

THE WIDER VALUE OF THE BRITISH ARMY

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FOREWORD

The British Army's role in protecting the UK is understood intuitively by many in society. The central role the Army has played in many of the UK's seminal moments is well recognised; be that wars and countering terrorism, or the London Olympics and the Covid-19 response. Few would disagree that the Army is important to the Nation, but unlike a business with a balance sheet that can be easily scrutinised, it is hard to quantify the value of the Army. Indeed, perceptions can often be skewed by this and the Army seen simplistically as an overhead or insurance policy.

In commissioning this study, the Army has asked Oxford Economics to examine the value of the British Army to the Nation. Just like valuing a share price, elements of this are both tangible and intangible. The fact remains that the ultimate reason for maintaining an army is to protect the Nation and help provide a secure environment in which the UK economy and our democracy can flourish. The Army is also part of the fabric of society, contributing beyond its primary purpose in ways that are often unrecognised or unquantified. Determining the value of the Army is a blend of objective and subjective assessment, like a share price, drawing on the full spectrum of the Army's activity. This report lifts the lid.

The report sets out the value of the Army's primary purpose to the UK and then, framed through the lens of National Security Objectives, how the Army creates wider value over-and-above its primary purpose. In doing so, the report demonstrates that the Army is not simply an expensive insurance policy, rather it is constantly offering the Nation a yield on investment.

Of course, this cannot be all empirically quantified. Nonetheless, the report demonstrates how through its added value, the Army is a vehicle for Global Britain, with soldiers routinely deployed in a quarter of the world's countries, projecting influence, promoting prosperity, and defusing threats to the UK before they proliferate. It sets out how the Army is a powerful agent of the levelling-up agenda with a recruiting and basing footprint that injects money and create jobs across the Union, including for some of the country's most deprived areas. Furthermore, it highlights opportunity, particularly in Army support to R&D and exports. And it reveals how the Army contributes to UK culture and the enhancement of the natural environment, with associated economic and societal benefits.

The British Army is here to serve the Nation and will continue to maximise the return on the Nation's investment—protecting the Nation, projecting influence, and promoting prosperity.

Major General R W Wooddise CBE MC
Assistant Chief of the General Staff

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EXECUTIVE SUMMARY

The Army is funded, designed, and structured to deliver its core purpose of protecting the UK, defeating the nation's enemies, dealing with disaster, and preventing future conflict. In doing so, the Army contributes to the security and stability of the UK, ensuring an environment conducive to investment, innovation, international trade and, ultimately, economic growth and prosperity.

Yet while the benefits that the Army delivers through its core purpose are fundamental and far-reaching, assigning value to them is extremely challenging. Successfully deterring and managing threats means that those threats do not materialise, or at least that their impact is minimised. The counterfactual cannot be observed or measured, but the human and economic costs of more frequent periods of war and instability would undoubtedly be significant. War continues to impose costs long after conflict has ended.

One possibility could be to view the Army as an “insurance policy” to ensure the UK is equipped to cope in the worst-case scenario of major conflict. However, such a view might be interpreted as a passive investment which only yields returns when crises arise. The Army actively maintains a preparedness to act and constantly seeks to reinforce its reputation to deter. Its global engagements project the UK's influence, shape events, and are a key pillar of the government's Global Britain agenda.

While the Army is organised and structured to fight wars, it routinely adapts its capabilities to undertake a range of wider activities which benefit the UK. Some of the Army's wider activities are closely related to its core purpose, for example building relationships overseas which help prevent future conflict. Other activities generate wider benefits as by-products of the Army delivering its core purpose. For example, training personnel and investing in innovation enhance operational effectiveness, and also have wider value for the UK economy.

The Army has an annual budget of around £11 billion. In an ideal world we would compare the value of all of the benefits the Army delivers to that cost to understand the return the Army generates for the taxpayer. However, as noted above, it is challenging to attribute monetary values to some of the most important aspects of the Army's work. Nonetheless, there is value in taking stock of the many ways in which the Army delivers value for the UK and, where possible, getting some sense of the scale of these benefits.

In this study we examine, for the first time, the wider value of the British Army. Our main findings are summarised in the diagram below and in the text which follows. We see this study as a starting point for a new programme of research and we hope that, over time, additional information will become available to permit more of the benefits to be quantified. Our recommendations for further research and data gathering are presented in the Appendix.

THE VALUE OF THE BRITISH ARMY TO THE UK

We estimate that the total economic footprint of the Army in 2019 supported **271,000 jobs and £15 billion in GDP**



The Army **disproportionately recruits** from parts of the country where wages are **lower**, providing a source of employment and training where opportunities might otherwise be more limited.



The Army delivers a vast range of training to the thousands of recruits who join each year, and throughout the careers of its personnel. **The Army's training in just one year is conservatively estimated to be worth £550 million.** The same training and opportunities boost social mobility, providing skills, focus and structure to recruits from all backgrounds.



The scale of the Army means it is an important source of jobs and income. **The Army directly employs 117,000 personnel**, drawn from and based in areas right across the UK.

WHILE THE ARMY IS ORGANISED AND STRUCTURED TO FIGHT WARS, IT ROUTINELY ADAPTS ITS CAPABILITIES TO UNDERTAKE A RANGE OF WIDER ACTIVITIES WHICH BENEFIT THE UK



Between 2009 and 2018, UK exports of equipment and services for land-based forces were **worth almost £6 billion.**

For every job the Army supports, a further 1.3 are supported elsewhere in the economy as a result of supply chain or worker spending multiplier effects.



Since the start of 2010/11, the British Army has spent close to **£1.6 billion on R&D** and we estimate this has increased the UK's productive potential by 0.03% per year—equivalent to £730 million in 2019/20.



For every £1 that the Army directly contributes to UK GDP, a further **£1.70 is supported** through multiplier effects.



The Army's scale, resources and expertise can be deployed to assist UK civilian authorities during times of major crisis. In March 2020, **17,800 soldiers were deployed as part of the COVID Support Force.**

The Army undertakes an **extensive range of overseas engagements** to build relationships, promote British interests, help prevent future conflict and reduce the likelihood of threats materialising at home. **In total, 61,000 soldiers were deployed to 128 countries in 2019.**



The Royal Military Academy at Sandhurst (RMAS) trains personnel from other nations in the British Army's approach and ethos, creating lasting relationships with very senior figures from strategically important partner nations. **RMAS is currently training 105 international cadets from 40 countries.**



The Army protects the nation's heritage: it manages important aspects of the MoD's heritage portfolio, which is **similar in size to that of the National Trust.**



State Ceremonial and Public Duties are major attractions that project the UK's heritage to a global audience, **help attract overseas tourists, provide leisure opportunities for UK residents, and support prosperity.**

In the remainder of this section we show how the Army creates wider value for the UK, over-and-above its role in protecting the nation. To provide a structure for the report and a framework for assessing the Army's value, our findings are organised according to the National Security Objectives (NSOs): to protect our people, project global influence, and promote prosperity.

PROTECT OUR PEOPLE

The Army's scale, resources, and expertise mean it is ideally suited to assisting civilian authorities during times of major crisis. The Army provides a response function in areas where it is crucial to retain specialist capabilities and maintain a contingency option for use during times of crisis. This includes responding to major terrorist incidents, disposing of bombs, taking the place of fuel tanker drivers or prison officers during strikes and, as demonstrated during 2020, helping the NHS deal with a national medical emergency. **The MoD provided assistance to civilian authorities on 145 occasions in 2019, with the vast majority of personnel deployed drawn from the Army.** This resource is already funded to deliver the Army's core purpose and reduces the need for other public bodies to invest in their own contingency capacity. In this way, **the Army enhances the nation's resilience to unexpected events, and reduces the human and economic costs of crises and disruption.**

The Army helps to protect the UK's way of life as a by-product of delivering its core purpose. By managing its vast training estate, the Army protects the UK's natural environment and makes land available for the public to enjoy, benefitting health and wellbeing. The Army also protects the UK way of life through its work in heritage and culture. It manages important aspects of the MoD's heritage portfolio, which is similar in size to that of the National Trust, and **the Army has close links to more than 50 museums.** These assets provide visitation and engagement opportunities which **contribute to the UK's sense of identity and place; enhance health and wellbeing; and create unique educational opportunities.** The museums also contribute to the UK's prosperity through the visitor economy and through their own operations—research for the Arts Council found that **150 Armed Forces or MoD-funded museums employed more than 1,000 people and contributed £30 million to GDP.**

PROJECT OUR GLOBAL INFLUENCE

The Army undertakes an extensive range of overseas engagements to build relationships, promote British interests, help prevent future conflict, and reduce the likelihood of threats materialising at home. Many engagements are not widely known, but on a single day in 2019 more than 5,000 soldiers were deployed across 47 countries. **A total of 61,000 soldiers were deployed to 128 countries during 2019.** Overseas activities include providing humanitarian assistance and disaster relief, for which the Army's unique crisis-planning skills can be of considerable value, and delivering training to partners and allies in strategically important parts of the world. **Such activities enable the UK to maintain a "licence to operate" in many parts of the world which might otherwise succumb to instability** or fall under the influence of states with interests which do not align with those of the UK. The Army also exchanges personnel with other countries' armed forces and leads

international conservation initiatives, enabling the UK to demonstrate global leadership on environmental issues.

Closer to home, the Army delivers activities which enhance the UK's "soft power" by promoting British values, heritage and culture. For example, the Royal Military Academy at Sandhurst (RMAS) trains personnel from other nations in the British Army's approach and ethos, creating lasting relationships with very senior figures from strategically important partner nations. **RMAS is currently training 105 international cadets from 40 countries** and alumni include eight serving heads of state in the Middle East, Europe, Africa, and Asia, and more than a dozen crown princes, heads of defence or armies, and people in unique positions of responsibility.

The Army also contributes to the UK's soft power through State Ceremonial and Public Duties, and major events such as the Royal Edinburgh Military Tattoo, which attracts a global TV audience of more than 100 million. **These activities are major attractions that provide leisure opportunities for UK residents, attract overseas tourists, project the UK's heritage to a global audience, and support prosperity.** The prestigious Army regiments who deliver ceremonial duties are drawn from all parts of the UK, **reinforcing the notion of the Union between the four nations of the UK.**

PROMOTE OUR PROSPERITY

The scale of the Army means that it is an important source of jobs and income. The Army directly employs 117,000 personnel, drawn from and based in areas right across the UK. This geographical dispersion means that the Army is already operating in accordance with the government's ambition to spread prosperity more evenly across the UK.

The Army directly contributes £5.5 billion to UK GDP, but makes a much larger contribution through its procurement expenditures and as a result of workers' spending. **We estimate that the total economic footprint of the Army in 2019 supported 271,000 jobs and £15 billion in GDP.** This impact can be particularly important to local economies close to major bases. The results also indicate that that **for every job that the Army directly supports, a further 1.3 are supported elsewhere in the economy as a result of supply chain or worker spending multiplier effects.** Similarly, **for every £1 that the Army contributes to the UK directly, a further £1.70 is supported through multiplier effects.**

The Army's activities to deliver its core purpose contribute to the UK's long-term productivity and prosperity. For example, while the Army undertakes research and development with the aim of increasing its operational effectiveness, such investment creates wider spillover benefits as the knowledge and knowhow developed are disseminated and put to other uses. **Since the start of 2010/11, the British Army has spent close to £1.6 billion on R&D** and we estimate this has increased the UK's productive potential by 0.03% per year—equivalent to £730 million in 2019/20.

The Army delivers a vast range of training to the thousands of recruits who join each year, and throughout the careers of its personnel. This training enhances soldiers' effectiveness within the Army and benefits the UK

more widely when soldiers transition into civilian roles. **We estimate the value of training delivered by the Army in just one year to be more than £550 million.** This result is conservative since it only relates to a subset of Army training which can be equated to formal education.

The same training and opportunities boost social mobility, providing skills, focus, and structure to recruits from all backgrounds. This impact is particularly seen amongst junior soldiers who join at the age of 16 or 17. In 2019 60% of these had only Level 0 or Level 1 qualifications. Within this group, more than 80% achieved a Level 2 literacy qualification by the time they were 19, compared with 21% in the wider population.

Between 2009 and 2018, **UK exports of equipment and services for land-based forces were worth almost £6 billion, or 7% of UK defence exports. The Army supports UK defence companies in their efforts to sell to overseas armies.** This not only boosts exports, benefitting UK jobs, income and innovation, but provides a further opportunity for defence engagement with partners and allies.

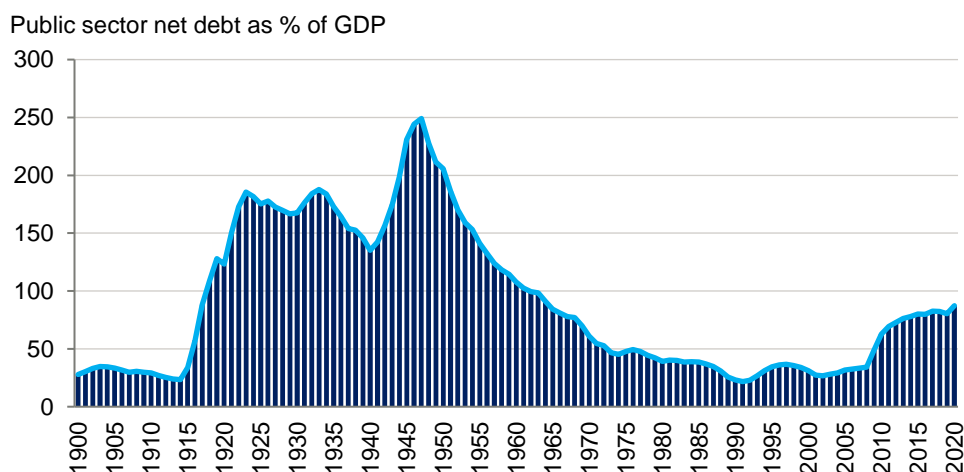
1. INTRODUCTION

1.1 THE CORE PURPOSE OF THE BRITISH ARMY

The Army exists to protect the UK, defeat the nation's enemies, deal with disaster and prevent future conflicts.

History shows that war is expensive, in both human and economic terms. A simple illustration is provided by the chart below which shows how UK public sector debt increased sharply during both the First and Second World Wars. Separate data from the Ministry of Defence suggest that defence spending rose to around 40% to 50% of GDP during those periods.¹

Fig. 1. UK public sector debt



Source: OBR, ukpublicspending.co.uk (Chart D.13t)

More detailed research has found that two of the five peaks in world indebtedness since 1900 were due to major wars.² Another study identified that war can have large effects on international trade, national income, and global economic welfare, and that war continues to impose costs long after conflict has ended.³

It follows that much of the Army's activity is focused on preventing conflict and the costs it entails. The Army's structures, expertise, and infrastructure provide a range of response options to deter adversaries, from a single soldier protecting a policeman at home to an entire warfighting division as part of the NATO alliance.

¹ Source: MoD data provided directly to the authors for this study.

² Carmen M. Reinhart and M. Belen Sbrancia, *The Liquidation of Government Debt* (NBER Working Paper Series 16893, 2011).

³ Reuven Glick and Alan M. Taylor, *Collateral Damage: trade disruption and the economic impact of war* (The Review of Economics and Statistics, 92(1), 2010), pp.102-127.

This military capacity to act in a meaningful way reinforces the global status of the UK and underpins the ambition of UK foreign policy. Nations with similar global aspirations dedicate significant resources to defence and maintain sizeable military forces.

