



I. Introduction

Henrik Heidenkamp, John Louth & Trevor Taylor

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I. INTRODUCTION

Defence industries are still regarded, principally, as a part of a country's arsenal: a repository of goods, services, know-how and manpower from which a military can draw in times of conflict.¹ Indeed, companies such as BAE Systems, Lockheed Martin, Raytheon and QinetiQ supply goods and services for people in uniform to use on operations and will continue to do so for many decades yet. However, companies today are much more than just component parts of a military's supply chain. For example, in the United Kingdom, contractors drawn from the private sector provide 45 per cent of the country's overseas military effort.² In Afghanistan, at the height of operations in 2010, sixty-seven companies employing close to 5,000 employees were fielded on the front line in direct support of British operations.³ Industry is not just democracy's arsenal – it is democracy's operational partner, meaning that much of today's military competencies actually reside in the industrial base. Consequently, understanding the relationship between government and defence industry becomes a critical policy discourse in the provision of national security.

This Whitehall Paper deals with how governments in three countries – the United Kingdom, Germany and the United States – deal with the defence businesses on their territory, across three dimensions: as the customers of such businesses, as their sponsors and as their regulators. These states, which account for three of the largest NATO defence budgets, are used as exemplars so that the lessons and insights gleaned might be applied to other states. The authors have found that, typically, the same element of government – the defence ministry – is the leading voice in all three of these spaces, and a working definition is offered for each.

¹ See, for example, Trevor Taylor and Keith Hayward, *The UK Defence Industrial Base: Development and Future Policy Options* (London: Brassey's for RUSI, 1989); Jacques S Gansler, *Democracy's Arsenal: Creating a Twenty-First-Century Defense Industry* (Cambridge, MA: MIT Press, 2011).

² John Louth, 'The Defence Industrial Knowledge Base: The Core Capability?', *RUSI Defence Systems* (Vol. 15, No. 1, August 2012) pp. 42–43.

³ Henrik Heidenkamp, 'Sustaining the UK's Defence Effort: Contractor Support to Operations Market Dynamics', *RUSI Whitehall Report 2-12* (April 2012).

Government as Customer

Text Box 1: Operation *Ellamy*: Industry Earns a Pat on the Back.

‘Twenty UK and overseas defence companies have been congratulated by the Minister for Defence Equipment, Support and Technology, Peter Luff, for the contribution they made to the success of Operation Ellamy – the UK’s share of coalition operations in support of the United Nations mandate on Libya.’

Source: The magazine of the UK MoD’s Defence Equipment and Support organisation, *Desider* (January 2012), p. 8.

Most obviously, a government buys goods and services from the defence industrial sector and from this perspective, government – and more specifically its armed forces – is the customer of that area of the economy. For firms offering specialised military equipment, such as artillery pieces or warships, the home government may be the only customer for their goods, but in any case is very likely to be the most important customer, as other governments are unlikely to buy a product that the domestic government has not endorsed with a purchase.

One important aspect of all customer–external supplier relations is the shape and predictability of demand. At the macro level, defence budgets in NATO countries are not growing and may even be declining in real terms – a trend that seems unlikely to be reversed in the foreseeable future (the next three to four years). At the same time, demand for specific elements within defence can increase, with current governments seemingly prepared to spend more on cyber-defences (and perhaps even offensive cyber-capabilities), for example.⁴ The argument for transparency is, of course, that a customer that signals future intentions helps potential suppliers to shape their investment and research plans in a manner that will benefit their customer.

Governments vary considerably as to how open they are willing to be about their future defence spending plans. The Australian government is particularly open in this regard, publishing Defence Capability Plans which are intended to increase suppliers’ confidence about the shape of future demand.⁵ The British government is seeking to follow a similar path but, to date, the details of its equivalent Defence Equipment Plan are not available in any useful level of granularity to potential suppliers.⁶ Moreover, the Australian capability plans have been unstable and much affected by

⁴ Robert H Scales, Jr, *Future Warfare* (Carlisle, PA: US Army War College, 1999).

⁵ Australian Department of Defence, ‘Defence Capability Plan 2012: Public Version’, May 2012, <<http://www.defence.gov.au/publications/capabilityplan2012.pdf>>, accessed 7 October 2013.

⁶ UK Ministry of Defence, ‘The Defence Equipment Plan 2012’, January 2013, <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/70258/Defence_Equipment_Plan_2012_20130130.pdf>, accessed 7 October 2013.

financial cuts to defence budgets, suggesting they do not necessarily ensure greater predictability. Both Germany and the US champion notions of supplier openness but, as will be shown in subsequent chapters, to very different ends. There is little doubt, however, that the concept of government as ‘customer’ remains highly relevant to the industry–state relationship.

