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COLLABORATIVE INNOVATION IN THE WATER INDUSTRY

HOW TO MAKE IT HAPPEN

An industry guide to create the right environment for successful projects

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TWENTY65

Contents

Purpose of this guide

Tackling the wide array of challenges facing the water industry, and at the same time pursuing the associated opportunities, demands innovation. This, in turn, requires collaboration across organisations and stakeholders, as no single entity alone possesses all the means to deliver the solutions that are required.

This research-based guide describes key factors for collaborative innovation project success, with the aim of helping the sector overcome barriers to collaboration and accelerate innovation, and includes a collaborative innovation assessment checklist to help project teams identify opportunities to enhance collaborative capability.

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An overview of the guide

Section 1 is an introduction to the guide, whilst Section 2 summarises the challenges and opportunities facing the water sector. Section 3 describes the research methodology employed to identify the key factors influencing collaborative innovation project success.

Section 4 describes six generic innovation project stages, against which the individual collaborative innovation factors have been mapped in Section 5. These individual factors are subsequently described in Section 6.

A Collaborative Innovation Assessment Checklist is provided in Section 7, which can be used by innovation teams to assess the current level of their collaborative innovation capability, and to signpost areas for improvement. A worked example is included in Appendix A.

Finally, a message from the authors is included in Section 8, welcoming feedback on the guide to inform subsequent editions.

About the TWENTY65 Water Research Programme

TWENTY65, a £3.9 million water research programme funded by the Engineering and Physical Sciences Research Council (EPSRC), is a consortium of the following with the University of Sheffield holding the role of lead university.

Engineering and Physical Sciences Research Council

The University Of Sheffield.

University of Reading

University of Exeter

Imperial College London

The University of Manchester

Newcastle University

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Supported by more than 40 international water industry partners, TWENTY65 aims to collaboratively and coherently accelerate innovation, generating a dynamic and energised water sector that delivers sustainable, tailored solutions which positively impact public health, the environment, the economy and society.

TWENTY65

Collaboration for Innovation is one of the eight TWENTY65 core research themes and focusses on identifying the key factors which influence multi-stakeholder collaboration across the innovation process, and thereby help the industry overcome barriers and accelerate innovation.

Its research findings have been converted into a set of key success factors for collaborative innovation to form the basis of this industry guide.

To find out more about TWENTY65 go to https://www.twenty65.ac.uk

1 Introduction

In a huge and complex global industry, with diverse stakeholders and demanding responsibilities, one message has become universal and crystal clear.

Only through active and committed collaboration, at scale and embracing all water industry stakeholders, will we fast track the innovative solutions and new ways of working that society urgently needs, to overcome the unique combination of challenges that we all face.

In the UK, the industry itself, the Government and its regulators are united in their support for innovation through collaboration. The vision of *Water Innovation 2050,* an alliance of 19 UK water utilities, is to "create open collaboration opportunities across the water sector and beyond to drive transformational change through innovation". And a key driver of Ofwat's £200 million innovation fund is the pressing need to turbocharge innovation through effective collaboration.

But if the case for collaborative innovation is beyond doubt, how do we make it happen?

While there are many individual examples of effective collaborative innovation in the UK water sector, evidence of how and why those examples were successful can be hard to find. What are the actions we need to take to ensure that projects have collaborative innovation baked in at every stage, from initiation to implementation?

Delivering value from innovation and creating impact

Researched and designed by the TWENTY65 Water Research Programme, this industry guide presents a set of key factors for water industry collaborative innovation, arranged in a project stage format, which come together to deliver successful collaborative innovation.

Circumstances surrounding innovation projects can vary considerably. For example, innovation can involve a small or large number of organisations, engage with technology at lower or higher readiness levels, extend from hard technology to new working practices or be characterised by a lower or higher risk profile.

As a result, the most relevant success factors for a particular project will depend on these individual circumstances. Accordingly, the list of success factors identified in this guide should not be regarded as a straitjacket where every factor needs to have been considered. Instead, the key is to focus on the most relevant factors, given the unique circumstances of each individual project. Additionally, the relevance of individual factors may well vary according to the stage of the project.

Whilst the factors are relevant to the wide range of water sector innovation projects, they have been developed particularly in the context of innovation typically implemented with a water utility as the end-user.

The factors are focussed on enabling productive collaboration from the outset and creating a unified culture which allows real innovation to thrive. By following this practical guide, the sector can create a common language for collaborative innovation, anchoring a shared approach which can accelerate innovation, deliver value and create impact.

Finally, this guide is, in itself, the result of a collaborative exercise. The research phase of the project featured collaboration throughout the industry, with detailed input from water utilities and their extended supply chains, and more. Creation of the guide was subsequently informed by review and feedback on content as it was developed, with diverse comments shaping this final version.

2 Challenges and opportunities

The unprecedented combination of challenges facing the water industry – and by extension Governments and communities worldwide – has been well documented.

The cumulative impacts of population growth, ever-increasing demand, stringent environmental responsibilities and targets, an ageing asset base in many parts of the world, and the growing effects of global warming require us to embrace change as never before. The global impact of COVID-19 in 2020 has underlined the urgent need for action.

It is estimated that meeting the United Nations' Sustainable Development Goals for water and sanitation between 2018 and 2030 will cost almost $2 billion for rehabilitation and more than $4 billion for new infrastructure.

To achieve these goals will require innovation and collaboration in a refreshed and refocused collective response.

Tough and urgent as these challenges are, they also provide many exciting opportunities to transform our industry, including harnessing the power of new digital technologies to save and recycle water and to develop new models to apply these technologies efficiently, cost effectively and at the scale required.

The innovation strategy published by *Water Innovation 2050*, an alliance of 19 UK water companies, identifies "huge opportunities for water innovation in the fields of energy, design, manufacturing, data science, food security, and resilience".

The UK water industry is united in its commitment to meet these challenges and pursue the associated opportunities. We are well placed to achieve the transformational change required – through collaborative innovation.

A global need for action

POPULATION GROWTH

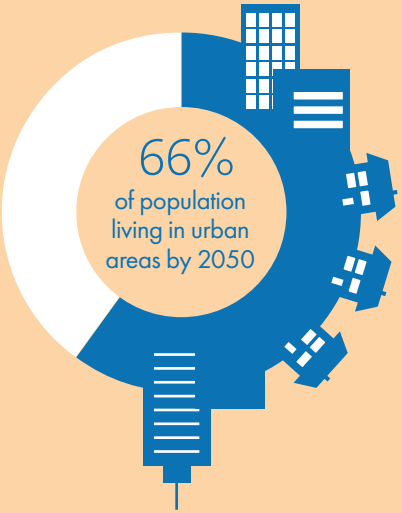
The global population will reach 10 billion by 2050, and potentially 16.5 billion by the end of the century, accompanied by a dramatic increase in demand for water and food. Increasing urbanisation – 66% of the world's population will be living in urban areas by 2050 – will put added pressure on water networks and infrastructure.

Access to clean water and sanitation is often reduced by urbanisation, with cities unable to cope with the needs of rising and ageing populations. Attitudes to water, and water utilities, are changing, with citizens' expectations of service and environmental performance increasing, and an ever present shared focus on providing value for money, reducing leakage and ensuring that bills are affordable.

