

Institution: University of Manchester
Unit of Assessment: 19 (Business and Management Studies)
Title of case study: Security and Defence Innovation
<p>1. Summary of the impact</p> <p>Research at the University of Manchester on the changing dynamics of defence technological innovation led to policy and practice change including: a changed approach to the strategic management of technology in a leading UK based defence and aerospace multinational company contributing to a radical shift in its funding and a new emphasis on open innovation (BAE Systems); the decision by the Swedish government not to pursue the privatisation of its government defence research laboratories (FOI); and contributing to the development of European Commission policy on security industrial policy. The lead researcher advised key stakeholders using the evidence base from his research through commissioned consultancy, high-level advisory meetings and workshops, industry round tables and conferences, via trade journal articles, using the media in evidence and sessions at the European Parliament.</p>
<p>2. Underpinning research</p> <p>The impacts flow from a programme of research led by Dr Andrew James at the University of Manchester on the nature of the defence innovation system and the organisations, institutions and relationships that underpin defence technological innovation. This research programme began in 1996 when James and Professor Philip Gummatt were funded to undertake a study for the European Commission on the transfer and civil-use of defence-related technologies and has subsequently been funded by a variety of sources including the ESRC; the European Commission (DG Research and DG Enterprise); the European Union Framework Programme (FP6 PRIME network of excellence and FP7); the European Defence Agency; the European Union Research Advisory Board; and BAE Systems. This on-going programme of research has sought to examine the changing dynamics of defence technological innovation, the changing knowledge base underpinning defence [4] and the changing nature of the actors and relationships underpinning the “defence innovation system” (including the internationalisation of the defence industry [2, 5] and the reform of government defence research establishments [1, 3]).</p> <p>Defence R&D and procurement has played a significant role as a stimulus to many important technological innovations as well as having profound implications for international security and society. The defence innovation system has often resisted analysis not least because of the limitations of publicly available information. This programme of research has recognised the importance of this topic and shed light on the dynamics of defence technological innovation.</p> <p>The research has also contributed to understanding of the organisations and relationships that underpin the defence innovation system and their response to changes in their operating environment since the end of the Cold War. The focus on organisation-level case studies of defence firms and government defence research establishments is in contrast to most of the academic work in this field in the UK, Europe and the United States that has been preoccupied with national or industry level structure and trends.</p> <p>Key findings from this research programme include:</p> <ul style="list-style-type: none"> • How dominant themes in the innovation management and policy field (such as “globalisation” and “open innovation”) have been modified by the particularities of the institutional and policy context of the defence and security sector. • The need to examine transnational linkages between nationally-located systems. In particular, it has highlighted the tensions between technological and economic drivers of cooperation and political and security drivers to sustain national capabilities. • The co-evolutionary character of change in the defence innovation system and the changing relationship between government and defence industrial firms. <p>The research programme has been led by James (Research Associate, Research Fellow, Senior Lecturer 1993-present) with significant contributions from Deborah Cox (Research Associate, Research Fellow 1995-present); Dr John Rigby (Research Associate, Senior Research Fellow 1999-present); Professor Philip Gummatt (1973-2001); and Dr Thomas Teichler (Research Associate 2009-</p>

2011) and also benefitted from contributions on open innovation from Professor Jeremy Howells (1996-2011) and Dr Khaleel Malik (1999-present).

