where the company needs to “top up” its score to meets its overall IP commitment.’

‘I would take serious issue with the view that IP raises substantially the cost of weapons procurement. Even if one were to dispute the above percentages, there is no denying the considerable benefits that IP brings to the economy in terms of more jobs (hence less benefits paid by the state); tax revenues (in terms of both personal and corporation tax); and the increased competitiveness of the UK in the global marketplace. The problem is that defence economists only see the “outgoings” part of the ledger – the 2 to 3 per cent increase in acquisition cost – and do not take into any account the “incomings” side of the ledger, where considerable benefits accrue to other government departments, such as HM Revenue and Customs.’

7. E-mail correspondence in June 2010 with senior executive of the offshore commitment holders, the three big US defence companies participating in the survey.
Offshore Commitment Holder: B
Value of the IP Cost Premium: –
Elaboration by Senior US Company Executives regarding the Existence and Nature of the IP Cost Premium
‘Our company has achieved a significant position in the global market, in part by investing time and effort to scout for world-class products and services via multiple channels of supplier engagement. Investing in a global supplier base contributes to the capability, performance and commercial competitiveness of our products. The degree of supplier scouting and research and development undertaken in the UK is complementary to the engagement required to meet IP obligations. Clearly engagement is not significant or separately identifiable and is, in fact, diminishing as the UK Trade and Investment Defence and Security Organisation (UKTI DSO) develops reporting tools and defence-contract processes that streamline the reporting process.’

Offshore Commitment Holder: C
Value of the IP Cost Premium: 3–5 per cent
Elaboration by Senior US Company Executives regarding the Existence and Nature of the IP Cost Premium
‘Offset, either as a direct or implied condition of contract award, adds additional effort and potentially risk, causing additional scrutiny. To mitigate these factors, some element of management or execution budget is generally considered, depending on the ease of working in a nation, the level of experience of working with local suppliers, and the ability of local industry to deliver effective products. The cost recovery approach applied by a company will also impact on what level of budget is applied. By this, I mean that if IP or offset execution is considered a direct charge, then it will be applied to the contract as a cost-line item. This approach is generally taken when the primary customer does not require offset (US domestic). What this effectively means is that the offset execution budget is not considered as an overhead.

Based on our experience of working in the UK, I would suggest that offset execution would typically be underwritten by a 3–5 per cent budget. However, this does not mean that the price of the contract would rise proportionally, as invariably the specific opportunity is subject to competition and therefore other budget lines, such as profit, risk or management reserve, could be – and often are – used to accommodate this budget. Equally, I would offer for consideration that one of the primary objectives of UK MoD Procurement Policy is the ability to access economies of scale by buying products and services from countries with either significantly higher domestic volumes, which have driven down unit prices, or additional export markets which have delivered higher volumes with potentially lower unit prices and greater numbers of unit sales to amortise cost. Hence it could be argued that, in part, any offset execution budget simply bites into some of the economies of scale developed through accessing a wider market.

Ultimately, a contractor offers the customer a price that he believes is attractive, or fair and reasonable, for the products or services being offered, and will use his experience if a customer decides to deviate from what could generally be called “a base line price” to reflect customer specifics, including offsets. The counter-argument might also need to be considered, in that the economic value to the recipient company could be as simple as “survival” or “market access”, whereas in the absence of IP, the option could be loss of market or, worse still, exit from the market segment.’

Source: Author correspondence with IP survey offshore commitment holders executives, June 2010.

The views expressed by the offshore vendor executives suggest that whilst an offset cost premium represented an option, it was not necessarily...
standard practice. It appears to depend upon numerous factors, such as competition, market importance and the efficiency of doing business with local defence suppliers. Thus, the existence and size of any IP premium would be variables – rather than a constant – in the cost calculation, influenced by the changed circumstances of different defence acquisition programmes. The policy question, however, is whether the provision by offshore suppliers of differential cost data – that is, the acquisition cost both with and without IP at the time of tender – would have been a realistic option in establishing the true cost of IP, thus assisting in the calculation of its net benefit (or cost) to the UK defence economy.8

The responses listed in Table 12 appear to suggest, in principle, the feasibility of acquiring such differential data. However, whether such a comparison would have proven meaningful is another matter, as there is a sense in the offshore commitment holders’ responses that IP costs could have been folded into different budget lines as an overhead on global operations, rather than as a cost of undertaking IP in the UK defence economy. The exercise, moreover, would have depended on the integrity of the data supplied, in turn influenced by a multitude of considerations, as stated by the offshore contractor executives. In this regard, perhaps, it is worthwhile highlighting the judgement made by the MoD in its 1990 deliberations when formulating the IP policy:9

> Although our explicit aim is to ensure that offset proposals do not result in extra costs to [the] MoD, it is impossible to be certain that this is achieved and it would be natural for companies to try to build into their prices some contingency to cover what they would regard as the extra costs of implementing an offset commitment.

As a final observation, the empirical research necessarily focused on the UK defence-industrial supply-side of IP agreements. As a consequence, there was minimal discussion of MoD demand-side processes. This is a serious omission when evaluating whether the IP policy was ‘fit for purpose’. Without robust operational procedures in place to ensure that IP opportunities could be identified and communicated to the IPU at the time that defence programmes were being negotiated, defence-industrial opportunities would have been lost, to the detriment of the UK economy and the taxpayer. Cases were reported, for instance, in which IPTs signed off acquisition programmes independently of the IPU, and then ‘forgot’ to communicate this fact to the latter – not a good example of joined-up government.10

---

8. Interview with Neil Davies, senior economic adviser, MoD, 21 May 2010.
10. Correspondence with the IPU, 12 July 2010.
Table 12: Transparency of the IP Cost Premium.

**Offshore Commitment Holder: A**

**Feasibility of Declaring Acquisition Cost, Inclusive and Exclusive of IP:** Feasible

**Offshore Commitment Holder Senior Management Comments with regard to the Feasibility of Declaring Acquisition Cost, Inclusive and Exclusive of IP:**

“Yes, it is feasible. All the MoD needs to do is to declare it as a requirement in any tenders that they issue involving potential offshore procurement.”

**Offshore Commitment Holder: B**

**Feasibility of Declaring Acquisition Cost, Inclusive and Exclusive of IP:** No difference

**Offshore Commitment Holder Senior Management Comments with regard to the Feasibility of Declaring Acquisition Cost, Inclusive and Exclusive of IP:**

“In reference to the points made regarding the IP cost premium [see Table 11], such a declaration would not make a difference to the defence contractor bid price. All economies, but particularly emerging economies, place a high value on attracting onshore aerospace manufacturing capability and, accordingly, pay a great deal of attention to IP policies that support their industries when procuring defence equipment. The UK IP policy ensures that our company pays attention to UK exporters that successfully achieve a significant share of our international spend. This spend makes a positive contribution to the UK economy, which in turn delivers the funds to provide the market-leading equipment that UK forces need.”