Fig. 2. Defence expenditure, 2019, total US\$ amount and % of GDP

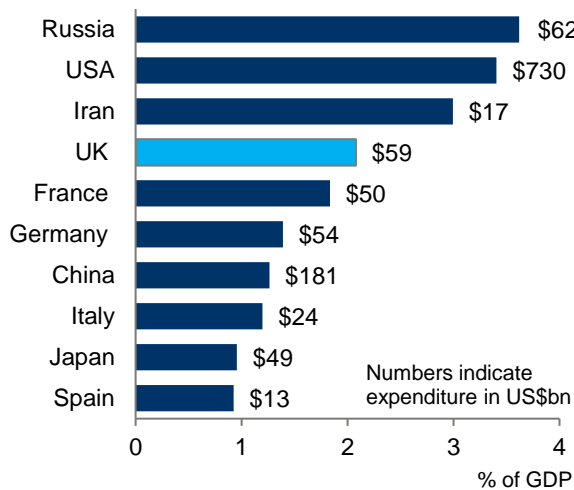
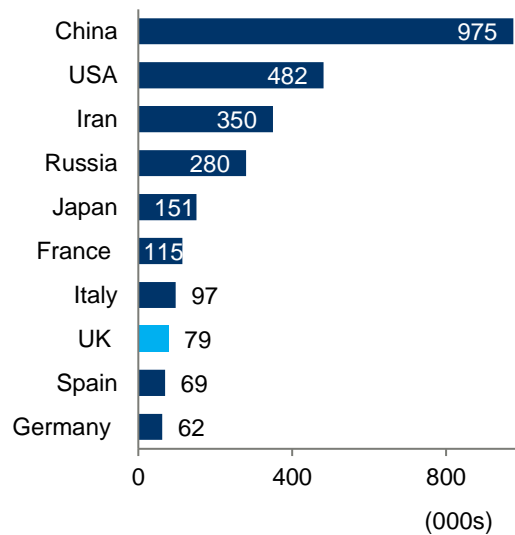


Fig. 3. Army size: regular uniformed personnel



Source: The Military Balance 2020: The annual assessment of global military capabilities, Defence Economics

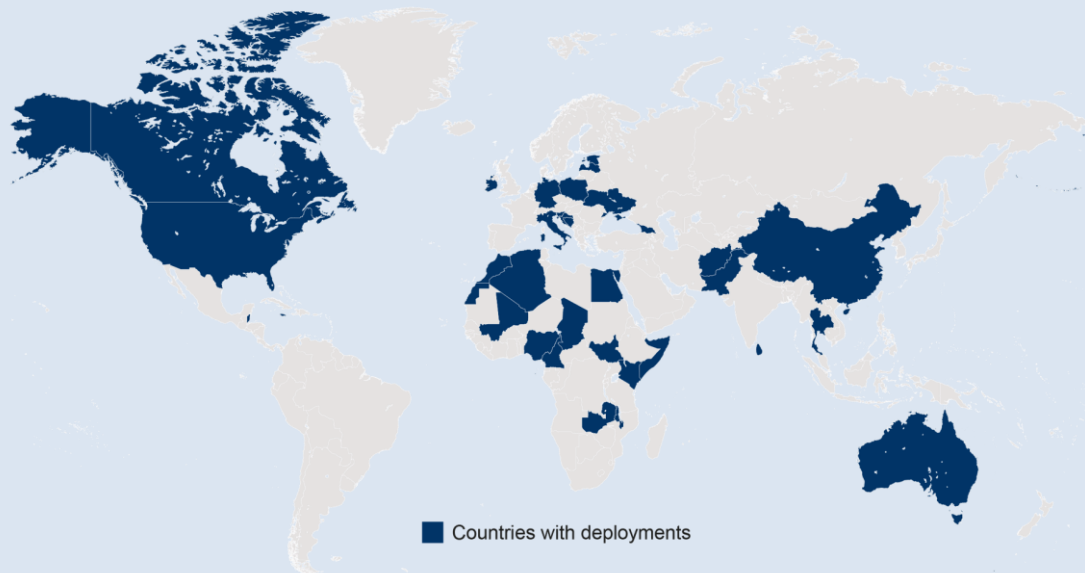
To prevent threats reaching the UK, the Army is continuously engaged worldwide. This global presence aims to strengthen international alliances and partnerships, deter adversaries, and contribute to UK influence and prosperity through the employment of both soft and hard power. It may adopt many guises including combat operations, overseas exercises, exchange programmes, and liaison posts.

The Army's global reputation means other nations who need assistance in building the capacity of their own armed forces turn to the British Army for support. By investing time and resources into expanding the capacity of partners in the places that matter most abroad, the Army seeks to reduce the likelihood of external threats materialising at home.

OPERATIONS

The map below presents a snapshot of overseas operations and training missions to support the Army's efforts to protect the UK and prevent future conflicts. On a single day in September 2019, over 5,000 soldiers were deployed across 47 countries, equivalent to one-quarter of all countries of the world. In total during 2019, the Army deployed over 61,000 soldiers to 128 countries on operations and training missions.

Fig. 4. Snapshot of British Army overseas deployments on 17 September 2019



By protecting the nation and reducing the risk of conflict, the Army helps to provide a secure and stable environment conducive to investment, innovation, and international trade. All of these things are key drivers of long-term prosperity.

1.2 OBJECTIVES AND STRUCTURE OF THIS REPORT

While the benefits that the Army delivers through its core purpose are fundamental and far-reaching, assigning value to that core purpose is extremely challenging.

Successfully deterring and managing threats means that those threats do not materialise, or at least that their impact is minimised. The counterfactual cannot be observed or measured. One approach could be to view the Army as an insurance policy to ensure the UK is equipped to cope in the worst-case scenario of major conflict. However, such a view might be interpreted as a passive investment which only yields returns when crises arise. The Army actively maintains a preparedness to act and constantly seeks to reinforce its reputation to deter. Its global engagements project the UK's influence, shape events, and are a key pillar of the government's Global Britain agenda.

In light of such challenges we do not seek to estimate the value of the Army's core purpose in this study. Instead, we explore the numerous other ways in which the Army creates value for the UK. While the Army is organised and structured to fight wars it is routinely able to adapt these structures to conduct an array of other activities which benefit the UK.

Where possible, we quantify these activities and highlight how they create economic and social value. In some cases we can estimate the monetary value of benefits, while in others the benefits are less tangible and can only be described qualitatively.

To help understand how the Army delivers benefits that are valued by the nation, our report is organised according to the UK's National Security Objectives (NSOs): to protect our people, project global influence, and promote prosperity.⁴ For simplicity we place benefits under a primary objective, as outlined below, but in reality many of the Army's activities are multifaceted and contribute to multiple objectives.

We start in Chapter 2 by outlining the Army's wider contribution to the **protecting people** NSO. We consider how the Army bolsters the UK's resilience to unexpected events at home by providing support to civilian authorities in times of crisis, and how it protects the UK's way of life through activities to preserve the UK's natural environment and heritage.

In Chapter 3 we highlight the Army's role in **projecting influence** through its work to strengthen relationships with allies and partners, with the ultimate aim of reducing the risk of conflict. This includes the Army's work to deliver training to other countries' armies; provide humanitarian assistance and disaster relief; and its engagement with partners through the Army overseas network. Chapter 3 also shows how the Army projects influence through activities in the UK, including through the Royal Military Academy at Sandhurst and State Ceremonial and Public Duties.

Chapter 4 focuses on **promoting prosperity**. We estimate the "economic footprint" of the Army in its role as one of the UK's largest public sector employers and show how it creates jobs, promotes social mobility, and delivers other economic impacts across all parts of the UK. We also explore how the Army promotes prosperity for the long term through innovation and training, and by supporting the UK's defence exporters.

ACKNOWLEDGEMENTS

This study draws on data and insights from a wide range of sources. As well as the review and analysis of published data, we accumulated a large quantity of evidence through consultations and correspondence with many representatives from the British Army. We also benefitted from the insights of Defence Economics on the technical aspects of the research. We extend our thanks to everyone who gave up their time to contribute to the study.

⁴ HM Government, *National Security Strategy and Strategic Defence and Security* (2015).

2. PROTECT OUR PEOPLE

Protecting the UK population is at the very heart of the Army's core purpose. The most high-profile way in which the Army protects the nation's people and interests is through its operations, and by providing a credible deterrent as part of the NATO alliance. As outlined in the introduction, this is of intrinsic value to the nation, but placing a value on this protection is extremely challenging and we do not seek to do so here.

Instead we focus on the additional ways in which the Army contributes to the Protect Our People NSO through activities that it delivers within the UK. Most notably, the Army works closely with civilian authorities to enhance the UK's resilience to unexpected events at home, whether through the safe disposal of bombs or supporting the UK's response to COVID-19.

The Army also makes an important contribution to protecting the UK's way of life, through various activities which are a by-product of its core purpose—most notably the protection of the UK's natural environment and heritage.

Many of the activities discussed in this chapter not only protect the UK population and way of life, but also contribute to a stable and prosperous nation, and therefore the prosperity NSO.

2.1 SUPPORTING THE UK'S RESILIENCE TO UNEXPECTED EVENTS

2.1.1 Military Aid to the Civil Authorities

The Army is unique in terms of the scale of resources, breadth of expertise, equipment, and infrastructure it can rapidly deploy during times of crisis. These assets are primarily intended to enable the Army to fight wars and protect the nation. Nonetheless, the Army can also be called upon to deploy its personnel and capabilities to support government departments in the nation's response to national emergencies. Such situations are known as "Military Aid to the Civil Authorities" (MACA).

MACA may be authorised when the following conditions are met:⁵

- There is a definite need to act and there are clearly defined tasks for the Armed Forces.
- Other options (e.g. mutual aid or commercial alternatives) have been ruled out.
- The civil authority either lacks the capability or cannot deploy urgently or at a sufficiently large scale.

⁵ Ministry of Defence, "2015 to 2020 government policy: Military Aid to the Civil Authorities for activities in the UK" <<https://www.gov.uk/government/publications/2015-to-2020-government-policy-military-aid-to-the-civil-authorities-for-activities-in-the-uk/2015-to-2020-government-policy-military-aid-to-the-civil-authorities-for-activities-in-the-uk>> [accessed November 2020].

In short, military resources can be used once the resources needed to manage a crisis exceed those available from the contingencies held by civilian authorities.

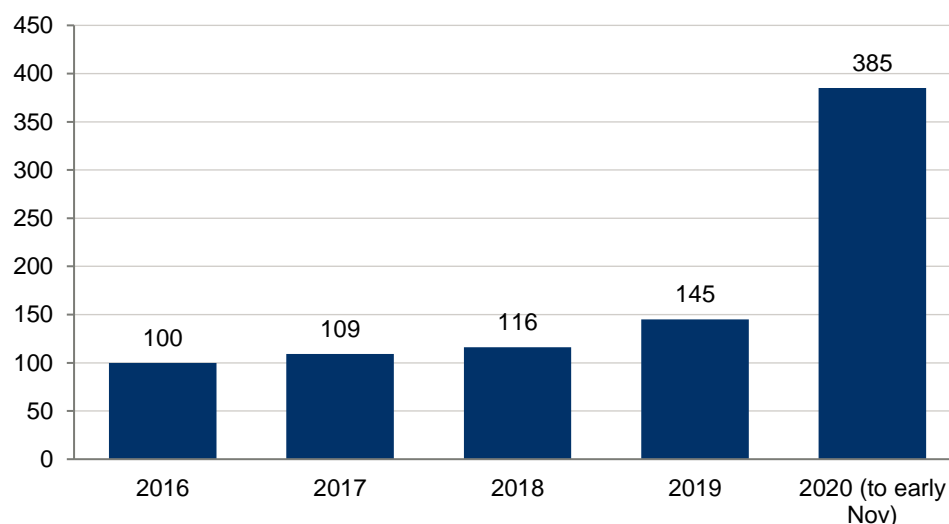
This means that the Army, along with partners from the wider defence community, provides a vital safety net, increasing the UK's resilience to unexpected events. In turn, this reduces the economic and social cost of unexpected disruption.

MACA may also have benefits for the taxpayer since it makes use of contingency resources which are already funded for other purposes. If MACA were not available, the damage and disruption caused by unexpected events would be greater, implying increased disruption and higher costs for response and recovery. Alternatively, in the absence of MACA, other public bodies would likely need to make greater investments to bolster their own contingency capacity—investments which might plausibly involve spending on personnel and equipment which are seldom used.

2.1.2 Ongoing Army MACA commitments

The MoD provided MACA on 145 occasions in 2019, up from 100 in 2016, with the vast majority of personnel deployed drawn from the Army. The number of MACA requests leapt in 2020, largely as a result of activity related to COVID-19 (see Section 2.1.3).

Fig. 5. Number of MACA requests, 2016-2020



Source: British Army

Three Army battalions totalling 1,200 soldiers are on round-the-clock standby to support efforts requiring a very rapid response, in addition to their regular duties. More broadly, a total of 18,500 Army personnel are committed to ongoing operations, or to operations contingent on specific events, again the vast majority being over and above routine duties. Key examples of current ongoing commitments are described below.

Operation **Temperer** is a contingency plan to deploy troops to support police officers in the event of a major terrorist attack. It is difficult to imagine that the

UK would have no capability for responding to such events and if the Army did not provide this contingency, it is likely that the police would need to put in place additional resources and capabilities. Assessing precisely how much additional police resource would be needed is complex, not least because putting one soldier on duty can free up more than one police officer for other duties.⁶ Nonetheless, discussions with stakeholders identified that Temperer is an essential component of the UK's response capability, particularly when there is a need to rapidly deploy large numbers of additional personnel.

Operation **Escalin** ensures the movement of fuel supplies in the event of a fuel tanker strike. The Army's contribution seeks to minimise disruption which, during previous fuel strikes, has been extremely wide ranging. Experience during the refinery and fuel depot blockades in 2000 demonstrated how fuel shortages impact on people's ability to travel to work and make leisure trips, either by private car or public transport. Such disruptions can also quickly lead to wider disruptions, such as to supermarket supplies, manufacturing supply chains, and to the operation of the NHS (due to impacts on deliveries and transport for patients and staff).^{7,8}

Another example of MACA is Operation **Quickthorn**—a contingency plan to support the Prison Service in the event of strikes.

The Army is well suited to intervening in the kinds of situations outlined above. As well as having a large critical mass of personnel that can be deployed extremely rapidly, Army personnel are disciplined, organised and have received leadership training at all levels. What is more, they possess unique crisis planning skills which have been learned for war, but which can be repurposed for other situations, as demonstrated by the examples below.

⁶ Purely as an indication of the value of freeing up police officers' time for other duties, in London it costs £72,500 per year to employ one police constable. Source: Mayor of London, "Police Officer Costs" <<https://www.london.gov.uk/questions/2018/3205>> [accessed November 2020].

⁷ BBC News, "Fuel crisis starts to bite" <<http://news.bbc.co.uk/1/hi/uk/923543.stm>> [accessed November 2020].

⁸ The Information Warfare Site, "Impact of September 2000 Fuel Price Protests on UK Critical Infrastructure" <<http://www.iwar.org.uk/cip/resources/PSEPC/fuel-price-protests.html>> [accessed November 2020].

MACA CASE STUDY: BOMB DISPOSAL

The Army retains niche capabilities which are essential to its primary role, but which are also routinely used to support the police in ensuring public safety and minimising disruption from security incidents. In particular, the Army has Explosive Ordnance Disposal (EOD) teams located across the UK. These are called upon around 2,500 times every year. If the Army did not provide these capabilities, they would need to be developed separately, most likely by the police. Two recent examples of bomb disposal incidents are outlined below.

Belfast docks Improvised Explosive Device

In January 2020, police were notified of an improvised explosive device (IED) on a lorry at Belfast docks, bound for Scotland. Searches were carried out and the bomb was located on an industrial estate. The Army provided personnel, including an EOD team, helping to prevent an incident that could have caused significant casualties and damage.

In such situations, the Army's ability to quickly respond and put in place personnel with the requisite skills can be invaluable. In this case the benefit was to minimise disruption to trade flows through the port.

An average of 15 vessels per day arrived at Belfast in 2019, comprising 10 roll-on roll-off vessels, and four other container or cargo vessels.⁹ Closing the port, or elements of it, would risk disrupting these vessels and other aspects of the port's operations. Previous academic research has identified how port disruption can impose costs on diverse parties.¹⁰ Firstly, the port itself may suffer lost income and reputational damage from disruption.¹¹ Secondly, manufacturers who use imported inputs may suffer disruption to their supply chains and production process. Thirdly, there are impacts on shipping companies, many of whom may operate to tight time schedules and incur additional staff, operating and fuel costs if vessels are delayed.¹²

Estimating the costs that all of these parties would have incurred if the Army had not been available to swiftly resolve the situation at Belfast is challenging, but it is clear that an extended period of disruption at a major infrastructure hub can impose financial costs with consequences far beyond the hub itself. The effort that the UK is dedicating to post-BREXIT planning to ensure the movement of goods through ports provides an indication of the crucial role that ports play in the economy.

⁹ DfT port ship arrivals from 2009 by vessel type and size. Annual values from "table port0601" divided by 365.

¹⁰ As noted by Gharehgozli et al., *Evaluating a "wicked problem": A conceptual framework on seaport resiliency in the event of weather disruptions* (Technological Forecasting & Social Change, 121, 2016), pp. 65-75., "studies focused on port disruptions and on improving port resilience are still sparse, showing that the topics have not yet received substantial attention in the literature". Nonetheless, some researchers have estimated the financial costs of port disruptions, but typically these studies focus on extended periods of disruption at very large US ports and their findings are unlikely to be applicable to Belfast. See, for example, Vera Wendler-Bosco and Charles Nicholson, *Port disruption impact on the maritime supply chain: a literature review* (Sustainable and Resilient Infrastructure, 2019), pp. 378-394.

¹¹ In 2019 the turnover of Belfast Harbour was £65.9 million, or an average of just over £180,000 per day. Source: Belfast Harbour, *Annual Report & Accounts* (2020).

¹² Vera Wendler-Bosco and Charles Nicholson, *Port disruption impact on the maritime supply chain: a literature review* (Sustainable and Resilient Infrastructure, 2020), pp.378-394.

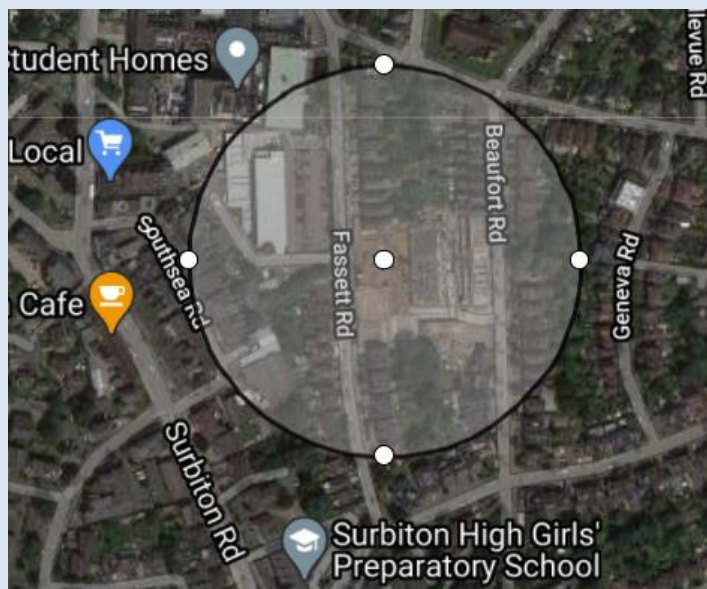
Kingston WW2 bomb

In May 2019, construction work uncovered a World War 2 German 250kg bomb in Kingston-upon-Thames. The bomb was found on a building site in an urbanised area surrounded by residential properties and one of Kingston University's main teaching and learning buildings. It was also close to a gas pipeline. There was therefore a significant risk to life and of damage to nearby properties (Fig. 6).

