

Digitally Enhanced Advanced Services (DEAS) Network Plus Call

Call for proposals for DEAS Network Plus Manufacturing Projects 2019

Closing date for applications: **18th April 2019**

Key dates

<i>Item</i>	<i>Deadline</i>
Issue date	6 th March 2019
Application development workshop	2 nd April 2019
Closing date	18 th April 2019
Notification to applicants	30 th April 2019
Projects started	1 st June 2019
Projects completed	1 st December 2019 – 1 st March 2020

The Network

The Digitally Enhanced Advanced Services (DEAS) Network Plus focuses on how a product or service is used rather than how they are produced. Increasingly, people and organisations are moving from buying conventional products and services, and instead are seeking to buy the ‘outcomes’ that these enable (e.g., rather than ‘buying an engine’ customers want to buy ‘thrust’, rather than ‘buying a car’ they want ‘mobility’, rather than ‘buying insurance’ they want ‘reassurance’). In this way the world of ‘selling things’ is giving way to the experience of ‘outcomes’, and this is paving the way for new and innovative business models that exploit digital innovations known as Digitally Enhanced Advanced Services. DEAS represent a major change in how firms earn money (e.g.: payment-per-use, availability or outcome) and is an area where the UK has the potential to excel. We aim to create a community of researchers and practitioners working collectively across disciplines (computer science, engineering and business) and sectors (manufacturing, transport and finance services) to co-create a comprehensive research agenda that accelerates the innovation of DEAS. The activities of the network will be guided by the principal research question of *how can transformative digital technologies accelerate the innovation of DEAS*. This first call focuses on the manufacturing sector.

Call Summary

Applicants are invited to apply for funding to undertake one of two types of project: a scanning project (stream A) or an implementation project (stream B). Projects in both streams should be specific to the manufacturing sector and align to one of the following seven priority research questions.

1. How can innovative digital technologies enhance the communication, education and engagement of customers about DEAS?
2. How can innovative digital technologies enhance the communication, education and engagement within an organisation about DEAS?
3. How can innovative digital technologies enhance value creation, delivery and capture across networks supporting DEAS?

4. How can innovative digital technologies enhance data management and analysis to allow improved decision making about DEAS?
5. How can innovative digital technologies enhance business model design, adoption and evaluation for DEAS?
6. How can innovative digital technologies enhance productivity and growth of the UK economy through DEAS?
7. How can innovative digital technologies enhance organisation and cultural change for effective adoption of DEAS?

Further details on each of the research questions can be found in Appendix A. The research questions will also be discussed in the application development workshop associated with the call that takes places on the 2nd April 2019.

Stream A – Exploratory scanning projects

Projects within stream A are exploratory scanning studies that focus on manufacturing and address one of the seven research questions. Exploratory studies might be based on cases of industrial practice, surveys of multiple businesses, or analyses and syntheses of economic data. Each project should bring together perspectives from different disciplines (e.g., Computer Science, Engineering, Business, Social Sciences and other relevant disciplines). Industrial support is encouraged for Stream A projects. It is up to the project investigators to identify this support and submit the relevant letter(s) of support with their application. Each project should result in a detailed report (template will be provided) and an academic paper, which can be submitted to a special issue of a journal after the project has finished¹.

Eight scanning projects will be funded from this call. Individual projects can request up to £5,000 total funding (total spend up to £5,000 as per FEC 80% funding).

Stream B – Implementation projects

Projects within stream B should provide proof of concept and demonstration of potential. Each project should address at least one of the seven research questions. Each project will include UK manufacturer Baxi² as their industrial partner and address the challenges that they describe in the workshop on the 2nd April. We will provide a project manager to facilitate the relationship with the company throughout the project. Each project should result in a detailed report (template will be provided) and an implementation of the proposed solution to demonstrate proof of concept.

Two implementation projects will be funded. Individual projects can request up to £80,000 total funding (total spend up to £80,000 as per FEC 80% funding).

¹ Details on the journal will be released during the project.

² Details on Baxi will be released prior to the workshop.

Notes

The following notes are applicable to all projects whether they are in stream A or stream B.

