AHRC DESIGN FELLOWS CHALLENGES OF THE FUTURE

PUBLIC SERVICES

2.4%

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CONTENTS

GLOSSARY

Civic engagement	A process that engages publics in decision-making and considers their input.
Civic technology	Technologies deployed to enhance the relationship between citizens and governments by enabling citizens to participate in public decision making or public service delivery.
Co-design	The act of designing products and services with users and clients instead of seeing the designer as an expert external to the situation. It relates to ideas of co-creation and co-production and positions the user as a situated expert.
Open public services	A government reform programme for public services whereby government, local government, private sector and civic society are involved in the delivery of local services and challenging the public sector to innovate their service models.
Outsourcing	The private or voluntary sector delivering a service to the government or the public after a process of competitive tendering.
Public sector innovation	The process of generating new ideas and implementing them to create value for society.
Public service mutuals	Organisations which have left the public sector through processes of spinning out and continue to deliver the service.
Public service organisations	An organisation that delivers public services from either the public, private or voluntary and community sector.
Relational services	Services based on interpersonal relationships which are an intrinsic part of the service solution.
Service design	A human-centred, creative, collaborative, iterative and systematic process that makes a skilled contribution to address a specific need.
Social enterprise	An organisaton whose main objective is to have a social impact rather than make a profit.
Thick data	Qualitative information that provides deep insights into people's everyday lives and emotions. It is gathered using ethnographic research methods and is complementary to Big Data.
Public procurement	The purchase by governments of goods, services and works aiming to maximise efficiency and value for money while delivering social value.
Commissioning	Commissioning is the process of assessing the needs of people or users in an area and designing and specifying the services to meet those needs. It involves choosing the delivery mechanism to secure an appropriate service while making the best use of available resources.

INTRODUCTION

This report addresses the state of UK university-led design research in the context of public services. It identifies centres of excellence and their supporting infrastructure and maps the research landscape through a review of projects and research centres. It presents salient themes, questions and approaches within practice and details the role that design research may play in the future of public service research and innovation.

Reviewing the innovative capacity of design research undertaken in the public service context, it looks at the methods, strategies and skills that afford this capacity. It identifies developmental opportunities to support further work in this context and provides insight into future collaborations, partnerships and consortia to support activity and drive co-investment between academia, government and industry.

The report aims to:

- Increase awareness of how design creates high-level societal and economic benefit in the public service context.
- Understand how academic design research functions strategically and how it is operationalised within this context.
- Understand how university collaborations are critically important in supporting innovation within this context.
- Understand how collaborations are initiated and sustained to add social and economic value.

The research was conducted from March to June 2020 and complements five other AHRC fellowships focused on design research for place, future mobility, artificial intelligence, clean growth and policy.

Design research

Popular understanding of design relates to product innovation, architecture, graphic communication, fashion, styling, aesthetics, form giving and the development of goods for mass production and consumption. These are all valid interpretations. But, design as both process and artefact is increasingly also used in service innovation, strategic contexts and as a form of academic inquiry. A fundamental component in any design process is action-based research where experimental processes of ideation, prototyping, realisation and reflexivity produce new knowledge and understanding. Moreover, design is a process of situated action that works to achieve coherent and anchored visions of the future through user participation.

Almost every aspect of life is designed, from the objects we use, the transport we ride, the applications we interact with and the cities we negotiate to the systems that govern us. Because design is so integrated into these systems of everyday life, research into its operation as a discipline and as a form of epistemic pursuit is essential to fully understand the capacity and capability of the subject. Design research in the UK is world leading. UK academics collaborate nationally and internationally across sectors to understand the operation, agency and value of design research and its contribution in a range of political, social, technical, environmental, economic and cultural contexts.

This review focuses on one of the most complex contexts of design research; public services. Complexity in this context resides in the fact that public services operate within a large-scale system influenced by social, economic and infrastructural demands.

The private sector has utilised design as a strategic actor for many years. Businesses and consultancies are employing design thinking in organisational contexts to manage operational challenges and innovate. Today governments are following suit and design thinking, practice and research are increasingly valued as agents of innovation and change.[1]

Design in public services requires systemic thinking in the management and delivery of services. Design research undertaken in this context is inherently 'live' and applied. It is contingent on action-based methodologies situated relative to the services that the research is focusing on.

Design researchers in this sector work in a network of communities, institutions and businesses and with public service managers and policymakers to understand user need, innovate and develop new services and infrastructures. They ultimately support the implementation and development of public sector policy. In parallel to this, design researchers work with transdisciplinary insight to evaluate design's effectiveness and value in a context that is far removed from the popular conception of what design is, what designers are and can do.

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[1] See Design Commission (2013); Nesta and IDEO (2017); Kimbell and Bailey (2017); Whicher and Crick (2019) and Policy Lab (2020). These reports, guidelines and initiatives demonstrate advocacy and implementation, and the evaluation of design in the public sector context with a focus on public services and policy.
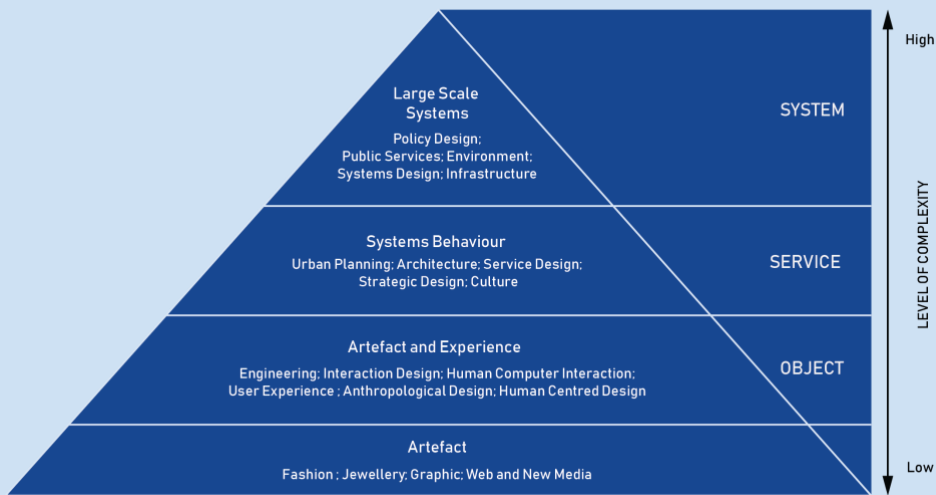
Figure 1 Stratification of design thinking: Adapted from Russo (2016).
The diagram visualises the application of design thinking from the development of artefact to intervention in large scale systems. Design thinking and research in public services are recognised as one of the most complex contexts to engage.

Design research adds value to public services by:

- Innovating with public service managers to add capacity to teams.
- Contributing creative engagement and consultation methodologies.
- Facilitating the implementation of policy within public sector institutions; aligning interests and actors across diverse stakeholder groups.
- Contributing to service transformation and new service development.

Public services

Public services are services essential to citizens, regardless of whether provided by public or private organisations. They are characterised by their social purpose and orientation. In recent history, these services were delivered by the public sector in the UK - traditionally by Local Government Organisations (LGOs) directed by central government policy and paid for by general taxation.

The traditional role of the public sector as a provider for public services is being transformed. A move towards open public services, driven by decentralisation and the development of public service markets, has led to increased delivery by outsourcing to private companies ranging from SMEs to multi-national organisations, as well as public service mutuals[2] and Voluntary and Community Sector (VCS) organisations.

Considering this landscape of public, private and VCS organisations, there is much scope and opportunity for research partnerships and collaboration within this field. The past decade has seen an increase in design research engaging in public services because of three developments:

1. **Open public services, localism and the empowerment of local communities.** The last three decades have seen numerous and far-reaching reforms to public services in the UK which have resulted in less direct provision of public services by local authorities and an increased marketisation of the public sector. This agenda has been a central part of government policy and was encapsulated in the *Local Government and Public Involvement in Health Act 2007; Communities in Control White Paper 2008; Local Democracy, Economic Development and Construction Bill 2009; Localism Act 2011* and *Open Public Services White Paper 2014*. A governing rationale for this policy is that if councils are in a constant, productive dialogue with citizens and service users, they are more likely to know what the issues are that matter to them. If citizens are empowered to co-develop, and even co-deliver, the services this may lead to better services in terms of both cost and service outcomes.

2. **Developments in the field of service design and design-led social innovation.** These two fields of practice have matured over the past decade and have developed processes, tools and methodologies that enable new ways of tackling social needs and creating new relationships by both empowering citizens and generating social benefit through the implementation of design processes. Community orientated methodologies including asset-based approaches to tackling an issue and creative participatory design approaches constructively align design to the aims of the *Localism Act 2011*. University design research has contributed significantly to the developments of these fields, both disciplinarily and professionally.[3]

3. **A turn towards socially orientated problems addressed through design.** The past decade has seen a shift from market orientated approaches in design practice and research towards social innovation, social enterprise and 'more than profit' activities. This is characterised as Transformation Design, Transition Design, Socially Responsible and Socially Responsive Design. The premise here is that the design process, as a form of systemic inquiry, has agency to manage complex and wicked problems and affords innovative capacity for service development and change. Here then, the public sector and its challenges are taken as a rich site for practice and inquiry.[4]

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[2] Public service mutuals are organisations - social enterprise, charity, cooperative or for-profit - developed in the public sector which have spun out but continue to deliver the services.
[3] See Sangiorgi, Prendiville and Ricketts (2014); Sangiorgi (2015); Sangiorgi, Prendiville, Jung and Yu (2015); Sangiorgi and Prendiville (2017).
[4] See Armstrong et al. (2014); Rodgers, Mazzarella and Conerney (2019).

The strategic application of design within this context is most apparent when used in government policy and innovation labs within administrations at central, regional and local levels. These labs use people-centred design approaches to policymaking using design, data and digital tools and act as a testing ground for policy innovation across government that filters down to inform service delivery. Collaborations between academics and government agencies have developed the strategic and operational capacity within this context.[5]

There is international consensus that current public sector structures and modes of operation need a radical transformation and design research and practice has attracted attention as an approach to support this transformation. Innovation in the public sector is seen as generating and implementing new ideas to create social value, either with an internal focus on improved processes of governance such as enhancing productivity or strengthening democracy, or external focus on public service provision and citizens' outcomes (Bason et al., 2013).

Design research for public services supports both internal and external objectives for innovation as it contributes to:

- Developing new service models.
- Improving and innovating service delivery.
- Positively challenging organisational structures and routines, creating capacity to test out alternatives.
- Interacting (and integrating) in news ways with other organisations and sources of knowledge.
- Developing stronger local networks for the co-creation of value.
- Leveraging funds for innovation based on robust evidence.
- Developing experiential learning for all stakeholders involved as they are exposed to diverse perspectives and creative problem solving.
- Facilitating practice-based processes and methods and training non-designers in those methods.
- Providing resources to respond to pressing social challenges and delivering solutions.
- Inclusive methodologies, giving special consideration to vulnerable citizens (extreme users) and thriving to eradicate inequalities in public service provision.
- Providing the capacity for experimentation and prototyping. This activity can be conducted without impeding the service provider's ability to deliver on its core purpose and essential delivery. This service prototyping process also develops institutional competencies and operational capacity.

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[5] This is exemplified by the work of Junginger (2014); Kimbell (2015); Whicher (2017); Kimbell and Bailey (2017). Their research informs and guides public service policy through training and sharing knowledge and practices of design with non-designers, civil servants, and policymakers. Design in this context develops an organisation's competencies in design thinking.

Locating public services in the public sector
The policy cycle is traditionally conceptualised as a linear two stage process where policymakers are concerned with identifying, clarifying and formulating a policy, and then public service managers proceed to policy implementation.