**Offshore Commitment Holder: C**

**Feasibility of Declaring Acquisition Cost, Inclusive and Exclusive of IP:** Inappropriate

**Offshore Commitment Holder Senior Management Comments with regard to the Feasibility of Declaring Acquisition Cost, Inclusive and Exclusive of IP:**

“Such a request, at face value, would seem fair and reasonable; however, I would respectfully suggest that the delta would not necessarily reflect the offset execution budget, for reasons explained in my discussion of an IP cost premium [see Table 11]. Faced with competition from domestic sources of supply, an offshore supplier’s ability to offer any price differential would be limited, so it might wish to take a wider, ‘market-orientated’ view, whereby it might only consider a nominal reduction. This is not a simple, standalone issue to resolve, as a number of questions need to be considered, all of which could be answered differently/uniquely in the case of each specific opportunity. It also assumes that cost and sales price are directly related. By this I mean that many commentators assume that cost is a bottom-up set of assumptions plus profit, but I would suggest that selling price can alter this thinking considerably, which could potentially contribute to a distortion of the original intent of such a question; that is, what are you charging me for offset?”

“In developing a “price to win” position, consideration will have to be given to all of the cost elements and corporate expectations, for example, profit. Hence, when faced with a ... [local] competitor which does not have to perform offset, one could argue that the offshore company is already potentially disadvantaged by having to underwrite the risks associated with the non-performance of IP. Whereas if you were competing against another offshore company, the assumption would be that they too would be considering the offset question, including budget cost. Therefore, I would not say that having a UK competitor would cause an offshore prime to reduce or absorb the IP premium cost, but more that it would add a different and additional factor to the bid solution. Similarly, when faced with a fellow offshore bidder, assuming that the full cost of offset would be added as a premium is also wrong.”

“What is being overlooked is that too much emphasis is being placed on the fact that a selling price is all about a simple cost build-up of material, labour, test, qualification, plus profit. The reality is very different, in that there is a cost, and there is a price to win, and a business has multiple options as to how to achieve the latter, which in some cases could be even a “loss leader” to gain market position.”

Source: Author correspondence with IP survey of offshore commitment holders executives, June 2010.
Conclusion
Chapters II, III and IV have explored the origins and nature of Britain’s IP policy; evaluated the case studies presented by the three biggest offshore commitment holders – Boeing, Lockheed Martin and General Dynamics – which account for 50 per cent of all IP contracts since 1997; and analysed the three biggest IP programmes linked to each. The offshore vendors signalled that the most important attribute of the IP policy was its flexibility, in terms of both design and implementation. Significantly, they posited a ceiling to IP obligations, with the appropriate level negotiated on a deal-by-deal basis, based on voluntary participation and partnership. This sense of partnership, however, went beyond the boundaries of IP obligations. The big US defence contractors, once aware of the competitiveness of UK defence companies, sought to deepen and broaden commercial relationships across the local defence-industrial and technological base. From the MoD perspective, this was the whole point of the exercise: for IP policy to encourage offshore vendors to search out competitive UK defence suppliers, which they would likely find some of the most cost-effective in the world. This chapter demonstrates that Boeing, Lockheed Martin and General Dynamics have all invested to a substantial degree in the UK defence sector, including in work packages, capital equipment and training. Additionally, these US companies invested in R&D programmes and capacity, and testing facilities – as well as creating opportunities for access to their global OEM supply chains. It is reasonable to conclude, therefore, that Britain’s IP policy was ‘fit for purpose’, suggesting that, going forward, industrial participation is likely to transition successfully into the more open policy of industrial engagement.
V. From Participation to Engagement

The purpose of the survey undertaken for this study was to establish if the policy had proven ‘fit for purpose’; that is, whether the policy had facilitated beneficial economic, employment and technological benefits to compensate for foreign acquisition.\(^1\) It represents an attempt to move beyond anecdote by presenting empirical evidence on the track record of offshore commitment holder investments over the twenty years since the IP policy was launched in 1990. This policy aimed to consolidate the earlier, fragmented policy approach by providing a standardised and consistent template for IP implementation. The policy was by any other name an offset policy, with the change in terminology an attempt by the MoD to distance itself from what was perceived to be an increasingly tainted ‘offset’ label.\(^2\) ‘Industrial participation’, by contrast, was held to connote partnership, a cherished theme of the British approach.

Yet the delineation between IP and offset goes beyond partnership alone. First, IP symbolised dynamism, given the contribution of local industrial innovation, in place of the stasis that characterises conventional offset contractual relations. Indeed, the policy represented a refreshing and perhaps unique approach to conventional, prescriptive offset arrangements, by employing IP as a facilitating mechanism to ‘invite’ offshore participation by competitive UK defence suppliers. This ‘model’ was held to be manifestly preferable to the norm of ‘arranged’ industrial ‘marriages’ involving a reluctant offshore company, and was based on a non-contractual relationship between the MoD’s IPU and the foreign OEMs that aimed, in turn, to promote durable partnerships between the latter and local defence suppliers. Partnership was a key theme in these interlinking relations, with the IPU acting as the pivotal institution in facilitating the stakeholder collaboration. Complementing this non-interventionist approach was the IPU’s flexible interpretation of IP policy, supportive of showcasing British defence-industrial competitiveness, while, at the same time, being sensitive to the commercial objectives of foreign defence multinationals. As such, Britain’s IP policy proved a novel approach that was alien to the interventionist and bureaucratic regimes dominating the international offset environment.

\(^1\) The erstwhile IPU was uncomfortable with the term ‘compensate’, viewing the IP policy more as a mechanism for encouraging offshore defence vendors to search out and locate highly competitive UK defence suppliers.

\(^2\) Beside the UK’s Industrial Participation policy, there are, for example, Canada’s Industrial and Regional Benefits, Brazil’s Industrial Cooperation and Germany’s Industrial Balances policies.
Yet the IP policy framework had never been subject to independent scrutiny.³ After more than two decades of dramatic change in relation to the defence-industrial structure, competition policy and procurement reform, empirical investigation was timely, not least to instil confidence amongst stakeholders that the policy had worked as intended. While the policy had its critics, for the most part it was viewed as a success. It was instrumental in attracting billions of dollars to the UK defence economy, generating income, activating economic multipliers, promoting high-tech investment and, whilst not creating substantial employment opportunities, the policy did serve to maintain critical highly skilled jobs and capacity.

