Lessons from coordinating a knowledge exchange network

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arcc

Acknowledgements

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Foreword

This report has been commissioned in response to an Engineering and Physical Sciences Research Council (EPSRC) review of the ARCC Research Programme published in 2014[1]. The Review Panel judged the work of the ARCC network coordination team as being exemplary. It issued a challenge to the team to capture exactly how it coordinated the multi-million pound research programme so effectively in order to help improve the performance of other knowledge exchange networks. This was not an easy challenge to respond to.

To date, the team had been operating on the basis of its members' tacit knowledge and their experience-based learning – which they had not previously attempted to share or capture.

The approach adopted for trying to capture lessons learnt was (seemingly) straightforward. Members of the coordination team were simply encouraged – through workshops, individual interviews, and at-a-distance dialogues – to say out loud or to write down plainly what they knew about how the team has operated. This approach was based on an assumption that, between them, they had sufficient experience and expertise to identify what made their coordination practices and activities 'exemplary'. By listening to each other and through self-reflection, they were encouraged to turn their implicit appreciation into a more explicitly expressed understanding of the strategies, tactics and practices they have been employing.

In parallel, selected network members were asked what they valued about the network and what they wanted it to deliver on their behalf. Their responses – which illustrate the highly complex and differentiated sets of demands imposed on the coordination team – make up the first half of this report. The second half outlines the strategies and tactics that coordination team members have developed or adopted for dealing with this complexity.

As the report reveals, the team have achieved success by observing their wide range of stakeholder groups carefully, listening to them attentively, and trying to empathise – seeking to put themselves in positions of those they are providing with services or who need to understand the practice-orientated outputs they are helping to develop. Doing this effectively has required them to deploy not just technical capabilities but an extensive set of interpersonal competencies – soft skills that are not normally seen as being at the forefront of requirements for delivering engineering-related research. Ironically, when practised well, these skills appear to be largely invisible to network members.

Capturing the soft skills of the members of the coordination team – like capturing the soft evidence of how and why its members value the ARCC network – required detailed analyses which cannot be reduced to a simple 'one case fits all' or easy one-liners. Instead both members' aspirations, and the skills that coordination team members deploy to meet them, are subtly complicated. Developing the skill set required to meet these aspirations has required major public investment. As both network and coordination team members indicate, the fruits of such investments shouldn't be abandoned because of the finite nature of research council funding initiatives. Instead long-term mechanisms for supporting knowledge exchange will be required if the value built up by such investment is not to be lost.

Ian Cooper
Eclipse Research Consultants

1 June 2016

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1   Engineering and Physical Sciences Research Council (2014) Review of the SUE and ARCC Programmes, EPSRC, Swindon.

Executive summary

Knowledge exchange between academic researchers and policy and practice communities is crucial to delivering benefits across the UK economy and society. UK research councils have invested heavily in supporting such activities to enhance the impact of the research they fund. One of these initiatives, the Adaptation and Resilience in the Context of Change (ARCC) network, is funded by the Engineering and Physical Sciences Research Council (EPSRC), to engage with researchers and a wide range of stakeholders in the built environment and infrastructure sectors. The aim is to help promote sustainable urban environments and resilient infrastructure systems.

With over 6 years' experience in delivering knowledge exchange and supporting impact activities, the ARCC network has recently responded to a challenge from the EPSRC to capture cumulative learning within the team on approaches to coordination and knowledge exchange in order to share this as a means of informing similar initiatives in the future. This report is the accumulation of several months of research across the network and within the small coordination team at the University of Oxford undertaken to unravel just what it is about the network that makes it so successful in achieving additional impact from the multi-million pound research investment. It highlights the complex range of network members' needs and requirements and it identifies the strategies and approaches that the coordination team have developed or adopted to manage this complexity.

Through a series of workshops, interviews and personal reflections on the network's desired deliverables and its successes, this work has sought to capture the lessons that have been learnt. Although focused on the built environment and infrastructure sectors, many of the conclusions are likely to be transferable across subject areas and disciplines. For example:

- making connections at all levels and across boundaries is paramount to enhancing value.

- underlying the successful operation of the network is the effective exchange of social capital; both through formal activities and by taking advantage of unexpected opportunities.

- all members of the network enhance their involvement by being clear, not only in what they are looking for, but what they have to offer, what is of value, and how they wish this to be judged.

- offering opportunities to develop engagement and knowledge exchange skills is valued at all stages of career development; such skills and learning are highly transferable.

- identifying and meeting the very diverse needs of the network members requires a flexible approach and an array of technical and interpersonal skills within the coordination team.

- moderating the balance between various forms of engagement is a key task of the coordination team allowing members to choose what to access depending on their own level of interest and absorptive capacity.

- done well, the work of the coordination team is often invisible, but requires an appropriate level of investment to provide strong and energised support to members.

With the new challenges of the Research Excellence Framework, and with responsibility for demonstrating impact now falling to individual institutions, initiatives such as the ARCC network can provide welcome additional expertise and a trusted, non-competitive space to share skills and perspectives. These are both critical for helping publicly-funded research projects to maximise and accelerate their impact. Nationally, in order to ensure this impact, it is crucial that longer-term, yet flexible, mechanisms to support the exchange of knowledge and evidence are established to enhance the value built up by investments in research.
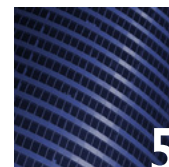
Introduction

In the UK, there has developed a large body of evidence from academic research on the need to adapt to the changes in our environment, technology and society in order to protect the performance of UK built environment and infrastructure systems. These complex and interdependent sectors are critical to national well-being, as well as our economic and social development.

The Adaptation and Resilience in the Context of Change (ARCC) network, funded by the Engineering and Physical Sciences Research Council (EPSRC), was established in 2009. It engages with researchers in the built environment and infrastructure fields to provide a comprehensive focal point for knowledge exchange activities, and to promote opportunities for engagement with the policy and practice communities that need access to evidence for their decision-making processes.

Unlike many networks, there is no official membership of the ARCC network; EPSRC-funded projects within the built environment and infrastructure sectors are invited to be involved with the activities of ARCC and contribute their details to the ARCC online listing. All stakeholders can fall within the loose definition of 'the network' through participating in ARCC coordinated events and activities.

At present, the network includes researchers at all stages of their career working on over 40 EPSRC-funded projects, plus a wide range of non-academic stakeholders from:

- central and local government departments, and their agencies
- infrastructure owners, operators and regulators
- professional bodies and institutions
- architects, building designers and developers
- engineering and multi-disciplinary consultants
- coordination bodies and other research networks.

By actively engaging with over 750 stakeholders, the coordination team helps to ensure that research from this substantial funding investment generates maximum impact by bringing together academics and users to facilitate the provision, uptake and use of evidence from research.

The network is coordinated by a small team based at UKCIP[2], University of Oxford. Since 2009, the skills sets within the coordination team have shifted to meet the changing needs of the network. The initial needs were for technical knowledge to inform research project coordination, then as the research developed, the broader knowledge exchange and communication skills were required to assist with synthesis and dissemination of research outputs.

2   UKCIP works at the boundary between scientific research, policy making and climate change adaptation practice.

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Over the past six years, this team has built up a wealth of expertise in managing a knowledge exchange network and facilitating stakeholder engagement processes. This was reflected in the EPSRC's independent review of the overall ARCC research programme, when management of the network was described as being:

> 66 … at the 'cutting edge' nationally and internationally in terms of adopting innovative and experimental interdisciplinary approaches and that part of the value that they have delivered is in cumulative learning, with an attendant challenge around whether this learning and the people within whom it resides, will remain accessible and active in the future. 99

As a result of this observation, the review panel threw down a challenge:

> 66 There are lessons and good practice which we hope will be translated into future practice, both through Research Councils, and in other research funders, and the research community and institutions more widely, and in particular concerning the coordination of programmes to enable capacity building and impact. 99

Responding to this challenge has prompted this piece of work by the ARCC coordination team to unravel just what it is that makes it successful in knowledge exchange and network coordination. By capturing this cumulative learning and sharing it in a form that can advise future practice, this report offers insights and key learning from the built environment and infrastructure sectors to help inform other research council-funded network activities.

The objectives were to:

- identify and share good practice and experiences gained over a six year period from a coordination and knowledge exchange network, particularly in support of interdisciplinary and stakeholder-led research programmes

- capture learning to ensure it remains accessible and useful in the future

- identify those aspects where greatest value can be achieved as a focus for future activities

- consider transferable messages, learning from the built environment and infrastructure sectors.

This report has been prepared by Ian Cooper, of Eclipse Research Consultants, who was commissioned by the ARCC coordination team to conduct independent research with current and past team members as well as a small sample of network members (stakeholders), to determine the value of this network.

The first part of this report catalogues what network members said they want.