Government as Sponsor

Text Box 2: The Mutual Benefits of Government Sponsorship.

‘It has long been recognized that market imperfections are unlikely to provide all the R&D needed in sectors such as defence ... there is a well-established acceptance on both sides of the Atlantic that governments will provide much of the funding, and this makes possible the conduct of international collaborative research programmes mediated by governments, if they see it in their joint national interests.’

Source: Alastair Cameron (ed.), ‘Defence Research and Development in the Atlantic Nations’, RUSI Occasional Paper, 2007, p. 1.

At the same time as being customers of the defence industrial sector, governments frequently play a sponsorship role, helping firms to survive and prosper. Governments, even in free-market societies, obviously give some direction to the private sector as a whole, not least by investing in infrastructure, making provisions for education, providing state funding for research, giving tax breaks for corporate research-and-development spending, and so on. They also often provide information about foreign markets and support sales campaigns in different areas. The US Department of Commerce keeps staff in many US embassies while the UK Foreign Office recognises the promotion of national economic interests to be a significant part of its mission. In defence, however, there is often a special emphasis on sponsorship of industry through practices of national preference in procurement choices, the funding of research and development, and support for exports. Where the defence industry receives special treatment from government, as arguably is the case with each of the countries examined in this Whitehall Paper, it is because the government sees that sector as one of special significance.

Government as Regulator

Text Box 3: BAE–EADS Merger ‘a Missed Opportunity’, Says Airbus.

‘BAE and EADS were forced to abandon £30bn merger talks earlier this month after the German Chancellor Angela Merkel personally intervened to block a deal.’

Source: Angela Monaghan, *Daily Telegraph*, 23 October 2012.

A third, often neglected, element is the directing of defence businesses, which includes national and international regulation. Governments do not just buy from and sponsor defence businesses: they also seek to constrain their behaviour through legislation, regulation and policy. Of particular relevance are policies and processes determining who can be employed in sensitive positions; the control of information (for example, the Official Secrets Act in the UK) and the control of exports (for example, the Export Control Act); and wider corporate behaviour (for example, the Bribery Act). The authors would also suggest that the ownership of corporations, or limitations on the powers of shareholders, is an important area of government regulation.

The Significance of the Debate

At first glance, the three areas of the authors' self-styled defence industrial triptych might appear rather dry, technical fields of interest only to specialists. However, it is argued here that they should be viewed as matters of high politics, of key importance to national and collective military capability.

This monograph is partly about the conflicting pressures in the defence industry between the political – where the sovereign state has been central for over 500 years – and the managerial, with industry's necessary focus on efficiency and effectiveness, economies of scale and access to market. It examines current practices, areas of change, and the dilemmas faced by governments and companies.

The Specialist Defence Sector and its Market Structures

Defining the parameters of the defence sector is not easy, since armed forces need supplies of a wide range of goods and services, many of which (such as diesel fuel, clothing and facilities maintenance) have an essentially civil or dual-use character. The authors' concern here is more limited and is focused on the systems and services that are specifically developed for defence, especially the air, sea and land platforms, surveillance and communications systems, and weapons and munitions that are central to military capability. It is in these areas that much of the money is spent and the majority of problems lie.

The market structures in this domain are rather different to those found elsewhere and are very distant from the perfect market features used to generate much economic theory. In defence, it is often a single government (the customer) that specifies a military requirement, thereby determining what is to be developed and produced. That government normally has to fund much or all of the development costs. This obviously contrasts with most other markets, in which companies considering innovation and product development have to estimate the likely demand

and, whilst market research can help, significant risk remains. Unsolicited innovation does occur in defence but is very much the exception rather than the rule because of the significant timescales, costs and risks involved.

The central trend in the specialist defence sector since the end of the Second World War has been consolidation among suppliers, most obviously within states, so that today even a major state such as the UK or France has only one or two indigenous suppliers in a sector. Even the US Department of Defense, which controls by far the largest defence budget in the world, has only a very limited choice of suppliers as far as ballistic missiles, submarines, tanks, combat aircraft and other military assets are concerned. Given that these firms must sell to their home governments to have much chance of third-party sales, government–industry relations in defence are often about a sole buyer talking to an oligopoly about the costs, delivery dates and performance of a complex product which does not yet exist and involves significant technological and financial risk. Some advanced defence projects, especially in their early stages, often involve ‘uncertainty’ in terms of hazards that cannot be foreseen or quantified. How this uncertainty is conceptualised and managed between the industrialist and the governmental overseer shades much of the debate around defence acquisition and its reform.