The Assault on Offset
As explored above, Britain’s IP policy was suddenly abandoned in early 2012. Although this represented a dramatic change of policy, in truth, the winds of change had been buffeting offset policy and practices for some time, leading to a questioning of the benefits gained from offset-trading regimes.

Take, for example, Australia’s discontent with defence offset performance. Canberra’s view was that offset policy had not delivered jobs, skills or manufacturing opportunities. Indeed, at best, offset policy could only act as a partial remedy for the challenges faced by relatively ‘small’ defence economies such as Australia.⁴ In today’s ‘transformational’ defence environment, offset performance will be negatively impacted by considerations of constrained scale, including insufficient acquisition ambition, the lack of an appropriate defence-industrial strategy and the uncertainty associated with long-term planning, exacerbated by capricious policy positions.

Meanwhile, in parallel with Canberra’s abandonment of offset, there had been an unrelenting stream of criticism of offset from the US government, particularly from the Department of Commerce. For years, there had been institutional unease regarding the linkages between US arms sales and recipient nations’ unrelenting demands for offset. This fuelled fears in Washington that the US was haemorrhaging production and jobs, leading to a hollowing-out of its defence-industrial base. Yet there is also an alternative view that US defence and aerospace industries have in fact benefited


⁴ There is growing scholarly interest in the challenges faced by small defence economies in the present high-technology defence transformational era. ‘Small’ in the sense used here relates to countries with relatively small defence budgets, irrespective of population and geographic dimensions.
The UK Offset Model

from outward flows of offset-related investment to the rest of the world. Whilst the truth, as always, lies somewhere between these two extremes, the negative stereotype of offset prevails. In particular, a common cry from US policy-makers, defence analysts and society at large is that offset fosters overseas defence-technology transformation at the cost of domestic US defence capacity. As discussed in Chapter I, the irony is that since the 1930s, the US Buy America Act has essentially thwarted the Pentagon’s ‘off-the-shelf’ procurement of foreign defence equipment. Under a different guise, this is still surely offset, yet incessant US pressure to eradicate offset demands from foreign defence customers has acted to keep the issue alive in the policy spotlight.

The EU Solution to Offset

The most damaging onslaught on offset has come from Europe. The European Commission is ideologically committed to liberalisation principles, single-market concepts and free trade, and thus the reality of transnational arms duplication rankles. In an attempt to eradicate fragmented arms markets, Europe has long resorted to the policies of defence-industrial consolidation, rationalisation and procurement harmonisation. In combination with these integration policies, the EU has pushed for the abandonment of national arms production, pressing instead for collaborative arms development and production as a first step towards the evolvement of a truly European defence-industrial and technology base.

Running in parallel to this liberalisation process has been the protectionism afforded to defence. The historical starting point for this dichotomous policy approach was the 1957 Treaty of Rome, specifically Article 223. This stated that:

Any Member State may take the measures which it considers necessary for the protection of all the essential interests of its security and which are connected with the production of or trade in arms, ammunition and war material; such measures shall not adversely affect the conditions of competition in the common market regarding products which are not intended for specifically military purposes.

5. From a different perspective, it might be argued that the US defence and aerospace economy has benefited greatly from overseas orders through income generation and skilled job retention, while work and jobs lost through offsetting investment to foreign countries are, respectively, low-value and low-skilled.

Article 223 subsequently morphed into Article 296 of the 1999 Treaty of Amsterdam, specifying that:  

(a) no Member State shall be obliged to supply information the disclosure of which it considers contrary to the essential interests of its security, (b) any Member State may take such measures as it considers necessary for the protection of the essential interests of its security which are connected with the production of or trade in arms, munitions and war material; such measures shall not adversely affect the conditions of competition in the common market regarding products which are not intended for specifically military purposes.

Finally, in 2008, Article 296 was replaced by Article 346 of the Treaty of Lisbon; the latter carrying different wording, but essentially the same meaning, namely that ‘any Member State may take such measures as it considers necessary for protection of the essential interests of its security’. Thus, over the decades, Europe’s protectionist stance towards its members’ defence industries has become ingrained in its industrial culture, with the consistent institutional position being that defence sovereignty rises above economic concerns. In practical terms, this means that where national defence-industrial sovereignty and European competitiveness collide, the sacrosanct nature of sovereign defence supply takes precedence – with non-competitive local arms production becoming the norm rather than the exception to European competition policy.

The partial default position to this autarky-versus-single-market trade-off has been arms collaboration. Thus, European collaborative arms programmes have carried the primary policy thrust in eliminating duplication of national industrial capacity in favour of evolving regional specialisation and a refined division of defence-industrial capacity across Europe. Yet practice has invariably proven different from policy, with national defence sovereignty safeguarded through inefficient work-share arrangements based on *juste retour*. Under this system, national workshare is determined according to relative country acquisition volumes. Thus, instead of a single production line for the Eurofighter, there are four assembly lines, located in each of the four participating countries (Germany, Italy, Spain and the UK), with *juste retour* ensuring that national production lines are kept warm, albeit at the cost of efficient resource allocation. In particular, the arbitrary allocation of

---


high-technology work programmes to countries, such as Spain, that possess limited aerospace expertise, is an obvious recipe for delay and cost overrun. In an attempt to overcome this deficiency, the Organisation Conjointe de Coopération en matière d’Armement (OCCAR) was created in 1996 as an institutional agency to manage European arms-acquisition programmes. The aim was to move away from the revealed inefficiencies of juste retour, and instead establish a regional procurement organisation allocating work on a competitive and multi-programme basis. Equitable distribution of workshare would be achieved over the long run across several arms programmes, determined in accordance with industrial and technological competence, rather than the short-run expediency of fulfilling politically driven juste retour requirements. Juste retour is not offset, but rather an institutional allocation of development and production work in collaborative arms programmes based on participating-country acquisition volumes.

OCCAR reflects an emerging European mood for liberalising regional arms procurement. The push is to open up Europe’s national duplicative and protected defence industries to both competition and co-operation – the former ensuring efficient market discipline and the latter providing scale through industrial consolidation and the harmonisation of procurement cycles. Inevitably, however, OCCAR has not been immune to workshare ‘wrangling’, with national political imperatives dominating economic orthodoxy. Nevertheless, it has made some progress towards regional defence co-operation aimed at ‘Europeanising’ defence industrialisation.

