

Modernising Defence

Addressing the barriers to
digital transformation in the
Ministry of Defence

INTRODUCTION

Since the last Government's Strategic Defence and Security Review (SDSR) in 2015, the environment in which the Ministry of Defence (MOD) and its suppliers operate has changed dramatically. The uncertainties surrounding the UK's withdrawal from the European Union, an increasingly assertive Russia and the proliferation of ever more sophisticated cyber threats have all made the challenge of underwriting the UK's national security more complex. Despite this, the financial pressures faced by the Defence sector have not eased since 2015, and both the MOD and its suppliers in industry will have to work more closely over the coming years to address the challenges Defence faces.

Against this backdrop, the digital revolution has continued apace, with disruptive technologies such as bio technology and artificial intelligence (AI) playing an ever-increasing role in the ongoing digital transformation of UK businesses operating elsewhere in the private sector. This revolution, which will fundamentally change our way of life over the next three decades, means that Defence must proactively exploit the opportunities created along the way, rather than being at the mercy of their consequences. In practice, this means that both the MOD and its suppliers must create an environment in which Defence is able to readily adopt the technologies and processes at the forefront of the digital revolution, so that the UK can stay ahead of, or at least maintain parity with, asymmetric, peer or near-peer adversaries. Equally, keeping pace with our key allies will be vital, as interoperability continues to play a crucial role in the development of new capabilities.

In a military context, today's capabilities, and those of the future, are entirely dependent on the technologies and systems that sit behind them and are essentially a collection of interdependent IP addresses, that are reliant on connectivity in a congested electromagnetic spectrum. Complex platforms such as the QE Class Carriers, AJAX, T45 and Satellite Communication Systems are, and will increasingly be, vulnerable to degradation and denial in the congested battlespaces of the future. To succeed, our Armed Forces will need an adaptable doctrine covering scenarios in which our systems and capabilities are rendered sub-optimal, and the right people with the right skills to react appropriately should this occur. Downstream, the integration of the technologies underpinning the digital revolution may offer some answers here, if utilised in the right way.

With the MOD undertaking a root and branch review of its business through the Modernising Defence Programme, now is the perfect opportunity for the department to address and ultimately remove the barriers to digital transformation, in partnership with sovereign industry and our international allies. If successful, the MOD will be able to greatly enhance UK military capabilities, boost industrial productivity, drive efficiencies across Defence and exploit the opportunities arising from the digital revolution.

Working with members, techUK has identified several barriers to digital transformation in Defence and has suggested several recommendations to address them as part of the ongoing work within the Modernising Defence Programme (MDP) review.

techUK and its members believe that the removal of these barriers will greatly enhance the MOD's ability to work with its suppliers, and will also encourage non-traditional suppliers into the sector, bringing with them cutting-edge digital technologies.

techUK hopes these recommendations will assist the department as it looks to reform the way it does business with industry and we stand ready to work with the MOD throughout the MDP review.

BEHAVIOURS, CULTURE AND UNDERSTANDING TECHNOLOGY

The technologies that can revolutionise both frontline military capabilities and the way the MOD conducts its business with industry are increasingly delivering a fundamental change to businesses in the private sector. For example, through effective use of cloud computing, organisations can sharpen their competitive edge by gaining the ability to accelerate their innovation cycles to take full advantage of the latest technologies available, such as AI and the Internet of Things (IoT). According to the International Data Corporation (IDC), by 2019 40 percent of digital transformation initiatives will use robotic or AI services, offering organisations the ability to automate repetitive tasks, and free up personnel to concentrate on more complex and valuable tasks.

For the MOD, techUK believes that the complex internal processes, ingrained behaviours and a resistance to embrace radical change have meant there is a barrier to the adoption of new technologies in the department. This is not a new barrier, but it is a fundamental one, as the benefits of embracing new technology will only be realised if senior decision makers in the department reflect on what has not worked in the past, and proactively address the behaviours, policies and processes which are currently holding the department back. Currently, techUK would postulate that the MOD does not differentiate between incremental, evolutionary technology and disruptive technology, and is hooked into the former at present.