Design research has contributed to the policy cycle by integrating these two design activities (Junginger, 2014). Either as a two-stage process, or as an integrated iterative cycle, policy and service are deeply intertwined. Policy Lab depicts three areas of design in government, all of which are interrelated and influence each other.
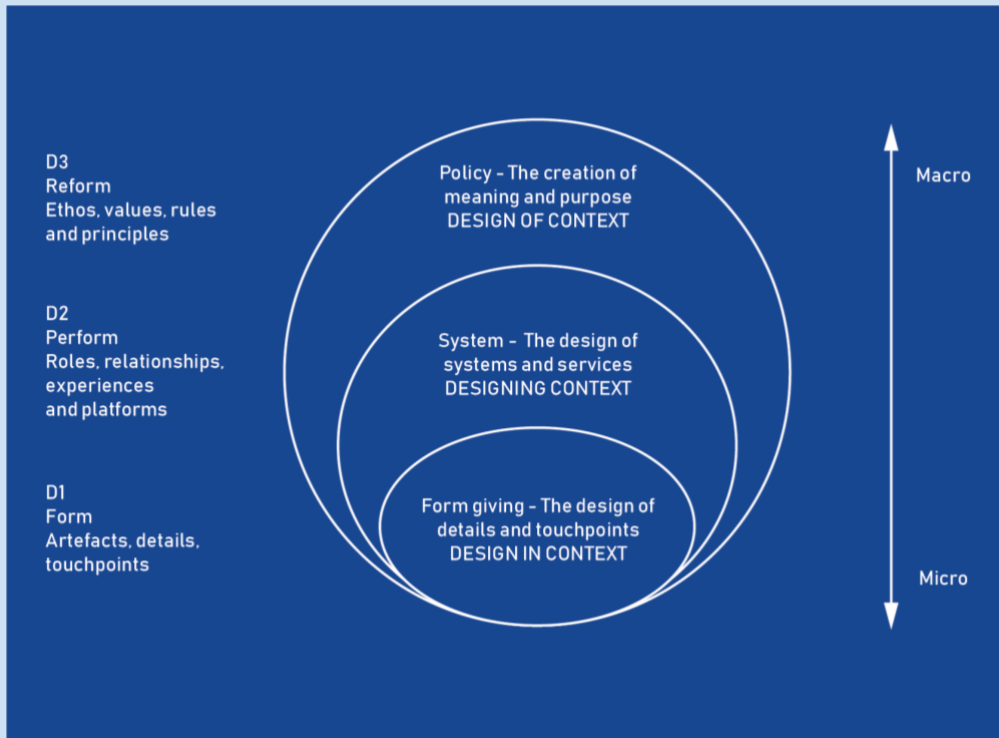

Figure 2 Model of design in government: PolicyLab.
Adapted from Young, Blair and Siodmok (2001). As with the stratification of design thinking we see the application of design move from the micro attention to artefact as touchpoints situated within a larger systemic context designing services and beyond that within a macro system of policy, meaning and purpose. Progressing from micro to macro the complexity of the context increases and therefore the complexity of the design problem or project increases. Design research in Public Services engages this complexity.
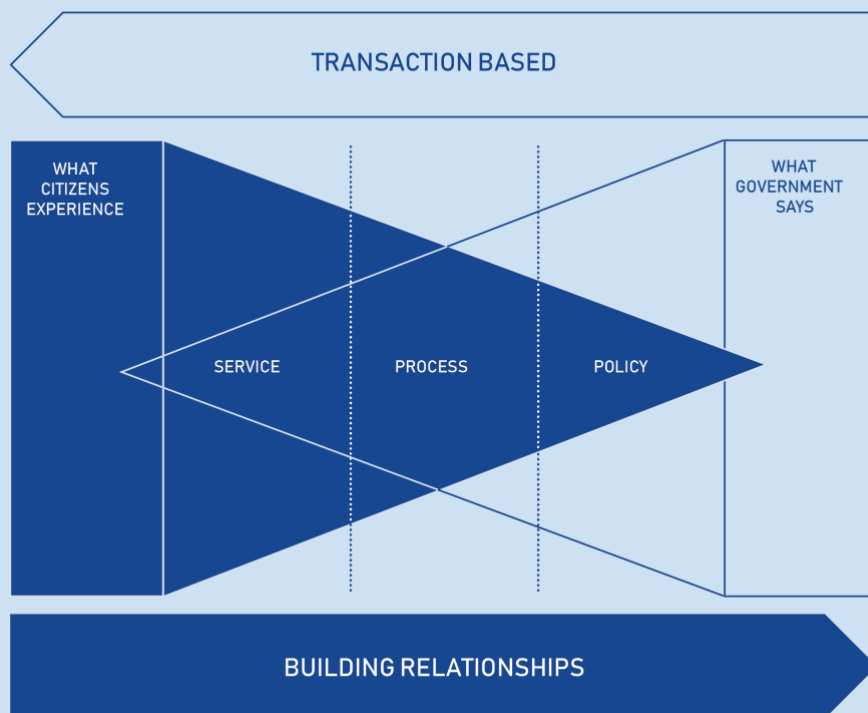
Figure 3 Design for Europe: Nesta and IDEO (2017).
Nesta and IDEO's research offers a useful conceptualisation of the space that design research in the public service context operates.

Design research in public services focuses on internal (processes) or external (services) objectives (Bason et al., 2013). Academics engage holistically by considering how their work might contribute to innovation in service delivery (service innovation), transform delivery (service transformation) and how design processes might contribute efficiency in delivery. They are equally concerned with the internal operational structures that manage and govern delivery (organisational change).

Research informing public services from 'the bottom up' is driven by projects focused on collaboration and design-led civic consultation. This includes prototyping services and the development of design-led consultation methodologies that engage service users, managers and frontline staff.

These are typically driven by co-design principles[6] and through digital civic consultation.[7] Other salient service contexts where design research is focused are in public healthcare services[8], the prison and probation system working towards skills development and education targeting recidivism and restorative justice, and in social care through the development of relational service infrastructures.[9]
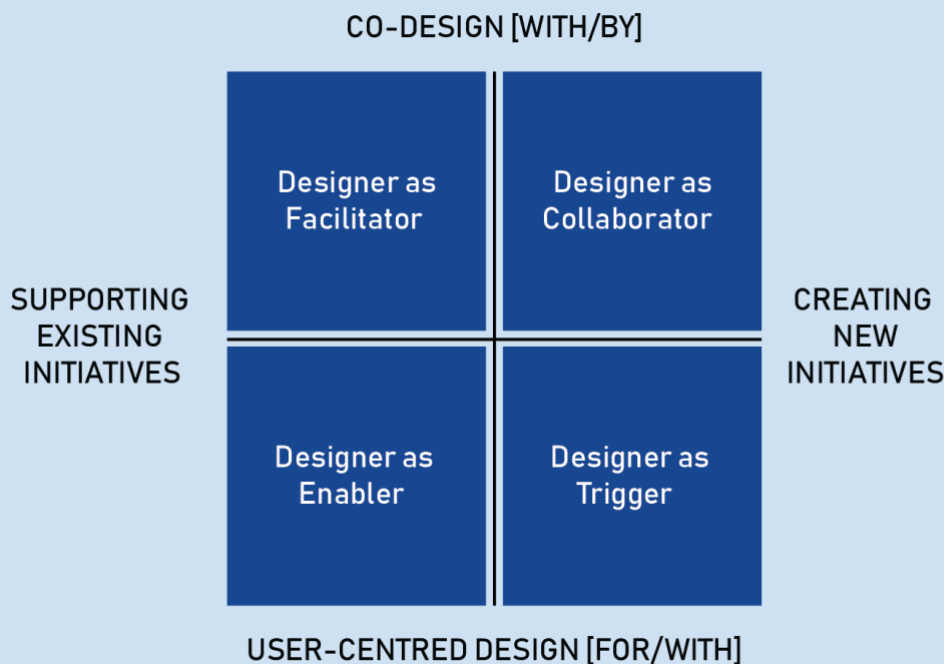
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[6] For example Cruickshank (2017); Thorpe and Prendiville (2015); Salinas et al. (2018); Gant (2019).
[7] For example Digital Civics: https://digitalcivics.io/
[8] For example Chamberlain and Craig (2017); Bate and Robert (2008); Rodgers (2018); French (2019).
[9] For example Gamman (2014; 2016).

Design research projects in these contexts require systemic thinking. The operational role of the designer has shifted from that of author of products, objects and services to an enabler of interactions and a facilitator of large groups of people holding different motivations, values and agendas to trigger ideas. These design capabilities create space for participation, interaction and prototyping with a range of stakeholders and actors to leverage the expertise required to collectively interrogate a situation, articulate concerns, and innovate through collaborative and open forms of innovation.

CO-DESIGN [WITH/BY]

Designer as Facilitator	Designer as Collaborator
Designer as Enabler	Designer as Trigger

SUPPORTING EXISTING INITIATIVES

CREATING NEW INITIATIVES

USER-CENTRED DESIGN [FOR/WITH]

Figure 4. Design roles in public services: Thorpe (2014).
A model of the role that design plays in projects engaging in public and collaborative partnerships, engaging citizens and LGO stakeholders.

Design processes, methods and tools provide structured models of engagement to manage these user assemblages and orientate projects towards service prototyping and new knowledge generation. Ultimately, research methodologies, and the outcomes of these processes, bind stakeholders together through engagement in the design process.

An important outcome of design research are the networks of people that are crafted through the process of delivering a research project. This network and infrastructure develop operational capacities within teams, communities, and institutions. This increased capacity in turn affords the potential to effect change working towards social and economic benefit for both the service providers and service users. Projects cut across the sector and departments to align objectives, and service users as participants provide user insight to inform delivery and more tailored, contextually informed interventions.

OVERVIEW

The design research landscape in this context is developing in scale and interest. The last decade has seen an increase in projects reviewing research in design for services (Sangiorgi, 2015; Kimbell, 2015; Sangiorgi, Prendiville & Rickets, 2014; Sangiorgi et al., 2015). This complements those that review the impact of service design practice in the public sector (Verhulst, 2016) and the application of design-led social innovation in public services (Thorpe et al., 2016; Thorpe & Brass, 2012-13; Cruickshank, 2015). The range of projects in the field demonstrates that there is a broad regional spread of projects, with centres of excellence distributed across the whole of the UK. This is supported by a rich service design eco-system of public, private and academic actors.[10]

Regional distribution

Activity is distributed across the UK with research typically undertaken within departments made up of art and design or computing and Human Computer Interaction (HCI). Design and HCI have a close disciplinary relationship since they both broadly focus on use-centred methodologies. Design research in this space requires interdisciplinary consortia and teams from fields as diverse as health sciences, planning and architecture, politics or social sciences, to name but a few disciplines collaborating on projects. Equally important are industry partnerships with LGOs, local authorities or councils e.g. London Borough of Camden, Bexley, Blackburn or Gateshead or service design agencies e.g. FutureGov and Snook and working with a range of private companies e.g. Serco and Veolia on projects. Academic research across the region is primarily supported financially by UKRI and European funding councils.

Research Funding

A review of funded projects from 2007 - 2025 shows 19 universities were awarded UKRI funding to conduct research specific to public service innovation. 30 research grants, 1 research fellowship 2 Expanding Excellence in England research projects, and 4 Doctoral training centres have been awarded. These have been funded by AHRC, EPSRC and ESRC and Research England. There is a total funded value of £49,100,059; of which £7,245,079 was awarded by AHRC in 22 awards, £22,012,580 by EPSRC in 8 awards, £2,842,400 by ESRC in 5 awards and £17,000,000 by Research England in 2 awards.

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[10] See Appendix 1 for a list of research centres and research profiles and Appendix 2 for UK and International research organisations supporting design research in the public service context.

Research Organisations Engaged in Design Research in Public Services

1. University of Dundee
2. The University of Edinburgh
3. Glasgow School of Art
4. University of Strathclyde
5. Northumbria University
6. Newcastle University
7. Manchester Metropolitan University
8. Sheffield Hallam University
9. Lancaster University
10. Lougborough University
11. The Open University
12. University of the West of England
13. University of Reading
14. Cardiff Metropolitan University
15. University of the Arts London
16. Brunel University
17. Royal College of Art
18. Goldsmiths University of London
19. University of Brighton

Geographic Spread ROs

Research Centres

CENTRIC: Centre of Excellence
in Terrorism, Resilience,
Intelligence and Organised
Crime Research
Sheffield Hallam University

Community21
University of Brighton

Design Against Crime Research Centre
University of the Arts London

Digital Health & Care Institute
Glasgow School of Art and
University of Strathclyde

ImaginationLancaster
Lancaster University

Lab4Living
Sheffield Hallam University

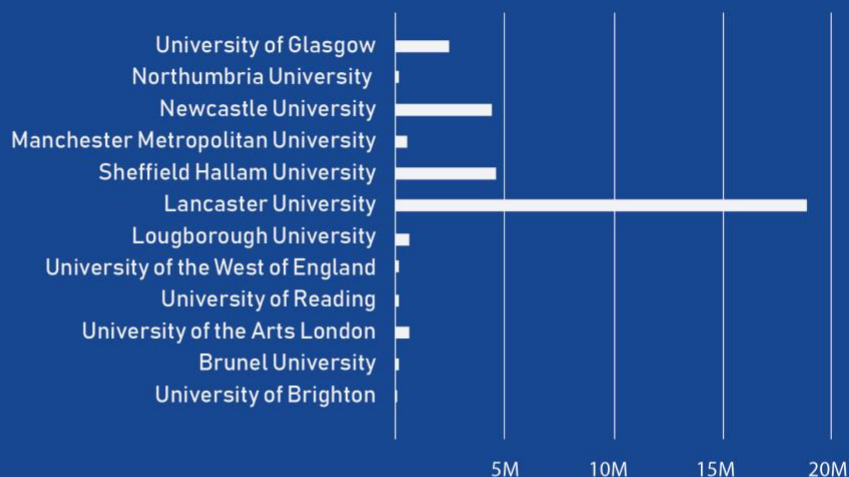PDR International Centre for Design Research
Cardiff Metropolitan University

Public Collaboration Lab
University of the Arts London

Social Design Institute
University of the Arts London

The Digital Economy Research Centre
Newcastle University

The Helen Hamlyn Centre for Design
Royal College of Art

University of Glasgow
Northumbria University
Newcastle University
Manchester Metropolitan University
Sheffield Hallam University
Lancaster University
Lougborough University
University of the West of England
University of Reading
University of the Arts London
Brunel University
University of Brighton

5M   10M   15M   20M

UKRI funded design research projects with public service focus 2007 – 2025
Source: Gateway to Research

Scotland

Scotland's approach to designing public services is driven by digital transformation and democratic engagement. The vision for the Scottish Approach to Service Design is that the people of Scotland are supported and empowered to actively participate in the definition, design and delivery of their public services from policy making to service improvement. Research aligned with this directive is exemplified by the Digital Health and Care Institute - a Scottish innovation centre funded by the Scottish Funding Council. Glasgow School of Art and University of Strathclyde are academic partners within the centre and are working with NHS services and businesses to innovate within public health. Also, looking at health services, the University of Glasgow utilises co-design practices in the TRIUMPH Network, a research project focused on education and social care in relation to youth mental health. The University of Edinburgh also offers exemplar projects which are developing critical frameworks to understand the role of service design within a context of public service management through the Co-VAL H2020 project. The project focuses on evaluating the role of participation and co-construction in public service innovation, management and delivery. Also, the University of Edinburgh's research in Design Informatics explores data driven digital services in the voluntary and public service sector.