Significantly, since the mid-2000s, Europe’s defence-industrial policy has shifted away from the hitherto tricky balancing act of sponsoring both competition and national autarky, to a position in which competition has become the priority. The European Commission is at the helm of this institutional assault, the intellectual rationale of which is based firmly on assumptions of the allocative economic efficiency of the single market, translated into policies focused on defence-market liberalisation, especially procurement reform. Although offset is not the principal policy target, it has, as it were, been drawn into the reform process, being viewed as inefficient, trade-distorting and, therefore, as adding cost to the acquisition process. This judgement is probably accurate, if only because the majority of European offset policies are prescriptive, directive and coercive, representing an inefficient allocation of investment resources, undermining competitiveness, retarding growth and derailing efforts to achieve sustainable indigenous defence-industrial development.
In this sense, then, offset has become a legitimate target of European Commission policy-makers seeking to stamp out non-competitive practices. In particular, Europe has adopted a two-pronged approach to managing down and eradicating offset. First, there is the 2008 European Defence Agency (EDA) Code of Conduct on Offsets. The code is an explicit attempt to create the conditions in which offset will no longer be tolerated. This new environment is to be achieved through a framework aimed at ‘evolving’ Europe’s defence market to a higher level of openness, transparency and competitiveness, where, it is contended, offset cannot exist. Some twenty-five European states have agreed to observe the code, and have committed to compete with foreign bidders via a website advertising to non-national suppliers all ‘non-essential’ defence contracts worth over €1 million. This electronic bulletin board has led to the award, under competitive tender, of 385 non-sensitive defence-related contracts, a third of which have been cross-border within the EU. Thus, although the code is voluntary, non-legally binding and applicable only to non-essential contracts, it is symbolic of the growing institutional pressure to marginalise offset in European defence contracts.

The second dimension of the European approach is pursued by the European Commission and is aimed at liberalising defence procurement. Through a strident legalistic approach, the goal is to open up defence acquisition along the lines of the competitive single market. The consequent, anticipated development of a consolidated European defence-technological and industrial base is then held to lead to the elimination of offset from the intra-European defence trade. This policy thrust began with the publication of the European Commission’s Directive 2009/81/EC on defence and security procurement. As with the EDA’s Code of Conduct, the aim of the directive is to promote the development of a truly European defence market via the prescriptive route of defence-tailored procurement rules. This is based on the need to open up Europe’s protected defence market, held up by the fact


12. Ibid.


that some four-fifths of European equipment budgets are spent on products from domestic manufacturers, which often do not offer the best value.\textsuperscript{15} As such, the directive seeks to liberalise defence and security markets and raise the transparency of transactions for all stakeholders, with the Commission arguing that European taxpayers’ money will be spent more efficiently, Europe’s armed forces will achieve better value for money, and its industry will obtain access to new markets.\textsuperscript{16} The directive is therefore substantive and wide-ranging, implicitly identifying offset as discriminatory:\textsuperscript{17} during its transposition phase (August 2009–August 2011), it was required that member states’ offset legislation be amended to become compatible with European law, both in general and with particular regard to the new directive.

Directive 2009/81/EC is set to have a considerable impact on national defence policy within Europe, principally in light of subtle changes in its interpretation of the exemption provisions, namely the exemption of defence from the EU’s generic competition regulations. Treaty of Rome Article 223 and Treaty of Amsterdam Article 296 have conventionally viewed defence as exempted from the single-market, open-competition concept. The Treaty of Lisbon’s Article 346 appears to echo this standard refrain, and whilst defence continued to be exempt from open-competition, henceforth it was treated as an exception rather than the norm. This is a complete reversal of the conventional position adopted by the European Commission, reflecting a highly liberal interpretation of Article 346 and a profoundly reoriented interpretation of essential security interests. This, in turn, dilutes the significance attached to defence sovereignty in favour of liberalisation, competitiveness and free trade, with the onus now falling on member states to justify why a nationally oriented, ‘closed’ acquisition process is necessary for the protection of essential security interests.

Exclusions to the directive rest not only on proving the national-security case (as outlined in Treaty of Lisbon Article 346) but, additionally, on the imperative of eradicating duplication across national defence programmes via alternative policy routes. Indeed, based on an ‘alternative means’ rationale, the European Commission has identified six exclusion gateways. The first major exclusion relates to national defence R&D via bilateral or multilateral programmes, clearly recognising the inherent civil-military technological


synergies associated with this higher form of investment. However, the Commission judges that once the risks have been addressed at the national level during the conceptual, assessment and development phases of the acquisition cycle, then open European competition in the manufacturing and in-service phases can ensue. It requires open competition at the manufacturing stage, because in the Commission’s view this offers the carrot to encourage progressive defence-industrial consolidation and cross-border collaboration as a means of facilitating progression towards a truly ‘European’ defence industrial and technological base.  

The remaining five exclusions cover international rules (procurements by international treaty organisations, such as NATO and OCCAR, that involve one or more European states); the disclosure of information (relating to information that would compromise national security); intelligence activities (including, presumably, encryption equipment, satellite and possibly even nuclear stockpiles); contract awards in third countries (local purchases during military operations); and, finally, government-to-government sales (covering extraordinary arms trade, such as the sale of surplus supplies between member states).

Two profound policy implications arise from Directive 2009/81/EC that will have a major impact on future EU arms procurement – one explicit and the other implicit. The first is explicit in the sense that the directive states unequivocally that EU countries will no longer be able automatically to legitimise a preferential national arms-production model on the grounds of sovereignty. Since August 2011, Article 346 of the Lisbon Treaty no longer applies universally; rather, it applies, as stated previously, on an exceptional basis in only those cases where national arms production can be justified on national-security grounds. It is an approach that complements the search for affordability through defence-globalisation opportunities, reflecting the fact that defence-industrial sovereignty is difficult to sustain given that a high proportion of the value added in modern weapons systems is sourced from the competitive commercial civil sectors.

The second implication stemming from the launch of the directive is far less explicit, based on a nuanced interpretation of European legislation by government offset practitioners. The European Commission’s position is that offset ‘violates the basic rules and principles of primary EU law’. The directive reaffirms this view, stating that any derogation of Article 346 must be limited to exceptional and clearly defined cases; that economic conditions are not accepted and indirect offsets are therefore illegal; and, finally, that decisions will be taken on a case-by-case basis. Further, for exemption from

---

18. Arms collaboration within the EU presently accounts for 22 per cent of the total, with an EDA aspiration that it should rise to 35 per cent. See Edwards, *The EU Defence and Security Procurement Directive*, p. 11.
the directive on national-security grounds via Article 346, only defence goods are relevant; commercial goods are not and possibly neither are dual-use items. Importantly, the burden of proof that the derogation is justified lies with the member state that invokes it. In the absence of such proof, EU member countries must open up their defence markets to cross-border trade within Europe. To facilitate this process, national-sovereignty-imposed constraints to free trade must be dismantled, creating the necessary conditions for the development of a truly European arms market.