3. References to the research

- 1) James, AD, “Radical organisational change and innovation system dynamics: the reform of the UK government defence research establishments”, *Journal of Technology Transfer* Vol. 34, No. 5, 2009: pp.505-523. DOI: 10.1007/s10961-008-9104-0 (3 citations – Google scholar)
- 2) James, AD, “The transatlantic defence R&D gap: causes, consequences and controversies”, *Defence and Peace Economics*, Vol.17, No.3, 2006: pp. 223-238 (13 citations – Google scholar) DOI: 10.1080/10242690600645134
- 3) James, AD, Cox, D and Rigby, J, “Testing the boundaries of Public-Private Partnership: the privatisation of the UK Defence Evaluation & Research Agency”, *Science & Public Policy*, 32 (2), April 2005: pp.155-161 (9 citations – Google Scholar). DOI: 10.3152/147154305781779579
- 4) Howells, J, James, AD and Malik, K, “The sourcing of technological knowledge: distributed innovation processes and dynamic change”, *R&D Management*, Vol.33, No.4, September 2003, pp.395-409 (162 citations – Google scholar) DOI: 10.1111/1467-9310.00306
- 5) James, AD, “The place of the UK defense industry in its national innovation system: co-evolution of national, sectoral and technological systems”, in Reppy, J (ed.) *The Place of the Defense Industry in National Systems of Innovation*, Cornell University Peace Studies Program Occasional Paper 25, 2000 pp.99-128, Cornell University: Ithaca, NY. ISSN 1075-4857. (17 citations – Google scholar) – Copy available on request

[1] and [2] are both published in peer reviewed international journals. [3] is published in a leading international peer reviewed journal. [4] has 162 citations in Google Scholar, and is a peer reviewed international journal. [5] is published as an occasional paper for the Cornell University peace studies program.

4. Details of the impact

Research at the University of Manchester on the changing dynamics of defence technological innovation has led to policy and practice change. The beneficiaries have been a multinational defence aerospace company, a European government and the European Commission.

IMPACT 1: INTRODUCING OPEN INNOVATION IN A LEADING UK DEFENCE AND AEROSPACE MULTINATIONAL

The research has contributed to a changed approach to the strategic management of technology in a leading UK based defence and aerospace multinational company contributing to a radical shift in its funding and a new emphasis on open innovation. BAE Systems is a global defence, aerospace and security company with an annual turnover of over £19 billion employing around 88,200 people worldwide. Research on the changing dynamics of technological knowledge sourcing [1] as well as James' on-going research programme on the changing dynamics of defence technological innovation enabled him to win a funding bid from BAE Systems to undertake a study to evaluate new business models for the BAE Systems Advanced Technology Centre (ATC) (2004-2005) [D]. The research study examined the applicability of a unique open innovation model that addressed the specific needs of the ATC and options for future business models. ATC's "journey" towards an open innovation approach started in 2004 and the Manchester study was the starting point for an on-going dialogue between the Director of the ATC and James on how to implement a move from closed towards more open innovation, improve engagement of the ATC with external sources of technological knowledge and alter its funding. The research provided an evidence base to support the shift in strategy and was used by the ATC Director to gain internal "buy in" within the company.

Impact case study (REF3b)

In his statement [A] the Director of the ATC commented: *“Defence and the ATC have predominantly operated under a more closed innovation model and the work from Andrew James and Manchester Business School was fundamental in starting the journey of the ATC on this “closed” to a more “open” business model.”*

In 2008, BAE Systems launched its Investment in Innovation (I3) programme as a key element of its open innovation strategy. I3 is a multi-million pound annual investment fund for small and medium sized organisations to develop technologies for the company’s defence and security customers. It also provides non-financial support, drawing upon BAE System’s engineering, project management and technology resources including test and evaluation facilities. The Manchester research also stimulated a radical shift in the funding base of the organisation: ATC has moved from a model of 80%:20% internal:external funding to a situation where 80% of its funding comes from outside BAE Systems. At the same time, the business has grown from circa £30m per annum to circa £50m per annum today. The research by James was also used by the Director of the ATC to inform his contribution to a Ministry of Defence-industry examination of open innovation which led to the establishment of the MOD’s Centre for Defence Enterprise (CDE). ATC working with the MoD in a joint National Defence Industries Council (NDIC) Research and Development Working Group helped develop and implement CDE - an on-line innovation portal to access innovations from non-traditional defence suppliers including academia and Small Medium Enterprises – key to the principles of open innovation and in accessing the broader supply chain for defence. This influence of the research of James in this area is further confirmed in the statement [A] from the ATC Director; *“The work was also very influential in the dialogue that the ATC had with the MoD, Science and Technology organisation, (now Dstl) in creating an establishment of the MoD’s Centre for Defence Enterprise (CDE) innovation portal.”*