England

In England, centres of excellence include ImaginationLancaster at Lancaster University who have developed pioneering methodologies within a diverse design research culture and portfolio of projects including PhD and postgraduate programmes of study. Their work spans a spectrum of design research working in industry, public and voluntary sector partnerships and utilising approaches of co-design, design management, design fiction and disruptive design strategies. Their record of accomplishment has secured Research England funding for the Beyond Imagination project that focuses on communities and the public sector, as well as a range of interrelated themes, to evaluate design research in public contexts. Northumbria University have also developed strategies in public service design-led social innovation and VCS contexts. Newcastle University's DERC: Digital Economy Research Centre is committed to social inclusion through the design of new digital services to enable citizen participation in local democracy, planning, public health, social care and education.

Sheffield Hallam University's Lab4Living is a leading centre in the context of health. Their approach is to inform services relating to demographic change through product and service innovation, developing marketable interventions and applying user-centred and empathic methods, as well as discursive and speculative approaches, to problematise the systemic concerns in relation to health and wellbeing. Also, in Sheffield Hallam, the Centric Research Centre collaborates across public, private and voluntary and community sectors problematising and innovating in the security domain to develop digital interventions supporting themes as broad as migrant integration and training emergency service first responders through innovative use of ICT technologies, user-centred methodologies and the development of serious games.

In London, the Helen Hamlyn Centre for Design at the Royal College of Art (RCA) has developed pioneering strategies in the contexts of health and wellbeing, working with the NHS in innovating product and service systems. The RCA's Service Studio-Lab is currently undertaking work in the contexts of social housing and public policy formulation. University of the Arts London (UAL) also hold numerous projects within its research centres and institutes. Their focus is on prison and probation services through the Design Against Crime Research Centre and London College of Fashion's Making for Change programme. UAL's Public Collaboration Lab collaborates with local authorities using asset-based methodologies to address community need and develop strategic capacity within the local authorities. Within London College of Communication at UAL, research and knowledge exchange activity have pioneered the development of service design research. Analysing practice-based activity and policy applications, the Social Design Institute synthesises UAL activity and is generating work to evaluate and understand the role of design in social design and policy contexts.

In the south of England, the University of Brighton is engaged in research and knowledge exchange activity through its Community21 design agency and research group. Community21 works with communities, NGOs, industry and VCS partners to develop research-led innovation and address issues and opportunities for sustainable and social development.

Wales
PDR at Cardiff Metropolitan University has driven innovation policy work and consultation on public services across the UK and internationally. PDR has been active in advising and developing design strategy within national, regional, and local governments throughout Europe.

Northern Ireland
Northern Ireland is perhaps the least represented region in terms of funded design research in public services. This might be a consequence of only Ulster University specifically operating in the art and design context. There is however a vibrant design and innovation culture within the region. Ulster University are developing the Creative Industries Institute and the policy and service expertise of PDR played an important role in establishing the Northern Ireland Public Sector Innovation Lab (iLab) which aims to improve public governance by creating space to generate ideas, test prototypes and refine concepts with beneficiaries.

Industry engagement
Design consultancies specialising in public services contribute to the UK design research and innovation landscape. These often have links with design academia and UKRI. The service design agency Snook, for example, have been active collaborators with Northumbria University in Identifying and Mapping Design Impact and Value. They have also worked with Lancaster University through the Creative Exchange, Design for Service Innovation and Development and Service Design Research UK networking projects.

As a leading public sector service design agency, FutureGov have collaborated with Manchester Metropolitan University and Imperial College London in Project REMeDY - Spearheading a Revolution in Energy Market Design and on UKRI supported projects developing Community Kitchens - A Community Based Meals Service powered by PopCash. Independently, they have undertaken research to develop relational care services through we:care - A 'Big Society" community-based social care service. They have also partnered with Newcastle University to support the EPSRC Centre for Doctoral Training in Digital Civics, the Centre for Digital Citizens and the EPSRC Network on Social Justice Through the Digital Economy.

The design research for social innovation agency STBY deliver academic research from within a private sector context. As a company, STBY have actively engaged with the academic community and have led on the problematisation and contextualisation of public service design and design-led social innovation over the past decade, partnering with Northumbria University, UAL and the RCA in the UK and with TU Delft and Eindhoven in the Netherlands.

Larger private companies and strategic suppliers also lead and collaborate on research projects. In this context, Serco Institute - an in-house thinktank for the multi-national Serco Group Plc. - work across all aspects of public services. Institute staff are engaged in projects across Europe to improve public service delivery through citizen-centred approaches to innovation.[11] The Capita Institute uses the innovation and research thinktank model to offer insight and direction to the core business operation of Capita.

In an advocacy and industrial development role, the Design Council, an independent charity and the government's advisor on design, is an active actor in this space. The Design Council

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[11] See Unity http://www.unity-project.eu; AUGGMED http://www.auggmed-project.eu; EOPEN http://eopen-project.eu/

has worked with UAL to develop the <u>DESIS-UK</u> network of actors focusing on design-led social innovation and with Lancaster University to develop the Service Design Network across the UK. Contributing to EU funded research they partnered with Nesta, the design agency IDEO and a broad range of academic partners from across the EU on the Design for Europe project. This project looked at how businesses, policymakers and public servants can change the way their organisations work for the better. The Design Council also works in partnership with the <u>Local Government Association</u> on the Design in the Public Sector programme. This equips councils with design skills and techniques to apply to service challenges facing their local communities and identifies innovative opportunities to deliver positive and sustainable change.[12]

Co-investment
In some instances, industry participation is costed into the projects through UKRI, EU and public sector funding to support cross-sector university and industry activity. There are, however, few examples of co-investment or match funding from industry partners into public service design research.

It is more typical in the public service context for industry to engage and invest through the contribution of staff time and expertise 'in-kind', particularly public sector partners. This is essential to the operation of the projects.

The review of UKRI funded projects demonstrates that networking and pilot projects tend to progress to secure further funding from research councils as well as private and non UKRI investment. Examples of this are detailed in Appendix 7.

Contract research
Contract research and consultancy from within research organisations is another model of industry engagement. Researchers within academic contexts act as consultants and universities sell their research expertise and services to companies. This includes commissioning research, developing design concepts and strategies, licencing product innovations and intellectual property.[13]

Knowledge Transfer Partnerships
The Knowledge Transfer Partnerships (KTPs) scheme supports three-way partnerships between UK-based businesses (including private sector, social enterprise or non-for-profit organisations), academics with a relevant knowledge base and a graduate to lead a strategic business project. The scheme funds projects with potential for economic growth and social, cultural and environmental value.

The KTP database registers over 8,209 completed partnerships, including 534 partnerships with a design knowledge base. These are largely held by engineering departments who have partnered with businesses who manufacture products, none of them are applied to the public sector context. 96 of the completed partnerships are from a services knowledge base where public authorities and public service organisations have had great involvement.

Examples of design KTPs in public services include:

- Northumbria University and Age Concern (now Age UK) working together 'to establish Service Design and User-Centred Design processes through the remodelling of a coherent suite of services for older people's care and inclusion' (2009-2011).
- The University of Edinburgh's School of Design and NHS Lothian's partnership 'to improve public engagement and understanding with cancer prevention and early cancer diagnosis leading to improved survival of patients with head and neck cancer' (2009-2012).

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[12] See Appendix 3-6 for agencies and research networks.
[13] See Design Against Crime Research Centre; Lab4Living; PDR.

There is surprisingly limited participation from those with a design knowledge base, especially considering that some of the funded KTP objectives read as a design brief. [14]

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[14] For example 'to create and embed a strategy of engagement through which a series of innovative solutions will be developed; returning empty homes back into use' (Tameside Metropolitan Borough Council and the University of Salford's Urban Studies Unit, 2012-2015).

SKILLS

The complexity of design in public services demands multifaceted and multidimensional practices. This work demands not only the skills of multidisciplinary teams, but for team members to have an open attitude towards the boundaries of disciplines, the creation of understanding and the formulation of action; to be transdisciplinary.

Creative attributes of design researchers in this field are distinguished by the marriage of 'hard' technical and 'soft' interpersonal skills. This blended, often multi-disciplinary and empathic, skill set is important for design researchers to have as they need to engage in the complexity that exists within the challenges faced within the public sector. However, it is important to stress that the creative and technical skills of the designer differentiate design from other forms of consultative work such as public service management or social work.

The ability to realise ideas, craft tools and experiences through the production of physical and digital touchpoints, iterate through making, prototype services and experiences and develop design methods and processes from scratch differentiates the practice of design from the practice of design thinking.

Design thinking can be taught, structured and applied through the plethora of tools and techniques available, but design practice has the agency to generate tools and techniques to be applied among non-designers. The development of context-specific tools and methods, and the service prototyping done through these, is salient within the field. A taxonomy of skills and attributes is generalised from literature, case studies and interview in Appendix 8.

Higher education
Internationally there are a range of specialised higher education courses that work with the public sector to develop design and research competencies within this field. Typically, these focus on methodology and frameworks with a focus on user experience. They explore the real-world applications of service design through models of challenge-based learning, situated projects and creative design. The importance of design processes that involve collaboration, participation and co-creation are commonly delivered, and training focuses on managing the complexity in collaboration, for example understating the ethics, project management and leveraging behavioural insight. A cross-section of these courses is in Appendix 9.

Taught postgraduate courses are beginning to emerge in the UK to specifically train and equip students for PhD study. These courses are integrated into PhD programmes, extending the typical duration of full time PhD study from 3 to 4 years, or as a platform to develop the necessary research skills required for PhDs in complex contexts. [15]

Doctoral training
There are a range of doctoral training programmes where research centres and institutes are developing PhD inquiry with an emphasis on public service design research. Training takes various formats, either through consortium projects with multiple institutions collaborating in the training or through programmes held within centres of excellence. Training is distributed across the UK and consortia are typically clustered geographically. They include:

LDoc: Centre for Doctoral training in Design Research
LDoc is located in London. Funded by the AHRC, LDoc is a collaboration between the RCA, Kingston University and UAL. The Centre provides cross institutional PhD studentships and

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[15] See EPSRC Centre for Doctoral Training in Digital Civics. PhD students spend the first year undertaking an MRes in Digital Civics before progressing to PhD ensuring an appropriate skill base before undertaking research. While not supporting direct progression, the Royal College of Art MRes programme delivers research training aligned with the RCA course portfolio targeted at students who aspire to develop a career in research.

training, working in collaboration with key industry partners including the Design Council and Microsoft Research. LDoc trains doctoral students in a number of contexts but there is a strong social design orientation within the cohort of students and supervisory expertise. For example, studies range from the intersection of healthcare and design to improve individuals' health outcomes to the development of service interventions supporting people suffering technology enabled intimate partner abuse. It is difficult to undertake meaningful design research 'theoretically' in contexts of social design and public service innovation. The research is dependent on situated experience - be it working with an NHS trust or by embedding yourself within a charity. This expands the partner organisation's capacity as they benefit from the research insights of the PhD student.

Design Star Centre for Doctorial Training
Design Star is an AHRC-funded consortium made up of Loughborough University, University of Reading, University of Brighton, The Open University and Goldsmiths University of London and is training doctoral researchers in service contexts. The cohort includes students working at the interface of design, public policy and government services, as well as those improving services in the voluntary and community sector in health and welfare contexts.

Centre for Doctoral Training in Digital Civics
The EPSRC Centre for Doctoral Training in Digital Civics partnership between Newcastle University, Newcastle City Council, Gateshead Council and Northumberland County Council is training a minimum of 55 PhD researchers between 2014 and 2022. It delivers training for doctoral researchers which includes internships and placements at leading charities, companies and universities. In developing competencies to operate effectively in this field, PhD candidates study the social, political and economic contexts of citizenship, community, and service provision. They undertake training in participatory methods, digital design and the development of digital service design.