As such, the Commission’s position is that measures restricting the free movement of goods, including imports and exports, must be prohibited.\(^{20}\) This applies to member states obliging or inducing trade between them,\(^{21}\) while, in its Guidance Notes, the European Commission seeks to extend its discouragement of offset outside the intra-European theatre of operations, embracing acquisition arrangements with non-European countries, such as the US. This is an interpretation of the directive’s intent, based on the view that ‘by preventing economic operators from purchasing from suppliers based in other member states, such [offset] measures discriminate against products manufactured in other member states and result in a barrier to intra-EU trade’.\(^{22}\)

Meanwhile, another basic principle of the directive is that ‘Contracting authorities/entities shall treat economic operators equally and in a non-discriminatory manner and shall act in a transparent way. This principle prohibits all measures which imply a discrimination against participants in a procedure, for instance, by providing compensation obligations only for tenderers from abroad.’ These are interpretations that remain legally untested but which, if true, would be of grave concern to many European member states, including the UK.\(^{23}\) This is because whilst directive 2009/81/EC aims to eradicate offset in intra-European defence trade, the greatest proportion of UK defence trade, aside from European collaborative arms programmes (such as the Tornado and Eurofighter), involves non-European

\(^{20}\) Ibid., p. 2, para. 6.

\(^{21}\) Ibid.

\(^{22}\) Ibid.

\(^{23}\) However, evidence of the European Commission’s conviction in upholding its view that derogation of Article 346 must only be on an exceptional basis can be found in its refusal to accept the Greek government’s discriminatory requirements in its 2009 call for tenders on a €22-million contract to supply submarine battery kits. The contract specified that 35 per cent of production should occur in Greece, based on national-security grounds. The Commission ruled that Greece had breached EU competition policy by failing to provide a detailed and reasonable justification as to how non-Greek production of battery kits would endanger Greek national security. See European Commission, ‘Public Procurement: Commission Calls on Greece to Amend Procedure for Awarding Supply Contract for Submarine Battery Kits’, Europa press release IP/10/1558, 24 November 2010, <http://europa.eu/rapid/press-release_IP-10-1558_en.htm>, accessed 2 April 2014.
companies. The UK’s defence trade, and thus offset, with US defence contractors, for instance, is substantial. The result is that the UK defence economy is squeezed both ways.

As noted, the Commission’s intention is that offset practices be proscribed, in relation not just to intra-European defence contracts, but also to non-European procurement. The reasoning behind this position is that it would be extremely difficult for a European country to demand offset from a non-European supplier as it would clearly discriminate against European suppliers bidding in the same competition, unable as they would be to offer an equally ‘enticing’ offset package. This understanding of the directive is open to legal interpretation, and thus is conjectural, but the logic of the argument is robust. Loopholes may nonetheless exist – if, for instance, the non-European supplier enjoys a global monopoly position. However, arguing this case would distil down to highly technical engineering and perhaps doctrinal arguments which the European country might find difficult to defend.

Across continental Europe, the directive has led to radical changes in the defence-offset environment. Offset policies have been abandoned and modified, with only brave (or foolhardy) nations keeping in place pre-directive prescriptive offset policies. *In extremis*, offset offices have closed (in the UK and Portugal, for example), although most countries have adopted a ‘wait-and-see’ strategy in relation to how structures and policy approaches might change in light of the directive. This probably helps to explain why more than twenty European member states had not enacted the legislation by the transposition date of August 2011. Indeed, over a year after its enactment, four states – Poland, the Netherlands, Luxembourg and Slovenia – had still not fully implemented Directive 2009/81/EC, leading to their referral by the European Commission to the European Court of Justice.24 Since August 2011, no major defence procurements have been signed by EU member states, so a period of uncertainty has stalled member-state policy responses in the post-directive European context. The only exception is the UK.

**The New UK Mantra: Engagement**

The European directive is a powerful piece of legislation with the potential to transmogrify defence production from the national to the European level. However, in the process, offset has been placed in the European Commission’s line of fire. Although the transposition of Directive 2009/81/EC has been tardy, having extended beyond the August 2011 implementation deadline, its effects have already proved inhibitive, leading to disarray amongst Europe’s

---

national offset authorities. Yet, although European nations have signed up to the directive’s legislation, few if any alternative policy frameworks have emerged. The one principal exception is the UK’s abandonment of its IP policy model and adoption of an approach based on ‘engagement’.

Announced in March 2012, the UK approach does not impinge on the acquisition ideal reflected in Directive 2009/81/EC, but focuses on the promotion of an ‘open’, voluntary, non-penal, solely defence-related and non-coercive policy based on the overarching goal of competitiveness. This policy shift seeks to encourage offshore vendor ‘engagement’ with British defence and security companies, and necessitates a change in the cultural mindset of stakeholders – from formal policy to informal engagement, fostering voluntary partnership rather than subtle coercion in R&D and production.

This new approach is called the Defence and Security Industrial Engagement Policy (DSIEP). Its purpose synchronises with that of the 2012 White Paper *National Security Through Technology*, having particular resonance with the ‘wider UK perspective’. Here, the UK government recognises that:

[T]o fulfil the aim set out in this White Paper ... [with the best and most affordable capabilities, there is a need for] thriving, innovative, and highly efficient suppliers. A healthy and competitive industry in the UK makes a significant contribution to developing and sustaining key defence and security capabilities, as well as contributing to export-led growth and a rebalanced economy.

The essence of the White Paper is to raise investment in the UK defence economy, boosting its innovation and competitiveness to secure sustained export performance. The DSIEP chimes with this approach by encouraging offshore defence contractors to invest in Britain’s defence and security sectors. In order to enhance export performance, the DSIEP also aims to encourage participating foreign companies to see the UK as a prime location in which to engage in R&D investment and technology transfer; to extend opportunities for UK companies to become part of their supply chains; and to engage specifically with SMEs in these activities, providing advice, where possible, to enhance their opportunities to succeed in the market place.

---

26. Ibid., p. 9.
Overseeing the implementation of the DSIEP is the MoD’s head of industrial engagement.\textsuperscript{28} The new policy invites participating foreign defence companies operating in the UK to report their annual activities and investment, providing ministers with an overview of companies’ interaction with the UK’s defence and security industry and how this supports the nation’s capability. As of August 2014, eight major foreign defence companies – Boeing, L-3 Communications, Saab, Rockwell Collins, Rheinmetall, RUAG, Airbus and Raytheon – have signed up to participate in the DSIEP. Further signatories are anticipated.