Table 1 below, reporting research done within the UK Ministry of Defence, captures data about the increasing cost of British frigates. The Type 23 design represented a commitment to bringing this upwards trend under control, although the first ships went into service without a fire-control system.

Table 2 offers similar information about British combat aircraft, as well as their increasing speed and range.

Table 3, summarising much of the research, suggests no standard tendency among different sorts of equipment, other than a clear

Table 1: British Frigates, 1956–89.

| Class | Earliest In-Service Date | Unit Cost (£ million, 2009 prices) |
|----------|--------------------------|------------------------------------|
| Type 14 | 1956 | 33 |
| Type 12 | 1957 | 62 |
| Type 12M | 1957 | 71 |
| Type 81 | 1959 | 94 |
| Leander | 1961 | 81 |
| Type 21 | 1972 | 192 |
| Type 22 | 1976 | 413 |
| Type 23 | 1989 | 183 |

Source: N Davies, A Eager, M Maier and L Penfold, ‘Intergenerational Equipment Cost Escalation’, Defence Economic Research Paper, 18 December 2012, p. 12.

Table 2: British Combat Aircraft.

| Type | In-Service Date | Speed (mph) | Range (miles) | Unit Cost (£ million, 2009 prices) |
|-----------|-----------------|-------------|---------------|------------------------------------|
| Hunter | 1955 | 715 | 1,130 | 4.29 |
| Lightning | 1960 | 1,049 | 1,148 | 4.55 |
| Harrier | 1968 | 843 | 2,073 | 8.66 |
| Tornado | 1979 | 854 | 1,207 | 29.59 |
| Typhoon | 2006 | 1,550 | 1,801 | 66.54 |

Source: Davies, Eager, Maier and Penfold, 'Intergenerational Equipment Cost Escalation'.

orientation to unit costs rising in real terms, year on year, well above average increases in defence budgets in NATO countries.

Companies that lose a competition for a research-and-development project often decide to leave that sector by selling or closing the business concerned. For example, Hunting Engineering left the defence sector when it lost the contract for the operation of the Atomic Weapons Establishment to Lockheed Martin and Serco.⁷

Another core characteristic of much of the defence industrial sector is the high financial, technological and knowledge-based entry barriers. Consequently, old firms leaving the industry are not usually replaced by new entrants. The American firm General Atomics, which pioneered the development of larger unmanned aerial vehicles (UAVs) and is the manufacturer of the Predator and Reaper systems, is an exception to this rule. In general, the ability to make a modern warship, combat aircraft, smart missiles or even an armoured vehicle depends on such a broad range of factors that companies and countries trying to enter these

Table 3: Simple Unit–Time Trend Model of Overall Intergenerational Cost Growth.

| Item | Real Annual Cost Growth (%) | Time Period |
|-------------------------|-----------------------------|-------------|
| Generic naval platforms | 2.6 | – |
| Destroyers | 4.3 | 1962–2011 |
| Frigates | 2.9 | 1956–2000 |
| Generic submarines | 3.8 | – |
| Aircraft carriers | 5.8 | 1955–2011 |
| Combat aircraft | 5.9 | 1955–2008 |
| Main battle tanks | 3.4 | 1963–94 |

Source: Davies, Eager, Maier and Penfold, 'Intergenerational Equipment Cost Escalation'.

⁷ Air Force Research Institute, *Deterrence in the Twenty-First Century* (Maxwell AFB, AL: Air Force Research Institute, 2009). This lays out the proceedings of a RUSI conference held in London on 18–19 May 2009, co-sponsored by the Air Force Research Institute and King's College London.