10 billion by 2050
16.5 billion by 2099

ECONOMIC DEVELOPMENT

To feed, house and care for an ever-increasing and ageing population, the world economy will need to continue to grow rapidly to keep pace, in turn adding to the demand for water and energy, whilst at the same time ensuring the protection of water sources.



ENVIRONMENTAL FACTORS

The effects of climate change are now clear, with extreme weather events, increased risks of flooding, droughts and water stress.

Groundwater is the most extracted raw material in the world – with supplies in some parts of the world under threat. Feeding a growing population requires more water and energy for food production and transportation, at a time when reducing carbon emissions is essential to meet tougher environmental standards and slow down climate change.

3 Research methodology

In this guide, collaborative innovation is defined as two or more stakeholders working together in the creation, development and implementation of new products, services, processes or strategies *(Porter & Birdi, 2018)*. Stakeholders in the water sector context refer to water utilities, suppliers, policy-makers, academics, user groups, communities or other interested actors.

Despite the accepted urgent need *(Moore et al., 2014)*, the do's and don'ts of working with others across organisational boundaries remain obscure *(Cropley & Cropley, 2015; Perry-Smith, & Mannucci, 2017; Sabatier, Leach, Lubell & Pelkey, 2005)*.

To better understand these types of issues, the TWENTY65 programme conducted a series of studies to identify the barriers and facilitators of collaborative innovation in the water industry.

STUDY 1: SYSTEMATIC LITERATURE REVIEW
(PORTER AND BIRDI, 2018)

The review found 26 papers on collaborative innovation in water, published between 1996 and 2016, which met the criteria of relevant and adequately conducted empirical research studies. The studies were conducted in a range of contexts including Europe, the US, Australasia, Latin America and Africa.

A content analysis of the conclusions generated 22 broad themes, which were spread across five key considerations:

1. How to kick-start collaborations, for example through introduction of new legislation, regulation or policies and funding
2. Deciding who should be involved, for example, participation should be open to all relevant parties, with stakeholders having the capacity to enact change
3. How to get everyone to work together effectively, for example, through acceptance of different values, norms, cultures and trust
4. How to design the collaborative innovation process, for example, clear roles and responsibilities, good methods for evaluating and measuring outcomes, and adequate time
5. How to keep the collaboration on track, with a clear and strong vision and sustained participation.

STUDY 2: STAKEHOLDER INTERVIEW STUDY
(GARWOOD AND BIRDI, 2020)

Addressing the collaborative innovation process more directly, interviews were undertaken with 38 water sector professionals in the UK from four stakeholder groups – water companies, supply chain organisations, trade bodies and regulators, and academic researchers.

Respondents described the experiences they had of collaborative innovation with other sector stakeholders and gave reasons why they had been successful or not. Thematic analysis of the interviews identified seven types of influences that were categorised as core and supporting factors.

Core factors reflected the skills and experience of those people involved in developing the innovation, their motivational drivers and the extent to which there was a shared understanding of the problem. Supporting factors provided the wider contextual influences, including internal and external governance frameworks and financial, time and geographical considerations.

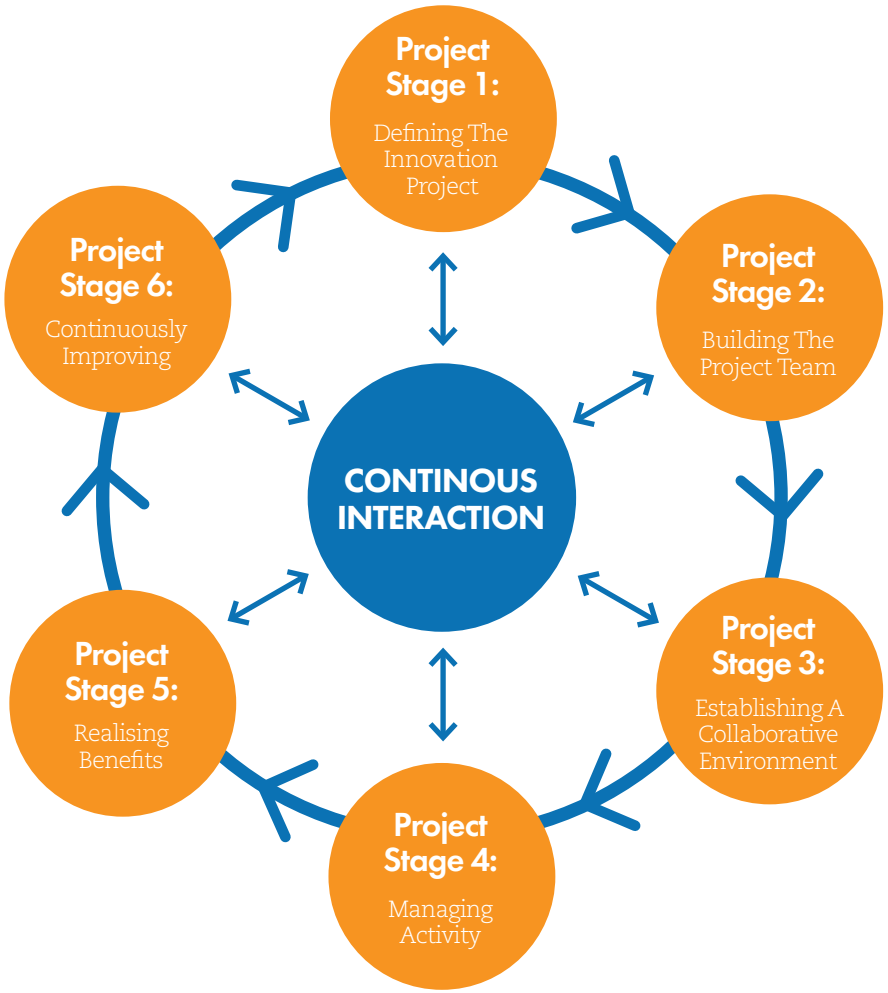
An additional three smaller-scale studies under the supervision of Dr Kamal Birdi were conducted which provided further understanding of core and supporting factors. Study 3 *(Ramay, 2016)* interviewed 13 stakeholders, Study 4 *(Cox, 2017)* interviewed 14 stakeholders and Study 5 *(Oliver, 2019)* interviewed 17 water sector participants. In combination, these studies illustrated in more detail the importance of issues such as trust, communication and risk in collaborative innovation initiatives.

Insight gained from a wide range of collaborative workshops held during the TWENTY65 programme, using the CLEAR IDEAS methodology, have also been incorporated into the guide.

The guide draws on the findings from the studies and collaborative workshops, and incorporates additional insights from the wider literature and the extensive industry experience of the authors. Anonymised quotes from interview participants have been used in the guide to support the importance of the factors we are highlighting.

4 Collaborative innovation project stages

The collaborative innovation factors have been allocated across six generic innovation project stages, as shown in the diagram below.



However, the circumstances surrounding individual innovation projects can vary considerably. This may result in an alternative sequencing of the six project stages being adopted, or individual project stages overlapping, or being interrupted.