Beyond Imagination
Supporting skill development, Beyond Imagination (2019 - 2022) is a £13.2 million project which explores and demonstrates how cutting-edge design research can address world challenges for a healthier, more prosperous and sustainable world. PhDs in areas of ageing, health and wellbeing, community and public sector are developed, and importantly research expertise in evaluating and understanding the role of design research in these contexts.

The Creative Exchange
The Creative Exchange (2012-2016) was one of the 4 AHRC Knowledge Exchange Hubs across the UK. Led by Lancaster University, in partnership with the RCA and Newcastle University, it explored the concept of digital public space through creative collaboration with arts and humanities academics, creative industry practitioners and doctoral candidates; generating knowledge exchange opportunities, stimulating innovation and contributing to the development of the creative economy in the UK. The thematic cluster *Public Innovation and Democracy* explored trends in open data, citizen content creation and new approaches to public service delivery and public governance.

Collaborative Doctoral Awards
As a model of supporting PhDs in public service contexts, Collaborative Doctoral Awards offer particularly effective mechanisms for knowledge exchange and integration because of the inherent applied nature of the collaboration and the situated inquiry. The partnership between the academic institution, collaborative partner and doctoral candidate facilitates knowledge and skill exchange through supervisions and researcher placements. Additionally, these collaborations may formalise institutional relationships. The model is particularly

valuable because established networks support the project infrastructuring and needs are identified in the development of the partnerships.[16]

Emerging activities from doctoral training

Design research has a strong orientation towards addressing complex social issues (Rogers et al., 2019) and this emphasis is also evident within doctoral training. Institutions all have strong agendas to conduct research for social good, inclusivity and community resilience.

Projects are carried out with communities and users that they are intended to serve, through processes of situated action and reflection. PhD programmes aim to develop researchers capable of engaging in both multi- and cross-disciplinary research, and equipped with the conceptual, technical, and practical ability to design, develop, and evaluate systemic interventions. Relationships are built with project partners, drawing on networks or experiences or through placements and volunteering. These immersive activities are employed to gain access to the communities and organisations required to deliver impactful contributions through the training.

Themes that emerge from doctoral study demonstrate that:

- Projects are engaging with the VCS sector: The Open University with Mind, Northumbria University and Newcastle University working separately with Age UK, UAL with Refuge and Crisis and University of Brighton with Rural Action Sussex.
- There is increasing activity around developing technology driven service innovation with attention paid to digital participation.
- Studies are increasing in a context of design and policy.
- PhDs in this context typically include programmes of exchange or placements, whether formally structured through institutional partnerships or developed by the students to situate the study and inquiry.
- Partnerships or situated PhD studies where design research is embedded within local government or public service providers are not as evident.

Challenges to retention in academia

It is not uncommon to find Early Career Researchers (ECRs) with fixed-term contracts associated to a research project and/or zero-hour teaching contracts, which extend on a rolling basis depending on yearly budgets. Moreover, teaching loads often leave little time to build research profiles. These reasons make academia less attractive to design researchers who, having the highly transferable skill set to conduct practice-based research in a public service context, have an advanced position in the job market. Consequently, many are drawn to agency and consultancy work because of the applied nature of the field and more competitive salaries.

Nurse (2015) and Rodgers, Mazzarella, and Conerney (2019) argue that ECRs are not in a strong position to apply for grants as they are contingent on permanent contracts and a track record. It is therefore difficult to retain academics working in this field.

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[16] For example Duggan (2017).

RESEARCH

This section explores current and emerging themes in academic design research. These focus on civic engagement, service innovation, and the valuation of design operating in this context. Open and democratic processes of innovation are salient in the structure of research methodologies and inform the research questions.

Design-led civic engagement
Civic engagement and the development of creative consultation methodologies are important within research projects. The research develops, and questions the use of, service design tools and co-design activities that function to enhance operational and strategic capacities within actors engaged in projects. In all instances there is a focus on developing situated design methods and evaluating the use and application of these methods. These methodologies are applied physically in situ but are increasingly supported by digital resources and platforms. The research explores opportunities for civic engagement and how tools can facilitate empowering citizens by encouraging bottom-up approaches to decision-making. Civic engagement exercises bring a citizen-centred approach to public services, providing a better understanding of social needs and divergent thinking towards a solution of complex problems that potentially leads to improving government's outcomes (Cooper et al., 2006; Davies & Simon, 2012. Salanis et al., 2018)

Lancaster University, Glasgow School of Art:
Leapfrog: Transforming Public Service Consultation by Design

Leapfrog was a 3-year research project (2015-2018) led by ImaginationLancaster in partnership with the Glasgow School of Art's Institute of Design Innovation and a range of partners from the public and voluntary and community sectors e.g. Lancaster City Council, Blackburn with Darwen Council and Child Action Northwest. As a key example of design-led civic engagement, the project developed and evaluated co-design approaches to consultation with communities to inform public service decision making. This addressed the demand for more consultation and the challenges created by a reduction in local government funding to undertake such consultative practice. The team ran 22 projects through 83 facilitated workshops which accumulated in a series of consultation tools that were co-determined and co-delivered with project partners aligned to their contexts and agendas. These tools are openly available affording local communities the ability to structure and facilitate consultation activities in an open and distributed system of engagement through the Leapfrog platform. The team questioned how this work can be evaluated through a framework guided by applied ethicists to ensure that participation and the evaluation of the process was mutually beneficial. The project ultimately questioned how design research can transform public sector partners' ability to co-design, consult and engage with communities through open source citizen-centred democratic consultation tools.

Outcomes include:
- The development of consultation tools and processes; new tools, approaches and practices designed to contribute to a change in culture of how public sector institutions think about engagement. This creates capacity for public sector partners to engage and consult without the need of external expertise, thus saving the cost of expensive outsourced consultation services. Over the duration of the project, Leapfrog aimed to achieve a cost saving to the public sector partners of approximately £500,000.
- The project provides a case for citizen-led consultation and a means to coordinate and evidence perspectives through open, distributed and democratic methods structured by designed artefacts.

- Informing best practice of co-design through the evaluation of the project and the open access digital assets created for wide use.

Infrastructuring

The aim of many public service design research projects is for public sector employees and users to not only work with design researchers, but to understand and use design thinking and practice themselves. Design processes and techniques are developed as transferable strategies for non-designers with the aim of developing capacity and tools to be used as part of day-to-day operations for those managing, delivering or experiencing the service. A salient theme explored through projects is design's ability to assemble publics constituted of diverse stakeholders in address to the service(s) that are the focus of the research activity. This process of assembling publics and transferring knowhow through engagement tools and strategies is termed infrastructuring. The capability and value of infrastructuring is explored through design research.

Infrastructuring ultimately broadens the view of what might be considered an innovation. It moves away from a technocratic view of innovation, for example the development of an artefact, product or a tool, towards one that includes social innovation that arises out of actions and interactions within the constitution of a public.[17] Infrastructuring is not only a process of co-development within a service context, but a process of aligning the interests of a range of stakeholders through the design research process. Three types of infrastructuring activities emerge from work undertaken in this field:

- Relational infrastructuring - these are activities that create shared trust and value aimed at building relationships between the range of actors within a project.
- Operational infrastructuring - these are activities that develop and build capacity and where participation within the process develops knowledge and resource within the actor network.
- Strategic infrastructuring - these are practices of participation that break institutional silos, align agendas and create space for future innovation resulting from interactions in the design process.

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[17] For detailed accounts of infrastructuring in public services and social innovation see Ehn (2008); Björgvinsson, Ehn and Hillgren (2010); La Dantec and DiSalvo (2013); Thorpe (2019).

University of the Arts London:
Public Collaboration Lab

The Public Collaboration Lab is a strategic research collaboration between local government, the citizens they serve and a higher education institution. Infrastructuring is a key principle, method and outcome of the project.

Public Collaboration Lab engaged partners from within the public, private and voluntary and community sectors including the London Borough of Camden's Strategy and Change department, Veolia Environmental Services, Iceni Projects and Age UK. The Public Collaboration Lab was developed on the premise that public services need to be radically reshaped to meet the needs of citizens in the context of diminishing public financing. The project aimed to develop consultative practices specifically exploring the potential for, and value of, design-led research to address societal challenges and to inform policy. This was achieved through a series of co-design projects to co-deliver public services.

These 'public and collaborative' approaches mobilise citizens as active collaborators, what the team describe as 'service participants' rather than 'service users'. Projects addressed challenges and service areas such as how to consult more meaningfully on public issues such as the future of libraries and the planning process; finding ways of increasing recycling rates; dealing with the effects of overcrowded housing and reshaping youth centres to facilitate the integration of Youth Services. The activities engaged community groups and the team of designers increased capacity for local government to engage with service users. The open and collaborative research process engaged actors and made visible their experiences, concerns and desires in relation to the issues and services considered. It also identified and prioritised challenges and opportunities for intervention. The work collectively envisaged new ways of addressing these challenges and opportunities. The process cut across different departments within the council, aligning interests between different members and service delivery partners. The outputs of these activities include rich qualitative insights that have supported decision making and priority setting in the London Borough of Camden, as well as affording insights around cross-sectoral collaboration to stakeholders further afield, both nationally and internationally.

Outcomes include:
- Building social design capabilities and developing advocacy for design in public service contexts within design education. The PCL has informed changes in the design curriculum to promote collaboration with local administration in public service contexts.
- Developing understanding within the council of the strategic capabilities of the design process, especially within departments such as Integrated Youth Services, Planning, Building Control and Development Management.
- Extending the network of public officers and design researchers seeking to collaborate through the dissemination of the work within and across each organisation.
- Establishing a community-based makerspace from which to coordinate future PCL projects through cross-sector funding. Relative to this activity and infrastructure, the PCL has secured European investment to explore the role of place based, design-led innovation to support citizen-centred service innovation and delivery in the London Borough of Camden.

Development of relational services

Another important theme that emerges from design research in this context is identifying, supporting and developing structures that support relational service delivery. Relational services are a specific kind of collaborative service in which participants are not only active co-producers, but also need to interact with others in a highly personalised way requiring specific interpersonal qualities to operate, such as trust and familiarity. Roles of clients and providers are interwoven and together they produce 'more than a service' (Cipolla 2009; Cipolla and Manzini, 2009). Again, through co-design, guided by principles of care and trust, asset-based approaches, empathic design and qualitative mapping processes can contribute to relational services.

Glasgow School of Art and the University of Dundee:
Future Transitions in Palliative Care

Funded by the Scottish Universities Insight Institute (SUII), the Future Transitions in Palliative Care programme (2019) explores the future of care for people living with life limiting conditions to build a contextual understanding of care needs and scope future person-centred care models. The programme engages stakeholders to explore and roadmap future palliative care transitions. The process shares research evidence gathered from lived experiences of people with life limiting conditions. It facilitates knowledge exchange by bringing stakeholders together with policymakers to identify key policy and practice priorities for future palliative care needs. The programme establishes a platform for innovation through relational services and practices for people living with life limiting conditions. The approach is underpinned by the need to develop innovations based on informed conditions and principles that place interactions between people, and their care circle, at the core of care delivery.

Outcomes include:

- Understanding where policy enables palliative care transitions.
- Understanding the role of community in providing support in palliative care.
- Translating research into best practice and implementation.
- Highlighting the importance of narrative and stories in both informing and underpinning policy and creating an accessible language for communicating and translating experiences.
- Identifying the need to instil an ethos of doing 'with' rather than 'to' or 'for'. There is need to look at integration in health and social care in its broadest sense, working across boundaries to bring everyone involved in the care of a person and their family together to understand roles and skills.
- Bridging lived experiences and policy intent.

Co-creation of value

Co-design, participatory design, civic engagement and co-creation are terms commonly used in design for public services. In these approaches, a service is created iteratively with input from citizens on a spectrum ranging from consultation to collaboration. In public management literature, the Co-Val project advocates for co-creation as a fundamental requirement for successful public services, rather than something nice to have. In this context, Mureddu and Osimo (2019) distinguish between intrinsic co-creation whereby service users have a passive role and their data is used, and extrinsic co-creation as co-design.

Design research in public services puts citizens at the centre of public service provision by changing the way services are designed and implemented. It enables collaboration within the organisational structure of public administration, with the potential for addressing public service challenges and opportunities holistically beyond the department that owns the problem.

Design research therefore co-creates value through the public service journey starting with creative approaches to public engagement and consultation to co-designing the public service offer and the co-delivery of relational infrastructures that emerge through the engagement. As designers and researchers pursue the goals of socially engaged design, and strive to infrastructure projects alongside communities, or publics affected by a common matter of concern, a series of ethical considerations are raised relating to how valuable participation is and who is it valuable for; the individual, the council or the research project?