At least 1,500 people were evacuated in a multi-agency operation, and gas and water supplies were disconnected. A specialist Army EOD Team was deployed and identified that the bomb could not be moved. Due to its age and deteriorated state, there was no way to defuse the bomb and Army Engineers undertook protective works to place around 350 tonnes of sand around the bomb.

The EOD Team destroyed the bomb in a controlled explosion. This removed the threat to life and the risk of property damage, and the gas pipeline survived intact. As such the community was able to swiftly return to normality.

Fig. 6. Indicative radius for potential casualties if there had been an uncontrolled explosion in Kingston¹³



¹³ Data obtained from British Army, plotted using <https://www.mapdevelopers.com/draw-circle-tool.php>.

2.1.3 The Army's role in the UK's response to COVID-19

In March 2020, a COVID Support Force (CSF) was put in place to support public services in the midst of the outbreak. Approximately 20,000 military personnel were called in (of which 17,800 were from the Army) to perform extraordinary tasks or stand ready. Just a few examples of the ways in which the Army contributed are outlined below.

National Testing Programme

To meet the National Testing Programme's targets, a logistics team was deployed to the National Biocentre at Milton Keynes. It introduced several operational changes, including a new inventory system and a complete stock check. This was one factor in helping the centre's testing capacity to increase from 300 tests a week to 30,000 a day.

Mobile testing

The Army responded rapidly to a request on 11 April to provide UK-wide mobile testing facilities. The Royal Engineers built and developed a prototype mobile testing unit (MTU) within four days, ahead of a demonstration. A full development programme was then put in place, to meet the requirement of the capacity to carry out 12,000 tests a day by 30 April. Over 1,200 military personnel were allocated to help with the initial request of 92 MTUs, including front-line crew, support crew, and planners. This was increased to a request for 236 MTUs by the end of July, with a total of 3,100 personnel fulfilling this capability.

The MoD subsequently trained civilian contractors to operate the MTUs independently.

Construction of Nightingale Hospitals

The military played a supporting role in the creation of the eight Nightingale hospitals in England and Scotland, and 18 smaller medical facilities across Wales. Soldiers from the Army were involved in a wide variety of tasks including construction and plumbing. The Army's involvement enabled the works to be completed extremely swiftly and likely at lower cost than if private contractors had been engaged. The Army was also involved in the provision of Trauma Risk Management (TRiM) to NHS staff on the frontline.¹⁴ This has been found to "support traumatised staff, reduce sickness and facilitate access to professional care".¹⁵

¹⁴ TRiM is a novel system of post incident management first used by the British Army in Afghanistan. It is a process which allows commanders to provide support to their subordinates in the aftermath of traumatic events.

¹⁵ Neil Greenberg and Derek Tracy, *What healthcare leaders need to do to protect the psychological well-being of frontline staff in the COVID-19 pandemic* (BMJ Leader, 2020), pp.101-102.

MACA CASE STUDY: OP 2012 OLYMPICS

Another example of the benefits the Army can provide in its role as a contingency reserve to support civilian authorities was in evidence during the 2012 London Olympic Games. The Army had already been earmarked for various duties at the Games, but their contribution (and that of the other Armed Forces) increased significantly when it became clear two weeks before the Games that a private company contracted to provide 10,000 venue security staff would be unable to provide sufficient personnel to fulfil its contract.

Up to 18,200 service personnel were deployed on peak days of the Games, and over the entire event the Army supplied two-thirds of all personnel from the Armed Forces. These individuals supported up to 15,000 police officers on peak days.¹⁶

The Army undertook a range of duties. It was central to ensuring the security of the games, and was involved in command and control functions, helicopter support, counter-terrorism work, and bomb disposal and searches. It also played a major role in the main operation of the games, providing personnel for venue security, performing ceremonial duties, and contributing a contingency force of further personnel who could be deployed at short notice if required.

The contribution of the Armed Forces to the success of the Games has been highlighted by many senior figures, including the then prime minister David Cameron: *"We were hosting the world's biggest event, and we hadn't got enough security guards. Thank God there were troops on standby... As ever, our service personnel were amazing, and the public loved their presence, which added to the patriotic atmosphere."*¹⁷

And Lord Coe, Chair of the London 2012 organising committee commented: *"We were able to draw down on the extraordinary commitment of the military and from police forces around the country... The military became one of the defining characteristics in the delivery of the Games."*¹⁸

¹⁶ House of Commons Home Affairs Committee, *Olympics security* (Seventh Report of Session 2012-13 Volume I, 2012), p.2.

¹⁷ David Cameron, *For the Record* (William Collins, 2019), p.377.

¹⁸ Lord Coe, "Oral evidence to House of Commons Home Affairs Committee session on Olympic Security" <<https://publications.parliament.uk/pa/cm201213/cmselect/cmhaff/uc531-iii/uc53101.htm>> [accessed November 2020].

2.2 PROTECTING THE UK'S WAY OF LIFE

To deliver its core purpose, and operate at the scale it has, the Army manages a vast estate of land and buildings. It also manages significant collections of artefacts that provide a record of the UK's military history. Through these activities the Army helps to protect the UK's natural environment and cultural heritage, and therefore contributes to the UK's way of life. These activities also contribute to prosperity through their role in the UK's visitor economy.

In this section we outline the Army's activities in these areas and discuss the ways in which they create value for the UK.

2.2.1 Protecting the natural environment

The Army's activities, particularly training, require large areas of land which must be carefully managed. The Army's training estate covers almost 2% of the UK and provides realistic training across a variety of challenging terrain. The largest area is Salisbury Plain Training Area, which extends over 38,000 hectares.

HOW DOES THE NATURAL ENVIRONMENT GENERATE VALUE FOR THE UK?

As noted in the government's National Ecosystem Assessment: "*We depend on [ecosystems] to produce our food, regulate water supplies and climate, and breakdown waste products. We also value them in less obvious ways: contact with nature gives pleasure, provides recreation and is known to have a positive impact on long-term health and happiness.*"¹⁹

Research for DEFRA estimates that the ecosystem contributed £10.5 billion to UK GDP in 2017 through spending on day trips and overnight stays for tourism and outdoor leisure purposes.²⁰

The wellbeing value of the natural environment is recognised within the Office for National Statistics' "Measures of National Wellbeing" Dashboard,²¹ which includes indices for accessing the natural environment and protected areas.

The value of nature reserves has been highlighted in research by the Royal Society for the Protection of Birds.²² That research identified that the RSPB's reserves play a crucial ecological role by preserving species and habitats, but also provide opportunities for people to visit and receive the health, educational, and wellbeing benefits which result from spending time in the natural environment. The RSPB estimated that 10 of its reserves supported £66 million of spending in surrounding local economies in 2009, as a result of the employment supported at reserves; local spending by employees, volunteers and visitors; and spending by the reserves themselves.

¹⁹ Annela Anger et al., *UK National Ecosystem Assessment: Synthesis of the Key Findings* (UNEP-WCMC, 2014), p. 5.

²⁰ Eftec et al., *The ecosystem contribution to tourism and outdoor leisure* (Defra, 2019).

²¹ ONS, "Measures of National Well-being Dashboard"

<<https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/measuresofnationalwellbeingdashboard/2018-04-25>> [accessed November 2020].

²² Dominic Molloy et al., *RSPB Reserves and Local Economies* (RSPB, 2011), p.9.

By managing this land the Army plays a significant role in protecting the UK's natural environment. This environmental management, and the fact that many areas are made available for use by others, creates wider value for the UK's wellbeing and prosperity.

Ministry of Defence (MoD) training areas, the majority of which are primarily used and managed by the Army, have largely escaped intensive agriculture, fragmentation, and urban development, and form a vital resource from which species can move out into the wider countryside. The MoD is responsible for approximately 170 Sites of Special Scientific Interest or Areas of Special Scientific Interest. More than 130 of these also have international or European designations. The Defence Training estate has 18,000 hectares of forestry, which is actively managed. Some 500,000 trees have been replanted over the past two years.

MOD sites are also important at the regional or local level as Local Nature Reserves or Sites of Importance for Nature Conservation.

The MOD encourages public access, when appropriate, and is responsible for ensuring the military training estate is maintained and safe for the public and other users. This provides opportunities for the public to engage in outdoor activities such as walking and realise the associated benefits for health and wellbeing.²³

Other government departments and organisations also benefit from the land, including the police, cadet associations, and car rallies. The estate is made available to the UK film and television industry for filming purposes. Recent productions have included *1917*, *James Bond*, and *Top Gear*—these are productions which are important sources of revenue for the UK creative industries, and which share and promote British culture with large overseas audiences. Individuals using land or buildings on the training estate pay a fee, and the profits from these arrangements are reinvested into management of the estate.

²³ For a review of the health benefits of outdoor exercise, see Caoimhe Twohig-Bennett and Andy Jones, *The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and health outcomes* (Environmental Research, 166, 2018), pp.628-637.

CONSERVATION CASE STUDY: FOXGLOVE COVERT NATURE RESERVE

Foxglove Covert is located on the Army's training estate in Catterick. It is recognised nationally as providing a unique mosaic of wildlife habitats, and is home to 2,776 species, including several red-listed threatened species. The reserve's field centre has won various awards as a centre of excellence. The reserve's wetlands are recognised by freshwater ecologists as amongst the 10 most important in the country, and form part of Natural England's Flagship Ponds project.

Since it opened in 1992, Foxglove Covert has received 747,000 visitors, including more than 42,000 schoolchildren on educational visits. It has also received 65,000 hours of volunteer time from local civilian and military communities over the last four years.

Foxglove Covert is a centre of excellence for bird ringers, whose work provides valuable insights into the movements and survival of birds. Some 285 bird ringers have been trained on courses run at the reserve. 127,000 birds have been processed on site, and more than 63,000 new birds have been ringed.

Beyond its ecological importance, Foxglove Covert provides a focal point for the area's community groups. These include conservation-related groups such as the Police Wildlife Crime Unit, Badger Group, Heritage Skills, and the North Yorkshire Biodiversity Action Plan. The reserve also supports MOD community groups and Help for Heroes, and provides facilities for the military community, including an Eco Club for children, and the hosting of events at Halloween, Easter, and so on. Such community engagement can create a range of benefits for participants in terms of health, self-efficacy and social support.²⁴ The Cabinet Office calculated in 2011 that wellbeing benefits of frequent volunteering could be worth as much as £13,500 per person per year.²⁵

²⁴ A. O'Mara-Eves et al., *Community engagement to reduce inequalities in health: a systematic review, meta-analysis and economic analysis* (Public Health Research, 1.4, 2013).

²⁵ Daniel Fujiwara, Paul Oroyemi and Ewen McKinnon, *Wellbeing and civil society: estimating the value of volunteering using subjective wellbeing data* (Department for Work and Pensions Working Paper, 112, 2013), p. 20.

2.2.2 Protecting the UK's cultural heritage

The Army contributes to the UK's cultural heritage through its portfolio of historic monuments, ceremonial activities, and museums.

The Army's heritage portfolio

HOW DOES HERITAGE CREATE VALUE FOR THE UK?

Research by Historic England sets out how heritage generates value.²⁶ Heritage contributes to our knowledge and sense of identity, and helps places to feel "special". Participating in heritage-related activities can positively contribute to personal development, wellbeing, and health. The report cites research suggesting that visiting heritage improves individuals' wellbeing to the value of £1,600 per person per year. Heritage also increases the UK's attractiveness as a place to work, study, or do business. Previous research by Oxford Economics has investigated the value of heritage tourism.²⁷ This revealed that in 2015 domestic and international tourists made 192 million trips to visit the UK's cultural, historic, and natural heritage assets. The heritage tourism sector supported £20.2 billion to GDP, broken down as follows:

- The **natural heritage** sector supported the largest GDP contribution at £9.2 billion. This includes visits to gardens, parks, beaches, wildlife attractions, and nature reserves, and countryside.
- **Historic built environments**, such as museums, castles, religious buildings, historic houses, and palaces supported £7.2 billion of GDP.
- **Museums and galleries** supported £3.8 billion of GDP.

The MoD manages a heritage portfolio which is similar in size to that of the National Trust.²⁸ It includes 779 Scheduled Monuments, parts of 10 world heritage sites, six registered battlefields, and thousands of non-designated archaeological sites. The Army has 481 listed structures on its estate, nearly half of all the MoD's 1,062 total.

²⁶ Historic England, "The Value and Impact of Heritage" <<https://historicengland.org.uk/content/heritage-counts/pub/2014/value-impact-chapter-pdf/>> [accessed November 2020].

²⁷ Oxford Economics, *The Impact of Heritage Tourism for the UK Economy* (2016).

²⁸ Source: British Army

Museums

HOW DO THE ARTS AND CULTURE GENERATE VALUE FOR THE UK?

The Arts Council has identified that arts and culture create value for people and society in four main ways:²⁹

- They build a sense of **society** by celebrating the diversity of our national identity; creating a sense of national pride; contributing to community cohesion; and reducing social exclusion and isolation.
- They contribute to the **health and wellbeing** of those who participate.
- They support **economic activity** amongst organisations within the sector, and by attracting visitors to cultural attractions.
- They provide **educational opportunities** for students of all levels and participation in certain cultural activities can enhance attainment.

A separate report for the Arts Council investigated the economic contribution of museums in more depth.³⁰ It found that in 2012/13, the sector directly supported 38,000 jobs and £1.45 billion in GDP across more than 2,700 sites. Within this total, 150 Armed Forces or MoD-funded museums were found to employ more than 1,000 people and contribute £30 million to GDP. The study also identified that museums generated a range of wider economic impacts. These included their contribution to the tourism, regeneration, local economic development, learning and skills, health and wellbeing, and cultural diplomacy.

As noted in the box above, museums deliver important economic benefits by contributing to the UK's visitor offer, as well as wider social, educational, and well-being benefits. The Army has close links to more than 50 museums across the whole of the UK, to which it contributes not only a strong sense of identity, but also funding, leadership, and other types of practical support. The museums house collections of military artefacts, which together received more than 5 million visits in 2017. Many of the Army's most visited museums benefit from the footfall of visitors to nearby attractions, e.g. the Fusilier Museum at the Tower of London. In such cases, the Army museums provide visitors with a wider range of attractions, enabling them to prolong their visit to an area and increasing the UK's overall visitor offer.

The Army also plays an important role in preserving artefacts and documents for future generations. Amongst its collections, the Army manages three designated nationally significant collections which are held in trust for long-term public benefit. The designation of these collections, under The Arts Council's scheme, identifies that they are amongst the best collections held in museums, libraries, and archives across England. Designating collections in this way aims to build understanding of the country's heritage; reveal the strengths of

²⁹ Arts Council England, "The value of arts and culture to people and society"

<https://www.artscouncil.org.uk/sites/default/files/infographics/Evidence_review_Infographic_March_2014.jpg> [accessed November 2020].

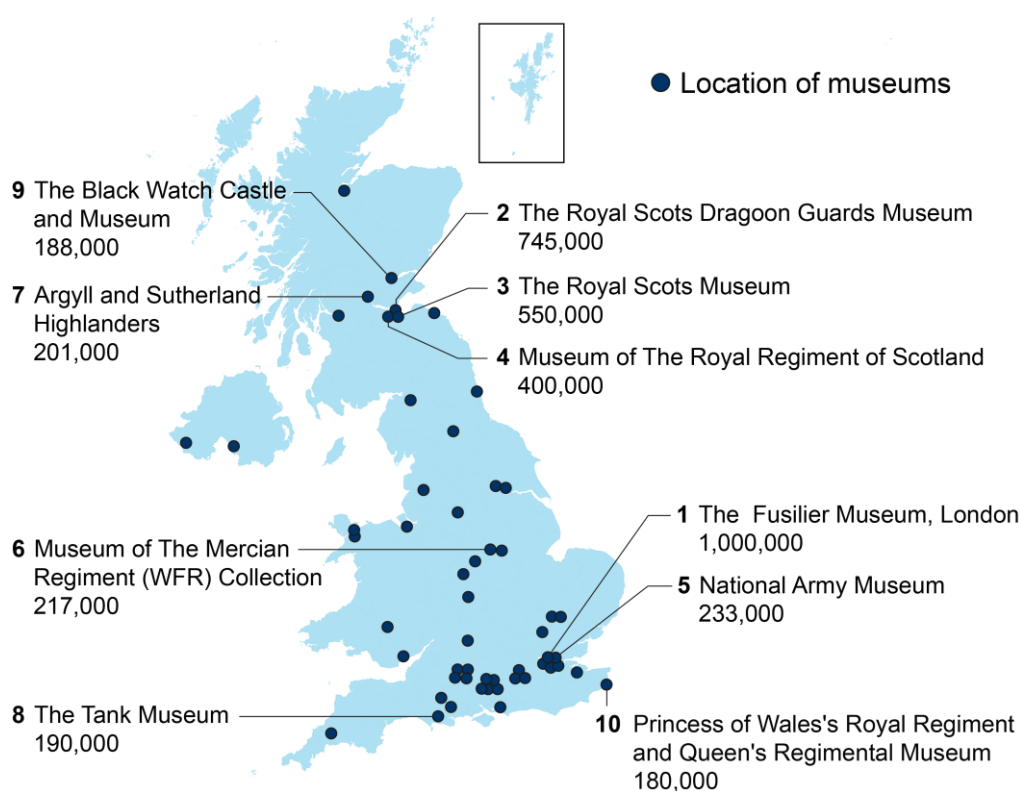
³⁰ Fiona Tuck and Scott Dickinson, *The Economic Impact of Museums in England* (TBR, 2016), p.4.

collections; ensure collections are properly safeguarded; and inform funding decisions.^{31,32}

The Army's three nationally significant collections are:³³

- The Royal Engineers Museum which shows how the Corps has contributed to military construction and engineering. It includes a library founded in 1813.
- The Royal Artillery Collection, which includes an internationally important collection of guns, rockets, missile, equipment, and vehicles dating back over 600 years.
- The Tank Museum, Bovington Camp, which charts the history and development of tanks and armoured vehicles.