Additionally, there is a continuous interaction taking place between the considerations relating to the individual project stages. For example, a problem associated with developing the innovation (Stage 4) may lead to redefining the objectives of the innovation project (Stage 1). Similarly, a change in attitude to risk (Stage 3) may result in a replanning of the project (Stage 4) or re-evaluation of its value to the water utility.

Nonetheless, whatever the sequence of the individual project stages, the collaborative innovation factors relating to a particular stage remain valid. Whilst the factors are relevant to the wide range of water sector innovation projects, they have been particularly developed in the context of innovation typically implemented with a water utility as the end-user.

5 Collaborative innovation factors overview

The chart below summarises the collaborative innovation factors relevant for each project stage. Individual factors are described in more detail in Section 6.

A collaborative innovation assessment checklist, which can help project teams identify opportunities to enhance collaborative capability, is included in Section 7.

PROJECT STAGE 1

DEFINING THE INNOVATION PROJECT

THEME 1a CLARITY OF PURPOSE

Factor 1	Establishing the problem, challenge or opportunity, and setting project objectives
Factor 2	Understanding the relationship between the proposed innovation and government policy, legislation, and regulation
Factor 3	Understanding the relationship between the proposed innovation and end-user water utility strategy

THEME 1b VISION

Factor 4	A compelling, shared and unifying vision

PROJECT STAGE 2

BUILDING THE PROJECT TEAM

THEME 2a SPONSORSHIP AND LEADERSHIP

Factor 5	Collaborative innovation team sponsorship
Factor 6	Collaborative innovation team leadership

THEME 2b TEAM CHARACTERISTICS

Factor 7a	Strategic commitment of partner organisations to collaboration
Factor 7b	Competence and expertise
Factor 7c	Diversity of thought
Factor 7d	Creativity
Factor 7e	Engagement and commitment
Factor 7f	Enthusiasm to collaborate
Factor 7g	Capacity to enact change
Factor 7h	Availability of time to participate

THEME 2c ROLES AND RESPONSIBILITIES

Factor 8	Clarity of team roles, responsibilities, and mutual partner dependencies

THEME 2d PARTNER BENEFITS

Factor 9	Defining the benefits for all partner organisations

PROJECT STAGE 3

ESTABLISHING A COLLABORATIVE ENVIRONMENT

THEME 3a CULTURAL DYNAMIC

Factor 10a	Trust
Factor 10b	Psychological safety
Factor 10c	Acceptance of different social values
Factor 10d	Sensitivity to power imbalances
Factor 10e	Alignment of team culture with delivering value
Factor 10f	Managing stakeholder relationships

THEME 3b COLLABORATIVE CAPABILITY

Factor 11a	Team facilitation
Factor 11b	Collaborative training

THEME 3c COMMUNICATIONS

Factor 12a	Effective communication and information flows
Factor 12b	Opportunities for informal communication
Factor 12c	Accessible language
Factor 12d	Managing geographic spread

THEME 3d RISK AND FAILURE

Factor 13a	Attitudes to risk
Factor 13b	Attitudes to failure

THEME 3e COMMERCIAL DIMENSIONS

Factor 14a	Intellectual property interests
Factor 14b	Incentivisation arrangements

PROJECT STAGE 4

MANAGING ACTIVITY

THEME 4 PROJECT MANAGEMENT

Factor 15	Project planning and timeline
Factor 16	Regular progress monitoring and review cycles
Factor 17	Securing funding
Factor 18	Assessing value and developing the investment case
Factor 19	Managing project finances
Factor 20	Governance and business process flexibility
Factor 21	Decision making

PROJECT STAGE 5

REALISING BENEFITS

THEME 5 IMPLEMENTATION

Factor 22	Change management capability
Factor 23	Collaborative implementation
Factor 24	Implementation planning
Factor 25	Operational end-user engagement

PROJECT STAGE 6

CONTINUOUSLY IMPROVING COLLABORATIVE CAPABILITY

THEME 6 CONTINUOUS IMPROVEMENT

Factor 26	Reflection and learning

6 Collaborative innovation factor descriptions

This section describes the individual collaborative innovation factors summarised in the chart in Section 5. A collaborative innovation assessment checklist, which can help project teams identify opportunities to enhance collaborative capability, is included in Section 7.

PROJECT STAGE 1 – DEFINING THE INNOVATION PROJECT

THEME 1a: CLARITY OF PURPOSE

Factor 1:
Establishing the problem, challenge, or opportunity, and setting project objectives

Innovation can relate to any aspect of the water cycle and water utility activity, from operational efficiency to customer service, from digital innovation to cultural development, and more. Proactively scanning the horizon to understand the changing circumstances surrounding the water landscape is key.

A pre-requisite for collaborative innovation is for all partners, from the outset, to have a shared and clear understanding of what the problem is to be solved or opportunity to be pursued, and why it is important. This includes setting project objectives and success criteria. Without this shared understanding there is an absence of collaborative context for the innovation project, a lack of a unifying sense of direction and destination, and hence confusion.

Factor 2:
Understanding the relationship between the proposed innovation and government policy, legislation and regulation

The introduction of new government policies, legislation or regulation has led to some of the most significant changes in the UK water sector, in many cases setting both the timetable and nature of change. Indeed, a strong argument can be made that evolving regulatory requirements have traditionally been the main driver of change.

Given that government policy, legislation and regulation represent primary drivers of change, understanding the priorities is vital for the water sector. Changes in regulatory requirements lead to challenges to be tackled and opportunities to be explored. Consequently, for relevant projects, understanding the relationship between the proposed innovation and its contribution to fulfilling regulatory requirements is key.

Factor 3:
Understanding the link between the proposed innovation and end-user water utility strategy

Understanding the relationship between the innovation opportunity and end-user water utility strategy provides a clear line of sight between collaborative innovation activity and water utility direction. Establishing this relationship provides a basis for productive conversations with water utility stakeholders and securing their engagement with the proposed innovation.

Without a link to water utility strategy the proposed innovation can appear as an isolated, unconnected activity without a robust organisational context, and therefore has the potential to suffer from a lack of key stakeholder support.

"I think that the research itself needs to be looked at to make sure the nature of the work being done is relevant to the needs of the organisations."

Water utility interviewee.

THEME 1b: VISION

Factor 4:
A compelling shared and unifying vision

A clear and strong vision for the innovation project creates clarity, providing a sense of direction and a destination. Conversely the absence of a vision leads to confusion, with members of the team unable to unify around a common goal, and hence likely to be pulling in different directions. Accordingly, the vision needs to have been created with the active participation of all team members and represent a clear and agreed outcome.

"I think it's absolutely fundamental. For collaboration to be successful I think there's got to be a shared understanding of shared objectives and shared understanding of the destination."

Water utility interviewee.

6 Collaborative innovation factor descriptions

PROJECT STAGE 2 – BUILDING THE PROJECT TEAM

THEME 2a: SPONSORSHIP AND LEADERSHIP

Factor 5:
Collaborative innovation team sponsorship

The collaborative innovation team sponsor is typically a senior leader. This role includes championing the innovation project within the water utility, together with engaging and managing the ongoing relationship with key stakeholders. The sponsor provides high level support, addresses any organisational conflicts and removes barriers which could otherwise impede progress or hamper project success.