The UK’s DSIEP model may act as a template in the transformation of wider European offset practices, with a number of EU member states already seeking advice in relation to the policy. Indeed, the British MoD has moved more quickly than other European countries to comply fully with the European legislation. Of course, the UK’s position is relatively advantageous compared to that of many of its European counterparts. The British defence economy is one of the most technically advanced in Europe, characterised by a breadth and depth of expertise in defence research, design, development and production. It possesses extensive systems-integration capabilities, underpinned by an array of mature, specialised and innovative supply chains. The industry also enjoys a degree of competitiveness unparalleled across much of the global defence economy, forged by decades of MoD policies designed to raise competition through liberal trade and contracting regimes, as reflected by the country’s consistently high defence-export rankings. Given this advanced level of defence-industrial capability, it would be surprising if offshore vendors were not attracted to Britain’s rich defence resource base. Indeed, since 1990, major US and European primes such as Boeing, Lockheed Martin, General Dynamics, Saab and Thales have all invested heavily in the UK defence economy on the back of its erstwhile IP policy. The viability of these investments, including in R&D and production capacity, is secure, unless scale and profit diminishes (if the financial viability of these defence multinational companies becomes vulnerable, they will relocate to other, more profitable overseas destinations, ‘hollowing out’ the UK defence-industrial base in their wake). The problem for Europe is that Britain’s strong defence-industrial base is not reflected more widely across the EU. For the majority of small and medium defence players, offset continues to be viewed as a vital mechanism for extracting production packages and technology transfer from the major prime contractors, be they European or non-European. For small defence states, therefore, the challenge in a post-directive ‘offset-less’ Europe will be to sustain local defence jobs, skills and capacity in industries debilitated by low defence expenditure, limited scale and constrained export opportunities.

\textsuperscript{28} The DSIEP model replaces the Industrial Participation policy, and since April 2013 policy implementation has been transferred from UK Trade and Investment back to the MoD.
Conclusion: Back to the Future?

This report offers two sets of conclusions. The first concerns the working of the UK IP policy from 1990 to 2010. The findings are important in their own right, vindicating the MoD's role as a responsible custodian of taxpayers' money by ensuring a judicious balance between securing the fullest possible economic return from competitive offshore procurement under a free and open defence trading regime, whilst at the same time sustaining critical sectors of the local defence economy. Meanwhile, at a broader level, the successful operation of a flexible and open ‘participation’ policy also offers a powerful model for many other industrialised countries struggling with over-prescriptive, heavily bureaucratic and highly directed offset policies. The second set of conclusions concerns the intellectual underpinnings and policy implications of the European Procurement Directive. Although the judgements are speculative, they do raise important questions as to the theoretical and practical validity of the assault by the European Commission and EDA on offset practices. Meanwhile, despite the fact that Britain’s IP policy has now disappeared, the case-study findings suggest valuable insights as to the appropriateness and possible future success of the country’s successor policy of Industrial Engagement.

The Case for Britain’s Industrial Participation Policy

The research conducted into the defence-industrial impact of Britain’s IP policy, though limited in scope, has comprised an analysis of the positions of the biggest offshore vendors operating in the UK, representing 50 per cent of the value of IP projects since 1997. The aim was to establish whether the UK’s 1990 IP policy was ‘fit for purpose’ in the radically changed defence-economic environment of the twenty-first century. An immediate finding was that over the survey period, the policy’s implementation was remarkably flexible, reflecting, in part, the fact that it had been formulated and operationalised in the absence of formalised objectives. Implicit objectives were determined that were aligned to the ‘wider’ priorities of the UK defence-industry strategy.

The survey’s findings indicate that the IP policy was an effective instrument in strengthening and sustaining the UK defence industry via MoD orders placed overseas. Whilst employment creation proved to be modest, there was evidence that the IP policy had led to an improvement in defence-industrial capability, increased export potential, and enhanced investment in the defence research and technology base. There is also evidence to suggest that in the absence of IP, one – or possibly two – major first-tier UK suppliers would not be operating today. The findings suggest, further, the likelihood that an IP cost premium was applied by offshore vendors, although the certainty of the premium, and its percentage value, remain conjectural. The case for requiring offshore suppliers to furnish two bid submissions in their tender – providing acquisition costs with and without IP for the purpose of
raising ‘transparency’ in the acquisition process – is feasible, but whether it is meaningful is open to debate.

The findings from the empirical research undertaken for this report demonstrate that industrial participation – or offset, more generally – can work. This judgement is in line with a small, but growing, body of literature, arguing the case for offset. Although highlighting the universality of positive offset spin-offs remains challenging, evidence is emerging that offset can play a role in the development of defence and aerospace capacity. Whilst offset will not create substantial numbers of highly skilled local jobs, it can serve to help maintain them. The British experience reinforces the view that a high level of technological absorptive capacity is a critically important explanatory variable in securing such offset objectives. Additionally, the British case suggests that a high degree of competitiveness and a liberal trading regime are important ingredients in achieving successful outcomes, as are the possession of diversified defence-industrial capacities, including SMEs integrated across an array of high-technology value chains.

The Case against the European Procurement Directive

The aim of the European Commission and European Defence Agency has been to raise the level of openness and transparency in European procurement, in an attempt to stimulate the development of a unified European defence-industrial and technology base. To achieve this ambitious and longstanding goal, the European Procurement Directive was launched with two objectives. First, the directive emphasised the imperative of strengthening the interpretation of the national-security exemption under Article 346 of the Treaty of Lisbon, so that its application operates on an exceptional basis. This would expose Europe’s protected defence and security market to more intense competition, approaching that which prevails in the single economic market. Article 346 remains, because it is recognised by the European Commission that the defence sector is different due to national-security considerations, especially in relation to defence-industrial sovereignty. However, the link to national security is not automatic, and must be proven by the member government seeking the exemption. The second objective concerns the need to remove market distortions in order to achieve openness, transparency and a higher degree of competitiveness. Offset is judged to fall foul of this objective on two counts: at the product level, where there is the danger that the most appropriate weapon system may not be selected due to non-market offset incentives and, at the process level, where the requirement for local supply – irrespective of efficiency – might lead to suboptimal economic outcomes.

There is nothing inherently wrong with the European Commission seeking to promote competition, open markets and free trade in the defence sector. Indeed, a single European defence market would eradicate product
duplication and excess capacity, leading to economies of learning, scope and scale. However, caution must be exercised in presuming that the directive will be successful in evolving a European defence community since, after sixty years of repeated policy pronouncements and European initiatives, there has been precious little progress on the ground. In fact, it is likely that corporate merger-and-acquisition activity has proven more effective than governmental or supranational diktat in rationalising Europe’s defence industries. Member-state governments have demonstrated time and again their reluctance to sacrifice sovereignty on the high altar of a unified defence-industrial and technological entity, as evidenced aptly by UK and German governmental reluctance to allow the proposed BAE–EADS merger in October 2012, with the inevitable national-sovereignty concerns acting to delay rather than accelerate European defence-industrial integration. Thus, whilst the directive may increase competition in Europe’s defence market, it is unlikely to lead to European defence-industrial convergence.