The second part outlines the strategies and tactics that coordination team members have developed or adopted for dealing with this complexity of requirements.

And finally, some overall team conclusions highlight key messages that may be of interest to other research-based networks and funding organisations as they seek to take forward knowledge exchange and coordination activities into the future.
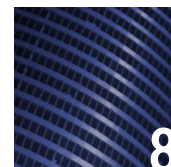
What do network members want?

The coordination team sought to discover what members of the network want by asking them. Interviews were conducted with seven of them. These were not selected to be representative of the network's 750 members. Instead they were chosen to illustrate the widely differing stakeholder groups that the coordination team is seeking to serve:

- research funders
- (government) policymakers
- sector-based forums
- professional institutions
- academic researchers
- early career researchers
- private sector design consultants.

Each of the network members was asked about their experience of both the network and its coordination team.

About the network, members were asked:

- how they had engaged with it
- whether they thought it had been successful
- how they had benefitted from engaging with it
- which aspect of the network they valued most
- whether that engagement had resulted in any changes to how they or their organisation operates
- how they wanted to use the network in future.

About the coordination team, they were asked:

- whether it had added value to their engagement with the network
- what it could have done better to meet their requirements.

In addition, each member was asked to identify what they saw as the most important lessons they had learnt from engaging with the network and from the activities of the coordination team.

Their answers are summarised on the pages that follow. Some responses focused very much on the value of the network, others concentrated more on the work of the coordination team, whilst some members were able to address both aspects. This was entirely dependent on their experiences with the coordination team and the network.

What the responses illustrate is the disparate array of needs, wants, expectations and aspirations that the coordination team has tried to serve. Each type of stakeholder employed a slightly differing set of criteria for judging how successful they thought the network and its coordination team have been. Even where their criteria are similar or overlap, there are highly nuanced differences – as a result of the individual circumstances and motivations of particular network members.

These differences, in turn, illustrate just how sensitive coordination team members need to be when attempting to provide support and services to each type of stakeholder group – especially when dealing simultaneously with mixtures of them, either at the same event or through the same publication.
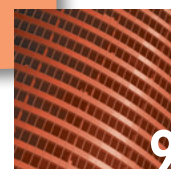
What research funders value about the network

Criteria for judging success

- Putting partnership working in place from the very beginning of the programme.
- Getting industry stakeholders to engage effectively with top researchers.
- Working with key stakeholders to develop new ideas, new ways of thinking, and new tools, that both academics and practitioners agree are valuable.
- Delivering impact beyond the timescale of the funding for individual projects.

The network's successes

TRANSLATING RESEARCH RESULTS
Projects were required to produce outputs not just for academic consumption but useful for industry stakeholders too.

PROMOTING THE IMPACT AGENDA
ARCC's thrust has been to deliver the impact challenge, driving changes in researchers' and practitioners' behaviour during the lifetime of the research.

ESTABLISHING ITS REPUTATION
ARCC has achieved a higher profile than a lot of other mechanisms the research council has used.

DEMONSTRATING COMPETENCE
Because of what ARCC has achieved, we were in a position to increase the scale of the resource so we could broaden the network in terms of both current activity and looking to the future.

ACHIEVING DURABILITY
ARCC has had a longevity beyond quite a few of the mechanisms that we have employed for knowledge exchange.

Key lessons learnt

66 Just how hard it is to get the message out of researchers and across to the right people. You've just got to keep doing this, again and again and again. And it needs to be couched in the right terms. That took a bit of learning. But we know that now throughout our whole impact programme. 99

66 We know knowledge exchange isn't an easy space to work in or coordinate. So you have to be ambitious and realistic at the same time. It's not easy because there aren't that many people interested out there and you have got to find the right ones. 99

66 Through our continued support of ARCC, we have realised quite a strong built environment engineering community. Now we have to broaden that across our other interests – the mathematical sciences, the digital and information sciences. So we need to broaden ARCC out beyond its historical engineering practitioner-based roots. 99

66 As responsible research managers, we need to have an ongoing eye for evidence about what is being delivered. ARCC has helped by anticipating how to provide this to demonstrate its added value. 99
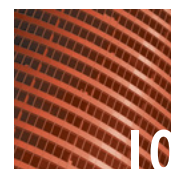
What research funders want from the coordination team

Desired deliverables

- Protecting research council investment, achieving resource efficiency and best value
- Intelligence gathering and information brokering and acting as critical friend
- Raising the profile of a research area
- Coordinating inter-disciplinary working and achieving community buy-in
- Acting autonomously, being ambitious, persistent, flexible and creative
- Identifying future research needs.

What has worked?

ESTABLISHING THE BRAND
There's the strength of building on and out from an existing ARCC brand. So they have become part of the ecosystem, not a separate activity and raised the profile of adaptation research.

PUSHING THE IMPACT AGENDA
The team's made projects put more effort both individually and collectively into thinking about impact and stakeholder engagement. And then they've created and publicised that impact.

AVOIDING DOUBLE FUNDING
They've helped prevent double funding by managing to get projects to collaborate.

COMMUNITY BUILDING
Their integration and coordination of the research has added a lot of value to community building and there has been genuine buy-in from the ARCC community.

SUCCESSION PLANNING
They have helped to start thinking about career development of early career researchers. And helped our thinking about priorities for our next delivery plan.

SHOWING ENTHUSIASM
They're always enthusiastic in our interactions with them. They always seem in touch and knowledgeable which is a positive.

LISTENING
They are very good to work with. They put forward ideas but they are also good at listening, taking forward our ideas and asking for and valuing our input without giving the impression that they are dependent on it which is hard to pull off.

Key lessons learnt

66 We're interested in how much additional space you have to give the team to plot their own way through a complex and changeable space so as to reinforce that sense of empowerment, creativity and learning from making choices. 99

66 You need energy and commitment but also continuity to do the right things and demonstrate them. You need continuity of understanding of process and mechanism. 99

66 They have done remarkably well managing a lot of changes. Any time they have had to work with somebody new, they have been positive and helped them graciously. 99

66 I can't put my finger on how they have able to influence outputs. But I'd be interested in demonstration of that as a learning point – look this is how we have done it. 99

66 When it works really well, it becomes part of business as usual. It's seamless. You can't point to particular activities and say, that's the critical one. It just becomes how we work. 99
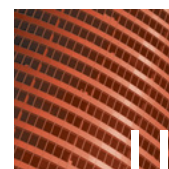
What a senior researcher values about the network

Criteria for judging success

- Creating a research community with a comfortable discussion space in which members can collaborate rather than compete
- Providing on-going network opportunities for building relationships, teams and future opportunities amongst researchers, policymakers and practitioners
- Effectively encouraging researchers to translate their academic research results into outputs useful to policymakers and practitioners
- Supporting researchers in their response to the impact agenda introduced by the Research Excellence Framework.

The network's successes

BUILDING A COMMUNITY OF RESEARCHERS
It was valuable to feel part of a community all working collaboratively on climate-related issues.

COORDINATION AND ALIGNMENT OF PROJECTS
The network made us aware of each other and so it was much easier to work together more quickly, sharing approaches, methods and data across the projects.

SHARING GOOD PRACTICE
Attending another project's workshop, for instance, meant we could see how effective they were in engaging with their stakeholders.

EFFECTIVE INDUSTRY ENGAGEMENT
Through the network, we set up a challenging but ultimately productive relationship with a local government collaborator.

BUILDING THE EVIDENCE BASE
Industry engagement had real benefits for us. We had to write simplified statements backed up by evidence. We had to ask ourselves "How strongly can you actually believe what we're saying in this paper".

POLICY SUPPORT
We went from writing academic papers to trying to make supported recommendations based on evidence that has been included in local government plans and strategies.

FOLLOW-ON OPPORTUNITIES
Being members of the network has led to follow on research projects both with other academics and with industrial collaborators.

SUPPORTING THE IMPACT AGENDA
What do I value most? It's got to be the support offered on responding to the Research Excellence Framework's (REF) impact agenda.

Key lessons learnt

" Our ARCC experience helped us to think carefully about what our messages should be. That's about the translation of academic outputs into impactful ones. I thought I was doing that before but not very effectively. Our project in the ARCC Programme was a real turning point for me. I saw we weren't doing it optimally. I think we are doing it much better now. "

" The coordination team has demonstrated that it is possible to pull a research community together. They had the ambition and have been successful there. And inter-disciplinary working enabled that. "

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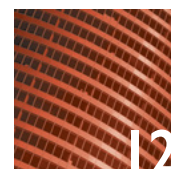
What an early career researcher wants from the coordination team

Desired deliverables

- Practical advice on how to bid for research funding
- Hands-on, interactive, face-to-face training opportunities
- Effective filtering and signposting through ballooning amounts of information available
- Advice on how to communicate and engage successfully with other stakeholders
- Worthwhile investment in developing the skill sets of early career researchers.

