

Two Become One: Human-Machine Teaming

On a fresh December morning, we headed to the **Ministry of Defence (MoD)**, to confirm our suspicions that it is a hub of HR innovation. The MoD, like many of the others, have been trying to do things that even they are not sure are possible, truly on the cutting edge of technology. We met with **Paul O'Neill, the Head of Defence People Strategy and several of his senior colleagues** from across the Ministry and the Military. Unaware of just how far ahead his team is in the AI game, he humbly described a range of projects across the department in areas we had not yet discovered during our research. Paul and his team talked us through their innovation, their best practice tips and as no surprise, their focus on data security.

People and Bots can be the best of friends

We begin our conversation by hearing about the Internal Defence Thinktank, which looks up to 30 years into the future to plan people strategy along with strategy across the ministry. Over the last year, the biggest area for the MoD has been *'human-machine teaming'*, also known as augmented intelligence, where they are exploring how they can get the most out of humans and machines working together to make decisions, complete processes and build trust. The MoD don't want quick fixes in this sensitive area, they want real long-term value, which contrasts the approach taken by the other vanguards to use AI as an interim solution. Neither approach is better than the other but tend to be selected based on what outcome an organisation is aiming to achieve. As with others we have spoken to, the MoD are diligent and bold enough to move into technological spaces that others have not been able to. The MoD are using the concept of 'human-machine teaming' across decision support, operations, intelligence, and information processing.

The innovation challenge

The MoD established a Defence People innovation challenge, encouraging individuals or firms from the marketplace to offer proposals focused on enhancing: recruitment, skills & training, retention, motivation and/or rehabilitation, with the opportunity to be backed by up to £3million funding.

The challenge has been a great success for

the MoD. The MoD's prestigious reputation, strong brand, and guaranteed funding gives them an advantage that they are utilising. Furthermore, the innovation challenge is providing the opportunity for smaller start-ups to put their ideas to the test in a meaningful way. Having innovators compete for funding by showcasing their products, also helps to identify ideas with the most potential.

Resulting from the challenge, they were able to develop 'Duchess'; a dynamically updated chatbot who uses Natural Language Processing and Machine Learning to bring us a hybrid between a survey and an interview. Duchess can interpret answers to questions and then ask follow-up questions, working off of an initial decision tree, but one that can go off-piste from your conventional questionnaire. Put simply, Duchess gives the MoD the ability to carry out large scale research in a qualitative way, obtaining more in-depth answers from a far larger data-set than previously would have been possible. In the navy, for example, being able to gauge feedback from those arriving home from a deployment can be invaluable.

The virtual life coach

The MoD's central hub of innovation—the Defence Science and Technology Laboratory (DSTL), decided to partner with Daden; an AI solution provider established in 2004, long before AI was a hot topic. With the business perspective and sourced technology capabilities, they devised a 'virtual life coach'. The coach has been designed to act as a single

point of contact and answer FAQs for colleagues, and is currently being trialled by the RAF. The bot also learns on the job, in the sense that it makes suggestions personalised to the individual based on previous interactions. It can offer help in all aspects of someone's life, not just those related to being in the military in what they call 'whole life support'.

The coach has the benefit of anonymous intimacy, which research suggests people are more likely to open up to and find themselves mirroring their affections towards a robot in a similar way to how they would towards an animal or person. This can be hugely beneficial in terms of building trust in technology and providing people with another form of support. The bot does not pass judgement and instead is a pragmatic tool for people to use to increase motivation, performance, and satisfaction with life and work.

Building Bots: Best Practice Tips

1) The bot mustn't be irritating

We discussed with David Burden, the founder of Daden, about how far a virtual coach should 'push' rather than 'pull' interaction with its users, agreeing that the last thing they wanted to do was be another app sending more notifications that are largely ignored. The key is having more complex algorithms related to what the bot asks you and when, and to integrate the bots questioning with just helping the user go about their daily business, so the coach can display passive and active modes, and reactive and proactive ones. That way it acts more human like and keeps users engaged.

Lesson proposed: Similar to what we see when businesses try to force their employees and managers to use self-service, a more successful approach might be to offer the solution to people and let them decide when to use it. The bot can assist with a wide range of everyday tasks, slowly building a track record of being helpful and trustworthy in all areas of life and work.

2) Be realistic about what is and isn't possible to improve with technology

The MoD didn't see virtual coaches as a

panacea to all their problems and chose common issues that may be resolved by a simple, 24/7 rule-based support system.