- An application development workshop will take place on 2nd April 2019, where Baxi will present some of the challenges that they have in adopting DEAS. Workshop participants will be able to begin to form teams and possible solutions, that can align with the research questions and form the basis of a proposal to this call. It is strongly recommended that applicants attend the workshop.
- Applicants will be awarded 80% of the full cost.
- Projects are expected to last six to nine months.
- Projects must be interdisciplinary (comprising members from Computer Science, Engineering, Business, Social Sciences and other relevant disciplines Business) and should preferably involve more than one institution or organisation. Interdepartmental collaboration is the minimum acceptable level of interdisciplinary.
- Each individual can be Principal Investigator (PI) on one project only. Submissions led by Early Career Researchers, as defined by EPSRC³, are encouraged.
- Projects should be able to demonstrate reasonable prospects of continuation funding to enable sustainable development.
- When considering impact activities, applicants should consider how they will contribute to the formation of the DEAS scientific community and how they might contribute to the DEAS website (e.g., articles they can offer for the website). We encourage presentations at special sessions at conferences⁴.
- **Funding is for academic research teams led by UK Universities and only UK-based academic salary costs will be covered.**
- Applications must be made through the DEAS+ application form and must not exceed 4 pages, minimum font size 11 Arial. They must be accompanied by a Gantt chart project plan.
- Applicants must be eligible for EPSRC funding. A list of eligible organisations to apply to EPSRC is provided at: <https://www.ukri.org/funding/how-to-apply/eligibility/>. As this call is a targeted funding opportunity provided via EPSRC funding, higher education institutions, and some research council institutes and independent research organisations are eligible to apply. For funding rules, guidelines and guidance on the type of support that may be sought please see: <https://epsrc.ukri.org/funding/applicationprocess/fundingguide/>.
- We do agree GDPR compliant policies and Data Processing Agreements between the applying institution and the University of Exeter. If these cannot be agreed within a certain timeframe, we reserve the right to abandon the contract process and select another application.

³ <https://epsrc.ukri.org/skills/fellows/peerreviewprocess/whocanapply/>

⁴ There will be tracks dedicated to DEAS across Manufacturing, Transport and Financial Services at the Spring Servitization Conference (SSC) 2020, which will be held in Birmingham (<https://www.advancedservicesgroup.co.uk/ssc>).

Assessment

Proposals will be assessed in according to the assessment criteria that are set out below. Decisions will be made by the DEAS Network Plus Leadership Team. Members of the DEAS Advisory Board will also conduct reviews dependent on their expertise. Marks will be allocated to proposals based on the degree to which they meet each criteria. Marks will be amalgamated to form a prioritised list with the highest ranked projects funded subject to available funds and quality criteria having been met. Each application will receive 2-3 reviews. Unsuccessful applicants may request feedback if they wish.

Assessment Criteria

- Suitability for the call: Does the project fit one of the seven priority areas listed in the call document? Is it research? Identifying the potential to inform the research challenges for the DEAS Network is essential. How will the project advance the adoption of DEAS and therefore benefit the DEAS Network?
- Standard EPSRC assessment criteria will also be applied: quality; importance; impact and the applicant's ability to deliver the proposed project within budget and in time.
- Suitable evidence of a planning and management process for the duration of the project.
- Is the project interdisciplinary?
- Does the project address a business need and have a supporting company?

The Management of Successful Projects

Fran Lumbers at the DEAS Network Plus investigator team will be the point of liaison for the successful projects. Each project will be required to keep the investigator team informed of progress, via regular reports, and take part in network activities as appropriate to the project. Each project will be expected to present their project outputs at a DEAS Network event in December 2019. Projects will need to submit a final report on the activities and outcomes of the projects (a template will be provided), along with their invoice within a month of the end of the project.

Regarding intellectual assets created as part of the funded projects, we will follow the EPSRC guidelines: <https://epsrc.ukri.org/funding/applicationprocess/basics/ip/>. It is expected that the outputs of any project will be shared with the DEAS Network Plus investigators team for inclusion in the project web site and other promotional materials to inform the Network as a whole and wider public in an appropriate and timely manner in such a way as to achieve some of the main aims of the funding, that is growing the Network and its associated research base.

The funding will be awarded via a sub-contract with the University of Exeter, which will specify the agreed terms and allow for any issues with respect to background IP to be highlighted.

Contact

For further information on the DEAS Network Plus <https://www.deas.ac.uk>. Please contact Fran Lumbers (F.Lumbers@exeter.ac.uk) with any queries.