Fig. 7. Visits to selected British Army museums in 2017



³¹ Arts Council England, "Designation Scheme" <<https://www.artscouncil.org.uk/supporting-collections-and-archives/designation-scheme#section-1>> [accessed November 2020].

³² Arts Council England, *Designated Collections* (2019).

³³ Arts Council England, *Designated Collections* (2019), pp. 30, 37-38.

CASE STUDY: THE NATIONAL ARMY MUSEUM, CHELSEA

The National Army Museum (NAM) in Chelsea, London, helps the UK to develop its cultural offer for domestic and overseas visitors. It also supports the UK's "soft power" through engagement with the military heritage sector in other countries.

In 2019/20 it received 235,000 visitors. Within this total the museum delivered educational activities and opportunities to more than 11,000 individuals on school trips and more than 3,000 attendees to family programmes. The latter included school holiday activities, such as Army-themed craft workshops, science challenges, and outdoor activities.

Fig. 8. Origin of NAM visitors, 2019/20



Source: British Army

NAM hosted 19 training courses on museum best practice in the UK. These covered topics related to the conservation and management of collections. Participants included representatives from India and Nigeria.

NAM has hosted military heritage sector delegations from Australia, Brazil, Egypt, France, Hungary, India, Mauritius, Pakistan, Poland, Singapore, South Africa, and the US. It has also hosted events, including lectures by Sir Hew Strachan to promote debate around defence issues.³⁴

³⁴ For example, National Army Museum, "Ends and beginnings: Legacies of the Great War" <<https://www.nam.ac.uk/whats-on/ends-and-beginnings-legacies-great-war>> [accessed November 2020].

3. PROJECT OUR GLOBAL INFLUENCE

British Army personnel and assets offer a platform to project the UK's wider influence beyond the threat of direct conflict. This approach, known as "defence engagement", boosts the UK's ability to use its reputation, heritage, and culture to attract and persuade partners to align with the UK's interests through "soft power". This approach is also significant in promoting the government's "Global Britain" agenda.

In this chapter we start by looking at how the Army directly engages with partners overseas by providing humanitarian assistance and disaster relief, delivering training to the armies of other nations, through the Army Overseas Network, and through international conservation initiatives. Through such activities the UK maintains influence and a "licence to operate" in many parts of the world which might otherwise succumb to instability or fall under the influence of states with interests which do not align with those of the UK.

The second part of the chapter looks at how the British Army bolsters the UK's influence through its activities within the UK, most iconically through the Royal Military Academy at Sandhurst and State Ceremonial and Public Duties.

Once again, there are clear links from many of these activities to the other NSOs: by building relationships and exerting influence the Army helps to prevent conflict and protect people. These same relationships enable the UK to develop international trade links (as discussed in Chapter 4), and many of the ways in which the Army projects the UK's influence at home contribute to the UK's image and attractiveness to overseas visitors, boosting prosperity.

3.1 PROJECTING INFLUENCE OVERSEAS

On a typical day the British Army has thousands of personnel deployed across many countries. During 2019 as a whole, the Army deployed over 61,000 soldiers to 128 countries on operations and training missions. These personnel were engaged in a wide range of activities which promote security, either directly or indirectly, build and maintain key international relationships, and fulfil the UK's commitments to international alliances (see box below).

EXAMPLES OF BRITISH ARMY OVERSEAS COMMITMENTS DURING MAY 2019

Below we outline examples of the Army's overseas activities during May 2019. These are only some of the activities that occurred during that month, but nonetheless provide an indication of the range of ways in which the Army engages overseas.

- **Providing security in Kabul.** British Army battalions took over provision of the Kabul Security Force which operates under a NATO mandate to bring security to the Afghan capital. This activity is crucial to building broader stability in Afghanistan.
- **Joint exercise with the US: Warfighter.** A British Army division joined exercises as part of a US Corps in Fort Hood, Texas. This exercise provided an opportunity to demonstrate the British Army's ability to work alongside US counterparts in complex operations as a credible and reliable partner.
- **Developing capability in Morocco: African Lion.** The British Army has an established relationship with the Moroccan Army. British soldiers undertook exercises in Morocco to build capability within the Moroccan Army and improve regional security.
- **Defence engagement in Moldova.** British Army Reservists delivered training to a Moldovan patrol team as part of a series of defence engagement exercises between the British and Moldavian armies.
- **Preparing to deliver disaster relief: Vigorous Warrior.** The Air Manoeuvre Medical Group is the British Army's most agile medical capability and travelled to Romania to hone its medical skills. Elements of the Air Manoeuvre Medical Group form part of the UK's contingency force, which stands ready to support international disaster response efforts as and when required.
- **Peacekeeping in Cyprus.** A British Army regiment provided the UK contribution to UN peacekeeping operations in Cyprus.

In addition to the above, a further 3,000 British Army personnel were committed at readiness for NATO or EU tasks.

In the sections below we provide further details and examples of how the Army projects UK influence overseas.

3.1.1 Humanitarian assistance and disaster relief (HADR)

The Army can be deployed at very short notice to deliver humanitarian assistance and disaster relief (HADR) in response to events which may arise anywhere in the world. The Army is therefore a powerful tool for supporting the UK government's response to international crises, and in doing so it builds international relationships, soft power and influence. In many cases such support is a reflection of the UK's desire to meet obligations to its overseas territories and partners. The Army's resources can help bring stability to regions which might otherwise have succumbed to instability and conflict.

This type of activity is also important in a broader geopolitical context. By engaging in HADR, the British Army obtains a "licence to operate" in many less stable parts of the world. It may be argued that if the UK were not to deliver HADR—as well as other defence engagement activity—it could leave a gap that could be filled by states whose intentions are not aligned with the interests of the UK and its allies. This could reduce the UK's influence and ability to tackle emerging threats overseas.

One example of the British Army's HADR activity is **Operation Gritrock**, which involved a 14-month operation combatting the Ebola epidemic in West Africa in 2014/15. Over 1,500 British military personnel, the majority from the Army, were deployed to Sierra Leone to help oversee the construction of six UK-funded treatment centres and train over 4,000 Sierra Leonean and international health care workers.

The Army was deployed to support an operation led by the UK's Department for International Development (DfID). The Army's deployment was particularly valuable due to its ability to quickly deploy skilled personnel with the right levels of protection and communications, and who could provide a command and control function. The military personnel included specialist engineers and medics who were able to quickly adapt to the circumstances and deliver the work at the core of DfID's mission.³⁵

An ongoing example of HADR is **Operation Caribbean**. Under this operation, 1,100 troops are earmarked to deploy to the Caribbean each year to provide hurricane relief. This arrangement was called upon in 2017, when UK personnel were deployed to distribute aid and ensure security in UK territories affected by Hurricane Irma.

³⁵ Source: Operation Gritrock Post Operation Report, provided by the British Army.

3.1.2 Deployable training teams

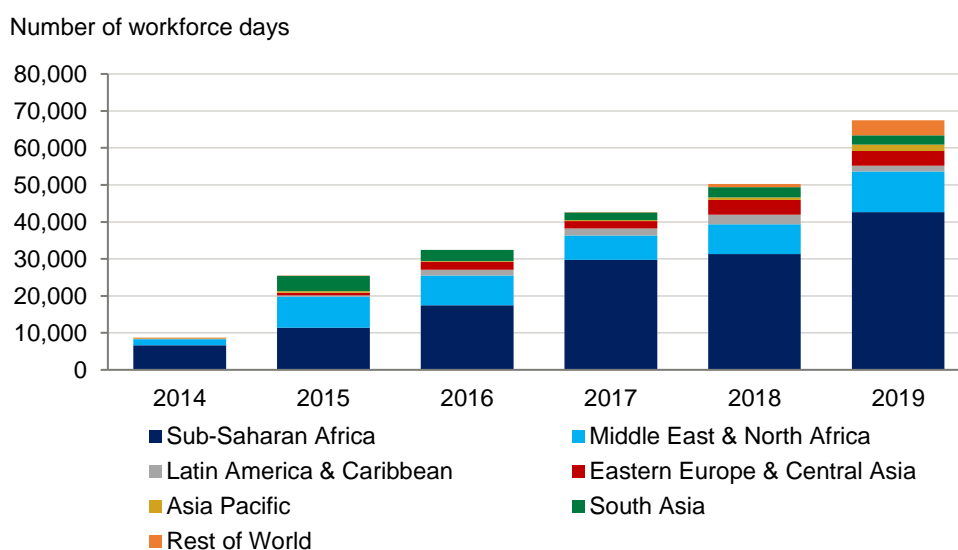
Separate to its HADR operations, the Army frequently deploys teams to deliver training to military counterparts across the world. This activity builds crucial relationships and influence from the individual to institutional levels. It also builds nations' capacity to service their own defence needs, enhancing stability in regions of strategic importance, and reducing the likelihood that the UK has to take direct action and incur the greater human and financial costs that would entail.

More than 60,000 training days were delivered overseas in 2019 by 447 short-term training teams. The volume of training delivered has climbed steadily in recent years, up from fewer than 10,000 days in 2014. The training itself can incorporate a wide range of content, from basic infantry skills to teaching massed bands.

For example, in 2020 a British Army team delivered mission-specific training to the Zambian Defence Force, prior to their deployment for a UN mission in the Central African Republic.

In another example from 2017, a Corps of Army Music (CAMUS) training team from the Band of the Parachute Regiment went to Bangladesh to train Bangladeshi students and instructors at the Army School of Music. This engagement was undertaken to support the UK National Security Council's Bangladesh Strategy. On the same deployment, the CAMUS team supported a number of other defence engagement tasks related to the UK's "GREAT" campaign, including a visit by the HRH The Countess of Wessex to the British High Commission and a Commonwealth War Graves site.

Fig. 9. Deployable training teams: workforce days committed per calendar year



Source: British Army

3.1.3 International conservation

A further means by which the British Army engages overseas is through its involvement in initiatives to support conservation efforts. While the primary objective of such activities is to protect wildlife habitats and natural ecosystems, this type of engagement presents another opportunity to build relationships and influence in remote parts of the world. It also provides an opportunity for the UK to demonstrate global leadership on environmental issues. Below we outline three recent examples.

Anti-poaching task force sent to Malawi and Gabon

The British Army sent a specialist team of troops on a mission to East Africa to train park rangers to deter poachers hunting elephants and black rhinos. The soldiers worked alongside the rangers, training them in skills such as tracking and counter-insurgency tactics which the soldiers had learned on the battlefield in countries such as Afghanistan.

Poaching and illegal logging in Belize and Kenya

The Army has provided training to anti-poaching staff in Kenya. The fees paid to access private land for training have, in turn, been used by ranches to strengthen anti-poaching measures, providing an enduring benefit outside of training periods. In Belize the Army has trained rangers in the Chiquibul National Park to tackle poaching of species such as the endangered scarlet macaw and illegal logging. Local stakeholders in both Kenya and Belize report that the very presence of military training in these remote locations deters illegal activity.

Belize environmental management

To reactivate jungle training in Belize, the British Army collaborated with the Belize Defence Force and other local stakeholders to develop an Environmental Impact Assessment to evaluate the impact of military training on the jungle. To further understand the effects of military training on jungle species such as the jaguar, the Army is working with Panthera, a big cat NGO, to bring research to parts of the jungle which have not previously been systematically surveyed, and inform jungle training practices.

3.1.4 The Army Overseas Network

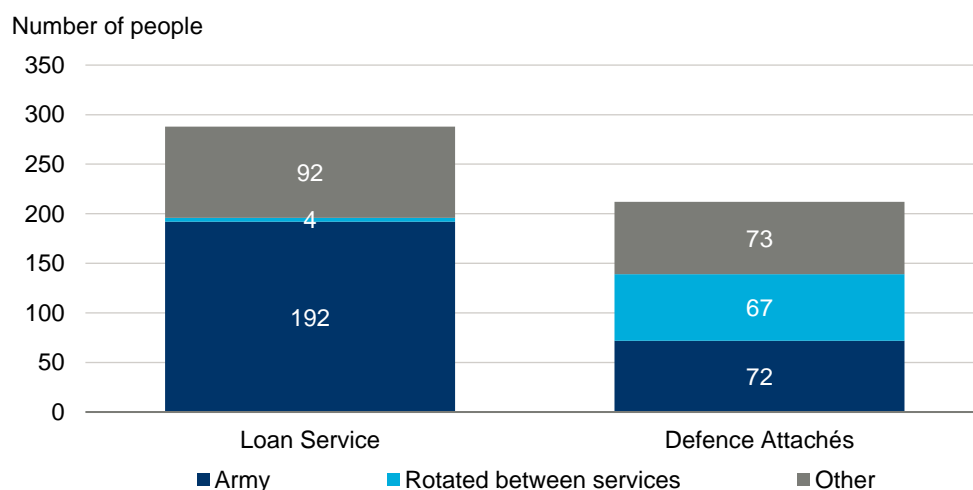
The Army Overseas Network is part of the UK's wider Global Defence Network (GDN) which spans 168 countries and territories.

The Army supports the GDN by sending at least 192 Loan Service personnel on secondment to the armed forces of other countries. It also provides 72 Defence Attachés, such as officers attached to embassies, who help represent British interests and seek commercial opportunities.

These Army personnel, alongside their British counterparts from other parts of the defence community, give the UK a permanent presence around the world through which strong political, military, and economic relationships can be built with allies, partners, and coalitions.

Allies and partners also send their personnel to the UK: London hosts the largest number of defence attachés in the world after Washington DC,³⁶ reflecting the credibility and the prestige of the UK's military amongst allies.

Fig. 10. Composition of GDN in 2020³⁷



Source: British Army

3.2 PROJECTING INFLUENCE AT HOME

3.2.1 Royal Military Academy at Sandhurst

Within the UK the Army trains foreign students on UK military courses, enhancing bilateral relations and reinforcing British Army values with our allies. The Royal Military Academy at Sandhurst (RMAS) provides the most prominent example of this.

RMAS is a globally recognised brand with a reputation as a world-class institution for leadership development. It is currently training 105 international cadets from 40 countries, and since 1947 has trained 5,000 international cadets from 124 countries. In the last decade alone, officers from more than 90 countries have trained at Sandhurst (Fig. 11).

The 105 current international cadets include members of notable families including the children of the President and Prime Minister of Hungary; the Grand Duke of Luxembourg; the Crown Prince of the UAE; and the Head of the Qatar Navy.

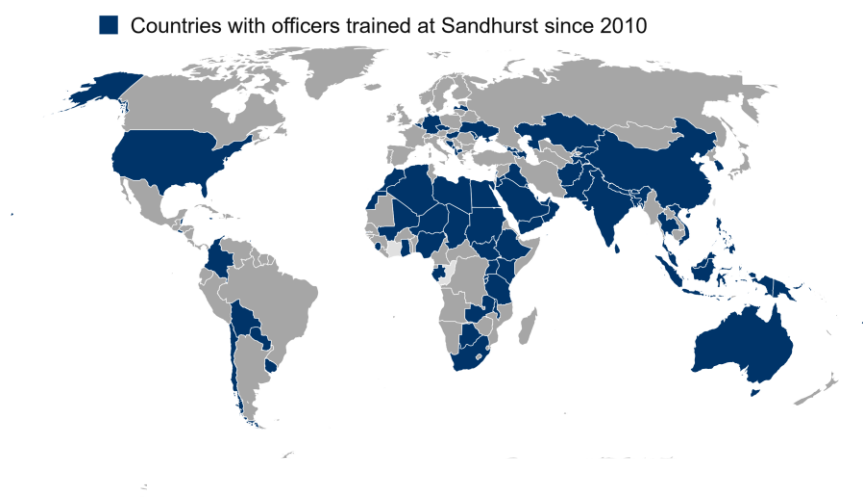
The RMAS Alumni network creates unique access and influence. RMAS alumni include eight serving heads of state in the Middle East, Europe, Africa, and Asia, and more than a dozen crown princes, heads of defence or armies, and people in unique positions of responsibility.

³⁶ Source: Army International Branch calculations.

³⁷ A conservative assumption would be that the Army routinely fills one-third of the spaces on rotation.