It is therefore common for ethically orientated evaluative frameworks to be designed into the research methodologies to question the role and impact of the work. For example, design researchers on Leapfrog worked with applied ethicists to inform the public engagement and the Public Collaboration Lab worked with the Institute of Government to evaluate the project. Driven by expertise in public service management, the Co-VAL project looks to apply critical frameworks in public service design focused on the co-construction of value.

Civic engagement	Co-design	Co-delivery
Citizens engage in local decision-making through institutionalised methods, achieving different degrees of participation and power-sharing, e.g. public communication, public consultation, public engagement	Citizens take part in designing the specifications of public services	Citizens take part in delivery of public services

Table 1 Citizen participation in public service: Salinas et al (2018).

Open innovation

Open innovation is a governing principle within this practice which focuses on civic engagement and participation. It advocates cross-sector collaboration in the public service context and requires utilising a wide range of actors to contribute to projects. Outcomes from research projects are openly shared and distributed to encourage iteration and further development of the projects and initiatives. This activity can lead to enterprise spinouts and create conditions for follow-on funding. In open innovation it is fundamental to integrate research and innovation activities in real-life communities and situations which requires an acute understanding of all potential actors.[18]

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[18] See Chesbrough (2003); Chesbrough and Bogers (2014); Thorpe and Gamman (2016); Marcel and Gascó (2017).

University of the Arts London:
Design Thinking for Prison Industries

Delivered by the Design Against Crime Research Centre (DACRC), University of the Arts London with HMP Thameside, the Design Thinking for Prison Industries project demonstrates how design can contribute by developing tools and techniques to help address recidivism by reframing prison industries as holistic 'creative hubs' to equip inmates to find employment opportunities when they are released from prison.

Across the world inmates often work for prison industries to keep busy, earn an income and learn new skills that may lead to future employment opportunities. However, prison industries rarely focus on creative thinking processes so prisoners aren't as resilient in the highly competitive and changing workplaces once they leave prison. Expectations of employment are often not met amongst marginalised groups, who in huge numbers fail to find legitimate employment and thus resort back to crime. Re-offending costs the taxpayer an estimated £9.5-£13 billion every year - equivalent to 10% of the entire NHS budget.

Design Against Crime Research Centre uses the design process to address the gap that currently exists between 'vocational' and 'educational' approaches to increase employability amongst inmates. The project introduced a design training programme and studio where inmate learning occurred in pragmatic vocational contexts. A series of anti-theft bags were produced, with inmates engaging in a co-design process to make the products to protect potential victims from crime. The co-design method empowers and builds empathy among the participants. Ultimately this functioned to deliver a form of 'restorative justice' by helping others avoid crime, as well as generating an income stream for prisons.

Recognising the social and economic value of the research, the project received further investment from Serco and Able and Cole to establish a design studio within HMP Thameside prison to produce the bags which were sold through the Able and Cole website with profits going to the charity Sue Ryder.

The training materials are openly available and were developed through processes of open design as comments and feedback regarding content was offered and considered.

The partnerships, infrastructure established, and the innovation principles applied were leveraged to secure further funding from Her Majesty's Prison and Probation Service (HMPPS) to use co-design to develop safer cell furniture to be produced by the UK prison industries.

Outcomes include:
- Inmate skills development through teaching creative design techniques. The downloadable teaching materials are aimed at prison staff and educators who wish to teach design in prison independently.
- Certification processes for inmates and volunteers to recognise learning.
- The project reached almost 100 prisoners and continues to raise small amounts of money for charity.
- The 'Makeright' range of anti-theft bags and accessories co-designed by prisoners and sold online.
- Working inside the prison context has informed further co-design efforts and projects such as the Safer Cell Furniture project funded by HMPPS.

Coordinated effort and support networks

An emerging theme in research and consultancy contexts is the development of digital Business to Business (B2B) - or organisation to organisation - platforms that mobilise public sector and VCS expertise and collective intelligence, sharing knowledge inside and across a complex network of organisations to share best practice and resource.

Scaling Up Leapfrog, for example, established an open repository of tools for civic engagement which are available to a diverse range of organisations, sectors and contexts to improve engagement practice in the public sector. Patchwork developed by FutureGov offers a digital platform that connects care workers across agencies, revealing the hidden network of support around a service user, so that they can offer a coordinated care response. Service Recipes for Charities developed by Catalyst, in collaboration with Snook and FutureGov, sources examples of digital solutions in the VCS and shares them as practical guides for straightforward implementation. These coordinated efforts and open networks offer further evidence of the open innovation principles that are salient in the public service context.

Emerging opportunities for research

Anticipatory innovation through speculative service design

An emerging theme within public service design research is anticipatory innovation. This activity focuses on recognising and engaging with significant uncertainty about not only what works, but also what is appropriate or possible in future service development. Speculative design practice is used to question the potential applications and implications of future services. Through scenario building it uses the design of objects, situations and narratives of use and interaction to vision how these developments might manifest in future. The aim is to engage publics within the range of concerns that are explored and to learn from this engagement. As a field of practice, it was developed within research organisations and has gained traction in government contexts. Policy Lab have utilised the methodology to explore how speculative design can be used for service design and future policy scenarios in contexts of open justice and explored regulatory need in the maritime sector for the Department of Transport. In the 3-month pilot project Proto-Policy (2015), PDR, Lancaster University, Falmouth University and the UK's All-Party Parliamentary Design and Innovation Group explored how design fictions - fictional speculative scenarios - could help politicians and civil servants engage with citizens. It speculated the future implications of policy initiatives in response to participant's understanding of upcoming public policies relating to issues as broad as data privacy and euthanasia. In another key example, the UK Government Foresight department commissioned the research consultancy Strange Telemetry to explore the ageing population and citizen's perspectives and expectations of the future.

Strange Telemetry:
Speculative Design and the Future of an Ageing Population

Speculative Design and the Future of an Ageing Population (2015) demonstrates the use of speculative design techniques. Undertaken by the design agency Strange Telemetry, the project used speculative visioning methods to propose and reflect on the future of work, services, transportation, and mobility with a timeline working towards 2040. Several key themes emerged, including the need for community - and associated fear of isolation - and for the wider support and investment needed to address this. In discussions around what could be done to 'prepare' for the future, participants were asked to consider what they could do as individuals (e.g. saving for retirement and keeping abreast of digital skills), and what would require larger, systemic, interventions (e.g. civic planning, transport infrastructures and large-scale skills training). The engagement methodology through co-design workshops and speculative design propositions demonstrates the role of design in a context of anticipatory innovation and developing insight into long-term trends in service development using design as a form of public engagement.

Creative disruption

The Open Data White Paper 2012 and the increase of open data made available by local authorities has supported the development of civic technology. However, a decade after pioneering projects like Open Data Manchester (2009), there is still a long way to go to achieve an open and trustworthy data ecosystem in the public sector, one that is useful to the public sector and businesses alike. Big data has great potential but also limitations such as the integration of different data sets due to a lack of standards across organisations and excluding the population who are not digitally active. The use of *thick data* to complement the limitations of big data, and achieve a more ethical approach to represent citizens, illustrates a design research approach in the field of emerging technologies. Whilst big data provides insights into *what* is happening, thick data provides deep insights into citizens lived experience and *why* things are happening. Drawing on ethnographic approaches, design researchers generate rich citizen stories that, together with big data, achieve a much complete picture to inform policy and service innovation (Siodmok, 2020).

Looking at recent public procurement as an indicator (Tussell, 2019a), investment in advancing technologies has almost doubled in the last two years. Artificial Intelligence (AI) was the most popular emerging technology, coinciding with the launch of the UK's Office for AI (2018). The development of AI is linked to big data and, in the public service context, specifically to the digitalisation of services and the generation of vast amounts of data from citizen's interactions with digital services. Not surprisingly, in this context, AI innovations are mostly related to the personalisation of service provision. Internet of Things (IoT) also plays an important role in the generation of data from interaction with connected objects and the development of services.

Human and more-than-human centred design, speculative critical design and anticipatory innovation approaches play a key role in exploring opportunities, uses and misuses, as well as the ethical dimensions and unintended consequences of new technology developments in public services. Salient examples of these design research approaches to emergent technologies in public services are:

The Uninvited Guests film by Superflux (2015) which explores smart care services and unintended human behaviours. Superflux's research was commissioned by Thing Tank, an international consortium including the Centre for Design Informatics at the University of Edinburgh that sets out to explore the potential of IoT and identify novel applications through design research.

The Future of Government 2030+: A Citizen Centric Perspective on New Governance Models project carried out by the European Commission's Joint Research Centre (JRC) in collaboration with the Directorate General for Communication Networks, Content and Technology (DG CNECT) in 2018. The project's aim was to reimagine the future of government, exploring how the future relationship among citizens, businesses and governments would evolve considering emerging digital technologies. JRC's EU Policy Lab commissioned 6 European design schools to enable creative speculations on possible alternative models of government. In the UK, the Public Collaboration Lab at UAL (with the London Borough of Camden and London College of Communication's MA Service Design course) delivered seven proposals of future models of governance and service delivery, such as government as an insurance company that in collaboration with private-data companies uses personal data to issue individual risk assessments, citizens as paid policymakers via Universal Basic Income and proposals for digital democracy platforms.

Innovation in public procurement

Appropriate public procurement practices have an impact on the capacity for an organisation to innovate their public service provision (Bason et al., 2013). The Public Services Social Value

Act 2012 asks public authorities to consider economic, social and environmental well-being in connection with public service contracts. [19]

In 2014 the Cabinet Office introduced new procurement regulations seeking to enhance innovation in public services. Innovation Partnerships (IPs) allow for the procurement of both R&D and commercial services and are better suited for collaborative innovation (Local Government Association, n.d.). IPs encourage using prior research to develop the service specifications. The Children's Innovation Partnership (CIP) between Leicestershire County Council and the national charity Barnardo's is an example of best practice. The CIP model features 'a level of flexibility and innovation not usually associated with public sector contracts [...] achieved through taking a creative approach to designing the procurement process' (Public Service Transformation Academy, 2019). The partnership aims to develop flexible and responsive children's social care services with a new approach to procurement and contracting, one that involves assessing the suitability of potential partners rather than procuring a specific solution. The contract was awarded to Barnardo's in 2018 who have an in-house service design capacity as part of their Digital & Technology team (McGirr, 2019).

Innovation in public procurement encourages investment in the development of innovative public services. It also offers transparency and accountability for the stakeholders involved. The CIP example demonstrates a role for design-led participatory practices in IPs by contributing to developing service specifications and procurement strategies.

Innovative service and business models for social value
Public sector collaborations with external organisations to deliver public services through outsourcing have increased. The rationale behind this outsourcing is that 'applying market mechanisms and private sector expertise to the work of government can reduce costs, raise quality and achieve wider benefits such as innovations and improved public sector efficiency' (Sasse et al., 2019, p.5). However, there is a 'lack of substantive evidence for the benefits of outsourcing in efficiency and quality' (TUD and NEF, n.d.) and consequently governments lack the evidence to inform current decisions on how best to deliver services.

An analysis of outsourcing in 11 sectors suggests that it succeeds in improving public service efficiency in some but not all sectors (Sasse et al., 2019). Evidence suggests it is most appropriate for 'support services' such as waste collection, cleaning, catering and maintenance, whereas for 'front-line services' and 'human services' such as prisons, healthcare, employment services or adult social care, the picture is more mixed. For example, in areas like probation outsourcing has failed.

For-profit service	Public service
Retention of customers and repeat business is the essence of profitability	Repeat business is likely to indicate service failure, e.g. social services
Customer engages voluntarily	Citizens engage unwillingly or are coerced in public services, e.g. prison service
Clear customer segment	Citizens are affected by the outcome of public services even if they are not direct end-users
Clear value proposition	Multiple stakeholders with different (and conflictual) understanding of a successful outcome, e.g. local planning

Table 2 Example of differences between public and private service affecting value creation: Osborne (2018).

Commentators also note the need to fundamentally change public-private partnerships from an approach that is transactional to one that aims for social impact and is underpinned by

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[19] See Tussell (2019b).

creativity, collaboration and self-determination, values akin to design practice and research (Walker and Lawson, 2018).

Valuation

Design research challenges narrow accounts of value. Value is multifaceted and should be approached from different and (often) conflicting dimensions. Design research deals with complexity and ambiguity and affords constructing a coherent narrative from disparate voices. For example, Participle's valuation of Circle London was based on three dimensions: 'money saved; outcomes (a comparison with a core set of statutory outcomes) and capability data (a core set of indicators complemented with qualitative case studies)' (Cottam and Dillon, 2014).

There is general agreement within the design research community in this field that evidence of the value design generates should be more systematically interrogated and articulated. This is not without challenges. The value of public services is complex as it covers social value, amongst other KPIs. Consequently, public service innovation must be accompanied by robust frameworks of evaluation.