What has worked?

TRAINING PROVISION

The Early Careers Researcher course was probably the best piece of training I have done. Really excellent. I'm seeing more and more of what I and my colleagues got from it.

KNOWLEDGE TRANSFER

On the course, a huge amount of information was covered very quickly giving real insight into what funders were looking for in applications.

KNOWLEDGE EXCHANGE

We did a lot of interactive work on the course which I think really stands out. For instance, we were given previous proposals and asked to deconstruct them, and then rate them.

KNOWLEDGE CURATING

Information available has ballooned in size. There's a real challenge to keep up with what's going on anywhere else. The newsletter is fantastic there.

IMPROVED UNDERSTANDING

Now we can discuss impacts and interaction with business and industry on a more informed level. We know that language now.

EMPOWERING YOUNG RESEARCHERS

My colleagues and I went from a group which hadn't got funding to where we can stand on our own two feet. We've helped to win three grants since then. That's an amazing transition.

Key lessons learnt

66 When we went in [to the ECR event], we were seeing research from our perspective. When we came out of it, I felt like we saw it from a perspective of government, of industry, people who were looking at it and saying, 'Shall I or shall I not give these researchers funding?' And I think that's a hugely useful thing to be able to do. It was quite a dramatic shift in perspective. 99

66 Today researchers are applying for quite a lot of different kinds of funding. And, if they get a fellowship, for example, or even some smaller amount of funding to do some really quite blue skies research, and to build relationships with industry and government, this will hopefully last them for a long period of time. It just seems to me that, if a research council is going to invest in someone in that way, then giving them ability to actually view it as clearly as possible … getting that perspective on it just seems like a very obvious thing to do. 99

66 I've been to final meetings of other research consortia where everything is handed over in a binder. The scientists say, 'We have addressed this research issue'. Industry people are frustrated that the research is not directly applicable to the questions they were hoping to answer. It feels like there's a real shift in expectations going on at that level. And that practice is no longer acceptable. ARCC's kind of training makes you feel that you can see that from another perspective. The vast majority of PhDs and most post docs will end up in industry and so by giving them the ability to operate in that way, the transferable skills will be credited as well. 99

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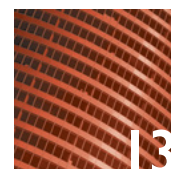
What a policymaker values about the network

Criteria for judging success

- Intelligence gathering – knowing what research has been going on and what future projects are being lined up
- Extent of the network's coverage of research in key sectors of interest to our Government department.
- The value of the network as a stakeholder group that we can use in our adaptation team, and the department more generally, to formulate policy
- Bringing the research, practitioner and policymaker communities together successfully.

The network's successes

ESTABLISHING CREDIBILITY
We know ARCC is a source of data excellence and knowledge.

WORKING WITH CENTRAL GOVERNMENT
The overall view is that ARCC has done a good job of what its long term ambition and vision are and in how it's worked with government.

MAKING CONNECTIONS
If it hadn't been for ARCC, for instance, we probably wouldn't have got to know the research manager at EPSRC. Now we are aware of what each other does. And, if we need to, we know where to go.

BUILDING THE EVIDENCE BASE
The network is a link into evidence. We've used the research as we've needed to. It's a really good tool in terms of providing substance for what we want to sell from an adaptation policy perspective.

VALUE FOR MONEY
The value of what ARCC does outstrips any balance in terms of what it costs.

TRANSFERRING KNOWLEDGE
The monthly newsletter is really valuable. It's a good source of information and update on what's happening.

Key lessons learnt

66 Our involvement with ARCC has made us more aware of the interdependencies between researchers, policymakers and decision-makers. 99

66 There's the value of partnership working, the value of collaboration with and understanding other sectors. Therefore how most things are inter-connected. That is the really big one. I think that's something that has been emphasised more and more over the last couple of years. The government perspective has been to co-create. It's about joint working. Not just a three-month consultation, get all these responses back and then doing something completely different. I think we are in a different era here. 99
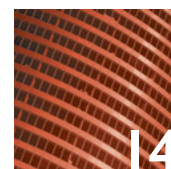
What a policymaker wants from the coordination team

Desired deliverables

- Demonstrating how research-based knowledge and data can support and add value to policymakers in their decision-making
- Helping us to make useful connections with other policy and decision-makers
- Contributing to collaborative and partnership working, including on co-creating policy and strategic developments
- Producing useful outputs that have been effectively disseminated
- Applying a concerted approach in working with cash-strapped local government.

What has worked?

KNOWLEDGE BROKERING
Team members are very knowledgeable and have huge circles of expertise. So, if they don't know something, they can play a gatekeeper role and pass us on.

COLLABORATIVE WORKING
There are some really concrete examples of collaborative working. That's something they do very well. For example, they been liaising with us on our review of the adaptation reporting power.

OPERATING BEYOND THE NETWORK
We've benefitted from the engagement of team members outside the network, like on the Adaptation Sub-Committee's work on risk assessment.

DISSEMINATION
It's fine having lots of research that's been done. But, if it's on the shelf, then nobody's going to pick it up. The team is very aware of this. And about the best routes to take to get through and disseminate.

EFFECTIVE OUTPUTS
Their outputs have been very valuable in terms of what we are trying to do on adaptation, not just in the built environment or local government sector but in the broader sphere.

Key lessons learnt

66 There is a lot of value in working with different organisations. In a different era, you never would have. Your paths might have crossed once a year or something. It's a lot more frequent now in terms of what they need from you, as well as what you need from them. And I think, from a policy perspective, we're looking to gauge the optimum source of connection and data that's available. 99

66 Because of the way the coordination team works, we've recognised that the research community is one of the stakeholders that is certainly valuable in terms of how we, both as an adaptation team and, I guess more generally, a government department can formulate policy. 99
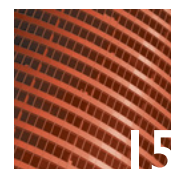
What a design consultant values about the network

Criteria for judging success

- Cutting edge science and research undertaken by high profile institutions and organisations through collaborative, multi-disciplinary working between academic researchers and industry
- Signposting of progress updates and knowledge sharing about research by an accessible and responsive knowledge exchange team providing an effective information repository and archiving service
- Good networking opportunities with other stakeholders in areas relating to the organisation's own strategic research priorities
- Continuing relationships with researchers, professional institutions, potential clients and other consultancies.

The network's successes

EFFECTIVE NETWORK COORDINATION
There was a clarity of intention and a personal dimension to how projects were managed and communicated that worked well partly because the people who ran the network were 'plugged in' to our organisations.

COLLABORATIVE MULTI-DISCIPLINARY WORKING
My natural inclination is to be collaborative and multi-disciplinary and the ARCC approach has supported and reinforced the value of that approach.

KNOWLEDGE SHARING
Without the network, it would be a lot more difficult to share useful information and knowledge if the coordination team weren't acting to signpost it.

EFFECTIVE ENGAGEMENT
Members of the coordination team have been key to us feeling connected with the projects. So, personally and professionally, I've benefitted from this interaction with the people and the projects.

BUILDING CONTINUING RELATIONSHIPS
Partly because of the network connection, we've been doing interesting further work with other academic partners, not just through EPSRC funding but Natural Environment Research Council funding as well.

Key lessons learnt

66 Our directors wanted to know what the business case or strategic value of engaging in the network was. Getting involved was definitely seen as worthwhile because it allowed us to remain at the cutting edge of science and research by giving us an overview of what going on and what's considered good practice, in our own priority areas. 99

66 The network has shown that this is a useful way of doing things and that it works. But you need a dedicated budget, specific projects and time, as well as being collaborative and multi-disciplinary – you can't effectively do one without the other. But, if you can combine the two, it's a really constructive way to support climate change adaptation and resilience work. 99

66 The network's been successful because it's served as a critical platform for climate adaptation and resilience work. Its website is really accessible, its people are very approachable, unlike some platforms or web-based resources where it's difficult knowing who the right people to talk to are, and finding reports and case studies. 99
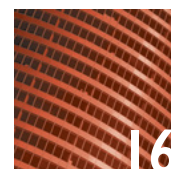
What a professional institution wants from the coordination team

Desired deliverables

- Jointly badged events between ARCC and us helping both organisations to reach broader audiences
- Continuously being put in touch with useful people beyond our usual membership contacts
- Suggestions for researchers to speak at our events to help promote in-depth discussions across professional boundaries
- Up-to-date summaries of research relevant to our members e.g. to -provide an evidence base for our special interest group on resilient cities
- Capturing knowledge and tools for climate change adaptation and resilience
- Curated knowledge for circulation onto our members and to other interested parties via our newsletters and website
- Bridge building between academic researchers and industry practitioners.

What has worked?

BRIDGE BUILDING
Working with the coordination team allows us to cross the bridge between academia and practice and access to others within academia beyond those we engage with already through the research projects we fund ourselves and the degree courses that we accredit.