International students studying at Sandhurst generate approximately £3 million per year in fees which offset the Academy's running costs.³⁸

Fig. 11. Countries with officers trained at Sandhurst from 2010-2020



THE AFGHAN “SANDHURST”

Sandhurst has provided a model for overseas officer academies. One such example is the Afghan National Army Officer Academy (ANAOA), which was set up by the British Army just outside of Kabul. It was closely based on the Sandhurst operating and training model and is now known simply as “Sandhurst” among Afghans. Around 70% of all combat leaders in the Afghan National Army now graduate from ANAOA. As well as the British Army, Australia, Denmark, New Zealand and Norway have also provided mentors for the Academy, recognising the credibility of the model and its brand.

The development of ANAOA has helped strengthen relationships between British and Afghan armies, and these relationships have proved invaluable on numerous occasions within the context of the British Army’s operations in Afghanistan. And by training Afghan Army Officers the UK and its allies are building a capability and ethos to help prevent Afghanistan from becoming a safe haven for terrorists. This helps to reduce risks and home and prevent future conflicts.

³⁸ The annual budget of the Academy is around £11 million, although this excludes the wages of military personnel and infrastructure costs.

3.2.2 State Ceremonial and Public Duties

The British Army delivers a range of State Ceremonial and Public Duties (SCPD), which are principally conducted by Army units from the Household Cavalry and the Foot Guards. Most take place in public, enabling SCPD to project a strong sense of the UK's brand image, history and culture. This is iconic, recognised globally and boosts the country's "soft power" and attractiveness as a place to visit, study, or do business.

SCPD are an important tourist attraction for overseas visitors, as evidenced by the large crowds that regularly attend events such as Changing of the Guard. To the extent that SCPD boosts the number of overseas tourists visiting the UK, they generate additional export earnings for the UK and contribute to the nation's prosperity.

SCPD also provide visitor opportunities for British residents on day trips or overnight trips to other parts of the UK, particularly London. In this case the money that visitors spend during their trips cannot be considered "additional" since it is likely that it would have been spent elsewhere in the UK economy if SCPD were not available. Nonetheless, SCPD provide leisure opportunities and provide a sense of national identity that is likely to be of value to British citizens.

THE VALUE OF THE UK'S VISITOR ECONOMY

Tourism contributed £58 billion to UK GDP in 2018,³⁹ or 3% of the economy. In 2017 tourism supported more than 1.5 million jobs, or 4.5% of total UK employment. This economic impact arises as a result of spending by overseas visitors to the UK (of which there were 28 million in 2017), and as a result of spending by UK residents on overnight visits away from home, or on day trips. It accrues across a range of industries, most notably accommodation, food and beverage establishments, culture and sport, transport-related industries and retail.

Some of the highest profile examples of SCPD include events such as **Royal Weddings** and **Trooping the Colour**, which promote and sustain the profile of the UK to a global audience of millions. Such events are iconic and contribute to the brand and offer of London and the UK, helping to attract foreign visitors.

Soldiers from the Scots, Irish, and Welsh Guards, together with the English Grenadier and Coldstream Guards, the Household Cavalry, and King's Troop Royal Horse Artillery conduct daily **Public Duties**. This underlines that prestigious Army regiments are drawn from all parts of the UK and links the four nations in the Union to the Crown.

The Army regularly provides **military ceremonies and Guards of Honour** for visiting heads of state or other senior national or military leaders. Such occasions reinforce the notion of a stable democracy founded on a long history and can provide a powerful and unique way of honouring and welcoming senior visitors and, ultimately, garnering influence.

³⁹ ONS's UK Tourism Satellite Account 2017: TSA tables accessed October 2020.

EXAMPLES OF STATE CEREMONIAL AND PUBLIC DUTIES

State Ceremonial Duties

- Trooping the Colour (5 million UK live TV viewers, 7,000 live visitors, and a substantially larger global viewership).
- State Opening of Parliament.
- Royal Weddings & Funerals. Wedding of Duke and Duchess of Sussex attracted 18 million live UK viewers and an estimated 1.9 billion globally.
- Royal Salutes.
- State Visits.
- Guards of Honour.
- National Remembrance.

Public Duties

- Queen's Life Guard, and Queen's Guard at Buckingham Palace and St James's Palace typically attract a total of 3,000 to 10,000 visitors per day, depending on the events scheduled and time of year.
- There are also ceremonial guards at Windsor Castle and the Tower of London.

3.2.3 The Royal Edinburgh Military Tattoo

The Royal Edinburgh Military Tattoo (REMT) is an annual series of military tattoos held on the esplanade of Edinburgh Castle. There are 25 shows over a three-week period aligned with the Fringe and other Edinburgh Festival events. While the British armed forces are the main performers, they are typically joined by Commonwealth and other international military bands, and other artists.

The Tattoo is one of 12 Edinburgh Festivals. In 2015 the festivals collectively contributed £313 million to the Scottish economy and supported more than 6,000 Scottish jobs.⁴⁰

The Tattoo is a prestigious event providing an opportunity to showcase the UK military to a domestic and international audience. Around 220,000 visitors attend the event to watch live, while the international TV audience is in excess of 100 million per year.

The RAF, Navy, and Army take turns to lead on the overall theme of REMT each year, but most of the resources needed to run the event are provided by the Army. Indeed, the Army leads the strategic planning of REMT on behalf of the MoD, while HQ 51 Brigade of the Army, in conjunction with the Governor of Edinburgh Castle (himself an Army Reserve Major-General), is responsible for delivering the event.

The Tattoo provides an annual opportunity for the UK's MOD and armed forces to engage with a range of UK stakeholders from the government, business, education, and charity sectors.

⁴⁰ BOP Consulting, *Edinburgh Festivals 2015 Impact Study* (2016).

It also provides an opportunity for very senior-level engagement with military contacts and other VIPs from overseas. More than 30 International VVIPs were hosted at the 2019 Tattoo, including heads of state.

Through the international attendance and viewership, REMT delivers “soft power” benefits through the recognisable UK military “brand”, which enables the UK to enhance its global influence and promote its defence industry to overseas partners.

4. PROMOTE OUR PROSPERITY

The Army's activities and objectives mean that it does not contribute to the UK's prosperity in the same way as a "regular" industry or business.

Its greatest economic contribution is likely to accrue through its core purpose of protecting the UK, dealing with disaster and preventing future conflict. Success in meeting these objectives provides a secure and stable environment which promotes investment, innovation, and international trade, and therefore economic growth.

Yet while such benefits are fundamental and far-reaching, they cannot easily be observed or valued. Our focus in this chapter is therefore, instead, on aspects of the Army's economic impact which can be more directly observed and quantified.

The first part of the chapter assesses the "economic footprint" of the Army's day-to-day operations during 2019. The scale of the Army's employment and spending mean that it supports a substantial economic impact across all regions of the UK. We use economic modelling to quantify this impact at the national level, and then show how the Army can be a particularly important contributor to local economies where it has bases.

Arguably more important is the Army's contribution to the country's productivity and prosperity in the long term. We explore this in the second part of the chapter. The Army invests in research and development and trains its personnel to enhance its operational effectiveness, but these activities generate spillover benefits which enhance the productivity of the UK's economy and workforce and promote social mobility. We also examine how the Army supports UK defence exports, boosting sales and providing another channel through which the UK can build relationships and project influence.

4.1 PROMOTING PROSPERITY TODAY

4.1.1 The Army as a source of jobs and income for local economies throughout the UK

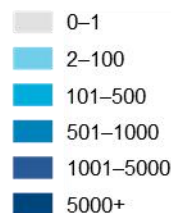
In 2019, the British Army directly employed 79,000 Regular personnel, 30,000 Reservists,⁴¹ and a further 9,000 civilian staff, making it one of the largest public sector employers in the UK.

The largest concentrations of personnel are in the South East (26,100), South West (24,800), and Yorkshire & the Humber (14,100). Nonetheless, both recruitment and employment locations are spread across all nations and regions of the UK. As such, it may be argued that the Army is already operating in accordance with the government's ambition to distribute income more evenly across the UK.

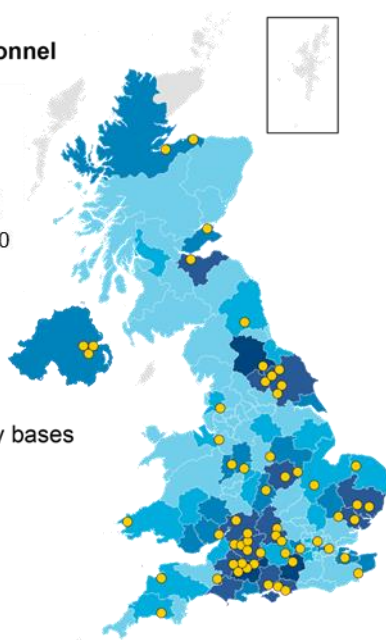
Fig. 12. Distribution of Army regular personnel and recruits

Place of residence of regular Army personnel, 2019

Number of Regular personnel

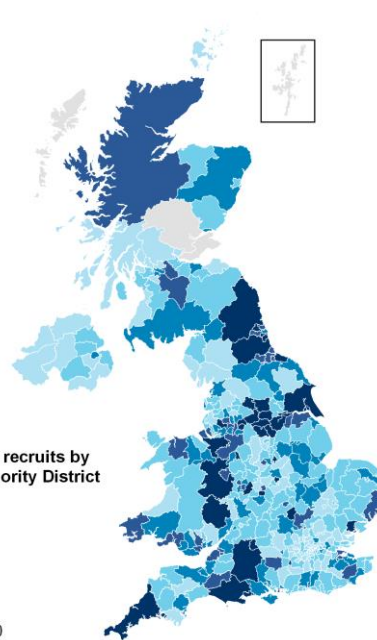


● Location of British Army bases



Place of residence at time of recruitment for soldiers, 2019/20

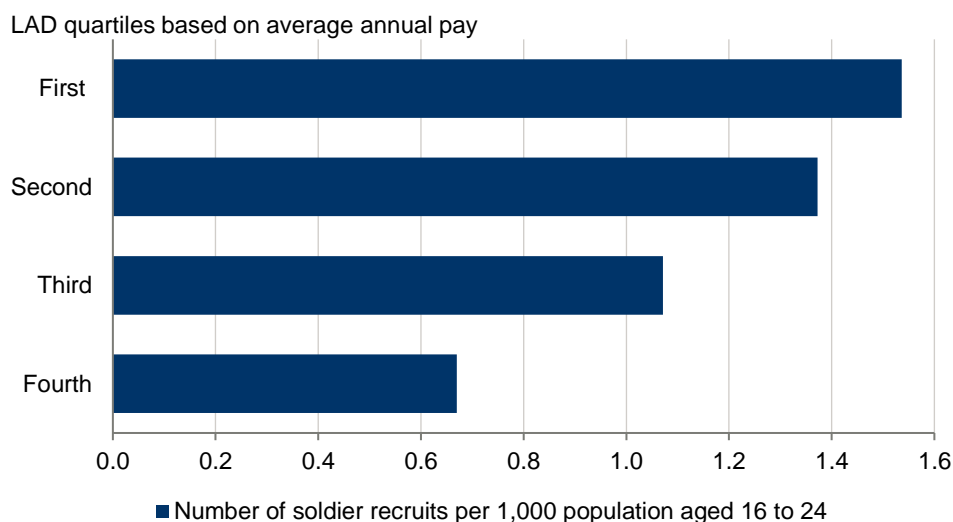
Number of recruits by Local Authority District



In fact, the Army tends to disproportionately recruit from parts of the country where wages are lower. It can therefore provide a source of employment and training for areas where opportunities might otherwise be more limited. Fig. 13 shows that amongst the 25% of local authority districts with the lowest average wages, the Army recruited around 1.5 soldiers per 1,000 residents aged 16–24 in 2019/20. This compares to 0.7 soldier recruits per 1,000 residents aged 16–24 amongst the 25% of districts with the highest wages.

⁴¹ Reserve soldiers work part-time as soldiers for the Army, with a minimum time commitment of 19 to 27 days per year, depending on their unit.

Fig. 13. Recruitment rate by wage quartile, 2019/20



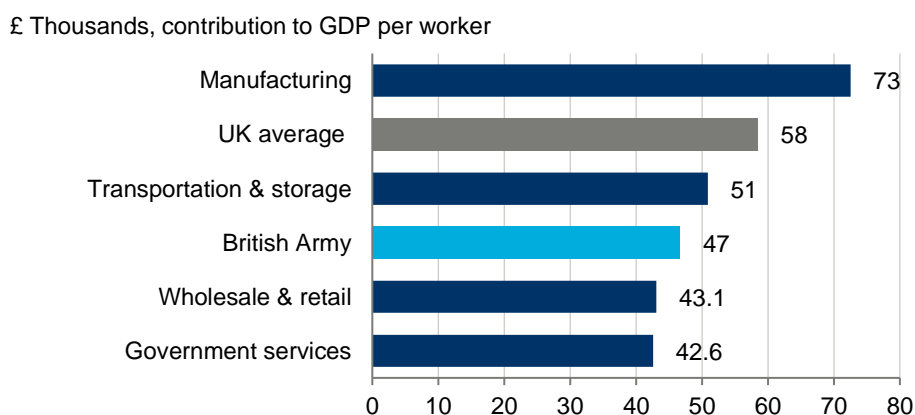
Source: Oxford Economics analysis of data from British Army and ONS

While the Army does not operate in the same way as a private sector company or industry, it still makes an important contribution to the UK's GDP. We can estimate this using the "income approach" to national accounting, under which the Army's GDP contribution can be calculated as the sum of:

- employee compensation (effectively the cost to the Army of employing its personnel, which includes gross wages, employer social security contributions, and other benefits in kind). This amounted to £5.5 billion in 2019; and
- taxes on production, which in this case includes the Army's UK business rates bill of £50 million in 2019.

On this basis the Army directly contributed £5.5 billion to UK GDP in 2019. Dividing this by the Army's 117,000 personnel suggests average productivity, measured in terms of GDP per worker, of £47,000. This is 10% higher than for the average worker employed in government services.

Fig. 14. Worker productivity, 2019



Source: Oxford Economics, Office for National Statistics, British Army

A NOTE ON GROSS AND NET IMPACTS

In common with standard practice for this type of study, our analysis has been carried out on a gross, rather than net, basis. That is, we do not make any assumptions concerning the extent to which the economic activity associated with the British Army would not occur if the Army did not exist.

The difference between the two approaches is whether account is taken of what the resources used in the operation of the Army could alternatively be deployed to do. A gross study ignores alternative uses, whilst a net study would estimate the impact created by the Army in excess of what would arise if the resources were deployed in their second most effective use.

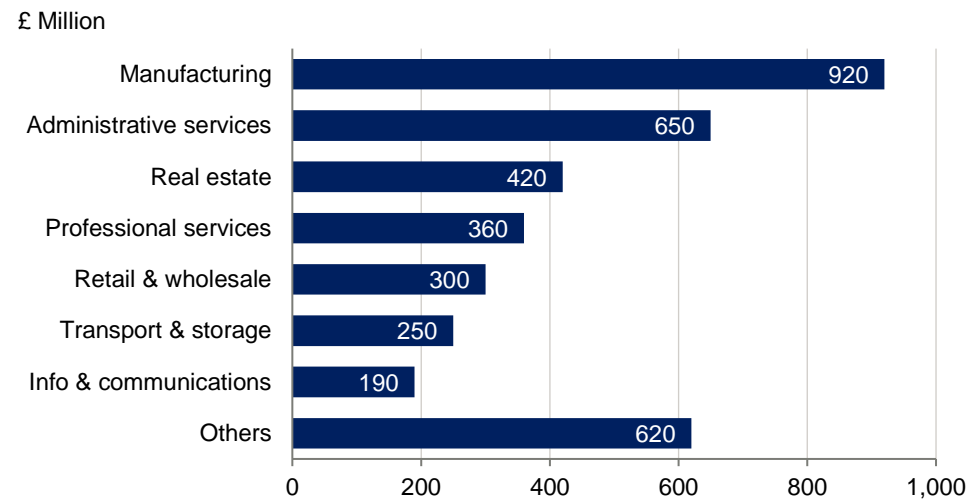
Such a net approach is considerably more complex and likely to involve greater controversy since it relies on constructing a counterfactual to reflect how resources might have been deployed if the Army did not exist. Views of what may constitute a plausible counterfactual are likely to differ, and it would be particularly counterintuitive to devise a counterfactual under which the UK did not have any Army to defend the nation.

As such our intention in this part of the analysis is to identify and quantify the channels through which the Army impacts on different parts of the UK economy on a gross basis. To our knowledge these impacts have not previously been quantified and it is informative to understand their magnitude. We do not seek to make any assessment of the extent to which the overall size of the UK economy might vary if the Army did not exist.

4.1.2 The indirect impact of the British Army in 2019

In 2019 the Army spent £4.7 billion with suppliers right across the UK. This figure includes both current and capital expenditure on goods and services. This spending supports activity not only amongst the companies the Army purchases from, but also amongst their suppliers, their suppliers' suppliers, and so on, right down the UK supply chain. As such, the Army's spending impacts on a wide range of companies in different industries across the UK (Fig. 15).

Fig. 15. The Army's indirect GDP contribution by industry



Source: Oxford Economics

In total, we estimate that the indirect impact of the Army's supply chain purchases supported 66,000 jobs and a £3.7 billion contribution to UK GDP in 2019.

CASE STUDY: THE AJAX PROGRAMME

The Army indirectly supports economic activity across all parts of the UK through its supply chain spending. Just one example of this effect is provided by the Ajax Armoured Fighting Vehicle investment programme.