Table 4: Leading Defence Companies, 2012.

| 2012 Rank | Company | 2012 Defence Revenue | 2011 Defence Revenue | Change (%) | Total Revenue 2012 | % of Defence Activity | Country |
|--------------|------------------------|----------------------------|----------------------------|---------------|--------------------------|-----------------------------|-------------|
| 1 | Lockheed Martin | 44,883 | 43,978 | 2.1 | 47,182 | 95.1 | US |
| 2 | Boeing | 31,378 | 30,700 | 2.2 | 81,698 | 38.4 | US |
| 3 | BAE | 26,813 | 29,130 | -8.0 | 28,255 | 94.9 | UK |
| 4 | Raytheon | 22,705 | 23,056 | -1.5 | 24,414 | 93.0 | US |
| 5 | General Dynamics | 21,023 | 23,491 | -10.5 | 31,513 | 66.7 | US |
| 6 | Northrop Grumman | 20,600 | 21,400 | -3.7 | 25,218 | 81.7 | US |
| 7 | EADS | 14,913 | 16,093 | -7.3 | 72,637 | 20.5 | Netherlands |
| 8 | Finmeccanica | 12,529 | 14,585 | -14.1 | 22,136 | 56.6 | Italy |
| 9 | United Technologies | 12,117 | 11,000 | 10.2 | 57,700 | 21.0 | US |
| 10 | L-3 Communications | 10,839 | 12,521 | -13.4 | 13,146 | 82.5 | US |
| 11 | Thales | 9,213 | 9,493 | -2.9 | 18,256 | 50.5 | France |

Source: All revenue given in US\$ millions. Adapted from *Defense News* (figures rounded), <http://special.defensenews.com/top-100/charts/rank_2013.php?c=FEAands=TIC>, accessed 7 October 2013.

fields – such as China, India and even Japan – incur enormous expense to make progress that is often much slower than that hoped for. South Korea, for example, has been able to move much more quickly into the global automobile and consumer-electronics sectors than into the defence sector, and its attempted entry into the combat-aircraft world remains late, over-budget and incomplete.

Implications of the End of the Cold War

Industrial consolidation in the defence sector is a saga that has been running for more than seventy years. However, since the end of the Cold War, two further fundamental changes have occurred, with profound and perhaps contradictory implications for government relations with the defence industry.

The Growing Presence of the Defence Multinational

The first of these is that defence consolidation has crossed national borders, creating defence multinationals with development, production and support activities in more than one country. This change has been driven, in part, by the lack of growth in national defence budgets and markets. Indeed, eight of the top eleven defence companies in the world have this characteristic (see Table 4). American defence companies have invested in the UK in order to ease access to the British market. Similarly,

many European companies recognise the need to invest in US facilities if they are to be awarded contracts by the Department of Defense (DoD). British companies (BAE Systems, Rolls-Royce, Cobham, QinetiQ and Meggitt) have had the most success in this regard and have been allowed to invest heavily in the US. Other European investors include Finmeccanica (an Italian conglomerate), which succeeded in buying Diagnostic-Retrieval Systems, Inc (better known as DRS) in 2009, and the European Aeronautic Defence and Space Company (EADS) – a continental multinational – which has gained a US presence through success in selling helicopters and its bidding efforts in the US Air Force tanker competition. Thales, as a partly state-owned French company, has experienced greater difficulty in gaining acceptance across the Atlantic because of the perceived influence of the French government over its corporate strategy.

Within the European arena, Thales, Finmeccanica and EADS have invested extensively in the UK. However, whilst the broader defence industrial sector has not been immune to the increasing dominance of the multinational business, France and Germany have resisted foreign involvement in their land and naval defence sectors. In the realm of aerospace, however, EADS and the missile developer MBDA are involved with both countries as key developers of smart weapons and air and space platforms respectively.

Transnational defence mergers occur only with the consent of the government of the state in which external investment is to occur while, to a certain extent, government stances in relation to the defence sphere can affect attitudes to foreign investment in general. The most explicit drivers are in Europe, where, in 1998, heads of government in France, Germany and the UK recognised that Europe's aerospace and defence electronics firms needed to be restructured across borders in order to better compete and collaborate with the large and essentially national businesses of the US.⁸ That agreement notwithstanding, and with the important exceptions of EADS and MBDA, it is clear that the UK has been much more open to foreign investment in defence than either Germany or France. The US has encouraged British and, to a lesser extent, other foreign investment in the US defence sector apparently because its authorities want to sustain the scope for competition among businesses operating in the US. However, as is made clear in the chapters on sponsorship and regulation (Chapters III and IV respectively), this has been only on the condition that foreign firms are tightly restricted, especially with regard to exporting technology.

⁸ Henrik Heidenkamp, John Louth and Trevor Taylor, 'The Defence Industrial Ecosystem: Delivering Security in an Uncertain World', *RUSI Whitehall Report 2-11* (June 2011).