Factor 6:
Collaborative innovation team leadership

The collaborative innovation team leader plays a pivotal role, establishing a shared sense of direction, setting the cultural tone, fostering an atmosphere of trust and collaboration, inspiring partners, nurturing creativity, co-ordinating activity and managing information flows. An effective team leader can help the team move forward collaboratively at pace, whilst an ineffective team leader can result in the team feeling confused and stymied.

"Leadership is important because things can get tough in collaborations."
Water utility interviewee.

THEME 2b: TEAM CHARACTERISTICS

Factor 7a:
Strategic commitment of partner organisations to collaboration

Project success depends on building the right team, with all the necessary skills, capabilities and perspectives represented. The strategic commitment of partner organisations to collaborate is key to setting the tone for collaboration at project level. Senior leaders within partner organisations demonstrating collaborative role model behaviours and championing collaboration provide a cultural cue to their staff to embrace collaboration. A lack of strategic commitment can hamper collaborative innovation, whereas the presence of such commitment can enhance the project level collaborative dynamic.

Factor 7b:
Competence and expertise

The overall effectiveness of the collaborative innovation team depends on its makeup and the contribution of each of the partner organisations. Accordingly, the competence and expertise of individual partners in their specific skill area is important for successful interdisciplinary collaborative innovation. Collaboration partners having a wider understanding of the water sector landscape and regulatory framework, alongside their particular discipline, knowledge and experience, adds value and can reduce risk.

Factor 7c:
Diversity of thought

Innovation demands new thinking, which is unlikely to be generated if team members share similar perspectives, experiences and backgrounds. Thus, the collaborative agenda is best served by building a team which collectively benefits from a diversity of thought and stakeholder perspectives.

Factor 7d:
Creativity

Innovation is manifested by the creation of a product, service or ways of working which didn't previously exist. Team members need to be open-minded and be willing to push conventional boundaries to explore novel as well as pre-existing solutions. Therefore, creativity, combined with a determination to find ways forward, are prerequisite attributes for team members to make their contribution to collaborative team success.

Factor 7e:
Engagement and commitment

Individual team members being personally motivated about the innovation project, fully engaged in the concept and its delivery, and committed to achieving the innovation team's goals, are all crucial to the collaborative success of the project.

"You have to be committed to a collaborative relationship, you can't just be in it for the short term to get some initial gains, you've got to be committed to see it all the way through."
Supply chain interviewee.

Factor 7f:
Enthusiasm to collaborate

If the individuals from partner organisations, working together at project level, possess a personal commitment to collaborate, then collaboration is much more likely to occur. Therefore, careful selection of the members of the interdisciplinary project team is paramount.

Factor 7g:
Capacity to enact change

The value of innovative solutions is maximised when they are implemented at scale. Accordingly, it is essential that the innovation team possess the capability and capacity to not only develop the innovative solution, but also implement the new approach across the end-user organisation.

6 Collaborative innovation factor descriptions

PROJECT STAGE 2 – BUILDING THE PROJECT TEAM

THEME 2b: TEAM CHARACTERISTICS

Factor 7h:
Availability of time to participate

Time pressures are commonplace for individuals throughout organisations. This can be particularly acute when someone is asked to contribute to an innovation project alongside an already congested portfolio of activity. However, the consequence of having insufficient time to devote to the innovation project can stifle progress and frustrate collaboration partners.

Accordingly, it is important for partner organisations to realistically assess resource requirements and protect each individual's time to effectively engage and participate in the innovation project.

As the typical end-user, the input of knowledge, experience and know-how of water utility resources is critical to successfully executing the innovation project. At the same time, water utility staff can find themselves facing a wide range of demands, particularly operational staff providing a reactive response to evolving operating circumstances. Accordingly, robust advance planning is required to ensure the right level of water utility resources, with the right skills and personal qualities, including a mindset that embraces change, are available in the right place at the right time.

THEME 2c: ROLES AND RESPONSIBILITIES

Factor 8:
Clarity of team roles, responsibilities, and mutual partner dependencies

Collaborative innovation team members need a clear understanding of their individual role and responsibilities, together with the roles and responsibilities of others, for effective functioning of the team as whole. This includes establishing clarity on how each team member relates to each other and their mutual dependencies.

THEME 2d: PARTNER BENEFITS

Factor 9:
Defining the benefits for all partner organisations

An essential prerequisite for collaborative innovation partners is to understand, at the outset, the value and benefits sought from the proposed innovation. Whilst benefits are commonly thought of in relation to the end-user water utility, each partner organisation will be seeking specific benefits from the collaboration. Accordingly, establishing a set of agreed benefits across all the collaborating partners can create a unifying clarity. An absence of agreed benefits can leave the members of the team feeling ill at ease, unsure and less engaged.

"It's a matter of actually sitting down with them and talking through what they want out of the project, and then what they think are the bits important to us. And getting that match."

Supply chain interviewee.

6 Collaborative innovation factor descriptions

PROJECT STAGE 3 – ESTABLISHING A COLLABORATIVE ENVIRONMENT

THEME 3a: CULTURAL DYNAMIC

Factor 10a:
Trust

Establishing mutual trust between individual team members is crucial for successful collaborative innovation. This vital connection can be developed through a combination of formal and less formal arrangements, such as commercial agreements, creating mutually agreed team ground rules, and commitments by members to be responsive to each other and honouring agreements made in their day-to-day interactions. Just providing time for people to get to know each other is useful for building trust.

"I think trust has to come from spending time together and getting to understand the others' motivations and reasons for wanting to be in the collaboration."
Academic interviewee.

"It's absolutely vital, trust. No trust, eventually the relationship or idea will break down, and if you haven't got trust when you hit the problems, the problems will become insurmountable."
Water utility interviewee.

Factor 10b:
Psychological safety

In a psychologically safe environment, team members feel comfortable voicing their thoughts and opinions, whether they align with the current direction of thinking or not, and feel able to raise and deal with difficult issues or conflict without feeling vulnerable or embarrassed. Shaping a team environment which feels psychologically safe creates an atmosphere where team members can interact in a genuine and honest way, enabling differing perspectives to be constructively explored, barriers to be overcome, and progress to be made. Personal and relationship related conflict between team members can be very damaging, whereas encouraging healthy debate regarding the task at hand can enhance innovative thinking.

Factor 10c:
Acceptance of different social values

Collaborating partners can come from a variety of individual and organisational settings, which can lead to a range of values and norms across the project team. A key focus is to create a collaborative team approach which treats people equally, accepts differences in values, norms and cultures, and finds a way to engage with those differences to best effect for the benefit of the project.

Factor 10d:
Sensitivity to power imbalances

Each member of the project team will have a view on their individual level of influence, or power, over the direction and outcome of the innovation project. Some may feel that their voice is drowned out by seemingly more dominant stakeholders, others that they have more they can contribute but there isn't the space or opportunity.

A partner's willingness to engage in the innovation process can be substantially impeded by a perception of being dominated by more powerful stakeholders. Whilst the perception may be real or not, it is the perception which matters. Accordingly, the leader must be sensitive to perceptions of power imbalance and address concerns or issues in order to maintain project engagement.

"Everybody, every voice has to be heard, and so when you are in the breakout groups you have to allow that to happen, making sure that they are chaired in a such a way that everyone's voice is heard."
Academic interviewee.