Lesson proposed: Identify challenges that exist due to a lack of time or capacity for managers or HR, or that materialise in common, repeated questions or processes. Starting with these tangible challenges rather than broad and intangible issues means you can build up to resolving the bigger more complex issues whilst delivering quick wins to your business and building trust in new technology.

3) Trust your vendor and give them space to innovate

They say the key is letting the technologists get on with it, giving them space to be creative and not trying to get too involved before their input is needed. In this sense, they are relatively hands-off until the solution needs to be tested and feedback provided. What they do really well is ensure the right stakeholders are engaged at the right time and this balance has been achieved because Daden has built trust in their customers.

Lesson proposed: Map out the stakeholders who need to be brought into this emergent technology. Assess how engaged you need them to be, from knowing about the project, to not blocking it, or to proactively championing the change and approving budget requests as part of a committee. Work with your partner to plan how you will bring these stakeholders on the journey, what information to deliver to them, how often and through what channels to ensure you have enough engagement to land the project but not so much that you're suffocating progress and innovation.

Implementations of any size, often have a few unanticipated teething problems to begin with. Time and resources should be allocated in advance to handle these as best as possible, and to get the project back on track.

One step further... the virtual persona

Alongside developing the virtual life coach, Daden have already succeeded at making a

'poor replica' of one of their team members, shaping the bot through one person's experiences. Only by making a poor replica with current technologies can areas of future technological research and current and future ethical issues be properly identified. The demand came from the need to capture and retain the knowledge of employees after they leave an organisation. When people retire what they know can be lost. That knowledge can be stored, but not in a way that is easy to access. In future knowledge will be retained differently, as if the person was in the room giving their opinion. The aim is to not just gain the facts and hard knowledge but to capture the memories and experiences that people have.

'The ethics of keeping a digital legacy became a very immediate issue for us' – David Burden on the Virtual Persona

On the success of the project: David tells us that they are surprised at how far their mission is advancing, and have paused to think about the real-life ethical dilemma that would be posed if for example, the person they're basing the bot on dies tomorrow. Would his family have some kind of rights to whatever they had created? The MoD have taken a wise decision to approach AI with caution to protect themselves and others against unintended consequences, ensuring that humans maintain the necessary levels of control, oversight and accountability over machines, and to ensure that the relevant ethical issues are being addressed.

Seven principles identified by Google's CEO, Sundar Pichai, to **ensure AI remains ethical:**

Technology should:

- 1) Be socially beneficial
- 2) Avoid creating or reinforcing unfair bias
- 3) Be built and tested for safety
- 4) Be accountable to people
- 5) Incorporate privacy design principles
- 6) Uphold high standards of scientific excellence
- 7) Be made available for uses that accord with these principles.

Figure 1: Ethical Principles of AI

Google have taken a positive step in communicating their values and their approach

towards AI to their employees and the wider public. Nevertheless, statements such as these tend to be open to individual interpretation, and so it is questionable how comprehensive and binding these principles are, suggesting that there may not be a way of developing a concrete code of ethics for AI. However, this is no excuse to not pursue an ethically driven agenda. AI promises both great benefits and risks to a universal humanity, both of which need to be carefully monitored.

Lesson Proposed: Best practice has been demonstrated by organisations such as Microsoft, who have assembled AI ethics boards, advisors, and teams. The formation of these boards enables the development of a shared language regarding the social and political concerns of AI and can obtain insight from diverse groups of people, rather than acting on an individual's take on the issue. We have already seen progression in government with the development of the [Centre for Data Ethics and Innovation \(CDEI\)](#) in 2017, at a key time to govern the innovation taking place at the MoD. When developing an ethics board for AI, we recommend forming diverse and representative teams to fully represent our current society, and to build a layered ethical review board. For example, an ethics board may govern a particular team, but there should be another layer above this, for example, a wider ethics body that governs the ethics board to ensure ethical rigour.

Reducing the Risk of Working with Start-Ups

With somewhere as critical as the MoD to UK national security, data privacy is of the utmost importance.

The MoD have taken their own innovative approach to ensure that their AI projects remain secure. As would be expected, when an AI solution is built in-house, an organisation can hold a higher standard of control over its security, processes and overall development, compared to AI solutions that have been outsourced. Thus there is a clear advantage of building in-house from a security perspective, but given the rapid rise of innovative start-ups, there is likely to be AI software out there that is

just as good or better than what is being developed in-house. The MoD have recognised this as an opportunity to take advantage of, as long as the risks are managed. They are cleverly and strategically utilising the Innovation Challenge as an opportunity to attract the best quality start-up technology to the organisation. By offering start-ups a partnership, they are also gaining influence to vet the development of software and its security approach.