ENRICHING THE WORK OF THE SPECIAL INTEREST GROUPS
The benefit we have got from working with the coordination team is that it enriches the work that we are doing so that we can bring cutting edge research to our members. The team identified the work on green and blue infrastructure which was presented to our special interest groups. Likewise we did an underground infrastructure event with civil engineers.

JOINTLY BADGED EVENTS
We did a jointly badged design challenge on making offices healthier, more sustainable and climatically resilient by using green infrastructure. That was a very productive workshop with a detailed design challenge and exhibition. Everything was written up for reference via social media and news articles.

Key lessons learnt

66 The single most important added value that the coordination team member has brought to us is just brain power. Everything that is in her head in terms of the people she knows and can connect with. If you are trying to curate for a conference session, it's just nice to have that additional brain power – not just in terms of the people in the network, but it's her own input, her thinking that's really valuable. But a lot of that work is in the background, it's about relationships and getting things out to our members. And it's invisible and the team don't get any real acknowledgement for doing that. 99

66 It's very good that the network's been created and set up these masses of relationships. And it has all these infrastructures and systems in place which are working very well. It's all very professional, with quick turn around times for writing up. And I really appreciate how well designed things go on the website very quickly. But it is really sad that this activity may not be funded anymore when it's clearly been doing good. If you go back to disparate people being funded to do projects and then trying to disseminate in their own way, they don't have that

added power of doing it together. And so you won't necessarily hear about it. 99

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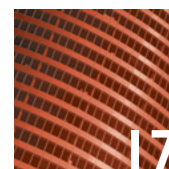
What a sector-based forum values about the network

Criteria for judging success

- The networking opportunities for finding contacts and receiving support
- Knowledge transfer and repository – help in understanding how new activities and knowledge relate to infrastructure
- Enabling follow-on projects – for instance, finding partners from the network and elsewhere to look at modelling infrastructure systems.

The network's successes

LEGITIMISING CORPORATE ACTIVITY
When you work in a big corporation doing something slightly off-beat like climate change adaptation, to have a network to go to rather than having to set something up is quite useful.

NETWORKING OPPORTUNITIES
There are people and organisations we wouldn't have come across so easily without the ARCC network. And people are coming to us and asking if we could partner with them.

CROSS-ORGANISATIONAL COLLABORATION
It's been very successful because it's brought together a lot of disparate organisations who started to think about how they all gel and fit together.

FOCUS ON SYSTEM INTERDEPENDENCIES
The network raised issues and good ideas by looking at infrastructure and society as a system. Our forum is very interested in interdependencies between energy, transport and ICT.

EXTERNAL BENCHMARKING
The annual conference was helpful in terms of corporate interests to gauge whether we were doing the right sort of thing.

CHALLENGING GOVERNMENT POLICY
Through working with projects, we have been able to challenge the Treasury's economic orthodoxy.

SCENARIO-BASED THINKING
Making the case for scenarios. That's not quite research because it's based on climate scenarios, on how we can make infrastructure more resilient by pushing thinking to look 20, 30, 50 years ahead.

Key lessons learnt

66 We understand the huge challenges in getting research into policy, into practice. There's something there about language and effective communications. But it's also about lots of different organisations out there that are inter-connected. And inter-connectedness and inter-dependency mean looking at things from a systemic point of view over 30, 50 or 100 years. That's an important lesson that we've learnt we need to keep working at. 99

66 Long-term thinking is in need of more recognition, because the government needs to sit back and take notice of the long-term. Infrastructure companies tend to work in five-year chunks because of the regulatory environment they work in. The time frames we are using are between 30 and 50 years ahead. But, for infrastructure, society needs to think 100, 200 or even 300 years ahead. 99

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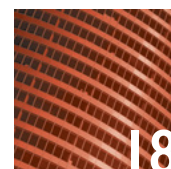
What a sector-based forum wants from the coordination team

Desired deliverables

- Enabling close dialogue with government department policymakers, regulators, industries and politicians
- Effective signposting to the evidence
- Creating momentum through building a critical mass
- Successful knowledge exchange in support of continual improvement
- Tackling the policy/practice divide
- Overcoming organisational inertia
- Securing long term action and funding.

What has worked?

KNOWLEDGE BROKERING

This is a continual improvement thing. We've gained knowledge. We know that there are still gaps. The coordination team keeps us briefed through its newsletter.

RAISING AWARENESS

We track issues through the newsletter. We see things there that sound interesting. It's a source of information … a portal almost.

SIGNPOSTING EVIDENCE

It's useful to have a team that pulls things together and disseminates them on a regular basis. It's about getting lesson learnt. When you have the coordination team pointing towards the evidence, that makes it a lot easier.

DISSEMINATION

You can put a lot of effort into disseminating and communicating but you have to make sure your intended audience is listening to be successful.

Key lessons learnt

66 One of the things we bring to ARCC is the need to work on the policy/practice divide. Because any new knowledge coming in has to become practice, has to be written into some sort of process. It needs to be codified. It needs to be in the right language so that people can understand it. And this is quite a bit of an issue. 99

66 If we are thinking infrastructure and a five to ten year timescale, then we now have the contact to persuade government to change legislation, if need be, to get data shared, or to set up repositories that are secure. And that's a major point to make – that the network and its coordination have to be funded over a long period – five to ten years – to make sure they keep this cycle of continuous improvement going. 99

66 To benefit from changes and practices brought about through research, you need to have champions for people at the other end to recognise and help out as well. Because you can't just transmit. You've got to have somebody there to receive as well. 99

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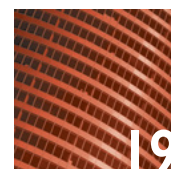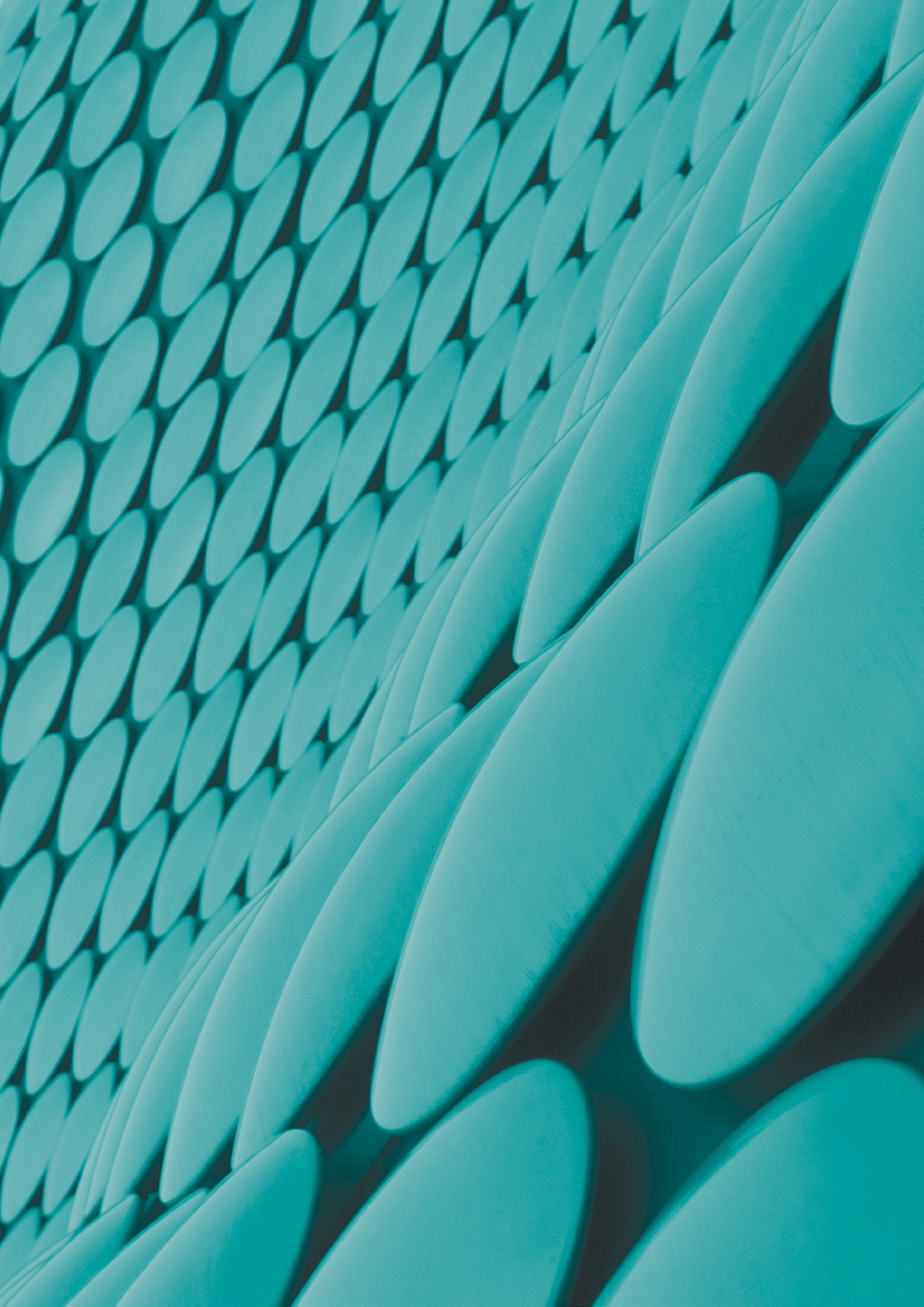
Meeting network members' needs

The second half of this report catalogues the strategies and tactics that members of the coordination team have developed or adopted to deal with the complex set of demands imposed on them by the disparate needs, aspirations and motivations of the stakeholder groups that make up the ARCC network.