Appendix A: Guidance on Research Questions

1. *How can innovative digital technologies enhance the communication, education and engagement of customers about DEAS?*

There is a need to raise awareness of what Digitally Enhanced Advanced Services are and how such services add value in general. The opportunity to sell advanced services occurs when the service provider aligns its offer with the customer's concept of value. It is a huge change to switch the basis of the relationship from the customer buying a product to selling them the outcome provided by that product. Digital technologies have the potential to help a customer understand the value of the outcome provided by the product and consequently how a DEAS can help them (the customer) perform better.

Challenges:

How can a company define a DEAS offer if they don't have input from their customers and how can the customer express their needs if they don't understand the concept? If a company has not yet developed a DEAS offer, how can it justify the expense of developing one if its customers will not understand the offer? How can innovative digital technologies provide tools to enable a business to demonstrate the value of a DEAS offer in terms that the customer will understand?

Possible Research Projects:

- How to educate the customer so they can see the value in the DEAS offer?
- How can innovative digital technologies get the customer to understand their new role in a DEAS partnership?
- Considering new risks associated with the introduction of DEAS, what would assure customers? Across different markets?
- Can gamification help a customer understand the value of DEAS?
- How does the customer view the value of the data created during the operation of a DEAS?

2. *How can innovative digital technologies enhance the communication, education and engagement within an organisation about DEAS?*

DEAS is often a response to the need to diversify and an aspiration to move away from transaction-based income. There is a need for a shared business vision: it is challenging to change the mind set at every step of the product (and service) development process. This vision needs to engage the entire organisational: e.g. a £1 saving on procurement of a washer (product mentality) could lead to a failure costing £m to repair (service mentality). With DEAS the service provider gets paid for NOT touching the asset: any touch is a cost. Therefore, there is a need to focus everyone on the final outcome. Innovative digital technologies have the potential to inform and educate both in regard to the concept of DEAS and to the impact of real-time data on decisions. Can we provide simulations to inform decisions in every part of the organisation?

Challenges:

The lead person's role may be divided among many tasks and not focussed solely on DEAS. It can be difficult getting people to sell the service to customers but even more challenging to sell the idea of DEAS to your colleagues. Performance targets are based on the existing way of making money so there is a need to align incentives with the new way of making money. Vital also to get cross functional agreement. The DEAS lead will be fighting against traditional product development for access to R&D resources.

Possible Research Projects:

- What are the internal challenges for digital enhancement?
- How do we change people's beliefs and values? Change mindsets about products and services to build a DEAS vision
- What are the risks associated with people, organisation and technology in the development and delivery of DEAS? Categories: trust & risk / customer behaviour / network
- How do you demonstrate the value of DEAS internally / externally?
- How do you develop a shared vision for DEAS between the senior team, frontline staff and back office team?

3. *How can innovative digital technologies enhance value creation, delivery and capture across networks supporting DEAS?*

All companies are connected with suppliers, customers and partners in a value network. The introduction of DEAS by one company in that network may challenge the other companies in that value network or even companies in a different market space while the new, digitally enabled products may challenge the customer's existing ability to maintain the equipment. Does a company embarking on a DEAS transformation understand its position in the value network and the power or opportunity it has compared to other market players? In the digitally connected world, there will be opportunities to collect and share data with all organisations in a value network that delivers or could deliver DEAS to the end customer. The selection of appropriate data will enable value to be shared based on real-time analysis of how the service is being used.

Challenges:

The person running the system into which you supply has an incentive to take over your service: suppliers, OEMs etc each want to offer the whole solution and keep all the money. How to determine the most appropriate role in the value network for your organisation? What stops you and them sharing data? Lack of trust. Sharing data with the value network should be OK but only with confidentiality. How to get each participant to trust the data and agree with the value share that it gives them? Value can arise from many different aspects of a service but getting paid is essential to company survival. A whole network may depend on a tiny contribution from a small company.

Possible Research Projects:

- How to use digital technologies to bring about change in a business network to deliver DEAS?
- How do we manage databases related to DEAS across a value network?
- How should we use technology (e.g. IoT) to improve the visibility of collaboration in a DEAS value network?
- How can revenue / value be shared across a DEAS value network to ensure everyone is motivated and successful?
- New technology can change who thinks they are prime: how do you manage shifts in power most efficiently?

4. *How can innovative digital technologies enhance data management and analysis to allow improved decision making about DEAS?*

In a DEAS system, we will capture not just data to monitor the system and its components but also data for the customer and, possibly about the activities of their customers. Who owns this data? Who needs to access it and use it? The ability to turn data into decisions will be the source of value. This is an opportunity for big data and artificial intelligence. What controls need to be in place?