A forward-thinking legal firm, Mishcon De Reya, have taken a similar approach and developed a programme for tech start-ups in the legal space called MDR Labs. Selected businesses are invited to a 'Pitch Day' before embarking on a 10-week programme, where they partner with Mishcon to identify how they can achieve their own goals as well as enhance Mishcon's strategic agenda. Mishcon supports the development and creation of ideas and in doing so, offer them coaching and mentoring as a business and ensure that their security and data protection processes are up to scratch.

A key challenge asked by our network is 'How do I persuade Procurement to invest in a new product from a relatively new 'unknown' vendor?'. Our vanguard is taking a slightly different approach to due diligence of Automation and AI tools that doesn't stifle

innovation. Here are our top tips for evolving your procurement process:

Lesson Learned: Tailor your approach to selecting and assessing emergent technology and suppliers. The traditional areas of assessment; profitability, age and size, are still relevant, but with an updated perspective. Previously, traditional procurement focuses on assessing an organisation's revenue and profit, years of operation and number of employees or global presence, against which potentially innovative and brilliant tech start-ups wouldn't stack up. We have summarised our new perspective on these areas of due diligence in *Figure 2*.

The MoD lead by example as a security-conscious and risk-averse business who have found safe ways to explore smart technology and we think their advice can benefit any business.

Although the MoD have set out on a long journey ahead, they have earned their place high on our list of vanguards, with an innovative mindset that knows no bounds. We are keen to see how they further develop human-machine teams and continue enhancing new technology that the rest of us can soon try out.

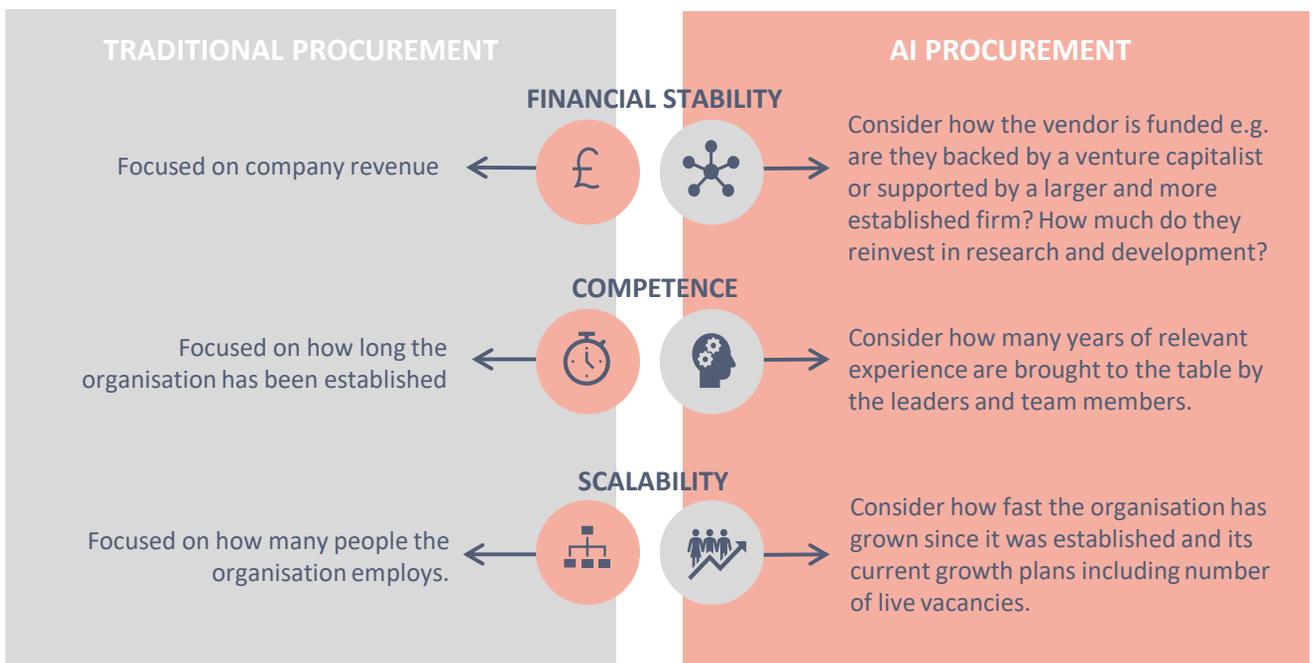


Figure 2: The changing nature of procurement