Certainly, defence cannot be compared to the commercial market. Warships and combat aircraft are different from flat-screen televisions and refrigerators, because national sovereignty considerations apply: when a country goes to war, security of supply is essential. In a twenty-first-century, globalising defence environment, where autarky is compromised by affordability, acquisition strategy is increasingly reflected by a strategic acquisition ‘mix’ of (often protected) domestic defence-industrial capacity, global sourcing of non-critical components and systems, and resource-efficient acquisition (invariably) through off-the-shelf procurement from US suppliers. For most countries, off-the-shelf acquisition of US weapons systems translates into licensed production, driven by the need to exploit American high-technology and efficient high-scale and low-cost benefits. However, transplantation of production lines and manufacturing capacity is not a costless exercise, and can only be secured through political acceptance of a cost premium. To avoid paying this premium, the rational liberal-market solution would be to buy arms off-the-shelf from the US, but for geostrategic, though not economic, reasons, this would be unacceptable.

The notion of a unified European defence-industrial base does not, therefore, represent resource optimisation, only a constrained form of regional sub-optimisation. In this constrained, second-best economic world, the case against offset weakens. It is a case that is already suspect, given that no defence market in the world is competitive. Defence is characterised by monopoly – monopsony market structures, high levels of government ownership and control, pre-determined contractual industrial specification and fixed-price contracts. Offset is a feature of this uncompetitive environment, but does

1. For instance, the MoD faced supply difficulties for 155 mm artillery shells (during the First Gulf War) and rocket propelled grenades (in the Second Gulf War) because friendly nations refused sales due to political opposition to the Gulf Wars.
carry the potential, as demonstrated in the liberalised UK context, to facilitate 
market searching and the identification of the best economic solutions.

However, as a result of Directive 2009/81/EC, offset has become entangled 
in the European Commission’s ideological crusade to increase competition, 
promote transparency and encourage the development of a single defence 
market. Yet there is flawed logic behind this process. Offset is a distortion 
of trade, in the sense that licensed production raises cost for the majority 
of EU states with illiberal offset regimes, through the search and selection 
of less-efficient suppliers and the associated need to upgrade capacity and 
train workers. Moreover, while to some extent these additional costs will 
be defrayed through the evolution of dynamic comparative advantages 
and mutual abatement programmes, overall offset will involve extra cost 
compared to off-the-shelf acquisition. The precise value of this distortionary 
impact, however, is unknown and, indeed, may be less than the combined 
employment, income, multiplier, export and tax-revenue benefits generated 
by the offset investment.

As such, the European Commission is clearly taking a fundamentalist line that 
open competition and free trade are best, ignoring the potential benefits 
that could be brought by ‘wider factors’. The fact is that no evidence has 
been provided to prove beyond doubt that the net economic impact of offset 
is negative. Perhaps even more significantly, there is no incontestable proof 
that the overriding determinant in the defence-acquisition decision is offset. 
Rather, it is one factor in a mix, with far more important factors relating to 
considerations including value for money and life-cycle cost, and the most 
important variable of all being the quality of the military kit. Indeed, it is 
inconceivable that industrialised countries might procure weapons systems 
on the sole basis of the attractiveness of an offset package. Moreover, the 
high-cost premiums associated with offset are also unproven, and whilst 
they do exist, their value will likely be inversely related to the sophistication 
of a recipient country’s defence-industrial base. Thus, for Europe’s major 
defence economies,² where procurement budgets, R&D expenditure, scale, 
industrial capacity and technological competence are at comparatively high 
levels, offset-related transaction costs will be low.³ Finally, no evidence has 
been produced to validate the argument that offset contracts are more prone 
to corrupt practices than defence-acquisition contracts more generally.

². These include the Letter of Intent countries: France, Germany, Italy, Spain, Sweden 
and the UK. Small states such as Belgium and the Netherlands might also be included 
in the discussion as they possess niche defence-industrial capacity, although they 
require defence exports to survive.
³. In the extreme, some vendors are prepared to cover the premium. Also, the process 
of abatement as was practised amongst the big European defence nations removed a 
major chunk of offset liabilities from defence-trade ledgers.
The primary aim of Directive 2009/81/EC is to remove protectionism, encouraging the region’s evolution towards a single European defence market. There is another view, however, that is less sanguine, and concerns the impact of the directive on the European defence-technological and industrial base. First, the emphasis placed on defence-industrial sovereignty by member states will diminish, but probably not substantially. In the case of the UK, for instance, it has been reported that 50 per cent of all pre-directive defence acquisitions were exempted on the basis of Article 346.4 Indeed, since the 2005 Defence Industrial Strategy and the introduction of the concept of ‘appropriate sovereignty’, Britain has prioritised indigenous defence technology, as well as the capture of associated intellectual property rights. This narrowly focused protectionist theme has continued with the publication of the 2012 National Security Through Technology White Paper, with its emphasis on ‘technological advantage’ through the maintenance of local capacity in critical technology sectors. It is therefore dubious whether protectionism will dramatically decline in the years ahead. This is all the more so given that MoD policy-makers appear to have crafted a policy under which the ‘national-security’ rationale closely aligns with the conditions necessary for exemption under Article 346.

The second concern arising from the directive is its indirect impact in terms of eradicating the ‘offset problem’. The EU interprets offset as a market imperfection, falling foul of its liberal economic regime. Accordingly, indirect offset has become illegal within the EU, with direct (defence) offset allowed only if member states can justify an exemption under Article 346, on national-security grounds. However, as the Greek case demonstrates,5 this may prove challenging – especially if local production is directed towards low-skill, low-technology items.

In this regard, Figure 5 illustrates the economic squeeze that member states will suffer from the opportunity cost of losing out on offset-induced investment linked to arms imports. Specifically, it provides the conceptual framework for approximating the opportunity cost to the EU economy of the introduction of Directive 2009/81/EC. The approach adopted is to assume that the most recent five-year data set available (2007–11) for the value of European arms trade to and from the US and the rest of the world is that which applies to EU arms transactions in a post-directive scenario. Under this assumption, the opportunity-cost of Directive 2009/81/EC is not insubstantial. As such, it shows that by banning offset on arms imports from the US (worth $6,670 billion) and from the rest of the world ($12,799 billion), the EU has lost a potential $19,469 billion in technology and work

placement. The effect of Directive 2009/81/EC is therefore to create what might be termed a net offset deficit, illustrating the fact that the almost $20-billion opportunity-cost of offset benefit forgone is likely to be higher – and arguably much higher – than the internal benefits to be drawn from enhanced competition and reduced market distortion following the removal of offset. Finally, compounding the offset burden to the EU is the fact that member states will still be obliged to service the offset demands tied to EU exports.

Figure 5: Europe’s Brave New World, without Offset.