In 2014, the MOD placed a £3.5 billion order for 589 of the Ajax, which will be part of the British Army's next generation of Armoured Fighting Vehicles.⁴² Total spend on the Ajax programme is expected to rise to £6.3 billion over the next five years, as the manufacturing and support programme continues.

The vehicle's manufacturer, General Dynamics Land Systems-UK, has invested more than £20 million in its Assembly, Integration and Test Facility at Merthyr Tydfil in Wales, and a further £12 million in its Armoured Fighting Vehicle Centre of Excellence in nearby Oakdale. As of 2020, more than 800 jobs are supported in Wales either directly with the company or at suppliers (up from 680 in 2018). This includes highly-skilled jobs in engineering and software, with many located in Merthyr Tydfil, which is one of the country's most deprived areas. The jobs at General Dynamics Land Systems-UK offer average wages nearly twice as high as the local average.⁴³ In total, General Dynamics Land Systems-UK estimates that in 2018 Ajax safeguarded or created more than 4,100 jobs across more than 230 UK-based companies.

Fig. 16. Number of UK jobs supported by the Ajax programme, by region, 2018⁴⁴



⁴² Army Technology, "Ajax (Scout SV) Reconnaissance Specialist Vehicle" <<https://www.army-technology.com/projects/scout-specialist-vehicle/>> [accessed November 2020].

⁴³ Source: General Dynamics

⁴⁴ The figure of 680 used on the map for Wales is for 2018, in line with the results available for other areas.

4.1.3 The induced impact of the British Army in 2019

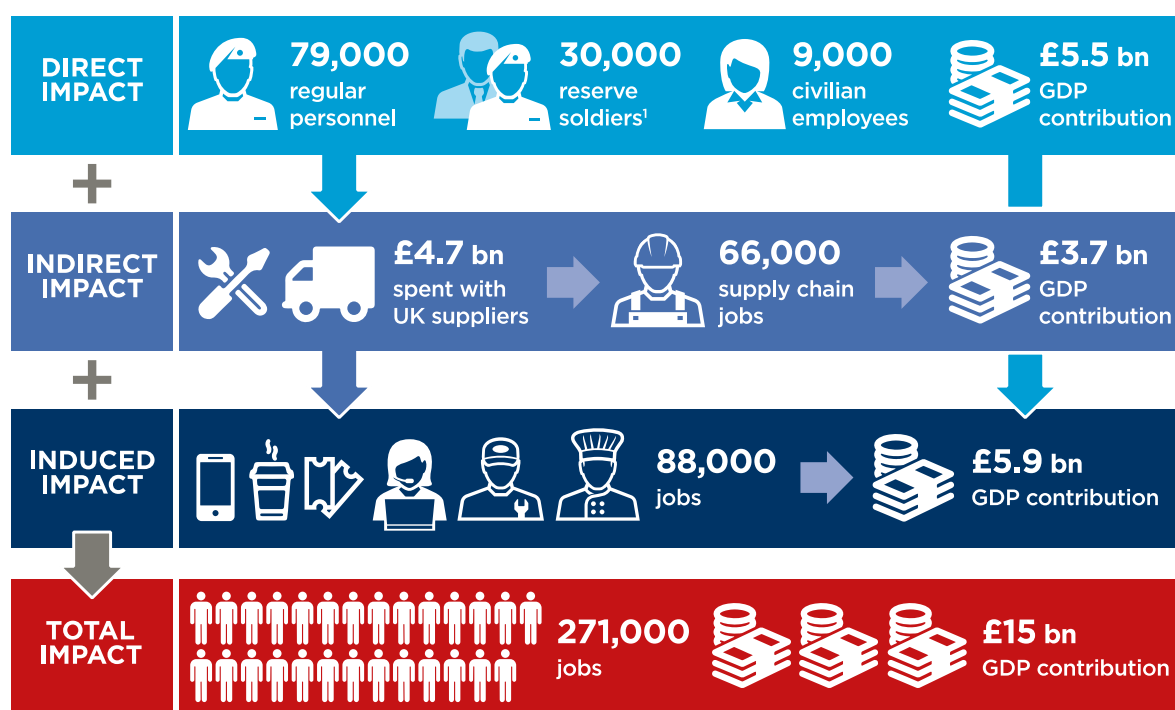
Spending by Army personnel, and those employed in the Army's UK supply chain supports a further round of impact. This initially benefits sectors in the consumer economy, such as retail, hospitality and leisure, but the impacts once again trickle down through UK supply chains across a broad range of sectors.

Our modelling suggests that this induced impact supported a further 88,000 jobs and a £5.9 billion contribution to UK GDP in 2019.

4.1.4 The total economic footprint of the British Army in 2019

By bringing together the direct, indirect and induced impacts described above we can estimate the total "economic footprint" that the Army supports from its total annual budget of around £11 billion. We estimate this footprint to incorporate 271,000 jobs and a £15 billion contribution to UK GDP. These figures equate to 0.8% of all employment in the UK, and 0.7% of GDP in that year.

Fig. 17. The total economic footprint of the British Army in 2019⁴⁵



These results indicate that for every job that the Army directly supports, a further 1.3 are supported elsewhere in the economy as a result of supply chain or worker spending multiplier effects.

Similarly, for every £1 that the Army contributes to the UK directly, a further £1.70 is supported through multiplier effects.

⁴⁵ Totals may not sum due to rounding

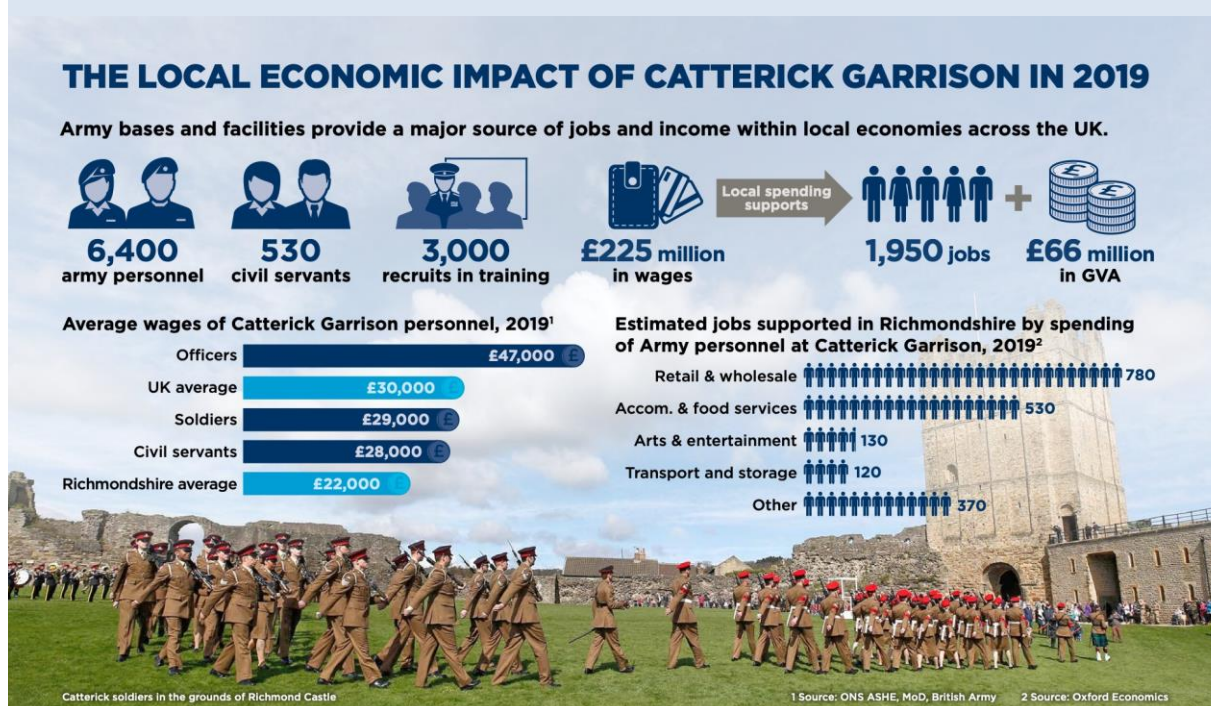
CASE STUDY: THE LOCAL ECONOMIC IMPACT OF CATTERICK GARRISON IN 2019

The Army has 58 primary bases spread across the breadth of the UK for major regular units, plus many more for reserve units. The critical mass of personnel located on these bases means that they can represent an extremely important source of spending and income for the surrounding local communities. Here we outline and quantify the local economic impact of just one army base: Catterick Garrison, in the Richmondshire district of North Yorkshire.

The Garrison is home to 6,400 army personnel and 530 civil servants. During the course of a typical year around 3,000 recruits also pass through the Garrison as part of their training. Average wages for officers, soldiers, and civil servants at the base are notably higher than the average for the local area. In total, we estimate that £225 million was paid in wages to base personnel in 2019.

We estimate that spending by base personnel supported almost 2,000 jobs in the local area and contributed £66 million to local GVA. These induced impacts are equivalent to more than 7% of local GVA and more than 6% of local employment. The largest employment impacts are felt in consumer-facing sectors such as retail and wholesale, accommodation and food services, and arts and entertainment.

Adding the 1,950 induced jobs to the 6,900 jobs permanently based at the Garrison indicates that the Garrison supports almost 30% of jobs in Richmondshire, either directly or through induced multiplier effects.⁴⁶



⁴⁶ Due to data limitations it was not possible to estimate the impact of the Army's expenditure with local suppliers. To the extent such spending occurs, our estimate of local economic impact may be conservative.

4.2 PROMOTING PROSPERITY IN THE LONG TERM

The government's Industrial Strategy identifies five “foundations of productivity:”

- Ideas: the world's most innovative economy
- People: good jobs and greater earning power for all
- Infrastructure: a major upgrade to the UK's infrastructure
- Business Environment: the best place to start and grow a business
- Places: prosperous communities across the UK.

The previous section outlined how the Army supports local prosperity across the UK, and throughout the preceding sections we have highlighted how the Army's activities contribute to a stable and secure business environment. In the sections below we turn our focus to the first two productivity drivers.

We start by investigating the Army's contribution to innovation, and then show how the wide range of training that the Army delivers enhances individuals' productivity and effectiveness. The final part of the chapter highlights the Army's role in supporting UK defence exporters, enabling them to support jobs in the UK and invest in innovation.

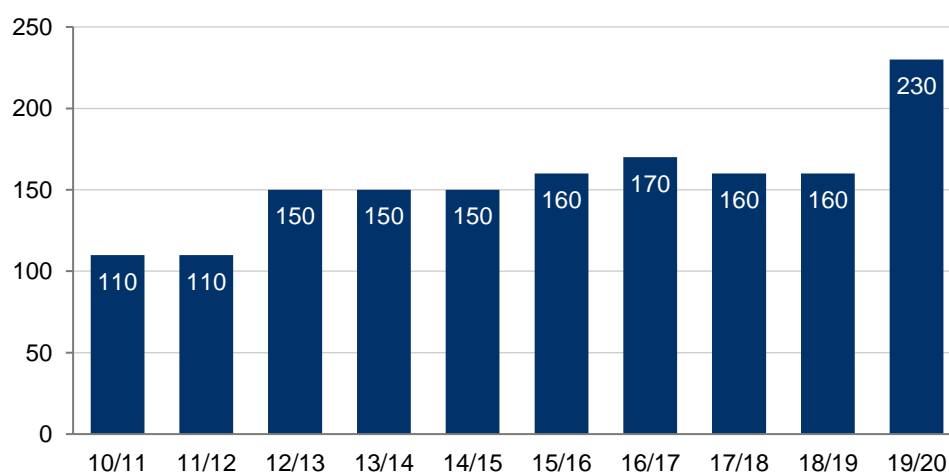
4.2.1 The Army as an incubator for R&D

For the Army, innovation can overcome technological challenges, create better equipment, yield cost savings, and enhance operational effectiveness. Innovation also generates benefits for the wider economy, as knowledge and knowhow find other applications. Ultimately, innovation enhances productivity and is a key driver of the UK's long-run prosperity.

Since the start of 2010/11, the British Army has spent close to £1.6 billion on R&D across a wide spectrum of projects, from digital communications and cyber systems, through the development of vehicles, to logistical and medical capabilities.

Fig. 18. Total British Army R&D spending

£m (2019 prices)



Source: British Army and DSTL

Over time, the Army's R&D investments build up a "stock" of R&D assets in the form of knowledge and knowhow that is dispersed and helps to enhance productivity throughout the UK economy. After accounting for depreciation, we estimate that at the end of 2019/20 this cumulative stock of assets was worth £1.2 billion.

These assets, and the productivity enhancements arising from them, help to boost the supply side of the economy, raising the nation's capacity for economic output.

To estimate the value of these "spillover" benefits, we have applied coefficients from previous research by Oxford Economics into the value of spillover benefits which arise from R&D in different sectors of the UK economy.⁴⁷ Our analysis suggests that the accumulated stock of Army R&D assets raises UK productivity, and hence the overall size of the economy, by 0.03% per year. This is equivalent to an increase in GDP of £730 million in 2019/20, over and above the benefits to operational effectiveness that the Army itself receives from its R&D investments.

4.2.2 Training the UK workforce

Each year, thousands of recruits enter the Army and benefit from the huge range of formal and on-the-job training that forms an integral part of Army life. This starts with training in basic numeracy and literacy, while other qualifications are targeted at higher levels. The close support the Army provides means that soldiers are less likely to drop out of courses than those in society as a whole. For example, in 2017/18 in England, the achievement rate for apprenticeships in the Army was 81.5% compared with 67.3% across all providers.⁴⁸ What is more, the Army is one of the UK's largest employers of apprentices.⁴⁹

A full Army career for a soldier lasts 22 years, meaning that even those who complete this in full enter the UK labour market with many working years still ahead of them. As they do so, wider society and industry benefit from the skills and experience gained during their time in the Army.

⁴⁷ Oxford Economic Forecasting, *Assessing the Economic Impact of Aerospace Research and Development*. (2006).

⁴⁸ Department for Education, "National achievement rates tables 2017 to 2018" <<https://www.gov.uk/government/statistics/national-achievement-rates-tables-2017-to-2018>> [accessed November 2020].

⁴⁹ Apprenticeships, "Top 100 Apprenticeship Employers Fact Sheet" <https://www.topapprenticeshipemployers.co.uk/Factsheet_Top100AppEmp20.pdf> [accessed November 2020].

Fig. 19. Number of awards of selected formal Army education programmes in 2018/19⁵⁰

6,400	Army Apprenticeship Programme New recruits can complete an Intermediate level apprenticeship, a Level 2 programme equivalent to 5 GCSEs at grades A*–C.
1,800	Army Accreditation Offer Allows personnel to gain accreditation and qualifications for leadership, organisational, and other skills learned in their Army service.
1,400	AFC Harrogate Level 1 or 2 Junior soldiers receive training in numeracy and literacy skills to be awarded Level 1 or 2 qualifications (equivalent to GCSEs at grades D–G).
1,100	Functional skills Level 2 The Army Education Service provides additional support to achieve functional skills at Levels 1 and 2. The latter is a requirement for promotion to Sergeant.
750	Degrees Army programmes such as the Higher Education Pathway and Chartered Manager Degree Apprenticeship allow soldiers to gain qualifications at bachelor's, master's and doctorate level.

The value of training

Training makes individuals more employable (so they spend less time out of work) and enables them to perform more highly skilled roles. In short, training increases individuals' productivity, both within the Army and when they enter the wider labour market.

This is crucial because a highly skilled workforce supports the economy's long-term productive potential and competitiveness. Better trained employees can undertake more complex tasks and tend to diffuse their knowledge throughout organisations.⁵¹ Higher average skill levels support greater technological innovation and adoption, increasing the returns to investment in R&D.⁵² Better qualified workers are also good news for the Exchequer since higher wages are associated with higher tax receipts.

There is an existing body of academic research which investigates the impact of various levels of education on an individual's lifetime earnings. This research finds that different types of additional education bring about different uplifts in

⁵⁰ Programmes highlighted here are those with a significant number of participants on programmes providing qualifications equivalent to National Qualification Framework levels.

⁵¹ UK Commission for Employment and Skills, *The Labour Market Story: The State of UK Skills* (2014).

⁵² Department for Business Innovation and Skills, *Innovation, Research and Growth* (2014).

earnings over an individual's lifetime, reflecting the impact of training on productivity. We can apply findings from this research to estimate the value of some of the training that the Army provides.

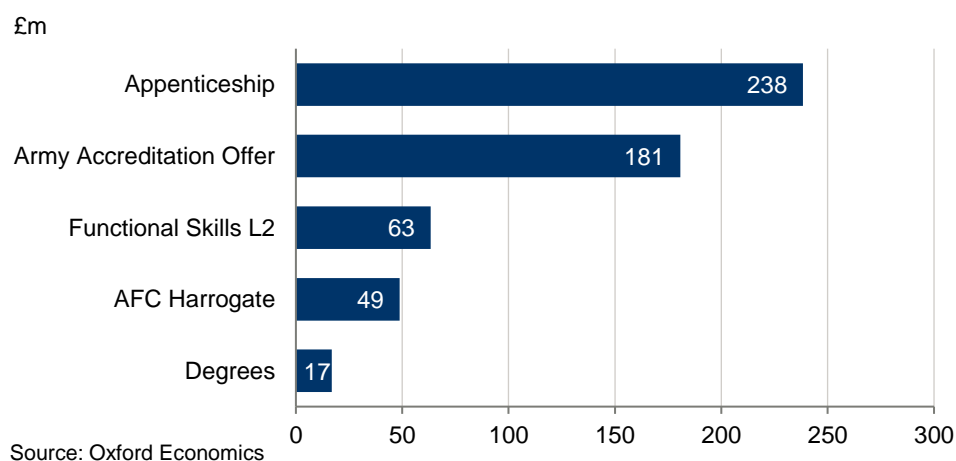
Note: our focus here is on formal Army training programmes which can be equated to NVQ levels, and therefore aligned with the evidence on how qualifications affect lifetime earnings. It is important to highlight that the Army provides a vast range of other types of training virtually continuously across the careers of its personnel. This training has value within, and usually outside of, the Army but cannot easily be equated with the earnings uplift coefficients required for our modelling. Our model therefore provides only a partial estimate of the value of Army training.