This information was primarily captured through individual interviews with team members, both past and present. They were asked:

- what they saw as the most significant lessons to be learnt from the work of the team
- what knowledge, information or data the team owned to illustrate these lessons
- who they saw as the main beneficiaries or target audiences for these lessons
- how the lessons could be presented so that they were accessible to the targeted stakeholder groups
- what mechanisms had proved the most effective for reaching them
- who had acted as information brokers for knowledge transfer and exchange with them
- what had proved to be the most useful boundary objects[3] used for such knowledge transfer or exchange?

In addition, team members were also asked to list the keys skills and/or capabilities which they felt were crucial to fulfilling their specific role(s) within the team.

The responses were transcribed verbatim and converted into narratives – seeking to capture in team members' own words their 'stories' of what they know about the coordination team and how it has operated over the past six years. In the pages that follow, a brief summary is given of the most significant lesson learnt offered by each team member, plus a summary of the combined expertise needed to achieve an effective network.

Their stories illustrate the soft skills they have had to employ when supporting network members – listening to attentively to stakeholders' demands and aspirations, and trying to empathise with their widely differing circumstances and motivations for engaging with the network. When practised well, these skills – and the team members who practice them – often appear to be largely invisible to network members who are being supported by their proficient deployment.

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3   Boundary objects are objects [e.g. documents] which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites ... They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognisable, a means of translation. The creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds.
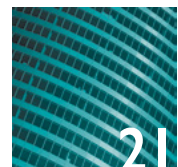
Building trust, credibility and openness

> 66 The importance of people and relationships is crucial. It's a key factor in the success of the ARCC Network. What I'm talking about is building trust and credibility. It's about highlighting our knowledge exchange expertise, but more about demonstrating the added value that working together can bring to the mix. Nothing beats face-to-face meeting, at least in the first instance. Early discussions can help explain the role of the network, understand recent research developments, and help identify opportunities to add value. 99

Building and managing personal relationships with the researchers and other stakeholders is crucially important to understanding where their priorities lie. You can only get so much from websites. The coordination team is small and some of the projects are very large with significant knowledge exchange resources. So, in the first instance, building up personal relationships is important for identifying a useful role for the network. You need to keep in touch to work out where you can help. And show a willingness to respond to researchers' and the other stakeholders' needs, to demonstrate that you don't have a hidden agenda so that you can add value by brokerage and facilitation. People tend to go to a trusted source that's proven its value in the past. As a network, you are only as good as the last thing you did in any particular sector. So you need to work hard to maintain quality to be recognised as a trusted source of information.

Example: Researcher Coordination Meeting

Your first step is establishing trust. Then you need to build on that. Twice a year we held researcher coordination meetings where we would get all the projects together for a two-day facilitated workshop looking at 'Here's current research. This is where we think links could be drawn across projects. How can we help?' These events offered a shared learning experience to build synergies and openness. You have to be sensitive, to look at not only what will help deliver the coordination team's Pathways to Impact, but to look across the research portfolio to help deliver the projects' objectives too. Sometimes it's a bit like knocking heads together, saying, "You two projects are working in similar areas. Are there opportunities to work together?" The majority of researchers were then very happy to follow through as appropriate. You are never going to get everybody on board. But you are trying to build trust, a meeting of minds, to get this message across. Then once you have built trust and credibility, you have an opportunity for strengthening this with individuals over time.
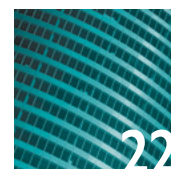
Demonstrating value

> ❝ One of the biggest challenges we have is demonstrating the value of the network to its stakeholders. And we have had some successes here. The main stakeholders of the network are the researchers, policymakers, practitioners and the funder. The challenge isn't just demonstrating the value to practitioners of the knowledge flow from the researchers. We also have to demonstrate the value of knowledge flowing from the policy and practitioner communities to the researchers as well. In other words, the significant challenge isn't transferring knowledge, it's actually knowledge exchange. Demonstrating the value of the network to its funders can't be forgotten either. That is also very important too. ❞

Our stakeholders have to see the value that our coordination team has added to their own activities. We seek to demonstrate this through the way we work with them individually and for them across the network. We're bringing information in, bringing stakeholders in, stakeholders together, research communities together. All the roles we play, and all our activities, have to contribute to demonstrating value. One significant lesson we've learned is the importance of being able not just to add value but adding it in a way that other people appreciate. How many times I've heard, "Oh this is very valuable work we're doing." You need to say, "Okay, I can see it from your perspective. Now look at the people you want to use that knowledge. How is it valuable to them?" This is an important conversation to have. To be successful, what you need to do is take the next step. You need to be driven by the user's need for knowledge and evidence, informed by your science.

Example: Investing in working outside the network

A coordination team needs to go beyond the stakeholders within its immediate network. First you go out there to capture intelligence and bring that back into the coordination team to use for the network. A director, for instance, has to spend a lot of time doing this through all the other activities that they are involved in, to maximise the benefits and the impacts of the network by demonstrating its value to outsiders. Your reputation stands or falls by that. Where outsiders value us, they demonstrate this by wanting us to be involved with them. There are a number of the independent research projects, outside the network, that have significant budgets of their own, that have specifically ask us to get involved with them on knowledge exchange. They want us working with them to help maximise their impact. We know we're valued by them. They want us to continue beyond the current term of our funding. They've said, "The network should continue to be supported. There needs to be something on-going that encourages knowledge exchange".

Managing relationships

> 66 You've got to be able to spot what's coming, what's useful, and the opportunity for using it. You have to be proactive in structuring the contributions that other people make, to realising that. It is important to research teams that we are technically credible for their particular project. But I'm not sure that they understand about our capacity to manage relationships. That very much depends on their own priorities, their characters, how they see the network. Part of relationship management is being able to recognise all of those characteristics of research team members. Play to their strengths and help them through their weaknesses, finding the key things that motivate them. This means a high degree of engagement with the research teams in order to be able to understand all that. 99

The absolute key is understanding what research teams require: impact, exposure, stakeholder engagement, or whatever it is. And then making sure that all the activities we undertake actually include and address those points. And that is independent of technical expertise. It is about understanding what motivates them. But it is informed by technical expertise because you need to understand the particular areas in which they operate. You have to understand the difference between individual issues, how they affect the industry, how they affect the policy, and then customise all your activities based on that. This is very much focused on tailoring technical outputs for different stakeholder groups. You need to manage the people involved, have relationships with them and to depend on them to manage the technical information for you. The role is bringing the people together to do the technical bit for you. Which, of course, means placing more trust in them and their expertise.

Example: The Green Deal Guide

A good example is the document the ARCC coordination team wrote for the Department of Energy and Climate Change (DECC) Green Deal. We worked on that with five different projects under the ARCC umbrella and, of course, for people from DECC and the Department for Communities and Local Government. It was all based on the relationships we had with those people. We wouldn't have been able to do that without those. It took a long time to set up and longer to deliver. We had outputs coming from different projects and they were all saying the same things, basically about insulating homes and the effect that had on the energy demand and thermal performance. So we convened meetings and asked the different projects what results they had. We put together an outline and said, "Okay, this is what the structure of the document is going to look. It can't be more than X number of pages, and this is what we want you to concentrate on." Then we asked them to make contributions and did the overall editing. We also did the negotiation with DECC during that process. These things don't come on like a light bulb. It developed slowly through presentations, discussions, events we had with the projects.