The Decline of Nuclear Deterrence and the Changed Strategic Situation

The second area of change since 1990 concerns the high-level military-industrial strategic situation: there has been a greatly reduced emphasis on the (nuclear) deterrence of a known adversary and an increased focus on the capability to undertake surprise and sometimes sustained military operations. Concomitantly, a significant aspect of a state's ability to use its armed forces now lies with assured access to a sufficient and agile supply of defence materiel and capabilities drawn from its own industrial base.

During the Cold War, deterrence was the name of the game and, for Western Europeans especially, this depended on conventional forces being strong enough to prevent an immediate resort to nuclear weapons following a possible Warsaw Pact offensive, but not so strong as to discredit the necessity of using nuclear arsenals after a week or so of fighting. This was the essence of NATO's 'flexible response' doctrine, in which NATO asserted its readiness to initiate the use of nuclear weapons. The West wished to send Moscow the clear message that any resort to aggression could result in the use of nuclear forces. Had NATO countries built their conventional forces to a level where they could aspire to hold Soviet forces indefinitely, this would have incurred massive expense and signalled that the West was extremely reluctant to use nuclear weapons, which in turn would have weakened deterrence. The adoption of this strategy meant that there was no provision for the mobilisation of industry for a Third World War, at least not in Western Europe. This was a conflict that would have been fought relying on equipment, ammunition and spares that were in stock at the outbreak of hostilities.⁹

Since the end of the Cold War, the major governments of NATO have had to discard the concept of deterrence, which offered a known adversary, certain operational parameters and a given playbook of responses to aggression. Now, NATO countries are faced with contingent and uncertain campaigns and operations that may come as a surprise in terms of both their nature and location. To a greater or lesser extent, these operations have required the mobilisation of a supply base and a plethora of Urgent Operational Requirements (UORs) being laid on the private sector. Once again, as before 1945, a country's assured access to capable and agile industrial production has become a significant aspect of its ability to deploy its armed forces. In the UK, this reliance upon industry was recognised implicitly in the British Defence Industrial Policy of 2002 and explicitly in the Defence Industrial Strategy of 2005.

Clearly, this change has been more important for the UK and some other European countries than for the US. During the Cold War, resource

⁹ Annually, *The Military Balance* – of the International Institute for Strategic Studies – lists the perceived key variables in this arena: the number of systems in national inventories and the extent of state defence spending.

pressures steadily forced the UK to focus more and more of its defence effort on its NATO responsibilities, with capabilities for 'out-of-area' operations becoming an ever-lower priority in the defence White Papers of the 1980s. The British government did have to mobilise the defence industry in 1982 in order to prepare for and execute the recapture of the Falklands Islands but this did little to increase the government's emphasis on the strategic importance of defence industrial capabilities. The defence-procurement policy theme of that time was to subject British firms to external competition, which implied a readiness to see the weak go to the wall.

The US, on the other hand, was always concerned with a wide range of conflict possibilities and experienced a protracted conventional conflict in Vietnam. Its serious, continuous concern with its defence industrial base was apparent throughout the Cold War and afterwards. In the Cold War debates about deterrence and NATO strategy, the US was most concerned that the Warsaw Pact's advantage in terms of quantity should be largely offset by a Western technological edge, which required extensive spending on research and development. In the event of a failure of deterrence in Europe, it was also in the US's interest that fighting should be limited to the conventional-weapons domain for as long as possible, so as to spare American territory from damage. From a broader, external security-policy perspective, especially after the Nixon Doctrine was first expounded in 1969 – under which the supply of US weapons was to be a substitute for the despatch of American forces to friendly countries and regimes – Washington needed an assured source of development and production of such equipment. For Europeans, too, a final useful aspect of a national defence industrial capability was that it enabled arms exports, either as sales or aid, to serve as a foreign-policy tool.

Clearly, defence industries were also important in Europe during the Cold War because spending defence budgets at home meant employment and tax revenues from the employees and firms concerned, sometimes useful technological gains and savings on foreign exchange. In considering how a domestic defence industry could reduce the economic pain of the defence effort, it should be remembered that in 1990 NATO members spent about twice the share of their Gross Domestic Product on defence that they did by 2013.¹⁰

With these qualifications, however, the fundamental generalisation remains valid: that during the Cold War the prime defence mission for Western states was deterrence of the Warsaw Pact, which did not involve a need to mobilise industry for combat. After 1990, the new challenge of

¹⁰ NATO, 'Financial and Economic Data Relating to NATO Defence', press release, 13 April 2012, <http://www.nato.int/cps/en/natolive/news_85966.htm?mode=pressrelease>, accessed 7 October 2013.

determining how to undertake surprise and risky missions at relatively short notice meant that assured access to a flexible and responsive defence industrial sector was especially valuable for governments.