In reference to Table 13, meanwhile, the EU’s total global arms exports over the period 2007–11 amounted to $40,998 billion, which is inclusive of intra-European exports, exports to the US (worth $2,259 billion) and those to the rest of the world (worth $38,739 billion). Applying an average offset quota of 70 per cent to Europe’s total arms-export value across this period, the offset-

6. The argument advanced here is that a cost-benefit audit is required to determine whether a net deficit results from the removal of offset – this being the reverse but equivalent argument of Travis Taylor that ‘Any deviation from free market exchange should be accompanied by an economic audit that estimates net benefits from a policy’s second-best solution’. Travis K Taylor, ‘Countertrade Offset in International Procurement: Theory and Evidence’, in Murat A Yülek and Travis K Taylor (eds), Designing Public Procurement Policy in Developing Countries: How to Foster Technology Transfer and Industrialization in the Global Economy (New York, NY: Springer, 2012), p. 32.
related resource leakage from the EU equates to $28,699 billion. Finally, adding this offset leakage cost to the offset opportunity-cost of $19,470 billion gives a total offset cost to the EU of nearly $50 billion.

**Table 13: The Offset Cost of the European Procurement Directive.**

<table>
<thead>
<tr>
<th></th>
<th>$bn</th>
<th>$bn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative Global EU Arms Exports:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest of World (RoW)</td>
<td>38,739</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>2,259</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40,998</td>
<td></td>
</tr>
<tr>
<td>(Economic leakage from EU due to offset demands from export recipients at 70 per cent contract value)</td>
<td></td>
<td>28,699</td>
</tr>
<tr>
<td>Cumulative EU Arms Imports from RoW</td>
<td></td>
<td>19,470</td>
</tr>
<tr>
<td>(Loss of offset based on pre-directive offset average of 100 per cent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total offset cost</td>
<td></td>
<td>48,169</td>
</tr>
</tbody>
</table>


Notes regarding total offset cost:

General assumption: The near $50 billion cost of offset (in terms of opportunity-cost and work leakage outside the EU) is assumed to occur over the same five-year period (2007–11) as the EU arms exports and imports, but of course this may not be the case. However, whilst the precision of the figures may attract criticism, the principle behind the analysis remains valid, and is that of using historical data to illustrate the additional offset cost to the EU if the European Procurement Directive had been applied during the 2007–11 period.

Specific assumptions: EU arms exports: the 70 per cent average offset quota on EU arms exports is based on the (reasonable) assumption that it is similar to that suffered by the US from 1993 to 2010. The US does not have an official offset policy, but if Buy America legislation is interpreted as equivalent to offset, equating to a 100 per cent quota, then the 70 per cent offset ratio applied to the offset cost build-up seems reasonable. This is especially so given that ‘buy America’ legislation does not apply to some of the EU’s exports to the US due to their low acquisition values. EU arms imports: the $19470 opportunity-cost of offset forgone is based on the pre-directive average offset quota of 100 per cent. Of the twenty-seven EU member states, the majority have 100 per cent offset policies in place, with only three (Italy, Luxembourg and Romania) having an offset quota target below 100.

---

The UK OffseT MOdel

per cent. It is notable, however, that in 2009 it was reported that ‘In Europe, generally the offset is 100 percent of the contract value’.8

The directive’s efforts to remove offset practices directly from intra-European defence-acquisition deals, and indirectly from European–non-European arms transactions, risks provoking two unintended and unacceptable developments, especially for smaller European states: first, that this robs them of opportunities to gain the infusion of work packages and technology transfer through offset-leverage and, secondly, that formal and transparent offset requirements and processes are driven underground. In this context, offset will, ironically, become more ad hoc, and less transparent, with the resultant increased temptation for country offset officials to agree offset deals that are inconsistent, do not conform to local defence policy, and are challenging to monitor.

Meanwhile, the forced abandonment of offset policy will likely mean that an offset-equivalent of Gresham’s Law will operate;9 that is, that ‘bad’ offset arrangements will evolve to replace the ‘good’ pre-directive formal offset policies. In this regard, the challenge for the authorities in an era of globalisation is to know when something that looks like an offset-based agreement is actually an offset. For instance, local prime contractors can become subcontractors to European and non-European arms vendors. The question is whether this equates to a negotiated offset or is simply a form of global outsourcing. Moreover, save for Australia, with its relatively modest defence-industrial capacity, the EU comprises the only group of major defence economies in the world within which offset has become illegal.

European arms-importing states will thus be disadvantaged, because whilst, officially, they are denied recourse to offset-related work and associated technology transfer, exporting member states will continue to suffer from the offset obligations imposed on them by overseas customers. The case against the directive’s assault on offset is, therefore, compelling. Only time will tell, but it is probably premature to write off offset practice in Europe: the emperor is dead – long live the emperor.


9. This ‘law’ is named after Sir Thomas Gresham (1519–79), an English financier during the Tudor period. He argued that when a government, out of necessity, overvalues one type of money and undervalues another, the undervalued money will leave the country or disappear from circulation, whilst the overvalued money will flood into circulation.
Ron Matthews holds the Chair in Defence Economics at Cranfield University at the UK Defence Academy. Between 2007 and 2014, he also held, concurrently, the Chair in Defence Economics at the S Rajaratnam School of International Studies (RSIS), Nanyang Technological University, Singapore. Ron has been awarded two NATO scholarships supporting research on International Arms Collaboration conducted at the Pentagon and the Institute of War, Revolution and Peace at Stanford University. He has also won a Robert S McNamara World Bank Research Fellowship that supported empirical work on African technological development. This defence-development relation has characterised Ron’s research focus, especially in the field of defence offset. He is an expert on the topic, with an international profile that includes lecturing to academic and policy-making audiences, publication of books and learned articles and consultancy encompassing European defence manufacturers and offset authorities in Asia and the Middle East.
RUSI Membership

RUSI membership packages provide privileged networking opportunities and benefits tailored to meet the needs of both individuals and large organisations.

Individual Memberships
Individual memberships are suitable for those individuals who wish to join RUSI’s growing network of policy-makers and practitioners. Benefits include regular updates from RUSI, including invitations to members’ lectures and seminars, subscription to the *RUSI Journal* and *RUSI Defence Systems*. This package also offers members access to our renowned Library of Military History.

Corporate Membership
RUSI’s corporate-level membership packages, offering discounts to all RUSI conferences, are open to all organisations concerned with defence and security matters, and can be tailored to meet the business interests of both public and private sectors.

Concessions
Discounted student and young persons rates are available for those under the age of 35. Concessions are also available for those over the age of 65. We also offer online membership to those wishing to access RUSI’s content of analysis and commentary.

www.rusi.org/membership