Our model looks at the four types of education identified in Fig. 19, and degrees. For students at each level we estimated the value of lifetime earnings with and without the training using wage data from ONS⁵³ and coefficients from previous research into the value of education.^{54,55} After factoring in assumptions for drop-out rates and course length, we are able to estimate the average lifetime earnings uplift for a student at each level. Multiplying through by student numbers provides an estimate of the total value of Army training (Fig. 20).

Across the five types of training considered, we estimate that the value of training delivered by the Army in one year is more than £550 million.

Fig. 20. Total value of individual Army training in 2019, £m⁵⁶

Lifetime earnings uplift per year of study for those enrolled in Army training programmes in 2019



⁵³ Lifetime earnings estimated using data on pay by age and qualification from ONS publication *Graduates in the UK Labour Market 2017* in conjunction with Oxford Economics' forecast of real wage growth.

⁵⁴ London Economics, *The Returns to Higher Education Qualification* (BIS Research Paper, 45, 2011).

⁵⁵ London Economics, *Returns to Intermediate and Low-Level Vocational Qualifications* (BIS Research Paper, 53, 2011).

⁵⁶ Source: Oxford Economics analysis using coefficients from London Economics, *The Returns to Higher Education Qualification* and *Returns to Intermediate and Low-Level Vocational Qualifications* (BIS Research Paper 45 and 53, 2011).

This result is conservative since, as noted above, it only relates to a subset of Army training which can be equated to formal education. In reality, the Army delivers far more training across a range of areas which cannot be directly equated to formal qualifications—perhaps the most recognisable quality of Army personnel is their leadership abilities, for example. Our analysis nonetheless highlights the substantial value the Army supports in a single year through its extensive training programmes.

The skills and value that Army-trained personnel can bring to civilian roles is recognised through the recruitment and internship schemes that major employers run specifically for former military personnel. Examples include Amazon,⁵⁷ Barclays,⁵⁸ Blackrock,⁵⁹ Deloitte,⁶⁰ and Morgan Stanley.^{61,62}

⁵⁷ Amazon delivers.jobs, “Opportunities for veterans and military spouses”

<<https://www.amazondelivers.jobs/about/military/>> [accessed November 2020].

⁵⁸ Barclays, “Military & Veterans Outreach” <<https://home.barclays/careers/our-programmes/after/>> [accessed November 2020].

⁵⁹ Officers’ Association, “Information and updates about the BlackRock Veterans’ Internship Programme” <<https://www.officersassociation.org.uk/blackrock-veterans-internship-programme/>> [accessed November 2020].

⁶⁰ Deloitte, “The Deloitte Military Transition and Talent Programme” <<https://www2.deloitte.com/uk/en/pages/careers/articles/military-recruitment.html>> [accessed November 2020].

⁶¹ Morgan Stanley, “Jobs for Military Veterans” <<https://www.morganstanley.com/people/experienced-professionals/veterans>> [accessed November 2020].

⁶² Morgan Stanley, “Military & Athlete” <<https://www.morganstanley.com/people-opportunities/students-graduates/programs/institutional-securities/sales-and-trading/military-athletes-summer-emea>> [accessed November 2020].

THE NET VALUE OF THE ARMY'S TRAINING

The analysis above estimates the value that the Army delivers through a subset of its training programmes. Our results are “gross” in that they represent the totality of the value created. A potential further avenue of research would be to determine the “net” value of this training over-and-above what would occur if the Army did not exist.

The question of the net value of Army training is a challenging one to address since it requires the development of a hypothetical counterfactual. While it seems reasonable to assume that at least some of those trained by the Army might be trained elsewhere if Army training was not available, there is no obvious way of determining the extent to which this may be the case.

One approach could be to assume that in the absence of the Army recruits would receive training at an equivalent rate to the population overall. With the data available for the study we were only able to test this approach for junior soldiers trained in basic numeracy and literacy at AFC Harrogate. Our findings were as follows:

- We estimate that the Army training at AFC Harrogate leads to an increase lifetime earnings of £35.7 million for the cohort of trainees for which we have data.⁶³
- If those same trainees had upskilled at the same rate as those in overall English population between the ages of 16 and 18, their lifetime earnings uplift from training would have been £25.2 million.⁶⁴
- The net value of Army training is therefore £10.5 million for this group of trainees.

However, this approach is, in our view, an over-simplification since it takes no account of potential differences in the characteristics of Army recruits and the wider population. That is, the Army trainees may have other attributes which make them more likely to achieve better (or worse) outcomes than the overall population. To the extent that is the case, the net value of Army training could be over- (or under-) stated.

A further consideration is the cost of delivering training through the Army compared to the mainstream education system. There is also the issue of capacity—while it seems reasonable to believe that some people might secure training elsewhere, it is unclear whether the UK education system could accommodate thousands of additional students if training were not available through the Army.

On balance it seems plausible that the additional value of Army training may be greatest amongst recruits who join with very low skill levels, and who are most likely to benefit from the support and structure that the Army provides. As discussed below, there is evidence to suggest that outcomes amongst Army recruits joining with very low qualifications are better than in the wider population, although further research would be needed to determine whether this relationship holds after controlling for other factors.

⁶³ The data used for this testing are a subset of the data used for the analysis in the main text. This subset included more detailed information on the recruits' level of education on beginning and leaving training. As such, the results obtained for this smaller cohort differ to those reported in the main text for all AFC Harrogate trainees.

⁶⁴ Typical outcomes for those in the wider population were taken from:

Department for Education, *Post-16 education: highest level of achievement by age 25* (2018).

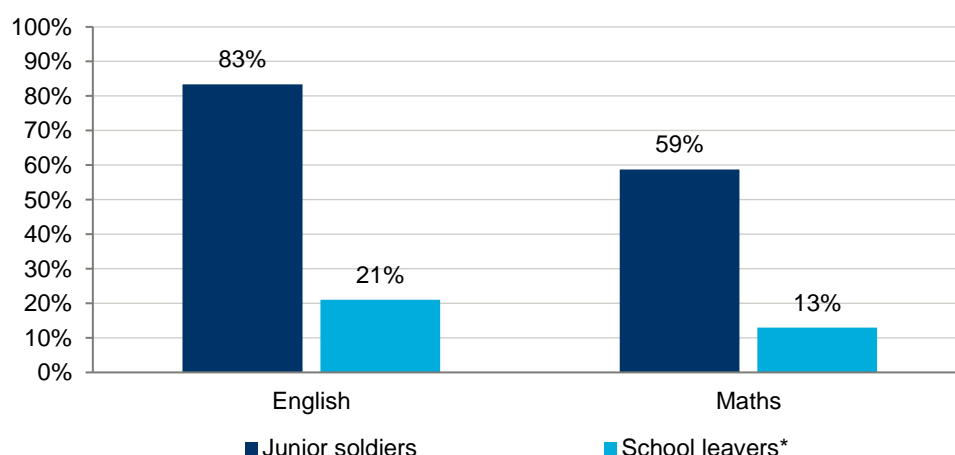
Social mobility benefits

The Army is one of only a few major employers that offers entry and progression to those without formal education. For instance, on completion of Initial Trade Training, all Army recruits will have achieved minimum Level 1 numeracy and literacy accreditation (equivalent to basic English and Maths GCSEs). In providing this training and associated support, the Army makes an important contribution to the social mobility of these recruits.

This impact is particularly seen amongst junior soldiers who join at age 16 or 17. In 2019, 20% of these joined the Army with only an entry level qualification (Level 0) in English or Maths. A further 40% had only reached Level 1.

Of these, more than 80% achieved a Level 2 literacy qualification by the time they were 19, compared with 21% in the wider population of those leaving school with only Level 1 or below English qualifications. The equivalent figures for maths were 59% and 13%.⁶⁵

Fig. 21. Likelihood of achieving Level 2 qualification in English or Maths by age 19 for those leaving school with Level 1 or below



Source: British Army, Impetus Private Equity Foundation

*School leavers are people from England and Wales who left education at 16 with qualifications in English or Maths at Level 1 or below

⁶⁵ Impetus PEF, *The road most travelled? The 16-19 journey through education and training* (2016), p.5.

CASE STUDY: CAPTAIN KIDANE COUSLAND

Each year, around 30 soldiers are directly commissioned from the ranks. Talent is spotted, nurtured, and developed in young soldiers and they are mentored through the Sandhurst selection process. A further 250 soldiers are commissioned through the “Late Entry” route for those who have spent at least 18 years working up through the ranks. These schemes represent an important source of social mobility for personnel from diverse backgrounds.

One example of an individual benefitting from this training structure is Kidane “Danny” Cousland. Danny grew up on a housing estate in Tottenham, north London, and, hindered by his dyslexia, left school at 15 without being able to read. He suggests that at that point he was headed for a life of criminality. In the Army Danny found purpose. After passing out at the Army Foundation College in 2009, he enrolled on the Commando course before deploying to Afghanistan in 2011, patrolling daily as part of a fire support team at a time when casualties were at their height.

Danny’s potential was recognised while he was still a soldier and he was given the chance to go to Sandhurst for officer training. Danny excelled in the academic challenges at Sandhurst and was awarded the “Sword of Honour” for coming top of his intake in 2016.

The 28-year-old, now Captain with the 29 Commando Regiment Royal Artillery, says “I went to school, I was completely disconnected, I didn’t get on, I didn’t do very well, I wasn’t motivated ... I was in a bad way really. But something I always wanted to do since I was a child was join the Army.”

CASE STUDY: THE ARMY CADET FORCE

The Ministry of Defence sponsors five Cadet Forces, including the community-based Army Cadet Force (ACF) and the Army section of the schools-based Combined Cadet Force (CCF). These are voluntary youth organisations which seek to provide young people (ages 12 and up) with interesting and challenging activities to help them develop valuable skills, gain vocational qualifications, and set them up for lifelong success. The programmes also show young people the opportunities presented by a career in the Army.

Research from the University of Northampton suggests that the cadet force helps underprivileged children to succeed: a sample taken at the Greater Manchester Army Cadet Force showed that involvement with the cadets reduced school absences from 19 days to 11 days a year,⁶⁶ and rates of bad behaviour halved.⁶⁷

In 2020, the Army Cadet Force was made up of 37,400 young people, while the Army section of the CCF had 29,900 participants. Female representation in the ACF was 35% and 37% in the CCF (Army).

The ACF also included more than 9,100 Adult Volunteers in 2020, while CCF (Army) had a further 2,170 volunteers, all of whom instruct, coach, and mentor cadets in their weekly training sessions. These volunteers themselves receive skills and training through their involvement

⁶⁶ Simon Denny, Meanu Bajwa-Patel, Richard Hazenberg and Asteria Brylka, *What is the social impact resulting from the expenditure on cadets; an interim report* (University of Northampton Institute for Social Innovation and Impact, 2017).

⁶⁷ CHACR, *The British army’s contribution to uk society and prosperity* (Ares & Athena, 9, 2017), p.8.

with the cadet forces, equipping them with skills and experience which can be transferred into their civilian lives.

The value of Army reservists to the wider economy

In addition to the 79,000 regular army service personnel, in 2019 the Army had 30,000 volunteer reserve soldiers who work part-time as soldiers alongside full-time regulars. These reservists are organised into more than 100 different units in 340 locations across the UK.

By serving in the Army part-time alongside their day-to-day roles in the civilian sector, reservists help disperse Army know-how and best practices throughout the economy. Their experience is often drawn upon by industries such as cyber security, logistics, and the NHS.

There are a further 27,000 regular reserve soldiers who have left their roles in the regular Army but can be recalled in times of need.

In a recent survey, three-quarters of companies that employ reservists consider that being a reservist is of significant benefit to the development of those employees, and 71% stated that employing reservists brings more advantages than disadvantages.⁶⁸

THE VALUE OF RESERVISTS TO THE WIDER ECONOMY

Case study: Simon Davies

The operational experience acquired by the UK Defence Medical Services in Iraq and Afghanistan has been put to use in England's network of Major Trauma Centres (MTCs).

As part of the Army medical services Reserves from 2003 to 2020, Simon Davies was first deployed in Iraq in 2004 and undertook Full Time Reserve Service between 2005 and 2011, a period during which he served in Afghanistan on four occasions. During his service in Iraq and in Afghanistan, Simon gained considerable experience with the novel approaches used by the Army to treat complex injuries.

Simon returned to the NHS in 2012 as the Major Trauma Co-Ordinator at the MTC of the Royal Stoke University Hospital. At the time, the centre was part of a network of similar MTCs being established across England. The expertise Simon gained during his service contributed to the development of the new working practices used by the hospital's emergency department. In 2017 the hospital was awarded the Silver Award in the MOD / NHS Employer recognition scheme and in 2019 it received the Gold Award.

Further examples of reservists applying skills gained in the Army in civilian roles

Staff Sergeant Millington's experiences as an IT specialist in Afghanistan and during the Commonwealth Games helped him secure a role as an IT manager for the NHS.

⁶⁸ Percentage of respondents who agreed or strongly agreed with the statement. IFF Research, *Defence Relationship Management: Employer Attitude Monitor* (2020).

Squadron Sergeant Major Hallewell works in a construction products business and became his employer's point of contact for all matters relating to transporting hazardous materials, after obtaining his EU Transport of Hazardous Goods qualification through the Reserve.

Employer testimonials

"The Reservist brings a number of advantages to the employer, including a broader set of skills and experiences, a natural inclination towards team working and many have an innate leadership ability."

Peter Flynn MVO, Director at PWC

"Army Reserve employees use the skills they gain during their military training to enhance their outputs in their civilian roles. Amazon values individuals that like to learn and be curious; volunteering to serve your country whilst also being employed full-time certainly fulfils those criteria."

Amazon

4.2.3 Supporting UK defence exporters

Exporting boosts growth by increasing demand for the UK's goods and services beyond a level that could be sustained by the domestic market. As such, growing exports is an important means to supporting jobs, income, and tax revenues.

Within defence, exports can mean that development costs are shared across more customers, cutting costs to the UK taxpayer, and helping to foster strategic relationships with partners. The Army's involvement is therefore not only a means to promoting prosperity, but also helps to project the UK's influence.

The UK is the world's second-largest defence exporter. Between 2009 and 2018, UK exports of equipment and services for land-based forces were worth a total of almost £6 billion, or 7% of UK defence exports.⁶⁹

The British Army's global reputation and "brand" represent a powerful endorsement of UK industry as other nations seek to collaborate with and replicate it in procedures and equipment. These reputational benefits can be reinforced by the British Army's engagement with overseas counterparts in a range of contexts, where that be through Sandhurst and other UK training exchanges, short-term training programmes, joint exercises or on operations.

The Army provides much of the expertise and personnel for the **Department for International Trade Army Export Support Team (EST)**. This supports British defence exporters by hosting visits, demonstrations, and training for overseas delegations, and by providing impartial advice and other engagement with potential customers.

⁶⁹ Department for International Trade Defence and Security Organisation (DIT DSO), *UK Defence and Security Exports* (2018).

EST CASE STUDY: STARSTREAK

The EST and Royal Artillery supported Thales to sell the STARStreak missile system to Indonesia. The EST demonstrated the system in 2014, with personnel from the Royal Artillery taking over to increase Indonesia's confidence in its ability to conduct its own firing camps, manage the equipment, and develop training programmes. The involvement of the Army meant that Thales were able to offer not just a product, but a full package of accompanying services, including access to the British Army's expertise in how the new system might be most effectively deployed.

The sale was secured and Indonesia has now upgraded its purchase to the Lightweight Multirole Missile. Thailand and Malaysia have also placed orders, largely based on Indonesia's experience.

The Defence Equipment Support Authority (DESA) sells surplus defence equipment. While this raises revenue, arguably greater value accrues by providing an opportunity to build relationships and influence with partner nations. It can also create potential for UK companies to secure export contracts to repair and maintain equipment. In 2018/19 DESA sold £20 million of land defence equipment, including vehicles, spare parts, ammunition, and clothing.

EXAMPLES OF DESA SALES

Latvia purchased 123 Combat Vehicle Reconnaissance (Tracked), formally used by the British Army. The deal was worth £36 million,⁷⁰ including base overhaul work by Babcock. This deal brings strategic benefits by supporting the UK's commitment to Latvia through NATO, as well as the direct benefits of trade sales to UK firms providing associated services (in this Babcock).

Finland purchased a large quantity of DROPS (military logistics trucks) in a deal worth up to £2.5 million, with a potential further purchase (subject to contract) worth up to £1 million.

⁷⁰ This value was over-and-above the £20m of DESA equipment sales cited in the paragraph above.