Communicating effectively

> " It's incumbent on everyone on the coordination team to be an effective communicator. It's part of everybody's job. It doesn't mean they're all going to stand up in meetings and talk about what the network does. But they all understand the need for effective communication and the various ways that manifests itself. So it'll be the website and its contents. Its presentations and all the sorts of written materials we provide. It's about having clarity of purpose. When you're running an event or attending a meeting, what's your purpose there? What messages do you want to share? Or what information are you looking to collect? It's about that sort of understanding of how communication fits into the wider work. "

There isn't any kind of induction for this when people are appointed. Members of the team don't receive any formal communications training. Normally, you would just try to spend time with the others – by having a chat, or through being part of events or meetings with people. And, because we're such a small team and well integrated, most exchanges about communications happen very informally anyway. We go to very different kinds of events with very different kinds of participants: academics, practitioners, and policymakers. So a team member needs to know how to communicate most effectively with each of those. Some know because they worked in that particular territory before. We do tend to put people where they feel most comfortable. You might be taking a lead on something but you might quite often be working with someone else. So you've got an opportunity to talk through some of these communications issues. You aim to set these out right from the start.

Example: Key factors for communicating effectively

We don't have a set of formal communications guidelines for ARCC. If you're old enough and know enough and have been around a bit, you know the rules and which ones to break. I think it's more difficult if you're less experienced or not experienced in a particular territory. Then it is useful to have a core set of key factors. Let's say, there was an event or a document that had to be produced. We'd talk to the people who were involved in producing it to say, 'This is the audience and this is how we like to speak to them'. Certainly for initiating a document, I use a template. This says who the audience is, what the format is, what's the print run is, what the timing is, and what's the shelf life is. The answers scope the communications activities. This ends up as a fairly formal specification but it all comes out of our heads. Fundamentally, considering communications always starts with who is this for and what you want them to do with it. Those are the two basic questions you always have to ask, and then everything else follows. All the other stuff is just to do the technical aspects.

Making translations

> 66 Working with the researchers, what's important is translating their research results into something that's really useful. For knowledge exchange, it's the translation that is the significant bit. That and getting it out there as well. Policymakers are an important group to communicate with. You need to translate between what researchers do and what the policymakers are prepared to read. A lot of this is to do with time, which policymakers don't have – they want something that is easy to digest, accurate, full of facts. Researchers aren't always very good at producing that themselves, their job is the research. So it's important that we do translate research results to enable easy and effective consumption by policymakers. 99

Here the interest is in synthesising, in making results more digestible. That's where translating comes into it, looking at things and going "Actually, really?" If we don't understand it, then the policymaker who's not an expert isn't going to understand it either. We've learned how to do this over time, and looked at guidance on how to do this. But mainly we've learned how to make researchers' outputs more digestible simply by working on them. Some of the coordination team members are very good at extracting information from researchers. But it's usually quite academic. We just try to make it a little bit less intense.

The design and layout of any content is also very important – a clean, clear and visually appealing piece is far more likely to be read than one that is cluttered and unattractive. Then we send it back to the researchers, they read it and very often they go, "Oh, right, this looks good." Originally, was this simply because we wanted to edit content that was going to appear on our website. Now it's being applied to all of our publications.

Example: The ARCC website

When writing for the web, the principles are: know your audience, know your subject, be clear and concise. You need your key points first. Keep it short and relevant, with links to the research and background information, because it all needs to be backed up. You can set down the principles for this, they are fairly short. But then it's mainly a matter of people working out how to apply them for themselves. Fundamentally it's about effective communication. We rely on other people – somebody else provides us with information, and then we make the most of that information. Actually that's the critical bit. We have three main target audiences: central and local government, trade bodies and business organisations. But we don't write differently for each – anything that goes onto the website should be written so that it is readable by everybody. As soon as you start tailoring language, using jargon and specific terms, then you start excluding people. And the website is visited by a lot of non-native English speakers, so you have to remember you're writing for them too.

Sharing skills and perspectives

> 66 A coordination team needs a mix of different skills and different perspectives. This is why our coordination team has been effective because it has team members with widely varying expertise that bring different perspectives to bear. This is a critical factor for two reasons. One, it allows the identification of the appropriate member of the team to talk to different research projects in the language that they are familiar with because they know the basic elements of it. Second, it's important because of the experience that we each bring from those different backgrounds. This allows a breadth of understanding of the various political, cultural, and social landscapes that apply in different domains. 99

Understanding the nuances that operate in the different domains we work in is important. If you've worked in lots of different domains, you are more likely to pick these up than if you've only worked in one. There is a breadth and depth issue here and both are valuable. It's not simply the set of skills that team members bring. It's also the range of contexts in which those skills have been gained in practice. The trick then is to identify the most appropriate person to lead activity in a particular space. That's the challenge that the director has got – to look across all of the spaces and identify what are the key attributes and elements of background knowledge to enable somebody to engage effectively with a particular community. And the communities we engage with are quite different. So the collective knowledge and experience of the team is in some sense more important than the individual. Where it functions well, the individual with the relevant experience can just say to another, "By the way, don't forget that X or Y is important."

Example: Early Career Researcher meetings

We have taken various types of lessons that we and others have learnt and brought them together in a controlled space for groups of young researchers as they're developing skills, using the opportunity to give them guidance and steerage. Early career researchers are enthusiastic to participate and talk about what works. The most important part about these events is actually physically bringing together early careers researchers, from different disciplines, with more experienced researchers and team leaders, with people who've been around the block a few times, people who know where some of the blind alleys are. And actually it's the dialogue, just bringing people together in a non-confrontational, very open space so they can share experience. Here, as elsewhere, what we have done is provide a safe space for people who own different attributes of a problem to come together and talk. You can make a space safe partly by standard things like the Chatham House Rule – by not attributing stuff outside of the room. So, without too many pre-prescribed boundaries, you have effective sharing.

Curating knowledge

> 66 It has been quite miraculous the way that the coordination team has managed to bring together academics and industry professionals effectively. This was evident at an early ARCC Assembly where research teams were presenting the highlights of their projects. The way they reported them, with just the right amount of the research being presented, and not being about methodology, but with an emphasis on the findings. All those had been very carefully brought together. And it worked. At the time, there was nothing else like that being done in the industry. What the coordination team has achieved with getting researchers to consider their audience is really quite astounding. 99

The coordination team has developed a unique academic/practice interface. It's a combination of getting researchers to the point where they can present themselves to industry members of the network. This isn't something all researchers are used to doing. It involves rehearsing researchers for an event. It can take a lot of hard work to get researchers to speak in the language of industry. There are two parts to this. One is being able to help researchers to translate their own work to the language of the target audience. But there is also the knack of curating the event. Bringing together the right knowledge, creating the right atmosphere, so it's not too formal, not too informal. Putting industry professionals and academics at ease so they are able to concentrate on interacting with each other, on sharing and transferring their knowledge. Knowledge curation extends not only to stage-managing how the event is done but also to what happens afterwards, to the way that information is captured and connected up on the web.

Example: Curating the D4FC's resources

Innovate UK's completed Design for the Future Climate Programme (D4FC) has its resources hosted on the ARCC website – another example of what the coordination team is able to offer to other initiatives making use of EPSRC research by signposting and hosting their outputs. Accessing D4FC via the Knowledge Transfer Network (KTN) at the time the resources were published was difficult as it required membership of the KTN. The consultants charged with making the resources available saw the merit of the coordination team's approach to showcasing research. If you want to know who's accessing your information, how it is affecting change, the way to do this is not to restrict access to it. You focus on the user experience and on how easy it is for them to access your information. 'The coordination team got this right and has since heard feedback, "I've been using the ARCC website to show the Design for Future Climate resources." That's important. Innovate UK's resources are public sector but it is motivated to make use of information to get things to market. That doesn't happen quickly with the kind of technical details, stats and figures D4FC produced which help transfer application of research to industry readiness. This is not always synonymous with market readiness. The network can play a wider coordination role because people understand that, with ARCC, there is no market agenda to the way in which the information is created and made available.

Exploiting network expertise

> **❝** Some sections of the policymaking community have high ambitions for data management. Some sections of the academic community share those ambitions but they are all struggling to realise them. And a lot of people in the academic community aren't aware at all this is going on. Many have feelings that, "Well, this is just not a priority for me, this is something I'm never going to get to." Local government's take on this issue is that they would like access to more research data because they think it might help local policy. But they also are holders of data that academics would like to get their hands on. There's a lot of reluctance on both sides to make that happen. There are most definitely reservations on both sides. **❞**

The Finch Report, published in June 2012, set out the principle that the findings of all publicly funded research should be freely accessible in the public domain. EPSRC set a deadline of May 2015 for doing this that was ambitious. We noticed that this wasn't an issue that most people were working on at all. Those organisations we met with that were trying to tackle it were coming up with quite specific and local solutions, non-transferable to other organisations. ARCC's approach, because of its particular position, was much more comprehensive and sought to be rather more profound. We talked to other research programme managers about other managed programmes and what they were doing. Our approach was based on conversations with them. Data management had sat in the 'too difficult to do' box for quite a long time. We have tried to take it out of this box, and put it in front of our stakeholders by creating guidance for authors on our website where there's a section called 'OpenARCC'.