Factor 10e:
Alignment of team culture with delivering value

Successful collaborative teams purposefully align team culture with the aim of delivering value from innovation. At the outset, there can be considerable differences between the culture of partner organisations who come together to form the innovation team. For example, the culture of a large water utility can be very different from that of a small specialist partner. The individual members of effective collaborative teams unify around delivering the innovation and shape the team's culture to best enable their combined activity.

Factor 10f:
Managing stakeholder relationships

Strategic support from key stakeholders is critical to enabling successful innovation. Thus, stakeholder relationships need to be proactively nurtured on a collaborative basis. The collaborative innovation team sponsor plays an important part in engaging stakeholders, particularly in relation to developing end-user relationships.

6 Collaborative innovation factor descriptions

PROJECT STAGE 3 – ESTABLISHING A COLLABORATIVE ENVIRONMENT

THEME 3b: COLLABORATIVE CAPABILITY

Factor 11a:
Team facilitation

Depending on the innovation project circumstances, adopting a facilitation approach can be helpful to enable collaboration and coordinate actions between different stakeholders. Such facilitation can help build team engagement and contribution, better enable creation of a shared and jointly owned team plan and support delivery activity. Facilitators or bridging organisations need to be neutral, possess the skills required to enable the team and be respected by participants. One approach can be to introduce an independent facilitator at the beginning to help the team cohere but once teams are up and running, the facilitator can step back.

Factor 11b:
Collaboration training

Assessment of the team's capability to collaborate may reveal gaps, in both individual and team skills. Identifying collaborative training needs and proactively putting in place solutions can enhance the performance of the team, supporting successful delivery of the innovation project.

THEME 3c: COMMUNICATIONS

Factor 12a:
Effective communication and information flows

Creating innovation is commonly an iterative process and so it is essential for collaborative partners to receive timely updates and share a common understanding of progress and next steps. Context is critical and information needs to flow freely between team members. Careful thought needs to be given to establishing clear and concise information flows where information requested and distributed is consistently timely and of value.

"I think the second [most important] one is communication and making sure that there is always communication between the parties. It doesn't need to be frequent, but I think it needs to be regular and you know that there is that process in place, and that you feel comfortable talking to the other party."
Water utility interviewee.

"Transparency is incredibly important, people being open and honest in their communications and everybody having access to the information, so everybody feels up to speed and knows where they are."
Water utility interviewee.

Factor 12b:
Opportunities for informal communication

Casual, unplanned, and opportunistic corridor or over-coffee conversations between team members often yield substantial value. Arguably, such conversations make an essential contribution to collaborative innovation projects moving forward. Consequently, creating the conditions and environment where such opportunistic conversations can occur is important.

Factor 12c:
Accessible language

The innovation team may well include stakeholders from a diverse range of backgrounds and capabilities, from community groups to specialised technical experts. Accordingly, attention needs to be paid to adopting language which is accessible to all, clear, easy to understand and inclusive.

"…one person might mean something by efficiency… and another person might mean something completely different by it. One person might be thinking about it solely in terms of the financial impacts, somebody else in terms of the environmental."
Water utility interviewee.

Factor 12d:
Managing geographic spread

The location of collaborative innovation partners can present both issues and opportunities. Whilst geographic proximity can help partners work together, there are also a wide range of examples, in a variety of industrial sectors, of successful collaborative innovation achieved by partners who are geographically distant. In circumstances where there is a geographic spread of team members, proactively thinking through and establishing mechanisms to enable collaboration is essential. The coronavirus pandemic is clearly demonstrating that digital technology is now a key enabler for effective and convenient interaction and teamwork.

6 Collaborative innovation factor descriptions

PROJECT STAGE 3 – ESTABLISHING A COLLABORATIVE ENVIRONMENT

THEME 3d: RISK AND FAILURE

Factor 13a:
Attitudes to risk

Attitudes to risk can vary across the water sector, with some stakeholders feeling comfortable operating at a higher or lower risk level than others. An often-voiced perspective is that water utilities are overly risk averse.

The opposing view is that water companies must always act to safeguard compliance with drinking water standards and environmental discharge consents, and to do otherwise would be both irresponsible and, depending on the particular circumstances, potentially illegal. Accordingly, it is important for collaborating partners to reconcile individual attitudes to risk and arrive at a team approach for managing risk which is appropriate for the purpose for which the innovation is intended.

Factor 13b:
Attitudes to failure

Effective collaborative innovation teams recognise that not every innovation project will succeed. Failure provides opportunities to learn, and insights on potential ways forward. When organisations build in the strategic headroom to accommodate a degree of innovation project failure, they also preserve the capacity to explore new ideas, some of which may succeed, while others may not.

THEME 3e: COMMERCIAL DIMENSIONS

Factor 14a:
Intellectual property interests

Poorly framed, inequitable intellectual property rights (IPR) agreements can hamper collaborative working, diluting partners' engagement and commitment. Conversely, mutually beneficial agreements can reinforce teamwork. Different organisations can take different views on the value of IPR agreements, some seeing them as central to the protection of commercial interests, and others attaching a lesser importance to IPR. An appropriate, agreed IPR arrangement needs to be established across the team which equitably fulfils the needs of team members.

Factor 14b:
Incentivisation arrangements

A range of commercial arrangements are available to incentivise innovation performance by partners. This can vary from bonus payments for meeting specific criteria to sharing in savings arising from implementing innovation, and more. Incentivisation frameworks need to be carefully designed to deliver positive outcomes, rather than unintended adverse consequences.

6 Collaborative innovation factor descriptions

PROJECT STAGE 4 – MANAGING ACTIVITY

THEME 4: PROJECT MANAGEMENT

Factor 15:
Project planning and timeline

Different partners can have different expectations on timescales, work to different planning horizons, and can be subject to a range of changing priorities. However, for the collaborative innovation team to work effectively there needs to be a common, shared and jointly owned plan established, to which all partners commit.

It is important that all collaboration partners and key stakeholders engage in the development of the plan and associated activity timeline. The project plan and timeline unifies the team and is the key to maintaining engagement and providing a clear and common sense of purpose and direction.

The planning approach adopted needs to be fit-for-purpose and appropriate for the particular project format selected, be that "agile", "succeed fast / fail fast", "multi-layer long term", and more. Recognising that the unforeseen is likely to occur and circumstances can change, it is essential that the plan is regularly reviewed, kept up to date and refined as necessary.

Factor 16:
Regular progress monitoring and review cycles

Monitoring innovation project progress against a clear set of delivery activities, milestones, and targets, ensures the team understands the current performance position, what remains to be done and by when, and risks which need to be managed.

Progress needs to be measured on a regular basis and requires a clear methodology for evaluating and measuring the outcomes achieved. Inability to quantify whether actions have been delivered and whether they have been successful can weaken collaborative engagement and discourage participation. However, progress reporting needs to be limited to value adding activity, with attention paid to ensuring that a burden of unnecessary project reporting activity doesn't develop.

Factor 17:
Securing funding

Ensuring there is a mechanism in place to provide sufficient funding to complete the innovation project is critical. Without a visible, viable funding route, the commitment of collaborative innovation partners can wane, and a shortfall of funds will typically lead to the innovation project stalling. Project funding may come from a single stakeholder or a combination of stakeholders, depending on the circumstances.