IMPACT 2: SWEDISH GOVERNMENT DECISION NOT TO PRIVATISE LEADING GOVERNMENT LABORATORY

The research has also had a direct impact on the decision of the Swedish government not to pursue the privatisation of its government defence research laboratories (FOI). In 2010-2011 a Swedish government inquiry investigated the forms of delivery of Swedish defence research (Swedish Government inquiry “SOU 2011-36”). Currently, a major part of Swedish defence research is carried out in-house by government. The inquiry studied options for changed forms of delivery, including privatization. The Swedish Defence Research Agency, FOI, furnished the inquiry with background material for its analysis and recommendations. FOI collected evidence on the changing dynamics of defence research and the reform of government defence research establishments in other countries, including the UK. Three studies by James were identified as directly relevant [1, 3, 5] and James was approached by FOI to provide expert testimony. His research was used as the key source of independent analysis of UK defence laboratory reform, confirmed in a statement [E] from the Coordinator of International Affairs at FOI; *“Three of Dr James’ articles were analysed at FOI together with mostly government-issued material (such as Report from the Defence Select Cttee of the House of Commons) in order to draw conclusions from the UK experience that would be valuable for Sweden”*. In addition, the concept of the defence innovation system used by James in his research was adopted by the inquiry as its intellectual framework for its investigation. This was used by FOI to argue the case towards the inquiry: *“the research that had already been performed by Dr James, proved to be most relevant for our needs and provided a sound basis for our provision of facts to the inquiry”* [E]. Based on the analysis the inquiry [F] listed the policy options but did not propose any change in forms of delivery. The Government has subsequently not pursued the alternative of privatization and defence research will for the time being, continue to be provided within government.

IMPACT 3: FORMULATING EUROPEAN UNION POLICY ON THE SECURITY INDUSTRY

The research has also had a direct impact on the development of policy at the European level and directly shaped COM (2012) 417 Security Industrial Policy [G] and the supporting Commission Staff Working Paper [H, C]. The research standing of Manchester, in the field of defence and security innovation, led James and the Manchester Institute of Innovation Research to be invited in

Impact case study (REF3b)

2010 to join a consortium to provide research services to the European Commission (DG Enterprise) (Framework Contract of Security Studies ENTR/09/050) in support of the preparation of the Commission Communication on Security Industrial Policy. Manchester (James, Rigby and Teichler) participated in a series of high-level workshops with senior Commission officials and contributed to three studies (Study on the pre-commercial procurement in the field of security; Study on civil-military synergies in the field of security; and, Study on regulatory framework, certification and conformity assessment in the security sector). COM (2012) 417 Security Industrial Policy and the supporting Commission Staff Working Paper were published in July 2012 and contain extensive citation of those studies in support of the Commission's policy proposals. A statement [B] from the Deputy Head of the Security Research Unit at the European Commission confirms this contribution: *"Dr James and the Manchester Institute of Innovation Research have actively contributed research that has been underpinning COM (2012) 417 and its supporting Commission Staff Working Document SWD (2012) 233.....the Manchester Institute provided highly valuable analytical support to the Commission"*

5. Sources to corroborate the impact

All sources cross-referenced in section 4.

- A. Letter from Managing Director, BAE Systems Advanced Technology Centre
- B. Letter from Deputy Head of Security Research Unit at the European Commission
- C. Letter from former policy officer in Directorate General for Enterprise and Industry at the European Commission
- D. Header of Report to BAE Systems
- E. Letter from Co-ordinator International Affairs, FOI Swedish Defence Research Agency, SE-164 90 Stockholm, Sweden
- F. Swedish Government inquiry "SOU 2011-36" *Forskning och utveckling samt försvarslogistik – i det reformerade försvaret* (English translation: Research and development and defence logistics in a reformed defence")
- G. Commission Communication, of 30 July 2012 - Security Industrial Policy - Action Plan for an innovative and competitive Security Industry - COM(2012) 417 final Commission Staff Working Paper
- H. European Commission Staff Working Document SWD (2012) 233