Example: Data Management Steering Group

Data management is a significant issue for a managed research programme like ARCC. It needs to be addressed, ideally as early as possible. The value of the breath and the depth of the contacts the coordination team built up has been important here. Exploiting them helped to develop our data management strategy so its ideas were better informed. Useful contacts within the ARCC network cover a lot of different UK universities. But there are policymakers as well as industry and practitioners. That really gives you a much more comprehensive view about issues. We were able to use those contacts in developing our data management strategy by setting up a steering group of academics, policymakers, and practitioners. They all agreed to be members. And we discussed the plans and approaches that we were hoping to take. And they advised us and told us what they knew about them. The other thing that we did was set up a virtual advisory group. This was a much wider group of experts and knowledgeable people who we could email round ideas and questions as things came along.

Learning through evaluation

> 66 One aspect we have become increasingly interested in is how to assess and capture the impact of the network itself and how it can inform our work into the future. At first this seemed a relatively straight-forward task – evaluating the number of people at events, tracking website hits etc., but then we wanted to investigate how the achievements of the network can be disentangled from the achievements of individual research projects and stakeholders. Of course, in reality, the greatest benefit often comes from all parties working well together. But we realised we needed to pinpoint where specific network activities add the most value, and how, in order to focus on-going work. 99

Monitoring and evaluation is a key task of any research project. Originally for us, it provided a means to track progress and impact and to feed any learning into future plans – and for reporting purposes. But we were increasingly aware that so much information on what works well was known only to individual team members, and that many achievements were informal in nature – not a specific report that could be easily recorded, but maybe an action taken as a result of an on-going conversation following a meeting we facilitated, maybe some time ago. And this time issue is also interesting when capturing impact. Research is often valid long after a project has finished and impact can occur even further down the line. So how far do you go in trying to track impact and understand its value?

Our experience is that it is definitely worth allocating resources to go beyond collecting the usual quantitative metrics, and to spend some time tracking through use and impact, but within reason. It does take time and effort, but with a diverse team working in different areas, it helps to centralise the activity and to continually provide a means and a prompt to go beyond the usual metrics.

Example: Developing an evaluation framework

When we wanted to delve deeper into investigating the added-value a network can bring, we worked with an expert in the field to help develop a framework against which the network's performance could be assessed.

The resulting evaluation framework captures quantitative and qualitative information on activities and includes process and output indictors and metrics but also follows this through to look at outcome and impact indicators. We also used a classification system for attributing cause or direction of effect to the network's performance. And recognising that so much linking information is still in the team members' heads or can't be easily summarised in numbers, we wrote some case studies to tell the story of particular network activities and their benefits to research projects, EPSRC and stakeholders.

It has been crucial in pin-pointing key areas of achievements and forcing us to look beyond the obvious metrics towards impact. But it's not perfect. Many network achievements remain informal and difficult to capture, and the time and resources spent on evaluation has to be balanced against actually doing the work.
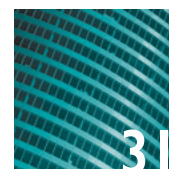
Team requirements: skills and capabilities

In delivering the range of lessons learnt above, the following combination of soft skills and capabilities were identified by the coordination team as key to delivering the network's aims and objectives:

ARCC coordination team members (past and present)

Team role:	Skills required:
Coordination team leader	**Strategic leadership, sector championing, expert domain knowledge, commitment to driving engagement, ability to inspire confidence**
Knowledge exchange manager	**Lateral thinking, ability to rapidly establish credibility, creativity and confidence, perceptive listening**
Adaptation science officer (built environment)	**Understanding of industry practices and gaps in knowledge, of academic practices and research funding requirements, of the role of industry in maximising impact of research, and of current policy**
Adaptation science officer (infrastructure)	**Adaptability – applying lessons from one domain to another, understanding of policy drivers and technical breadth**
Communications officer	**Understanding the wider context, ability to write for/communicate with intended audience, editing skills – not just words but focusing on key messages, stories or actions, empathy – to establish effective working relationships**
Designer and editor	**Ruthless editing, graphic design skills for print and web, common sense, and patience**
Data and information management officer	**Persistence, encouragement, recognising the value of small steps (in a new area), managing expectations, willingness to explore and bring in/exploit expertise in related areas**
Knowledge exchange officer (coordination support)	**Being responsive, keeping in touch, seeking and offering on-going engagement opportunities, being a generalist – others have specific expertise as required**
Knowledge exchange officer (monitoring and evaluation)	**Organisational ability (gathering evidence), attention to detail, willingness to go beyond usual quantitative information, looking for implications**

As both members of the network and of the coordination team make clear, effective coordination of a multi-million pound managed research programme is not a trivial task to be undertaken lightly, under-resourced or without a long term commitment to bringing about the changes in academic and industry practices being sought.

Building capable and compelling coordination needs sustained investment requiring adequate and dedicated resources. The array of technical and interpersonal skills required for effective coordination is unlikely to reside in a single or even a small number of individuals. Coordination teams need to be constructed to deliver the diverse sets of skills required – though some members of the team can play more than one role or can operate effectively through part-time or even short fixed-term appointments – depending on the life-cycle stage of the managed programme being coordinated.

Team requirements: skills and capabilities

KNOWLEDGE EXCHANGE MANAGER

Lateral thinking
Establishing credibility
Creativity & confidence
Perceptive listening

COORDINATION TEAM LEADER

Strategic leadership
Sector champion
Expert domain knowledge
Driving engagement
Inspiring confidence

COMMUNICATIONS OFFICER

Understanding the wider context
Ability to write for different audiences
Editing words, messages, stories & actions
Establishing effective working relationships

**KNOWLEDGE EXCHANGE OFFICER –
MONITORING & EVALUATION**

Organisational ability
Attention to detail
Going beyond quantitative information
Looking for implications

**KNOWLEDGE EXCHANGE OFFICER –
COORDINATION SUPPORT**

Responsive
Keeping in touch
On-going engagement opportunities
Being a generalist

ADAPTATION SCIENCE OFFICER – BUILT ENVIRONMENT

Understanding industry practices
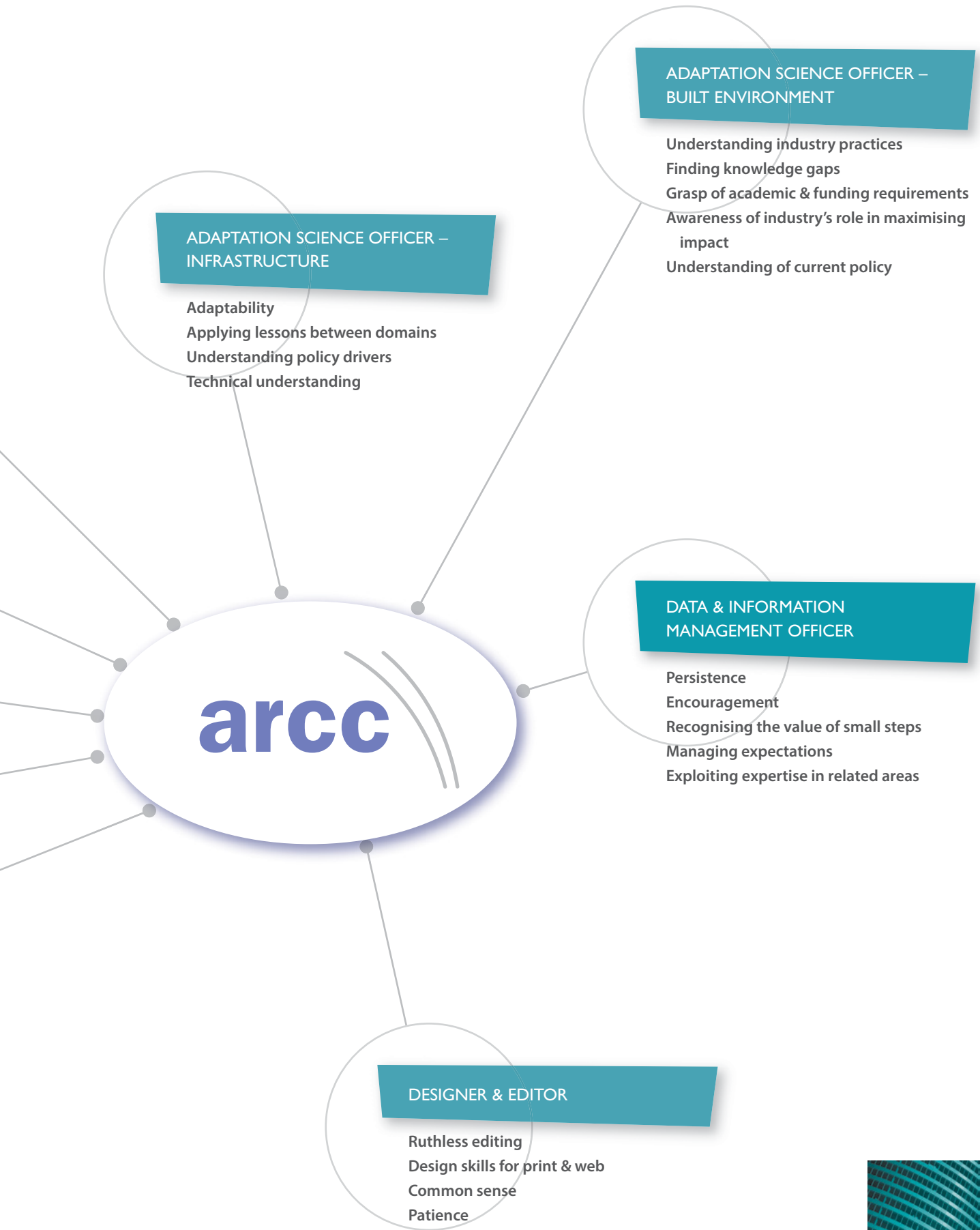**Finding knowledge gaps**
Grasp of academic & funding requirements
Awareness of industry's role in maximising impact
Understanding of current policy