For those partners contributing funds, careful attention needs to be paid to considerations of risk and reward to ensure arrangements are equitable. It is not uncommon for funding to be released in stages, subject to the collaborative innovation project passing a series of stage-gate reviews. Ensuring that review criteria are transparent and clear helps maintain collaborative momentum.

Factor 18:
Assessing value and developing the investment case

An end-user water utility decision to invest in a proposed innovation is driven by the value which the proposed innovation will deliver, typically expressed in the form of an investment case. At the start of the innovation journey the investment case can initially only be developed in concept or outline. However, as the innovation journey progresses the investment case can be progressively developed.

Typically, the progress of innovation activity and viability of the associated investment case will be periodically assessed at a series of stage-gate review meetings, held during the life of the project. If the value proposition has deteriorated and is considered to be too weak, or the likelihood of success too small, the innovation project may be cancelled or deferred. Therefore, it is key for all collaboration team partners to contribute to the ongoing assessment of value and development of the project investment case, ensuring that information is up-to-date, representative and realistic, thus enabling informed decisions to be made.

Factor 19:
Managing project finances

Adopting a whole business strategic view of value from innovation, rather than taking a silo view, is crucial when considering funding options for developing and delivering innovation. This can particularly be the case in relation to water utilities, where the arrangement of the cost centre structure may result in the cost of creating and implementing innovation being funded from one area of the organisation, whilst benefits are realised in whole or in part elsewhere in the organisation.

Factor 20:
Governance and business process flexibility

Poorly designed organisational governance frameworks and business processes can hamper collaborative innovation, whereas well designed approaches can enable collaborative activity. Collaborative innovation is focussed on creating something new, and consequently requires a degree of organisational flexibility, as options are explored and ways forward trialled. It is typically an iterative process.

Accordingly, governance and business process approaches focussed on delivery of predictable or steady state business activity are unlikely to contain the flexibility required to enable collaborative innovation. Collaborative innovation requires governance frameworks and business processes that are sufficiently rigorous, whilst at the same time incorporating the necessary organisational flexibility to deliver value, promoting rather than stifling innovation. A typical example could be the need to flex innovation project milestone dates or timelines in response to new insight gained during the development process.

Factor 21:
Decision-making clarity

Throughout the life of a collaborative innovation project there will be a host of decisions to be made. A lack of a clear process for decision making can create confusion, hinder progress and ultimately lead to the project stalling. As a result, it is important that a clear decision-making process is established, incorporating transparent criteria, and with accountability clearly defined.

6 Collaborative innovation factor descriptions

PROJECT STAGE 5 – REALISING BENEFITS

THEME 5: IMPLEMENTATION

Factor 22:
Change management capability

Organisational benefits will not be generated until the innovative solution has been deployed into operational use. This implementation phase involves change, as the organisation moves from its original ways of working to embrace the new innovative solution. Successful organisational change can be complex, requiring specialist change management capability and the combined collaborative input of the project team. If change management skills are lacking, training solutions can be explored to enhance capability.

Factor 23:
Collaborative implementation

It can be the case that innovators, whilst fully involved in the process of creation, are less involved in the process of implementation and roll out into operational use. However, the collaborative innovation team will collectively have the widest and most in-depth understanding of the innovation itself, and accordingly be well placed to engage with the end-user on implementation planning and transition into operational use. Therefore, adopting a collaborative implementation approach can realise the most valuable and sustainable overall benefits.

"So, it worked in a controlled environment; going out into the field to do it was more difficult because when you go …. from feasibility to field testing you need the buy in of the person in the field to do it right."

Supply chain interviewee.

Factor 24:
Implementation planning

Implementing innovation can involve changes to business processes, data flows, working practices, organisational structure, job design and more. In order to fully realise benefits, it's important to ensure that the scope and scale of implementation activity is fully collaboratively assessed, and a comprehensive implementation plan compiled.

"There is an operational risk from certain times that they are losing someone for half a day, a day, a week, two weeks, or a month whatever it might be. And how do they plan on their continuity alongside that? And then there are clear roles and responsibilities within that."

Supply chain interviewee.

Factor 25:
Operational end-user engagement

It is the end-user's operational staff who will be utilising the innovation that has been created. Consequently, it is essential that operational staff fully contribute to the planning and execution of the transition into operational use. Inadequate engagement of operational staff in the implementation phase can result in the benefits realised being sub-optimal, and in some cases markedly so. There is value to be had by those involved in implementation being brought into earlier stages of the innovation development process.

"A principal engineer prevents the implementation of something last minute because he has concerns over a process safety issue, well if we address that right the way back into the beginning of the project if wouldn't become an issue at implementation stage."

Water utility interviewee

6 Collaborative innovation factor descriptions

PROJECT STAGE 6 – CONTINUOUSLY IMPROVING COLLABORATIVE CAPABILITY

THEME 6: CONTINUOUS IMPROVEMENT

Factor 26:
Reflection and learning

As the project comes to a close, there are valuable insights to be gained by reviewing what went well, and what could have been better. Lessons learned can then be taken forward to improve collaborative innovation capability and applied to the next project. Accordingly, a specific activity should be arranged towards the end of the project to enable team members to, individually and collectively, reflect on project activity and identify lessons learned.

Additionally, it is important to hold shorter learning reviews throughout the innovation development and implementation process, thus benefitting the project as it moves forward.

7 Collaborative innovation assessment checklist

The aim of this checklist is to help innovation teams assess the current level of their collaborative innovation capability and to signpost areas for improvement. The instructions for completing the checklist are provided below, and a worked example is included in Appendix A.

COMPLETING THE CHECKLIST

1. There are a several approaches that can be adopted, including completion by:
   - an individual team member
   - all members of the team separately, with individual responses being subsequently aggregated to arrive at an average team set of scores
   - the team as a whole working together.

SCORING THE CHECKLIST

2. The checklist is set out as a series of statements, one per factor (see columns 1 and 2).
3. Respondents should work sequentially through the checklist, considering one factor at a time.
4. Respondents are requested to firstly read the factor statement (column 2), and assess its relevance given the particular project circumstances.
   - If a factor statement is considered relevant, a "yes" response is circled in column 3
   - If a factor statement is not considered relevant, a "no" response is circled in column 4.
5. If a factor is not considered relevant, respondents should proceed to consider the next factor.
6. If a factor is considered relevant, the respondent should next assess the extent to which they currently agree or disagree with the statement by circling the appropriate response in columns 5/6/7/8/9.
7. The respondent then moves forward to consider the next factor.

CREATING THE CHECKLIST PROFILE

8. After all the factor statements have been assessed, a line is drawn connecting the circled responses in columns 5/6/7/8/9, hence producing a collaborative innovation profile across all the relevant factors (see worked example in Appendix A).

CALCULATING THE COLLABORATIVE INNOVATION SCORE PERCENTAGE

9. The method for calculating the team's Collaborative Innovation Score Percentage is shown at the foot of the checklist (see worked example in Appendix A).

REVIEWING THE COLLABORATIVE INNOVATION SCORE PERCENTAGE

10. An overall Collaborative Innovation Score of:
    - **less than 50%,** suggests focussed improvement action is required across a range of factors
    - **between 50% and 75%,** suggests a profile with a combination of strengths and weaknesses, and hence significant opportunities for improvement
    - **greater than 75%,** suggests a profile with substantial strengths, and some remaining opportunities for improvement.