Intergovernmental Co-operation and the Persistence of National Feeling

Finally, in the face of rising equipment costs, there has been increasing recognition at the governmental level of the limitations of national defence efforts within Europe, with arguments being put forth in favour of greater pooling and sharing of military resources, national specialisation and more co-operative projects. While the institutional basis for increased European defence co-operation is a contested area – with British governments in particular being wary of the potential roles of the European Commission and the European Defence Agency – the generic pressures towards increased defence co-operation among European states are clear. The UK and France have made a significant move towards greater co-ordination, integration and the sharing of national efforts, with agreements signed in autumn 2010 covering nuclear, as well as conventional, areas.¹¹

However, in Europe, the contrast between the demands of popular politics and those of the ‘managerial’ (or ‘functionalist’) perspective is stark. Politically, the notion of national identity and independence has a continuing, strong attraction for substantial portions of European electorates. The German refusal to countenance a merger of BAE Systems and EADS typifies this tension. In contrast, the managerial outlook emphasises the value of, indeed the need for, a single European market with a shared set of standards and regulations, and in which the costs and risks of operating a multitude of national currencies are avoided. How else are businesses in Europe to compete with those based in the populous markets of the US, Japan and China, for example?

Thus there is an overall situation comprising the coming together of three uncomfortable bedfellows: the continued emotional and political preference for national identity and capability; the managerial need for defence businesses to be multinational in nature and for governments at least to co-operate on big projects; and the dependence of military capability on a capable and agile military supply.

¹¹ The Anglo-French Lancaster House Treaties were signed in November 2010 by then-President Nicolas Sarkozy and Prime Minister David Cameron. They covered key areas of defence research and development, such as unmanned aerial vehicles (UAVs), satellite communications and submarine technology, devoting an annual budget of €50 million each to joint technological development.

The Purpose of the Whitehall Paper

Looking forward is a hazardous activity, so there is a need to be explicit about the assumptions underlying the discussion put forward in this monograph. Of these, the most important is that nuclear deterrence will not return to its pre-1990 centrality and that the ability to use armed forces will continue to rest on assured access to a supply base.

For the dynamics of the future, much hinges on the key elements of the relationship between governments and defence industries. Accordingly, the role of this volume is to assess government attitudes, policies and behaviour in three NATO states towards the defence industry, and to explore the implications of these for both national and transnational defence firms and for future developments in defence, economic and national-security co-operation. The material here is important at the governmental level for determining prospects for co-operation on specific projects, and for companies it is significant for establishing where to invest in base production and development facilities. Specifically, the chapters that follow were prepared in relation to a series of key questions:

- Do national policies across the three areas of ‘customership’, sponsorship and regulation enjoy coherence or can contradictory elements be discerned?
- Do government constraints seriously hinder the ability of defence enterprises to operate effectively and efficiently?
- Do governments’ stances towards the defence industry facilitate or bring friction to defence collaborative and co-operative projects?
- Do governments’ stances towards the defence industry encourage it to invest in some countries rather than others?
- What directions of change can be discerned in governments’ stances towards the defence industry?
- Do governments aspire to control (and/or sponsor) the overseas investments of defence companies based on their territory?
- Does government policy and behaviour recognise the implications of and questions raised by cross-border investments in the defence industrial sector?

The authors return to these questions in the concluding chapter, having discussed the role of government as customer, sponsor and regulator of defence industries in the intervening chapters. Moreover, a focus on the US, the UK and Germany is maintained because of the significance of these countries to NATO and the relative ease with which data can be sourced. This is in marked contrast to other Western powers, such as France, and to powers such as China and Russia. However, the authors believe that the lessons gleaned from these countries are relevant to the experiences of other states.

There are no iron laws in this area: in principle, the emergence of more 'traditional' collaborative projects, such as Tornado and Typhoon, could reduce the pressure for the strengthening of transnational defence businesses. On the other hand, the presence of a transnational company, such as EADS (to be known as Airbus Group from 2014) or MBDA, could facilitate agreement on such projects and their subsequent delivery. Increased investment in Europe by American defence businesses could enable them to escape some of the constraints of American export controls if they develop technology in Europe. In contrast, if the US government looks to exercise extraterritorial control over technology developed in Europe but owned by American firms, these could become the agents through which US export-control practices are brought into Europe. The authors can aspire only to throw some light on these questions rather than generate final answers, but intend, at least, to make sure that their significance is recognised.