ADAPTATION SCIENCE OFFICER – INFRASTRUCTURE

Adaptability
Applying lessons between domains
Understanding policy drivers
Technical understanding

arcc

DATA & INFORMATION MANAGEMENT OFFICER

Persistence
Encouragement
Recognising the value of small steps
Managing expectations
Exploiting expertise in related areas

DESIGNER & EDITOR

Ruthless editing
Design skills for print & web
Common sense
Patience

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Lessons learnt

The ARCC network is focused on increasing the impact of research investments in the built environment and infrastructure sectors. However many of the approaches adopted by the coordination team are transferable and of value across a broad range of sectors. Drawing on all the insights uncovered through this research with the coordination team and network members, the following key messages are offered to those interested in developing or supporting similar knowledge exchange network initiatives.

> 66 Effective knowledge exchange and the enhanced quality of research (outputs, outcomes and impacts) are intrinsically linked. The ARCC network demonstrates one approach to facilitating this process and there is compelling (if soft) evidence that it is valued by members. 99

1 Maintaining and operating a network

MESSAGES FOR OTHER NETWORK COORDINATION TEAMS

- Stakeholders' capacity, both as individuals and organisations, for engaging with your network varies over time as do their interests; so it is important you keep offering them varied forms of engagement from which they can choose what to access at their own desired levels and absorptive capacity.

- Keeping in touch – via, for example, a monthly e-newsletter – can be as important as offering on-demand or face-to-face events.

- It is crucial to be consistent, reliable and open and to deliver on commitments. Continually demonstrating value to all members of the network is required if you are going to keep what you are doing for them valid in their eyes.

- You will need to accept that often successful network coordination is invisible.

- Avoid adding to members' 'background noise' by carefully curating what you include in your on-going dialogue with them.

- Much hidden work needs to be done to make engagement feel easy and smooth.

- Don't under-estimate the size and complexity of the continuous investment in strong and energised support to members required to be effective.

MESSAGES FOR NETWORK MEMBERS

- Underlying the successful operation of a network is the effective exchange of social capital.

- This social capital can take many forms – contacts, information, expertise, experience, collaboration, support, as well as the more tangible resources.

- You will enhance your membership of the network if you are clear, not only what you are looking for, but also what you and your organisation have to offer, what it is that you value, and how you are going to judge this.

MESSAGES TO FUNDING AGENCIES

- Informal links as well as formal activities are crucial to the success of a network but their impacts are difficult to evaluate and quantify.

- These informal links may have to stretch well beyond the immediate boundary of the network, reaching out to other networks, information providers and research programmes, managers and funders, as well as to professional institutions, sector-based organisations, government departments and media organisations.

- Both formal activities and informal links, within and beyond the network boundary, need to be adequately resourced if the knowledge exchange required to run the network is to be coordinated and delivered effectively.

2 Continuous improvement

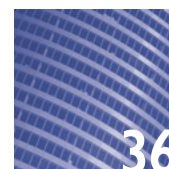### MESSAGES FOR NETWORK COORDINATION TEAMS

- To be successful, a network should itself operate as a learning organisation and it is your responsibility as coordinators to facilitate this learning both for network members and for yourselves.

- Networks need to evolve continuously in response to changing demands from funders, researchers and stakeholders, as well as changing external circumstances.

- This gives you opportunities to test iteratively the knowledge on offer as well as your exchange processes: use these opportunities to learn and build on what does and doesn't work for your network.

- A coordination team also needs to gauge from this evolution what additional skills and expertise it needs to offer in order to deliver what network members will judge to be useful services and activities.

- Flexibility is a keystone to meeting the unfolding challenge of stakeholders' requirements.

- The act of engagement itself can raise their expectations and aspirations and this, in turn, has positive implications for how you need to improve the support and services you are providing.

- You too need to be constantly listening and learning to Identify the best mechanisms for bringing about any improvements that are needed – in both network members' capacity to engage and your delivery capabilities.

- This includes learning from external examples and then applying this understanding across the range of your own network's activities.

MESSAGES FOR NETWORK MEMBERS

- As the first half of this report demonstrates, individual network members can have widely differing needs, motivations and aspirations.

- It will enhance your networking experience to recognise this and to seek out others whose interests can be aligned with your own.

- Not all networking activities, events or outputs can be equally useful to everyone all of the time so you need to be discriminating in how and when you engage.

- But, as the first part of this report makes clear, many useful exchanges are difficult to foresee so don't under-estimate the importance of surprise or unexpected encounters which will only occur if you expose yourself to the broad range of a network's activities.

MESSAGES FOR RESEARCH FUNDERS

- The total or unfolding scope of networking activities required to support a rolling programme of research is often difficult to predict, and prediction itself can be limiting as outputs often have applications beyond that originally anticipated.

- Funders need to recognise, value and accommodate flexibility and responsiveness in proposals for knowledge exchange and coordination networks, especially where these are intended to operate over the longer-term.

3 On-going viability

MESSAGES FOR NETWORK COORDINATION TEAMS

- Just as there is a constant requirement to maintain academic integrity whilst seeking to add value in a way that is useful to stakeholders, so too the quality and usefulness of this needs to be regularly tested and verified.

- Such testing and verification needs to be embraced as a formal and explicit part of the coordination team's duties.

- Doing so can be aided by developing and implementing an effective evaluation framework.

- Even if added value (financial or otherwise) can be demonstrated, this may be trumped by other external (political, timing) factors.

- The wider market failure in valuing knowledge exchange, particularly in the built environment sector, means there is currently little perceived demand for evaluating how effective exchange is being done.

- However, effective coordination and knowledge exchange facilitates evidence-based decision-making and contributes to 'national importance', and such intermediary activities need public funding.

- It is important that researchers and coordination teams both engage in significant arenas where these issues are being debated and bring their own evaluated evidence to bear on the debate.

- Properly curating, archiving and managing the legacy of major funded research programmes is important: past research can suddenly becomes relevant to new policy/practice initiatives and well-coordinated and curated networks provide one means of maintaining awareness of and access to available outputs.

MESSAGES FOR NETWORK MEMBERS

- Networking capacity, skills and expertise are highly transferable – both from one research programme to another and across sectors.

- If you value the network you are engaging with, then you should help plan and campaign for securing continued activities – either of your network or by the successful archiving and transfer of its legacy, including the hard-won experience and expertise embedded in coordination team members.

MESSAGES FOR RESEARCH FUNDERS

- The capability developed to support the ARCC programme is clearly valued by the network members whose positive assessments are catalogued in this report.

- Without exception, they all call for this networking and knowledge exchange capability to be continued.

- Continual discontinuation and then rebuilding of knowledge exchange networks by funding agencies is, in itself, an inefficient use of resources. Continuity of coordination, for instance, safeguards research investment by avoiding duplication.

- Funding agencies need to consider specific funding streams that will allow the creation and long term maintenance of overarching knowledge exchange networks, whose lives are not limited to particular research initiatives or policy imperatives.

- This is particularly important in sectors, such as the built environment, where knowledge exchange (and its effective evaluation) are under-developed and which possess little political traction to ensure that they are capable of providing a fertile environment for long term integration of the results of short-term research initiatives.

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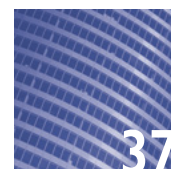
Strategic leadership
Sector champion
Establishing credibility
Expert domain knowledge
Driving engagement
Inspiring confidence
Lateral thinking
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Exploiting expertise in related areas
Applying lessons between domains
Understanding policy drivers
Understanding of current policy
Technical understanding
Grasp of academic & funding requirements
Understanding industry practices
Awareness of industry's role in maximising impact
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Lessons from coordinating a knowledge exchange network

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