IDENTIFYING IMPROVEMENTS IN COLLABORATIVE INNOVATION CAPABILITY

11. Review the shape of the checklist profile created from following instruction 8 above.
12. The profile will point to weaker factors, scoring 1 (in column 5) or 2 (in column 6).
13. Focussing on the lower score items, identify priority areas for attention and the action to be taken, with the aim of attaining a minimum scoring of 4.

REPEATING THE CHECKLIST ASSESSMENT

14. The checklist assessment should be completed at periodic intervals. The frequency can vary according to the stage of the project, milestone events and overall duration.
15. It is recommended that the interval between assessments does not exceed three months.

TO THE CHECKLIST ▶

7 Collaborative innovation assessment checklist

Factor nr	Factor statement	Is the factor statement relevant to the project circumstances?		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	(Read the statement below)	(Circle yes or no)		(Indicate your disagreement or agreement by circling the appropriate response below)				
Col 1	Col 2	Col 3	Col 4	Col5	Col 6	Col 7	Col 8	Col 9
PROJECT STAGE 1: DEFINING THE INNOVATION PROJECT								
Theme 1a: Clarity of purpose								
1	The problem, challenge, or opportunity which the innovation project seeks to address has been clearly established and is understood by all members of the team. Specific project objectives and success criteria have been set.	Yes	No	1	2	3	4	5
2	The relationship between the innovation project and government policy, legislation, and regulation is fully understood.	Yes	No	1	2	3	4	5
3	The relationship between the innovation project and end-user water utility strategy is fully understood.	Yes	No	1	2	3	4	5
Theme 1b: Vision								
4	A clear vision has been created for the outcome of the innovation project. Team members have actively contributed to and agreed the vision.	Yes	No	1	2	3	4	5
PROJECT STAGE 2: BUILDING THE PROJECT TEAM								
Theme 2a: Sponsorship and leadership								
5	A project sponsor has been appointed and is highly effective.	Yes	No	1	2	3	4	5
6	A project leader has been appointed and is highly effective.	Yes	No	1	2	3	4	5
Theme 2b: Team characteristics								
7a	Partner organisations are fully committed to collaboration and demonstrate collaborative role model behaviours.	Yes	No	1	2	3	4	5
7b	Collaboration team members are fully competent, possessing the required expertise to fulfil their role.	Yes	No	1	2	3	4	5
7c	Team members embrace a diversity of thought which collectively benefits the collaborative agenda, adding to team performance.	Yes	No	1	2	3	4	5
7d	The project team displays a high level of creativity together with the determination to find innovative ways forward.	Yes	No	1	2	3	4	5
7e	Individual team members are excited about the innovation project, fully engaged and committed to achieving the required outcome.	Yes	No	1	2	3	4	5
7f	Team members display an enthusiasm to collaborate.	Yes	No	1	2	3	4	5
7g	The innovation team possesses the capability and capacity to not only develop the innovation solution, but also implement the new approach across the end-user organisation.	Yes	No	1	2	3	4	5
7h	Individual team members have sufficient time available to effectively engage with the project and wholly fulfil their obligations.	Yes	No	1	2	3	4	5
Theme 2c: Roles and responsibilities								
8	Team members have a clear understanding of their individual role, the role of others, and their mutual dependency.	Yes	No	1	2	3	4	5
Theme 2d: Partner benefits								
9	A set of agreed benefits has been established for all members of the project team.	Yes	No	1	2	3	4	5

7 Collaborative innovation assessment checklist

Factor nr	Factor statement	Is the factor statement relevant to the project circumstances?		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	(Read the statement below)	(Circle yes or no)		(Indicate your disagreement or agreement by circling the appropriate response below)				
Col 1	Col 2	Col 3	Col 4	Col5	Col 6	Col 7	Col 8	Col 9
PROJECT STAGE 3: ESTABLISHING A COLLABORATIVE ENVIRONMENT								
Theme 3a: Cultural dynamic								
10a	There is a strong sense of trust between collaborating partners.	Yes	No	1	2	3	4	5
10b	The project environment feels psychologically safe where team members are comfortable voicing their thoughts and opinions and raising difficult issues without fear or embarrassment.	Yes	No	1	2	3	4	5
10c	Team members are treated equally with different social values and norms accepted and respected.	Yes	No	1	2	3	4	5
10d	Sensitivity is shown to the potential for actual or perceived power imbalances developing amongst partner organisations, with timely action taken to address concerns or issues.	Yes	No	1	2	3	4	5
10e	The overall team culture is strongly aligned with the pursuit of delivering value from innovation.	Yes	No	1	2	3	4	5
10f	Stakeholder relationships are nurtured on a collaborative basis.	Yes	No	1	2	3	4	5
Theme 3b: Collaborative capability								
11a	Facilitation support is utilised when required.	Yes	No	1	2	3	4	5
11b	Collaborative training interventions are put in place when required.	Yes	No	1	2	3	4	5
Theme 3c: Communications								
12a	An effective communications approach has been put in place which ensures there are clear and concise information flows which are both timely and "valuable".	Yes	No	1	2	3	4	5
12b	Arrangements have been put in place to enable casual, unplanned and opportunistic informal communication.	Yes	No	1	2	3	4	5
12c	Language is used which is accessible to all, clear, easy to understand and inclusive.	Yes	No	1	2	3	4	5
12d	Mechanisms have been established to ensure effective communication between geographically spread collaboration partners.	Yes	No	1	2	3	4	5
Theme 3d: Risk and failure								
13a	Individual partner attitudes to risk have been reconciled to arrive at an agreed approach for managing risk.	Yes	No	1	2	3	4	5
13b	The team recognises that not every innovation project will succeed. When a project does fail, it is seen as an opportunity to learn and generate insight that can benefit future innovation opportunities.	Yes	No	1	2	3	4	5
Theme 3e: Commercial dimensions								
14a	An approach to managing Intellectual Property Rights has been established which is seen as fair and equitable by team members.	Yes	No	1	2	3	4	5
14b	A commercial approach to incentivisation has been established which is seen as fair and equitable by team members and delivers a positive outcome.	Yes	No	1	2	3	4	5