Recognising that this is a complex issue which cannot be changed overnight, techUK puts forward the following recommendations to the MOD:

- 1** If the MOD is to truly embark on a process of digital transformation, it must be prepared to reach out to industry, in order to understand methods of best practice and the challenges faced by large complex organisations which are further along in this process. techUK can provide the mechanism for this engagement, giving the appropriate senior decision makers in the MOD access to large businesses which have started the digital transformation journey.
- 2** When launching new procurements, the MOD should avoid inflexible systems and look to adopt interoperability wherever it is possible to do so. This will give the department the flexibility to bring in new technologies quickly and will also help it increase its spending with SMEs. The MOD should also look at using secure cloud technologies for future infrastructure, and look to take advantage of the strategic direction of the technology industry to gain innovation edge and more efficiencies.
- 3** In the IT/IS space, the MOD should move away from bespoke systems, (where product switching is not easy or cost effective to undertake) and make greater use of Commercial Off-the-Shelf (COTS) products, which will reduce costs and can be more easily upgraded. In using COTS products, the MOD should also consider enterprise licenses, giving it the opportunity to leverage a wide user base across government.
- 4** The MOD should aim to make use of pre-approved technologies (where possible in partnership with the rest of government), and look to create sandpit environments to enable pilots for new technologies.
- 5** Given the vast and increasing quantity of data held by the MOD, it should look to utilise AI technologies to support data analytics across Defence. The introduction of new capabilities which are driven by data means that the MOD must invest in new data analytics tools, if it is to manage and exploit the increased volume of information it receives.

ACCESSING NEW TECHNOLOGIES AND BROADENING THE SUPPLIER BASE

The MOD is currently seeking technology innovation (rather than invention) in the following areas as part of the MDP:

- Information management and decision support
- Process automation and productivity aids
- Improved collaboration capability
- Cyber protection across the support chain

The capabilities and technologies that can modernise these areas already exist within the techUK membership, but in many cases sit outside of Defence. The Defence market is perceived to be too complex and difficult to enter. This means the MOD is not able to access mature technologies which are routinely exploited across the private sector. In consultation with the techUK membership, the following issues have been identified as blockers to the adoption of new technologies:

CURRENT BLOCKERS

1	Whilst the various MOD innovation initiatives have helped to identify and engage non-traditional suppliers, they have focused on technology assessment and evaluation rather than business exploitation (see figure one).
2	The current initiatives have not delivered an enduring route to market and growth for both SMEs and non-traditional suppliers wishing to supply into the major Defence programmes in the UK.
3	The lack of a single delivery framework for mature technologies between the MOD, Primes and SMEs is inhibiting technology growth and innovation across Defence.
4	The complexity, or perceived complexity, and length of commercial processes make entering the Defence market unappealing to non-traditional suppliers of all sizes.
5	Pressures on incumbent Prime contractors to both reduce costs and accept lower profit margins, combined with impact of single source contract regulations, have disincentivised Primes from investing in higher risk technology developments with non-traditional suppliers.

As noted on the previous page, the focus currently within the various Defence innovation initiatives is on technology assessment, encompassing Technology Readiness Levels (TRL) 1-7. This approach limits the speed and ability of Defence to pull through new technologies to major Defence Programmes and to the end users (Front Line Commands (FLCs)), even though maturing technologies exist outside of Defence at TRL 7-9. Enabling industry and FLCs to carry out top-down business exploitation rather than bottom-up technology assessment would help Defence access new technologies. Figure one below illustrates this:

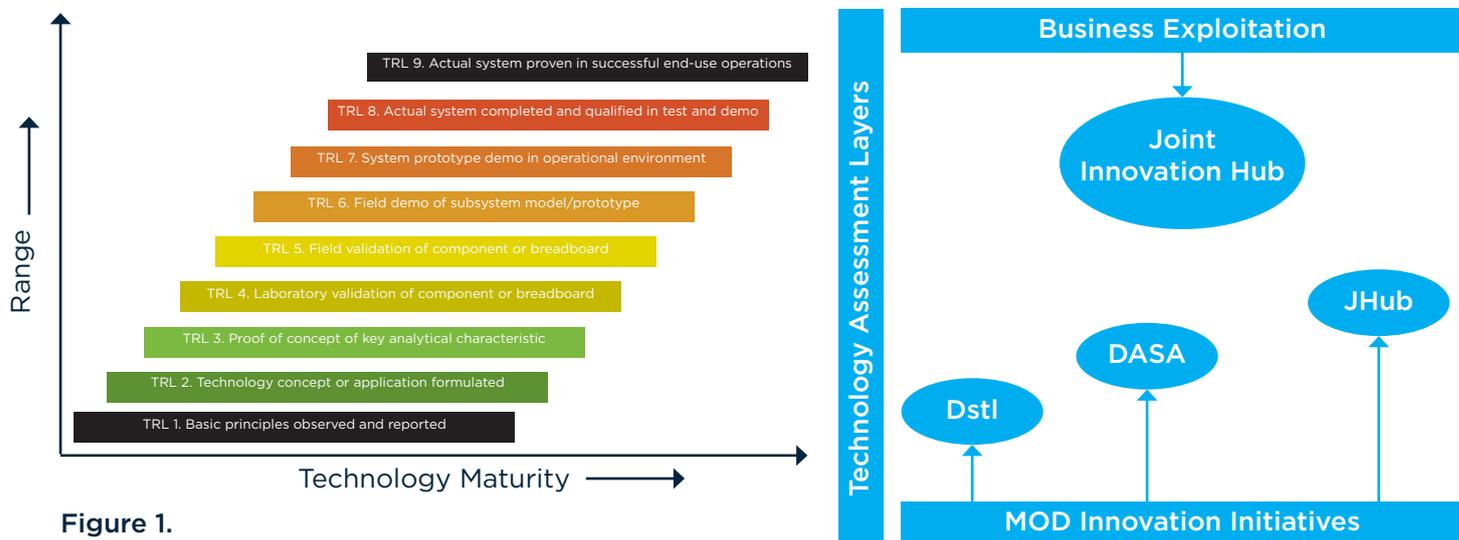


Figure 1.

In order to bridge the current gap between technology assessment and business exploitation, techUK recommends that the MOD uses the second phase of the MDP to create joint MOD-Industry Innovation Hubs (Centres of Excellence), to bring together the appropriate enterprise skills, investment and governance model which can manage both the risks and rewards associated with the exploitation of new technology. Figure two below outlines how this model could look:

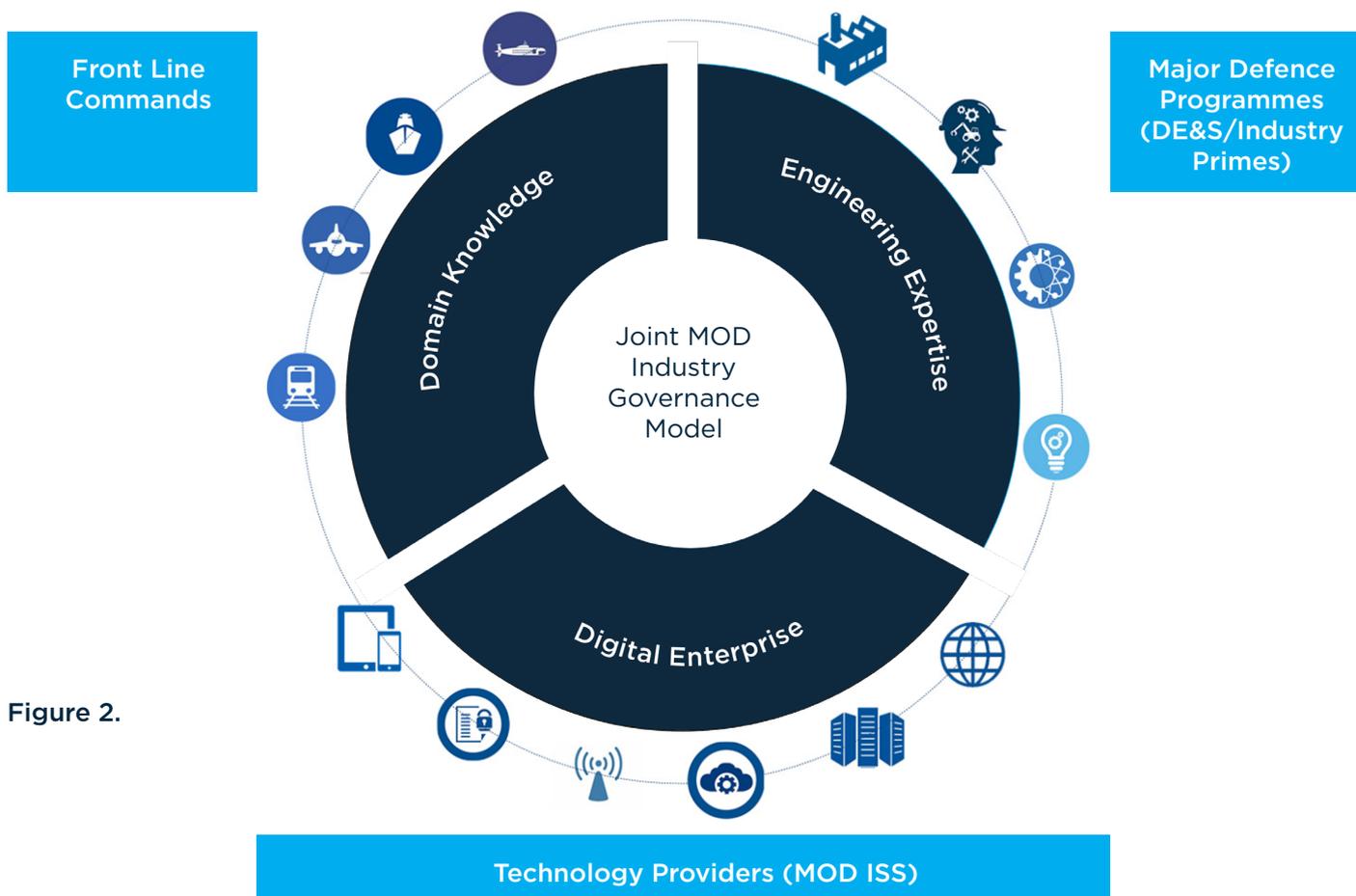


Figure 2.

techUK members also suggested the following as enablers to the exploitation of new technology:

FURTHER ENABLERS

1 The provision of a fast track MOD IT Innovation Platform / Application Store at OFFICIAL or lower, in which new applications created by SMEs and other non-traditional suppliers can be beta tested by Defence users. This would allow both the MOD and industry to:

- Exploit agile software development
- Enable SMEs and non-traditional suppliers to share applications developed for commercial use with real MOD users to test and assess their applicability and benefits for Defence
- Test the concepts and functionality of applications before a thorough cyber security assessment is undertaken, thereby reducing many of the technical and cost barriers associated with tailoring an application for use in Defence.

2 For low TRL initiatives, the creation of Advanced Research Hubs using business domain governance boards for Land, Sea, Air, Space, Joint Forces Command (JFC), and Cyber. This would enable the FLCs and systems integrators to co-invest in new technologies which have high gain and UK plc growth potential. This type of concept has already been developed with academia:

- The Advanced Nuclear Research Centre (ANRC) programme with the University of Strathclyde attracts annual investment funding from the Nuclear industry, wider government, the MOD and the Engineering and Physical Sciences Research Council (EPSRC). The ANRC's governance board has focused on Research & Development investment on real life business challenges that have significant business benefit to long term innovation and sustainability of the Nuclear sector.
- The Nuclear sector has many parallels with the Defence sector, specifically in terms of asset complexity, sensitivity and cyber security. This could suggest that other sectors can provide similar routes to co-investment and collaboration where common problems exist.

CONCLUSIONS AND FINAL RECOMMENDATIONS

To access new technologies and broaden the supplier base, both SMEs and non-traditional Defence suppliers need to be able to easily access mentors and funding within a single Defence innovation framework bringing together the MOD and major Prime contractors.

techUK believes that to embrace and exploit new technologies in Defence, industry will require a new business model, that encourages technology advancement within the sector. This requires an R&D style construct which acknowledges the increased risks of failure and reward associated with the introduction of new technologies. techUK suggests that such a model could include:

- 1 Ring fenced risk and opportunity funding lines on major Defence programmes to exploit innovation pilots under a joint MOD/industry governance model.
- 2 A flexibility that allows for increased financial reward for industry partners that co-invest with SMEs and non-traditional suppliers, including guaranteed ability to exploit the technology further.
- 3 Higher profit margins for unique technologies which are procured under single source contract regulations.

As the membership interests of techUK span Defence, the rest of Government and in the commercial sector, we are in a unique position to bring together MOD, the Defence industry and non-traditional technology suppliers.

Based on the views expressed by members within this report, techUK can help facilitate the development of a new innovation delivery framework in collaboration with MOD, as it modernises the way it conducts its business.

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Envitia	Thales
Evri Insight	UKCloud
IBM UK	Viasat
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techUK represents the companies and technologies that are defining today the world we will live in tomorrow. We have over 900 members that collectively employ over 700,000 people accounting for about half of all tech sector jobs in the UK. Ranging from leading FTSE 100 companies to new innovative start-ups. The majority of our members are small and medium-sized businesses. techUK is committed to helping its members and the sector grow.

techUK's Defence, Cyber & National Security programmes provide channels for the industry to engage with commercial and government partners to provide intelligence on the threat landscape, procurement planning and to stimulate demand for UK capabilities. We work with government partners from the Ministry of Defence, Cabinet Office, Home Office, Department for Business Innovation and Skills and UK Trade and Investment Defence & Security Organisation, among others. Our initiatives aim to bring commercial and government partners closer together to benefit our members, UK citizens and UK national security.

techUK Defence & Security Board

This is techUK's most senior grouping in the Defence and Security sectors. It is comprised of high level representatives from strategically important companies active in the UK's national security markets and policy areas. The Board represents the interests of small and medium sized enterprises as well as international companies with a UK presence.

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