Emergent design research is concerned with developing strategies to evaluate the impact of design practice and research in public services. Open Valuation is a collaborative research project between Lancaster University and the Cabinet Office's Open Innovation Team which has developed a tool-based approach to valuing entrepreneurial and innovation practice. Moreover, the UAL Social Design Institute is leading research on (e)valuation with a focus on participatory design and design for social innovation. These initiatives focus on the development of evaluative frameworks and longitudinal studies to better understand the role of participation and the legacy of projects within the communities that are engaged in the design process. They also evaluate the policy implications relative to the design research.

Designing the new normal: Post-Covid-19 public services

The Covid-19 pandemic has created a high-pressure environment in which the lines between government agencies, the public and other sectors have all blurred in the public interest. As a result, companies and charities have been working with public bodies on procuring medical components, manufacturing ventilators, establishing medical facilities, creating digital products, mobilising volunteers, and much more. In many public bodies, the pandemic rapidly surfaced ideas for longer-term change that would make public services more resilient, cost-effective and efficient. In the three months that this review was conducted we saw unprecedented service prototyping, service development and responses from the design research community.

Design research and reflexive methodologies are being used to capture insights. The aim is to inform and prioritise future developments, reflecting on the rapid processes that were employed in managing the crisis as it unfolded. In this context, UAL's Social Design Institute issued a 'design responder' (Kimbell, 2020) to guide the rapid use of design expertise to respond to Covid-19 and its consequences, followed by a call to collaboratively #SketchPostCovidFuture (UAL Social Design Institute, 2020). Beyond Imagination responded through projects such as Design for Recovery and Resilience: Covid-19 and post-Covid-19 and are developing generative methodologies for the design and implementation of social distancing measures.

The pandemic affords many opportunities for design intervention and the expertise of design research. For example, working to support and develop the relational services that were activated amidst the pandemic e.g. GoodSAM and learning from the resilience within communities and frontline staff in order to innovate through experience-based co-design. While the pandemic brings challenges and complexity to public services, design research is equipped with an appropriate set of skills, competencies and capabilities that can be applied to post-Covid-19 recovery. Examples are detailed in Appendix 10.

PARTNERSHIPS

Design research in public services is contingent on cross-sector and cross-disciplinary partnerships. The engagement of policymakers, social workers, public service managers, psychologists, health experts, applied ethicists and social scientists in interdisciplinary practice is evident in projects across the field. It is also clear from the projects surveyed that they all aim to engage citizens in the co-construction of services or the co-construction of insight that works to inform the research. In constructing partnerships, the Quadruple Helix Innovation (QHI) model can be advocated as an overarching and synthesising principle to structure the collaborative partnerships within the public service context. The model recognises that proximity between key actors in an innovation system is important for knowledge transfer and offers a resilient space for innovation.[20]

QHI outlines four major actors in the innovation system: university, policy, industry and society. Successful public service design research requires participation from actors across all these sectors. As a framework, QHI articulates the potential value of interrelationships between actors. This model can help produce more welcome innovations since it aligns stakeholder interests, and everyone gains greater access to and influence over the innovation process and its results.

Using the QHI model in the development of a service innovation can lead to more successful user-oriented innovations. Service users will be more likely to accept and use the innovation as they have gained understanding through interactions in the project.

The following organisations represent the key actors in design-led public service research. Building relationships between these actors is key in a project's development and implementation.

- **Local Government Organisations (LGOs)**

Collaboration and partnerships with LGOs responsible for services is essential to situate and deliver the research project. These relationships provide necessary access to project stakeholders and service participants. An important consideration in all projects is securing sponsorship and advocacy at leadership and management levels. An organisation's leadership team needs to understand the strategic capacity of design. High-level buy-in is required from the outset, otherwise projects may lack sufficient priority which could potentially jeopardise subsequent efforts.

- **Voluntary and Community Sector (VCS) organisations**

VCS organisations are engaged in service delivery and like local authorities situate projects within specific service contexts. These partnerships appear to be particularly salient in doctoral projects undertaken within this context.

Partnering with community organisations is important for civic engagement and understanding local and/or specific communities. These organisations often have established networks and the trust of community members. Interaction through these organisations supports initial project infrastructuring. Community organisations provide points of access to community networks and knowledge that is essential in citizen-centred approaches to design research.

- **Multi-national strategic suppliers**

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[20] See Boelman et. al (2014); Schütz, Heidingsfelder and Schraudner (2019); Thorpe and Gamman (2019); Hasche Höglund and Linton (2019).

Around a third of government spending goes on the procurement of goods and services from strategic third-party suppliers. Within these corporations there are cultures of innovation focused on the operational delivery of public services. Developing research relationships with these suppliers offers opportunities for knowledge exchange and integration.

Newcastle University:
The Centre for Digital Citizens

The Centre for Digital Citizens (CDC) (2020 - 2025) addresses the emerging challenges of digital citizenship through inclusive and participatory approaches to the design and the evaluation of new technologies and services that support 'smart' and 'data-rich' living in urban, rural and coastal communities.

Through processes of QHI, technological innovations are co-created between academic, industrial, public and third sector partners, with citizens supporting the co-creation and delivery of research.

Through these activities, CDC aims to incubate user-led social innovation and sustainable impact for the Digital Economy (DE). The framework uses design-led 'initiation mechanisms' (e.g. participatory design workshops, hackathons, community events, citizen labs, open innovation and co-production platform experiments) to support the co-creation of research activities. Innovation Fellows (postdoctoral researchers) engage in a 24-month social innovation programme within the CDC. This pilots design for social innovation projects within interdisciplinary, multi-stakeholder teams, including academics and end-users (e.g. community groups, NGOs, charities, government and industry partners). The outcome of these pilots is the development of further collaborative bids (Research Council / Innovate UK / charity / industry funded), venture capital pitches, spinouts and/or social enterprises. In this way the centre acts as a catalyst for future innovation-focused DE activity.

RECOMMENDATIONS

The following recommendations look at where and how university-led design research can best partner with non-HEI, government and industry to create positive economic, social and cultural outcomes for the whole of the UK.

1. **Increase awareness of how design creates high-level societal and economic benefit in the public service context (valuation)**

If the value of design is difficult to articulate, then it is difficult to on-board stakeholders. This could be achieved by:

- Including a Work Package dedicated to articulating multi-stakeholder and multi-value perspectives on the impact of design research on public services. This should be developed in close collaboration with public service organisations.
- Developing creative approaches to evidence-based valuation, combining quantitative and qualitative (design-led, ethnographic, and participatory) methodologies.
- Exploring the potential of setting a minimum percentage of total resources to be dedicated to valuation. For example, ImaginationLancaster are investigating the benefits of allocating 8% of project resources to valuation.
- Developing narratives around the role of design research in collaborative R&D consortia in order to communicate the strategic capability of design, especially when design is not the academic lead.
- Focusing dissemination towards public sector organisations in order to communicate the strategic capability of design more broadly.
- Structuring funding schemes with the follow-on phase built into research projects. This will support longitudinal (e)valuation and build robust evidence for the value of design research. This follow-on period might not be immediately implemented as the project concludes but following a period of incubation to test the sustainability, impact and resilience of the research outcomes.

2. **Develop business innovation in design research projects**

Sustaining initiatives that are born out of design research projects is a challenge. Projects typically end when the funding ends. Developing schemes and targeted support for enterprise development, and leveraging the networks formed around the research undertaken in the project, would be of benefit.

This could be achieved by:

- Dedicating Work Packages to explore opportunities that capitalise on design research projects' insights and infrastructure with the aim to leverage spinout and enterprise opportunities early on during the research.
- Structuring projects and funding calls using principles of QHI; incorporating entrepreneurial capability and capacity in the research teams and exploring interest from for-profit organisations, philanthropic organisations and other partners.
- Mentoring from diverse disciplines as a way of ensuring that design researchers and organisations have the capacity and capability to maximise impact.

- Developing knowledge exchange schemes, similar to KTPs, with a focus on public service mutuals, SMEs and social enterprises using the infrastructuring methodologies evident in public service design research.

3. **Develop capacity and capability through strategic partnerships in public service contexts**

Design research collaborations can afford experimental spaces for innovation to test alignment between policy and the practical implementation of services.

This can be further developed by:

- Embedding employees in research projects to allow public sector organisations to move from reactive processes towards strategic planning focused on citizen-centred outcome-based approaches.
- Developing embedded collaborations with public sector organisations, such as fellowships, residencies or Collaborative Doctoral Awards, whereby design researchers can take an insider/blended perspective on the challenges facing the organisation. These collaborations will also equip design researchers with expertise in policy, public service management and the challenges around specific public service areas. It will contribute to building trusted networks of stakeholders to identify service challenges, opportunities for service innovation and new service development, and to leverage funding. These collaborations would also create design advocacy and capability in public sector organisations.
- Quadruple Helix Innovation structured calls with the requirement of identifying government and community organisations, universities and industry to be actively involved in the project. Research topics under this call might be related to the development of IP, upstream engagement to inform procurement decision making, commissioning insights on user choice informed by citizen-centred methodologies or focusing on knowledge exchange and spinouts contributing to public service innovation.

4. **Skill pipelines**

The embedded nature of public service design research requires advanced training in applied ethics related to co-design and participation to equip design researchers with the skill set needed to act within the public sphere.

These skills can be developed by:

- Embedding design research and knowledge exchange activities in public service contexts into the graduate and postgraduate design education curriculum. This offers a means to encourage both public sector and design research career pathways among graduates and often develops opportunities for volunteering and internships.
- Facilitating public sector placements for design researchers.
- Continued Professional Development (CPD) training partnerships targeted at public servants to build understanding and addressing skills gaps. To accredit these schemes through university award structures and build into public sector employee appraisal schemes to recognise and formalise in-kind contributions and learning that are evident in collaborations.
- Public service and policy training programmes for design researchers to increase skill, advocacy and awareness.
- Design research training programmes for public servants to increase skill, advocacy and awareness.
- Training in applying for funding across sectors.

5. Support for design ECRs in public service contexts

Short-term contracts and high workloads limit the capacity of design ECRs to engage in bidding processes and developing design research in public service contexts.

This could be addressed by:

- Developing rapid, flexible and micro 'light touch' funding schemes (£2k - 15k) to support ECR research in public service contexts.
- Establishing thematic networked clusters to develop a community of practice in public service design research across UK research organisations. These should be guided by centres of excellence to include mentoring from design and non-design academics, as well as representatives from public service organisations.

6. Enhance reporting mechanisms

- Develop guidance for project reporting with a specific focus on any further funding leveraged. The review revealed a potential data lag and omission of evidence of non UKRI investment in public service design research leveraged from initial UKRI funding. Developing the evidence base of further non UKRI investment will demonstrate private organisation's interest in supporting research and recognises the social and economic value of projects in this area.
- Develop mechanisms to quantify savings in public service provision that stem from design research in the public sector.
- Develop mechanisms to report and quantify the impact and legacy of design research such as related funded research, entrepreneurial activities and venture capital.

7. Develop thematic doctoral training

In leveraging the shared expertise of centres of excellence, there is scope to develop training consortia that are thematically rather than geographically clustered. The focus of the consortia should be driven by public service challenges and developed in partnership with relevant public sector organisations, for-profit think tanks, CSR units, SMEs, social enterprises and VCS organisations together with centres aligned in terms of expertise.

Such a programme would support cross-pollination between (design) academia and the public sector. Informed by QHI principles, doctoral training should focus on public service improvement and innovation through in-house and open innovation.

8. Problem-solving and anticipatory innovation

Because of the near-term challenges exacerbated by Covid-19, public service organisations require very practical, logistical support to create equitable public service provision for the most vulnerable communities and extreme-users. In the recovery stage, mid-term challenges where design research can contribute relate to valuation and scaling out what works and developing a coordinated research effort to identify best practices. Additionally, long-term sustainability can be addressed through design research for anticipatory innovation to scope more resilient public services and therefore promoting a culture of responsiveness and innovation with a strong focus on sustainability.

9.   Explore opportunities for co-investment of design R&D in the context of public services

Capacity to fund academic research could be developed by:

- Strategically exploring and aligning the objectives of public sector organisations seeking to join forces in this space, leading to tangible and transferable public service innovations.
- Strategically aligning public sector innovation budgets with design research projects, as well as timings, to meet their operational objectives.
- Offering consultancy services to the public sector, for example co-design and participatory expertise in civic engagement and delivery.
- Looking at funding opportunities in the areas where impact is intended. For example, Interreg Europe financed by the European Regional Development Fund for 2014-2020 supports regional and local government innovation through partnerships between public administration and research institutes. Funding streams such as this should be targeted to support design-led research in public services.