APPENDIX 1: POTENTIAL FURTHER RESEARCH

To our knowledge this is the first time such a study of the British Army has been attempted. While the Army collects a large amount of data for operational and other reasons, in many areas it does not, quite understandably, collect information in order to inform economic analysis. As such, we have identified a number of areas where additional data or research could make it possible to tell a richer story and to better understand the Army's economic contribution. Below we outline our suggestions for the most promising areas of further research.

- (1) During consultations we heard numerous examples of the Army delivering Military Aid to Civil Authorities (MACA). However, the information available was typically not sufficient to enable us to quantify the Army's contribution in terms of the value of disruption avoided. Each MACA situation is unique and many will not lend themselves to a more thorough examination of disruption costs. Nonetheless, there may be certain cases where the Army provides support to dispose of bombs or the suchlike where the costs of disruption could have been extremely high without the Army's intervention. When these situations arise, we would recommend detailed case study analysis in the immediate aftermath of events, when details of the situation are fresh in the memory, to develop a full counterfactual analysis.
- (2) To better understand the Army's contribution to protecting the natural environment and cultural heritage we recommend more detailed surveys of visitors participating in recreational activities on Army/MoD land or visiting Army-related cultural and heritage sites. Such surveys should capture information on where visitors are from, the types of trip they have made, length of visit, motivations for visiting the site, expenditure during their trip, and so on. Such information could enable the development of economic models to estimate the value of visits to the visitors themselves, and of wider benefits to the local economy.
- (3) Similarly, there could be value in surveying SCPD visitors with a view to building models to value the enjoyment provided to UK visitors, and to estimate the influence of such spectacles on overseas tourists' decisions to come to the UK. A wider programme of research could involve "non-use" surveys to estimate the value that UK residents attach to SCPD, even if they themselves do not visit. Another survey could target all types of overseas visitors to the UK to understand the role of SCPD (and the brand image of the UK to which they contribute) in influencing visitation to the UK.
- (4) In this study we estimated the Army's economic footprint for the UK as a whole. If it were possible to capture regional breakdowns of wage and procurement expenditure (in terms of where money is actually spent and not just suppliers' invoicing addresses) then the modelling could be expanded to estimate the Army's footprint in each region.
- (5) Consideration of the benefits of the Army's R&D investment could be enriched through a better understanding of the products this has developed over the years (to the extent that such information is not sensitive) and examples of how technologies originally developed for the Army have found wider applications in other parts of society.
- (6) Finally, the Army delivers substantial value through its training. This could be assessed in more detail if information was captured on levels of education and qualifications upon joining and leaving the Army. In relation to the net value of training, we recommend separate in-depth econometric research to examine the extent to which labour market outcomes differ between former soldiers and the wider population, after controlling for differences in other characteristics.

APPENDIX 2: DETAILS OF ECONOMIC MODELLING

OUR APPROACH TO ESTIMATING THE ECONOMIC FOOTPRINT OF THE BRITISH ARMY

Direct Contribution

Since the Army is not separately identified within standard ONS classifications it was necessary to estimate the Army's direct contribution to GDP and employment using a number of data sources and approaches, as outlined below.

Direct Employment

Direct Army employment consists of Regular Army personnel (including Gurkhas and Military Provost Guard), Army Reservists, and MOD Civilian staff.

Employment of UK Army Regular personnel (excluding Gurkhas and MPG) was sourced from the ONS Annual Location Statistics (ALS) release.⁷¹ This provided details of the stationed location of personnel by UK Unitary Authority and Local Authority Area, as well as personnel stationed in international locations.⁷²

Employment of Gurkhas and Military Provost Guard personnel was sourced from Quarterly Service Personnel Statistics.⁷³

Employment of Army Reservists includes Volunteer Reserves, Serving Regular Reserves, and Sponsored Reservists. Estimates were sourced from Quarterly Service Personnel Statistics.⁷⁴

Employment of Civilian personnel was sourced from the Biannual Civilian Personnel Report and includes Civilian staff allocated under the Army Top-Level Budget (TLB).⁷⁵

All figures for direct employment include UK-based personnel only.

All figures are for employment as of 1 April 2019, excluding MOD Civilian staff that was for 1 October 2019.

⁷¹ Ministry of Defence, "Location of UK regular service and civilian personnel annual statistics: 2019" <<https://www.gov.uk/government/statistics/location-of-uk-regular-service-and-civilian-personnel-annual-statistics-2019>> [accessed November 2020].

⁷² Personnel deployed on operations to an area away from their stationed location are shown against their most recent stationed location.

⁷³ Ministry of Defence, "Quarterly service personnel statistics: 2020" <<https://www.gov.uk/government/statistics/quarterly-service-personnel-statistics-2020>> [accessed November 2020].

⁷⁴ Ministry of Defence, "Quarterly service personnel statistics: 2020" <<https://www.gov.uk/government/statistics/quarterly-service-personnel-statistics-2020>> [accessed November 2020].

⁷⁵ Ministry of Defence, "MOD biannual civilian personnel report: 2019" <<https://www.gov.uk/government/statistics/mod-biannual-civilian-personnel-report-2019>> [accessed November 2020].

Direct GDP

We estimated the contribution of the Army to UK GDP using the “income approach” to national accounting. To do this we summed Army employee compensation (the cost to the Army of employing its personnel, which includes gross wages, employer social security contributions, and other benefits in kind) and taxes on production (the Army’s business rate bill).

Typically, the income approach to calculating the direct GDP contribution includes profits. However, since the Army does not operate in the same way as a private company or industry, we assumed profits to be zero.

Information on the compensation of employees and business rates was provided to Oxford Economic by the British Army.

Indirect (supply chain) impact

Estimated value of Army supply chain spending

We estimated the value of the Army’s supply chain spending in 2019/20, and the split of that spending by industry. To do this we used information provided by the Army on both current and capital purchases as covered within its TLB. These data included spending on the Army’s Equipment Procurement Plan (EPP), Equipment Service Plan (ESP), spending on infrastructure and digital defence, as well as day-to-day operational purchases.

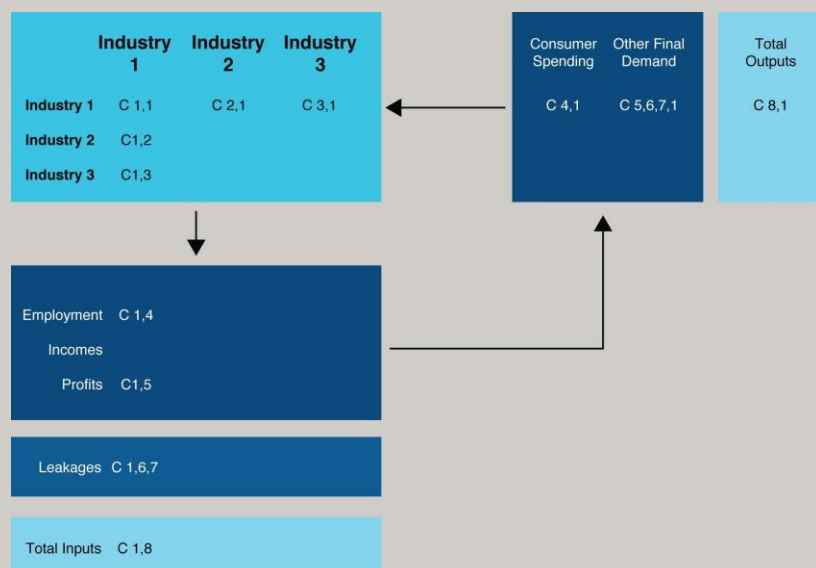
Indirect (supply chain) contribution

To estimate the impact of the Army’s supply chain expenditures on the economy, we inputted the expenditures into an “input-output” model based on UK input-output tables published by the ONS.

The UK input-output tables set out the goods and services that UK industries purchase from one another in order to produce their output (as well as their purchases from abroad). These tables also provide details of the spending patterns of UK households, and indicate whether this demand is met by UK production or imported products. In essence, the tables show who buys what from whom. Using details of these linkages from the input-output tables, Oxford Economics constructed a bespoke UK impact model to trace out the intermediate consumption and capital good consumption impacts attributable to the Army (this is known as the Leontief manipulation).

Oxford Economics’ impact model quantifies all rounds of subsequent purchases along the supply chain. These transactions are translated into GDP contributions, using UK-specific ratios of GVA to gross output, sourced from the UK input-output table. Once we had obtained results for output and GVA, we estimated employment using productivity estimates.

Fig. 22. A stylised Input-Output table structure



Induced (wage spending) impact

The induced impact was modelled using a similar method to the indirect impact. Using the employment and compensation of employees' estimates used within the direct impact calculations, we used household spending data to model the typical consumption patterns of UK households, making an allowance for "leakages" in the form of imports and savings.

For workers within the Army's supply chain, we used industry-specific ratios of employee compensation per unit of output to estimate the value of household wages supported among the suppliers' workers.

Both of these spending streams were fed into our input-output model, to calculate the total impact of this spending on GDP. As with the indirect impact, employment impacts were derived using productivity estimates for each sector of the economy.

ESTIMATING THE LOCAL ECONOMIC IMPACT OF CATTERICK GARRISON

We estimated the induced impact on the local economy of spending by soldiers and staff at the Garrison using inputs from the Army and published sources, and a bespoke impact model.

We received data from the Army on the number of personnel at different ranks based at Catterick Garrison in 2019. We combined this with publicly available data on Army average pay by rank to estimate the total wages paid to soldiers and officers at the Garrison.⁷⁶ Along similar lines, we used data from the Army on the number of civilian staff in different roles in the Garrison, and combined this with ONS data on average pay by occupation and region.⁷⁷ These datasets allow us to estimate the total wages paid to workers at the facility.

We then built a bespoke local economic model to estimate the impact of workers spending these wages in the area. This model was based on the national UK input-output tables, as published by the

⁷⁶ Armed Forces' Pay Review Body, *Armed Forces' Pay Review Body: Forty-Eighth Report* (2019).

⁷⁷ ONS, "Employee earnings in the UK: 2019"

<<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/bulletins/annualsurveyofhoursandearnings/2019>> [accessed November 2020].

ONS. Our methodology utilises so-called “Flegg-adjusted Location Quotients (FLQs),” which are consistent with the latest approaches and evidence in regional input-output modelling and regional science.⁷⁸ Inputting the wage data into our model provided our estimate of the impact on the local area.

ESTIMATING THE WIDER VALUE OF THE ARMY’S R&D INVESTMENT

We estimated the economic value of the Army’s R&D investment using an approach based on existing literature. To do this, we first calculated the sum of R&D spending by the Army in the period 2010/11 to 2019/20, including only expenditure that falls under the definition of R&D given in the OECD’s *Frascati Manual*.⁷⁹

Our approach depreciated this spending by 9% a year to account for the obsolescence of new ideas over time and the depreciation of capital stock. To the depreciated total, we applied a coefficient that represents the social return to R&D investment, which we took from previous research by Oxford Economics.⁸⁰ These coefficients were available for the chemicals and pharmaceuticals industry; the radio and television industry; the aerospace industry; and the precision equipment industry. The coefficients for the latter two industries were largely in line with one another and we selected these as the most relevant to the Army’s R&D activity. We have assumed no private return to the R&D investment since the Army is not a profit-seeking organisation. Such private returns might instead be expected to accrue in the form of enhanced operational effectiveness, although it would be extremely challenging to attribute monetary values to such improvements.

ESTIMATING THE VALUE OF THE ARMY’S TRAINING

The Army conducts a large number of training programmes, ranging from bringing junior soldiers and new recruits up to basic qualifications in numeracy and literacy; through qualifications to recognise the value of general Army training and professional development; up to sponsoring bachelor’s and doctoral degrees, as well as placements in industry for senior staff.

Our first step in estimating the value of the Army’s training was to identify those programmes for which benefits could be quantified. We selected those training programmes that produced a qualification equivalent to a level in England’s Regulated Qualifications Framework (RQF), since these could be aligned with coefficients from published literature on the value of training. Scotland and Wales have different qualifications frameworks, but for simplicity we used data related to the RQF. Under the RQF, Level 1 is equivalent to lower GCSE grades; Level 2 to higher GCSE grades; Level 3 to A level grades; and Level 8 to PhD-level. Once we had identified the programmes which we would assess, we sourced data from the Army on the number of awards for each programme in the latest year (2019 in most cases).

⁷⁸ Anthony T. Flegg and Timo Tohmö, *Estimating Regional Input Coefficients and Multipliers* (University of the West of England Economics Working Paper Series, 1302, 2013), p.5.

⁷⁹ The [Frascati definition](#) of research covers basic research, applied research and experimental development: activities that are undertaken to increase the stock of knowledge and develop new applications of available knowledge. General exclusions are activities such as routine testing and analysis of materials, feasibility studies, general purpose data collection and education and training other than PhD research.

⁸⁰ Oxford Economic Forecasting, *Assessing the Economic Impact of Aerospace Research and Development* (2006).

Fig. 23. Assessed Army education programmes and numbers enrolled, 2018/19

Programme	RQF level	Description	Enrolled
AFC Harrogate	1 & 2	Army Foundation College Harrogate trains junior soldiers joining the Army at age 16 or 17.	1,428
Functional skills	2	Soldiers must have reached Level 1 literacy and numeracy within three years of joining the Army; Level 2 is required for promotion to Sergeant.	1,093 sitting Level 2
Army Apprenticeship Scheme (AAP)	Intermed.: 2 Adv.: 3 Higher: 4+	A scheme for Army soldiers to gain an apprenticeship at different levels.	Int: 6,445 Adv: 6,020 Higher: 253
Army Higher Education Pathway (AHEP)	6 - 7	A Bachelor's or Master's degree in Leadership and Strategic Studies from University of Reading to all new officers and those promoting to Major.	657
Chartered Manager Degree Apprenticeship (CMDA)	6	A work-based bachelor's degree qualification.	79
STEM in-service degrees	6	Sponsored degrees in science, technology, engineering or maths subjects to meet Army demand for qualified officers in technical roles.	35
External academic placements	7 - 8	Part-time and full-time Master's degrees and PhDs as well as academic fellowships.	19
Army Accreditation Offer (AAO)	1 - 7	Leadership and management qualifications equivalent to RQF levels based on training and experience gained in the Army.	7,879

To calculate the uplift for each individual gaining a new qualification under these programmes we estimated lifetime earnings pathways for workers at each existing level of qualification using published data.⁸¹ We obtained marginal hourly wage uplift rates from gaining each new level of qualification from existing academic literature.^{82,83} We applied the uplift to the lifetime earnings path to calculate the total lifetime earnings uplift, which we then translated into present value (PV) terms using a discount factor.⁸⁴

A key assumption in our model was that everyone moves one level up in the RQF, i.e. those getting a Level 6 qualification previously held a Level 5 qualification. This assumption was necessary since we had no information on the previous qualification level of those being trained. This approach does, however, have limitations:

- It will underestimate the impact for individuals whose previous level of qualification was actually more than one level lower.

⁸¹ ONS, "Graduates in the labour market: 2017"

<<https://www.ons.gov.uk/releases/graduatesintheuklabourmarket2017>> [accessed November 2020].

⁸² London Economics, *The Returns to Higher Education Qualification* (BIS Research Paper, 45, 2011).

⁸³ London Economics, *The Returns to Higher Education Qualification and Returns to Intermediate and Low-Level Vocational Qualifications* (BIS Research Paper, 45 and 53, 2011).

⁸⁴ To calculate present values, we applied the Treasury's recommended discount rate of 3.5% for up to 30 years and 3% after 30 years.

- It will overestimate the impact for individuals that already had a different qualification at this level. For example, someone gaining an apprenticeship in the Army equivalent to Level 3 may already have A levels.

Another key assumption is that people gaining new qualifications through Army education schemes achieve an earnings uplift as a result of the new qualification, on average. We assumed the same uplift regardless of whether individuals stay in the Army or leave for another sector. That is, the impact of gaining qualifications on earnings was assumed to be the same within the Army as in civilian roles. We based estimated lifetime earnings (pre-qualification) on whole economy earnings data, rather than Army-specific data, since we could not identify any data source that would allow us to estimate lifetime earnings for Army personnel.

Once we had estimates of the wage uplifts from each level of qualification, we estimated the impact of the uplift on lifetime earnings, and multiplied the impact by the number of people receiving the qualification. The latter was estimated using assumed numbers enrolled and drop-out rates taken from both existing civilian academic courses and from the Army's own data. We calculated the average impact per year of training course by dividing the total impact by the number of years that the programme runs for. These calculations are summarised in the table below.

Fig. 24. Steps used to estimate the value of Army education

Programme	Enrolled	Drop-out rate	Awarded	PV of pre-qualification lifetime earnings (£)	Uplift (%)	Course length (years)	Total average annual PV uplift to lifetime earnings (£ million)
AFC Harrogate	1,428	36.6%	905	457,100 - 505,000	10% - 12%	1	48.8
Functional skills	1,093	NA	1,093	480,500	12%	1	63.4
AAP – Interm.	6,445	17.5%	5,317	490,600	8%	1.5	137.3
AAP – Adv.	6,020	17.5%	4,967	518,300	13%	3.5	97.9
AAP – Higher	253	8.2%	232	556,000	6%	5	1.6
AHEP	657	3.6%	633	751,300	9%	3	14.9
CMDA	79	6.3%	74	655,800	13%	4	1.6
In-service degree	35	6.3%	33	664,600	13%	3	0.9
Academic placements	19	6% - 27%	17	751,300 - 774,900	6% - 9%	1 - 4	0.9
AAO	7,879	NA	7,879	434,900 - 605,300	6% - 13%	2	180.7
Total impact							548

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