Challenges:

As soon as we fit our products with sensors and arrange for them to send measurements back to our control centre, we face a deluge of data. For example, readings of location, ambient temperature, product status sent every hour from thousands of devices. How to recognise which data is important - not only for today but for the potential new DEAS of the future. How to present that data in a way so that informed decisions can be made?

Possible Research Projects:

- How do we represent our level of confidence in the data and its interpretation? What happens if it is non-deterministic?
- How do you represent complex datasets from DEAS to the right people in the right way? How can be adapted to the user?
- Should manufacturers be triangulating data sources across the DEAS value network to measure what they really want?
- In DEAS, do we need complex datasets to make decisions? (site v content v sources)
- How can data from DEAS value networks be used to identify patterns of use? To identify new services?

5. *How can innovative digital technologies enhance business model design, adoption and evaluation for DEAS?*

The change from selling a product to selling the capability that the product provides presents some challenges, e.g. The boiler value chain is simple, but the heating value chain is complex. Everyone has vested interest in the existing value chain. DEAS challenges status quo. To provide the DEAS, a company may need a new business model and new business partners. Once started, it will be a challenge to handle the growth and scale up of operations: to gather data - not just about the products but also related to the environment in which they operate.

Challenges:

The existing transaction business model (selling products) is strong so why change? Good R&D is developing new standard products every year. As you start to gather data, you learn new aspects of how your products deliver capability: how to adapt your DEAS as you learn? Once you have insight, you want foresight - how to predict what the market will want next?

Possible Research Projects:

- How to change the business model and organisational structure to support DEAS?
- How do we predict / address risk in DEAS? New risks of digitisation, cyber security etc?
- When you already offer DEAS, how do you grow? Scale or new services or both?
- Do DEAS enable agility or embed rigidity in the existing processes and business model?
- Are we considering future technology requirements enough? Can we anticipate future requirements and future technological solutions?

6. *How can innovative digital technologies enhance productivity and growth of the UK economy through DEAS?*

Andy Haldane (Chief Economist of the Bank of England) in his recent report on productivity puzzle (essentially stagnant growth since the financial crash) argues that despite the advent of the digital age and the adoption of digital technologies by some leading companies there is a very long tail of poorly productive firms across all sectors. In addition, there is a growing preference to purchase services on a subscription basis. Many companies are however using all their available resources just to stay in business. What can be done to make it easy for companies to transform their business model to adopt Digitally Enhanced Advanced Services?

Challenges:

The challenge is to provide these firms with tools so that they can explore how the switch to DEAS can provide increased and sustained value to them and their shareholders. This needs to be done quickly and effectively as they will need to divert resources from their current core business in order to establish: what advanced services they can offer; how their products can be adapted to enable DEAS; how their organisation needs to change and how to sell this new concept to their customers.

Possible Research Projects:

- Develop an on-line tool to allow a firm to build a business case for a switch to DEAS
- What can be done to help smaller companies take the DEAS step? Can larger organisations help?
- How does an SME identify / assess the appropriate technology for DEAS?
- How can SMEs be aware of / learn what is available to implement DEAS given less resources?
- How to develop skilled people that can apply big data and AI techniques to developing DEAS?

7. *How can innovative digital technologies enhance organisation and cultural change for effective adoption of DEAS?*

Organisations, particularly SMEs, are often reluctant to adopt new systems because they are unsure of their own readiness for the change. Companies who are considering DEAS systems not only need to know the requirements and habits of external members of their value networks to be confident, they also need to know they have the internal conditions and personnel in place to achieve operational effectiveness. Can innovative digital technologies enable organisations to assess their own requirements and develop confidence that they have the right conditions and people in place to optimise DEAS implementation?

Challenges:

The challenge is to develop a reliable understanding of the most important factors affecting uptake and effective adoption of DEAS systems and to develop practical tools that organisations can apply to self-assess their current circumstances and identify what they need to put in place to optimise DEAS implementation.

Possible Research Projects:

- What are the key organisational barriers to / enablers for DEAS implementation?
- What are the internal direct user requirements for DEAS implementation?
- How can these factors be measured to evaluate an organisation's current readiness for DEAS?
- How can personnel skills be developed using innovative digital technologies to optimise DEAS integration?
- How can organisational conditions (environment, culture, etc) be developed for DEAS integration?