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APPENDIX

Appendix 1: Centres of excellence

Centre and research organisation	Description
CENTRIC: Centre of Excellence for Terrorism, Resilience, Intelligence and Organised Crime Sheffield Hallam University	CENTRIC is a platform for researchers, practitioners, policymakers and the public to focus on applied research in the security domain. Working with academic, government and public and private sector partners, the centre is a leader in applying human-centred and co-design processes and devising serious games in contexts of law enforcement, security and intelligence.
Community21 University of Brighton	Community21 is a social and sustainable design agency and research group within the University of Brighton's School of Architecture and Design. Community21 works with communities, NGOs and industry partners to develop research-led innovation and address issues and opportunities for sustainable and social development locally, regionally and globally. Community21 has developed models and solutions for utilising waste for social development, the circular economy, emergency planning, neighbourhood planning, inter-generational and inclusive youth engagement, citizenship and resilience and engagement with urban biodiversity. Projects often utilise accessible digital technology and collaborative making methods and test creative spaces. Community21 was founded as a collaboration with the charity Action in Rural Sussex and clients, collaborating partners and funders have included the Nominet Trust, NHS, Veolia, PUMA, Marine Conservation Society, Incredible Oceans, New Balance, Brighton and Hove City Council, East Sussex County Council, Dream Catcher Foundation (South Africa), Eco-Bali (Indonesia), British Council, Design Council, V&A and Natural History Museums, Arts and Humanities Research Council, and National and Heritage Lottery.
Design Against Crime Research Centre University of the Arts London	The Design Against Crime Research Centre (DACRC) is a socially responsive, practice-based research centre which uses the processes of design to reduce crime and promote community safety whilst improving quality of life. The centre has produced a number of award-winning designs working with both LGOs and commercial partners. Products ranging from street furniture to cell furniture for production in prison industries are developed from co-design and participatory processes. Ongoing engagement with the criminal justice system has led the centre to work in restorative justice and inmate education / training contexts to reduce recidivism. Clients, collaborating partners and funders have included the Ministry of Justice, Transport for London, Serco, HMP Thameside, Link, NCR, Abel and Cole, Sue Ryder, London Borough of Camden, Broxap and Brighton Council.
Digital Economy Research Centre Newcastle University	The Digital Economy Research Centre (DERC) works to theorise, design, develop, and evaluate new digitally mediated models of citizen participation that engage communities, the third sector, local government and (crucially) the commercial digital economy in developing the future of local service provision and local democracy.
Digital Health & Care Institute Glasgow School of Art and University of Strathclyde	DHI is a leading centre for creative collaboration that focuses on improving the provision of health and care in Scotland. The DHI uses design methodologies to develop innovative concepts to reimagine the future of digital services across health and well-being contexts. DHI is one of eight Innovation Centres funded by the Scottish Funding Council, which supports transformational collaboration between universities and businesses. As a partnership between Glasgow School of Art and the University of Strathclyde, DHI connects academics with designers, healthcare providers, SMEs, charities and other key stakeholders. Researchers work on developing new service models, delivery pathways and digital solutions that could change the way healthcare is delivered in Scotland. The methodological approaches focus on delivering participatory design and as a consequence the institute includes a diverse portfolio of projects based on real-life experiences, each using co-design methodologies to identify opportunities for future improvement.
Helen Hamlyn Centre for Design Royal College of Art	The Helen Hamlyn Centre for Design has its origins in the DesignAge action research programme which was founded in 1991. A research centre since 1999, its focus is on design to improve people's lives across a range of social needs. The centre collaborates with business, academic, government and voluntary sector partners.
ImaginationLancaster Lancaster University	ImaginationLancaster is a research lab that investigates emerging issues, technologies and practices to advance knowledge and develop solutions that contribute to the common good. The centre focuses on applied and theoretical research into products, places and systems. Areas of research span education, health and social care, well-being, culture, the leisure sector, media, transport, manufacturing and the environment. Through Expanding

	Excellence in England funding for the Beyond Imagination project, the centre will further grow capacity through design-led research in five key clusters: home and living; communities and the public sector; factory and workplaces; cities and urban; and, population and policy. Imagination has pioneered work in civic consultation and citizen-centred innovation working with public sector partners (see the Leapfrog case study).
Lab4Living Sheffield Hallam University	Lab4Living is a trans-disciplinary research group based on a collaborative community of researchers in design, healthcare and creative practices. The research team works together to address real world issues that impact on health and well-being, developing products, services and interventions that promote dignity and enhance quality of life. It has delivered global award-winning products and innovations exploring how we can ensure healthy productive lives in an aging society in collaboration with public service and VCS partners.
PDR International Centre for Design Research Cardiff Metropolitan University	A leading exponent in its field, PDR is a design consultancy and applied research centre based within Cardiff Metropolitan University. It covers the full spectrum of design including user-centred design, new product development and design management. Work in design and innovation policy, and its expertise in service design, locates it as a centre of excellence for public service design.
Public Collaboration Lab University of the Arts London	The Public Collaboration Lab (PCL) is a prototype for a public and social innovation lab focused on service, social and policy innovation at a local level. The PCL was born out of a partnership between UAL's Design for Social Innovation towards Sustainability (DESIS) Lab and the London Borough of Camden. The AHRC funded the development and testing of this prototype as an 18-month research project. Post-funding, PCL has continued to undertake research in collaboration with the London Borough of Camden on urban planning, social isolation and loneliness, housing and community place making contexts.
Social Design Institute University of the Arts London	The Social Design Institute champions social and sustainable design at UAL. It works to co-create new insights and ideas through design research with communities, businesses and policymakers. It focuses on the strategic application and evaluation of design's role in societal and policy contexts.

Appendix 2: Research Organisations

United Kingdom	International
Cardiff Metropolitan University	Aalborg University, Copenhagen
Glasgow School of Art	Aalto University Design Factory, Finland
Lancaster University	Delft University of Technology, Netherlands
Loughborough University	Design Academy Eindhoven, Netherlands
Manchester Metropolitan University	Federal University of Rio de Janeiro, Brazil
Newcastle University	Kolding School of Design, Denmark
Northumbria University	Linköpings University, Sweden
Royal College of Art	Lucerne University of Applied Sciences and Arts, Switzerland
Sheffield Hallam University	Malmö University, Sweden
The Open University	Politecnico di Milano, Italy
The University of Edinburgh	The New School Parsons, United States
The University of Reading	Tongji University, China
University of Brighton	
University of Strathclyde	
University of the Arts London	

Source: ServDes proceedings: 2009, 2010, 2012, 2014, 2016, 2018.

Appendix 3: Agency-led research in public service

United Kingdom	International
Capita Institute, In-house innovation project	Deloitte: Service Design in Government
FutureGov, Service design innovation agency	Innovation Unit, UK, Australia and New Zealand
IDEO, Design agency	La 27e Région, France
LiveWork, Service design innovation agency	
Serco Institute, In-house innovation team	
Snook, Service design innovation project	
STBY, Service design innovation agency	

Appendix 4: Organisations that promote design-led innovation in public service contexts

United Kingdom	International
Nesta: Supporting Government Innovation; Digital Public Services.	Estonia Design Centre, Connects designers to entrepreneurs and the public sector
Design Council: Training LGOs in design skills to address service challenges	Centre for Public Impact, Non-for-profit founded by Boston Consulting Group
Local Government Association: Developing Innovation in Local Government	

Appendix 5: Government design labs and design innovation units

United Kingdom	International
Cabinet Office Policy Lab, United Kingdom	The Australian Centre for Social Innovation (TACSI), Australia. An independent social enterprise that started with support from the South Australian Government in 2009. Although design is not mentioned, their approach is defined as human-centred, systemic and creative
Government Digital Service, United Kingdom	
Y-Lab, Wales. Partnership between Cardiff University and Nesta	
Innovation Lab, Northern Ireland	Lab-X, Portugal
Thinking Room, Cornwall	Alberta CoLab, Australia. The lab combines systemic design and strategic foresight
Innovation Lab, London Borough of Bexley	Services Development Agency, Georgia. Established in 2012, the agency supports the development of public services across government
Connecting Bristol, Collaboration with FutureGov and a consortium of public sector agencies (including Bristol City Council's City Innovation Team), private sector and community representatives working to deliver public service innovation around their Smart City Strategy	Public Policy Lab, United States. A non-for-profit organisation that operates at the interaction of human-centred and public policy to design public services with vulnerable communities
Public Sector Innovation Lab, Within the government of Northern Ireland. It uses design methods to rethink public services and the mechanisms set up by the government	Dublin City Council Beta, Ireland
	Laboratorio de Gobierno, Chile
	PS21 Office, China. Launched in 1995 in Singapore, the lab is responsible for driving innovation, focusing on policy implementation and service delivery
	Sitra, Finland. Created in 1967 is one of the oldest publicly funded innovation labs with a current focus on social innovation and systemic change to support sustainable well-being

Appendix 6: International networks

DESIS: Design for Social Innovation towards Sustainability	DESIS is a non-profit cultural association. It aims to promote design for social innovation in higher education institutions to generate design knowledge and create meaningful social change in collaboration with other stakeholders. It shares local learning internationally.
Service Design in Government	Annual international conference on Service Design in Government.
Government Innovation Lab Network	This network links government i-labs internationally.
SDN: Social Design Network	SDN is the leading non-profit institution for expertise in service design and a driver of global growth, development and innovation within the practice.
ServDes	International bi-annual conference on design for service with the aim of bringing researchers and practitioners together to discuss, share and evolve the emerging discipline of Service Design, and design-related service innovation.

Appendix 7: Examples of funded research securing further investment

Research organisation	Project	Funding	Further Funding
Lancaster University Department: Lancaster Inst for the Contemporary Arts	Service Design Research UK	Funded Value: £28,616 Funded Period: Mar 13 - Jun 14 Funder: AHRC	Design Innovation. Research Development Funding Amount: £50,000 Organisation: AHRC Sector: Public
Manchester Metropolitan University Department: School of Art	Developing an Action Plan for the Strategic Use of Design in the UK	Funded Value: £468,095 Funded Period: Jun 17 - Dec 20 Funder: AHRC	Commercial funding Design Policy Workshop Amount: £8500
Northumbria University Department: Fac of Arts, Design and Social Sciences	Design for Social Innovation Research Network: Bridging the UK and Asia-Pacific Practices	Funded Value: £37,717 Funded Period: Apr 16 - Jun 17 Funder: AHRC	RMIT Enabling Capacities Fund Amount: $10,000 (AUD) Sector: Academic UK-Based Researcher on Creative and Cultural Districts in Thailand Amount: £43,286 Sector: Charity
UAL Department: Central Saint Martin's College	Disseminating "Design Thinking for Prison Industries" through Teaching Resources, Delivery Models and Training for Trainers	Funded Value: £80,484 Funded Period: Feb 17 - Jul 18 Funder: AHRC	Improving Safer Custody Amount: £236,904 Ministry of Justice Sector: Public
UAL Department: Central Saint Martin's College	Design Thinking for Prison Industries: Exchanging design tools, methods and processes with prisons in London and Ahmedabad to build inmate resilience	Funded Value: £20,732 Funded Period: Sep 14 - Mar 16 Funder: AHRC	Private company funding Amount: £15,000 Serco Sector: Private
UAL Department: Central Saint Martin's College/ London College of Communication	Public Collaboration Lab	Funded Value: £384,507 Funded Period: Feb 15 - Oct 16 Funder: AHRC	European Commission € 984,865 Sector: Public (Non UKRI) Camden Can Innovation Fund £25,000 Sector: Private Camden Council: Tackling Special Isolation and Loneliness £10,000 Sector: Public European Commission H2020 € 7,998,425 (Non UKRI) Sector: Public

Source: Gateway to Research

Appendix 8. Researcher attributes: key skills, competencies, and capabilities of the design researcher in public service contexts

Acceptance of complexity	The nature of design research in public services requires an acute analysis and understanding of the service system. The designer recognises, accepts and embraces the ill-structured and complex nature of conducting work in this context.
Agility	The ability to act in response to changing situations and contexts.
Asset based approaches	The ability to identify the hidden value within a system and the assets (social, material, financial, infrastructural) that exist before you start driving to solutions.
Building trust	The ability to establish mutual trust between stakeholders and project partners is key. This is achieved by creating a shared language within a project or activity. This alignment is often achieved through co-design and participatory methodologies and relational infrastructuring. Co-visioning, co-production and transparency contributes to trust building and requires an acute awareness of the ethical considerations of collaboration.
Data literacy	The ability to understand data and allow this understanding to drive decision making both quantitatively and qualitatively through empathic processes. Learning from prototyping and testing with users; then iterating as an evaluative process to inform continual development of a project.
Empathy and social intelligence	This involves actively engaging and sharing influence or difference with others. Engagement and managing diverse content or ideas. The ability to connect to others in a deep and direct way, to sense and stimulate reactions and desired interactions. Considerate of relevant or relative contexts or situational conditions.
Enabling cross-sectoral collaboration	The ability to facilitate the exchange of knowledge, bringing together different disciplinary approaches. Design contributes to create collaborative connections between sectors, allowing stakeholders to better understand and define roles.
Facilitation	The ability to support people in communicating their needs, concerns and to articulate their attachments to a project or task they are engaged in. The ability to create interactions that allow for sharing a range of perspectives and goals.
Future acumen and literacy	The ability to construct and problematise future scenarios and experiment with ways to deal with them. The ability to horizon scan beyond immediate issues and envision circumstances and interventions that offer paths for development and progression. Visualising and visioning futures creates roadmaps for innovation and development. Working in environments where uncertainty and unpredictability are accepted.
Intrapenership	The ability to create space and opportunities for change inside an organisation. The ability to integrate into government departments, community groups and support in the development of proposals. This activity contributes to breaking down barriers and encourages risk, experimentation and fresh thought.
Mapping and envisioning information	The ability to visualise the service and envision information. Synthetic representation affords the visualisation of all actors and components involved in a service delivery. This skill set is utilised to map and clarify how different service components and roles are connected, highlighting the values they exchange. Mapping and envisioning information allows the articulation of service dynamics. Mapping tools in service design research are used to detect gaps and opportunities. The visual articulation of a service or the representation of research creates a boundary object that serves to align interests and agendas.
Organisational knowledge	Design researchers also need to become 'public service organisation-competent' to understand where and how public service organisations could benefit from design. These competencies refer to language, bureaucratic processes, hierarchical structures or the pace that is associated with the sector. The ability to operate pragmatically with recognition that the approaches that work in one sector might not be transferable.
Pluralism	The ability to take on multiple roles at once: design practitioner, design researcher, design facilitator. This requires the ability to understand concepts across multiple disciplines.
Service prototyping	The ability to test ideas before putting them into practice. Iteration of interventions and propositions, testing of prototypes with service users in context. In this process assumptions are exposed and challenged and adaption to the situation based on what is discovered is required. When dealing with social innovation in public service context, prototyping needs to move beyond rapid prototyping (that mainly focuses on testing the user experience of a future service) into a more long-term exploration that includes future roles and resource flows within the public systems. Prototypes can be a way of creating good teams and building capacity, which means enabling policy stakeholders, practitioners and users to run parts of the prototype. These prototyping skills underpin infrastructuring methodologies.
Systemic thinking	The ability to look at the service in macro context and to understand, design and systemise the flow of value from various aspects of the organisation across the value chain to ensure synchronicity, consistency, integration, and maximisation between people, activities, processes, policies, places, and resources. It requires a systemic understanding of the service in broader policy and economic contexts; recognising the opportunities that bottom up, co-designed and open innovation processes afford. It also operates strategically within managerial and operational constraints. It is also about being pragmatic about the agency of design and its ability to effect change. Systems thinking informs on-boarding and infrastructuring strategies. The ability to know (find out) who you need to involve in the project to ensure implementation, impact and scale.
Technological literacy	The ability to understand and use technological developments to support the design research. Digital competencies in understating the role of data to inform decision making.
Tool based creativity	The ability to conceive, construct and produce creative and tangible methods for telling, enacting, prototyping and making. This distinguishes design capabilities within the public service context from other public service management capabilities. The design of methods and the materials needed for implementation of process is a key competency. The ability to fundamentally design methods and tools, prototype and deliver services at the point of artefact, service or system is differentiated from the performative processes in design thinking.

Appendix 9: Higher education skills pipeline

United Kingdom	International
Royal College of Art: MA Service Design The Policy Institute, King's College London University of the Arts London, Central Saint Martins: MA Industrial Design (for Publics) University of the Arts London, Central Saint Martins: MA Innovation Management University of the Arts London, London College of Communication: MA Service Design University of the Arts London, Central Saint Martins and Birbeck University London: MBA in Critical Design Thinking Lancaster University Design Management MA Glasgow School of Art: MA Design Innovation and Service Design	Norway: Oslo School of Architecture and Design
	Finland: Aalto University: Design for Government and Aalto Pro, which brings design students and public sector professionals together
	United States: Austin Center for Design: Design, Society and the Public Sector (unit) Parsons School of Design: Civic Service Design, a graduate minor that includes units like Public and Collaborative Services, Civic Imaginaries: Urban commons, or Community Engagement and Design California College of the Arts Savannah College of Art and Design
	South Korea: Ewha University
	Australia: RMIT University
	Chile: Escuela de Diseño
	Brazil: EGC/UFSC
	Spain: Mondragon University ELISAVA: Postgraduate in Design of Network Applications and Services IED: Master in Service Design
	Italy: Politecnico di Milano's School of Design

Appendix 10: Covid-19

New relational services and social solidarity	Local residents self-organise to provide essential services for their local community, often in coordination with public and third sector local organisations. In the UK, local authorities are providing funding to support these emergent groups that have joined the provision of public services. Yet, the savings of these kind informal and relational services upon public service provision is not accounted for (Cottam and Dillon 2014). Such as #ViralKindness and Covid-19 Mutual Aid groups.
Adjusting public service delivery to context	Adjusting public service delivery to context, with a strong emphasis on digital transformation.
Leveraging and redeploying existing resources and solutions	Drawing on public servants' transferable skills to meet demand. For example, workers in the Royal Mail postal services volunteered as 'additional emergency service' to deliver medical aid, checking on the vulnerable and supporting people working from home.
Structural responses and possible longer-term shifts and behaviour change	Aiming for readiness for future crisis and to maintain sustainable developments, such as polities to shift to working from home, walking and cycling rather than using public transport, or adapting public spaces to facilitate physical distancing.
Open innovation through challenge mechanisms	All around the world have emerged open innovation challenges to respond to Covid-19 related challenges, in multi-sectoral and multi-disciplinary teams, such as COVID-19 Design Challenge organised by the World Design Organisation, IBM Design and Design for America.
Improving communication and providing targeted information	For example, WHO, UNICEF, UNDP and WhatsApp or UK's Coronavirus Information Service a dedicated chatbot in collaboration between WhatsApp and UK Government.
Infection control or tracking measures	Such as the COVID Symptom Tracker developed by King's College London, ZOE, and St Thomas' Hospitals.
Digital infrastructure and collaborative technologies	The pandemic has accelerated the use of technologies in the public sector and remade the case for further transformation. The number of people accessing England's NHS 111 online system had its busiest day ever on 17 March when 950,000 users accessed the service, compared to a daily pre-pandemic average of 10,000. And in just two weeks of lockdown, the number of court cases held as video calls in England and Wales rose by 800 per cent developments in digital civics and the migration of face to face paper services to digital services provides contexts to explore in user centred contexts, data privacy and ethics as these practices and platforms proliferate.
Reconsideration of which are (or ought to be) public services	Services that have proven to be essential although are not typically considered public services, such as food chain from production to distribution.
Unintended consequences of emergency solutions	Such as privacy breaches, lack of transparency in procurement, increase in domestic violence, delayed diagnosis and treatment of other health conditions, ageism and ableism, mental health,

Based on an analysis of the OECD's Open and Innovative Government Division (OIG) responses to a call-out to all levels of government, civil society, international organisations and the private sector to gather innovative solutions and inspiration on how governments across the globe are responding to the crisis (Observatory of Public Sector Innovation 2020)

Appendix 11: Example research questions

Research Organisation	Research Question	Thematic
Lancaster University ImaginationLancaster Leapfrog: Transforming Public Service Consultation by Design	Can innovative consultation tools and approaches enable more appropriate, effective and engaging consultation? How can we evaluate co-design and consultation processes in multiple communities over a long period of time in a way that captures real effects, and the added value that co-design approaches bring in a non-invasive manner?	Civic engagement through co-design
UAL Public Collaboration Lab	How can design education and local government work together to improve outcomes for citizens?	Civic engagement through co-design
Newcastle University Digital Economy Research Centre	How can 'in the wild' programmes of research, theorising, designing, developing, and evaluating personal and community-based digital technologies, be used to explore and create new forms of participatory citizenship that support local communities, local service provision and local democracy?	Civic technologies
The University of Edinburgh Design informatics	What are the potential opportunities and implications of emerging Distributed Ledger Technologies (DLTs) in the voluntary sector? By focusing on the potential for new forms of decentralised identity management.	Civic technologies
Sheffield Hallam University CENTRIC MIICT	How can design be used to co-create improved ICT-enabled services with migrants, refugees, public sector services, NGOs and other interest groups?	Civic technologies
The University of Edinburgh CoVAL	How can public sector organisations improve the value of services to citizens and other users through the co-creation of value, whereby both the public sector organisations and users are jointly involved in value creation?	Civic engagement through co-design / evaluation
Sheffield Hallam University Lab4Living	One in three children born in the UK today can expect to live to be 100 - and by 2066 one in two children will reach this milestone. What will this expanded lifespan mean for where and how people live; what products will they use; what are the implications for health care, communities, and of course the home?	Health and well-being
Glasgow School of Art / University of Strathclyde Digital Health & Care Institute	How can design methodologies to develop innovative concepts to reimagine the future of digital across health and wellbeing?	Health and well-being
UAL Design Against Crime Research Centre	How can design can contribute by developing tools and techniques that will help address recidivism by reframing prison industries as holistic 'creative hubs' that could better equip inmates to find employment opportunities when they are released from prison?	Anti-recidivism and skills

Source: Gateway to Research and interviews.

Appendix 12: Skills gaps and shortages preventing successful R&D partnerships

Gap	Action to close the gap
Business innovation	Limited capability to exploit opportunities for commercialisation of research in the formation of spinout social enterprises. Explore new business models to enable new public service partnership configurations.
Detailed knowledge of public sector organisations and service areas	Design into public problems should not only focus on organisational, administrative, and developmental capacities of the public sector, but also into the public decision making processes that affect public service provision and inter-sectorial relationships. The design researchers need to understand the systems and contexts of public service challenges. They need to develop deep understanding of public administration processes, service areas and interdependencies between public sector organisations. Knowledge exchange activities between academia and public service organisations are a starting point to build public management competencies in design academia. Develop active participation of postgraduate design students and ECRs in design-led research in public service contexts.
Legitimise design as a driver of innovation in public services	Lack of evidence-based reported results and impact of service design in the public sector. More design research should focus on evidence-based valuation to the impact of design in public sector organisations as well as valuing public services.
Limited resources in public service organisations	Allocating time to collaborative R&D is a challenge in a resource constrained public sector where service delivery is prioritised. Action research projects bring additional capacity to public service organisations to tackle public service challenges while conducting design research.
Lack of sensitivity to pre-existing innovation process in public service organisations	Acknowledging pre-existing innovation practices require design researchers to understand designing as a 'continuing process which exists before designers come in, and continues after the design work is completed and the innovation implemented' (Sangiorgi, Patricio, and Zurlo, 2018, p.11). Service management and public administration approaches that are familiar to non-designers offer some common ground. Design researchers would benefit from engaging in collaborations with public service organisations as a way of developing organisational knowledge and enabling collaboration.
Understanding of the design research contribution	Design research should demonstrate its contribution to public service R&D and specific service areas and articulate it in terms that are valued by public sector organisations and related academic disciplines. Avoid jargon and subject specific language. Build in time into projects to develop understanding and shared language. Consider public service KPIs in the development of design research methodologies and evaluative processes. Aim to align research project timelines with LGO timelines.

Methodology

The research aims to detail the contribution design research in public services makes to the economic and social challenges facing the UK. It also outlines opportunities to enhance the funding available for the discipline.

The methodology offers an analysis of this research practice in four phases:

1. *Contextual review* identifying the range of university-led design research activities within the public service landscape. This desk-based method drew on work already undertaken to collate a compelling and geographically diverse dataset of research funded by UKRI. This was identified via the UKRI Gateway to Research and Tableau. National and international design research not funded through UKRI was identified via proceedings of international design research conferences and networks.
2. *Case studies* were developed through 20 online conversational interviews (16 with design researchers and 4 with industry practitioners) to develop rich accounts of their design research projects and reveal narratives of impact and salience in relation to competency and capacity. Interviewees were identified through the contextual review, taking a geographically and thematically dispersed sample.
3. *Edit-a-thon* open to all contributors of the research and expert panel.
4. *Peer review* by peers within the UAL Design Against Crime Research Centre.

Limitations

The research was delivered during the Covid-19 pandemic so the methods originally proposed had to be adapted so they could be delivered following social distancing guidelines.

Our engagement with academics, practitioners and public service providers was therefore limited so, to maintain the participatory ethos of our methodology, we opted for online asynchronous activities to enable collective reflection feedback on the research.

List of interviewees

Surname	First Name	Research Organisation
Chamberlain	Paul	Sheffield Hallam University
Cruickshank	Leon	University of Lancaster
Duggan	Kelly	Nesta (ECR)
French	Tara	Glasgow School of Art
Gant	Nicholas	University of Brighton
Lord	Sue-Lin	Serco Institute
Holiday	Ben	FutureGov
Illarregi	Erika	Open University (Design Start)
Kirk	David	Newcastle University
Marzell	Laurence	Serco Institute
Mazzarella	Francesco	University of the Arts London
Osborne	Stephen	University of Edinburgh
Pierri	Paola	University of the Arts London (LDoc)
Prendiville	Alison	University of the Arts London
Sambles	Gavin	Experience Lab
Strokosch	Kirsty	University of Edinburgh
Thorpe	Adam	University of the Arts London
Warwick	Laura	Northumbria University