7 Collaborative innovation assessment checklist

Factor nr	Factor statement	Is the factor statement relevant to the project circumstances?		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	(Read the statement below)	(Circle yes or no)		(Indicate your disagreement or agreement by circling the appropriate response below)				
Col 1	Col 2	Col 3	Col 4	Col5	Col 6	Col 7	Col 8	Col 9
PROJECT STAGE 4: MANAGING ACTIVITY								
Theme 4: Project management								
15	A project plan and timeline has been established. Team members have actively contributed to development of the plan and are committed to it. The planning approach adopted is fit-for-purpose and appropriate to the circumstances of the project.	Yes	No	1	2	3	4	5
16	Project progress is regularly monitored, reviewed and communicated. This is accompanied by a forward-looking perspective describing what remains to be done, by when and the risks to be managed.	Yes	No	1	2	3	4	5
17	A clear mechanism has been established to provide funding to complete the innovation project.	Yes	No	1	2	3	4	5
18	The value proposition from the proposed innovation is clearly understood and continues to be updated throughout the life of the project, alongside the related investment case.	Yes	No	1	2	3	4	5
19	A whole business strategic view is taken in assessing the value from a proposed innovation, rather than adopting a silo perspective.	Yes	No	1	2	3	4	5
20	Governance frameworks and business processes are sufficiently rigorous, whilst at the same time incorporating the necessary organisational flexibility to deliver value, promoting rather than stifling innovation.	Yes	No	1	2	3	4	5
21	A clear decision-making process has been established, incorporating transparent criteria and with accountability clearly defined.	Yes	No	1	2	3	4	5
PROJECT STAGE 5: REALISING BENEFITS								
Theme 5: Implementation								
22	The collaborative innovation team possess the change management capability to effectively transfer the innovation into operational use and realise benefits.	Yes	No	1	2	3	4	5
23	A collaborative approach is taken to the implementation stage, where collaboration partners involved in creating the innovation also contribute to transferring the innovation into operational use.	Yes	No	1	2	3	4	5
24	A comprehensive implementation plan has been collaboratively compiled, which addresses the typically wide-ranging scope and scale of transferring innovation into operational use.	Yes	No	1	2	3	4	5
25	Operational staff of the typical water company end-user are fully engaged in the implementation phase of the innovation project.	Yes	No	1	2	3	4	5
PROJECT STAGE 6: CONTINUOUSLY IMPROVING COLLABORATIVE CAPABILITY								
Theme 6: Continuous improvement								
26	The plan includes specific activities to reflect on project progress and identify lessons learned.	Yes	No	1	2	3	4	5

7 Collaborative innovation assessment checklist

Collaborative Innovation Checklist Review

PART 1 COLUMN TOTALS			
Box A =	Total number of relevant factors identified indicated by a "yes" response in column 3	Box A =	
Box B =	Column total relating to circled "Strongly Disagree" items (column 5)	Box B =	
Box C =	Column total relating to circled "Disagree" items (column 6)	Box C =	
Box D =	Column total relating to circled "Neutral" items (column 7)	Box D =	
Box E =	Column total relating to circled "Agree" items (column 8)	Box E =	
Box F =	Column total relating to circled "Strongly Agree" items (column 9)	Box F =	
Box G =	Combined total of (Box B + Box C + Box D + Box E + Box F)	Box G =	

PART 2 COLLABORATIVE INNOVATION SCORE PERCENTAGE		
Collaborative Innovation Score % = (Box G x 100) divided by (Box A x 5)	Collaborative Innovation Score % =	

PART 3 COLLABORATIVE INNOVATION INDICATOR BANDS

As a broad guide, a Collaborative Innovation Score within the following ranges can be characterised as described below.

- **less than 50%, suggests focussed improvement action is required.**
- **between 50% and 75%, suggests a profile with a combination of strengths and weaknesses, and hence with significant opportunities for improvement.**
- **greater than 75%, suggests a profile with substantial strengths, and some remaining opportunities for improvement.**

PART 4 IMPROVEMENT OPPORTUNITIES

Adopting a focussed approach by setting an initial ambition of attaining a minimum "4" rating across all relevant factors, can help drive collaborative innovation improvement. Review the shape of the checklist profile, focussing on lower score items and identifying priority areas for attention below.

Lowest scoring factors, and hence primary areas for focus, include:

a)
b)
c)
d)

(Whilst the assessment checklist signposts broad focus areas for improvement, further review and discussion with team members will be needed in order to pinpoint the precise matters requiring attention)

8 Message from the authors

We hope that you find this guide helpful when planning and executing successful collaborative innovation projects within the water industry.

Our goal was to provide a practical, easy-to-use and contextualised process to help create the right conditions in which diverse teams can collaborate to accelerate innovation, deliver value and create benefits for all stakeholders.

Its publication is the direct result of collaborative innovation in action, with valuable contributions provided from across the industry during the research, design and production phases.

And with this spirit of teamwork in mind, we would welcome your feedback to help inform subsequent editions. We also plan to develop a training programme based on this guide to support colleagues engaging in collaborative innovation projects.

If you would like to comment on this guide or on the development of a training course, please use the contact details below.

Professor Tony Conway

Email: tony@ajconway.com

Tony is a former Executive Director of United Utilities and has led Asset Management, Operations and Engineering functions, as well as business change and transformation programmes. With the informal title of Director of Curiosity, he focused on identifying world leading water utility innovation, engaging with hubs around the globe.

Tony is a Visiting Professor at the University of Sheffield, chairs the Leadership Board of the TWENTY65 Water Research Programme and contributes to the Collaboration for Innovation Research Theme. He is a Fellow of the Institution of Civil Engineers, and a Director of British Water and of the Water Industry Forum. Tony provides strategic consultancy working across the water sector nationally and internationally.

Dr Kamal Birdi

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Kamal is a Senior Lecturer in Occupational Psychology at the University of Sheffield Management School. Following a BSc (Hons) in Psychology and an MSc in Occupational Psychology, he gained a PhD in Psychology from The University of Sheffield. He is also a practising Chartered Occupational Psychologist registered with the British Psychological Society (BPS) and the Health and Care Professions Council.

Kamal has researched and advised extensively for over 25 years on developing employee creativity, enhancing organisational innovation and improving the impact of employee training. In 2010, he was given the BPS Division of Occupational Psychology Academic Contribution to Practice Award for his work on using his research to improve organisational performance.

The University Of Sheffield.

Professor Tony Conway
Dr Kamal Birdi
University of Sheffield
Edition 1
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The valuable contributions of research team members Professor Vanessa Speight, Dr James Porter and Dr Jeanette Garwood are gratefully acknowledged, together with the valued input of industry contributors.

Appendix A:
Worked example of collaborative innovation assessment checklist

Worked example for illustrative purposes

In line with the assessment checklist instructions shown in Section 7, the following is a worked example to illustrate the use of the checklist and how it can be utilised to identify improvement opportunities.

In relation to the completion of the checklist, important points to note are:

- The respondent has identified which factor statements are relevant to the project circumstances, or not, by circling "Yes" or "No" in column 3 or 4
- For factors which are considered relevant, the respondent has indicated the extent to which they agree or disagree with the factor statement by circling the relevant score in columns 5/6/7/8/9
- The respondent has then drawn a line connecting the circled scores (in columns 5/6/7/8/9) to create a "Collaborative Innovation Profile".

In relation to the review of the checklist, important points to note are:

- The method for calculating the team's Collaborative Innovation Score Percentage is shown at the foot of the checklist
- Following Part 1 of the method, the respondent has:
  - added up column scores and inserted the relevant figures in Box A, Box B, Box C, Box D, Box E, and Box F
  - calculated the figure for Box G.
- Following Part 2 of the method, the respondent has:
  - calculated the Collaboration Innovation Score Percentage
- Following Part 3 of the method:
  - with a Collaborative Innovation Score of 58%, the project is characterised as having a combination of strengths and weaknesses, and hence has significant opportunities for improvement.
- Following Part 4 of the method:
  - the lowest scoring factors have been identified as primary areas of focus for improvement
  - it should be noted that the assessment checklist signposts broad focus areas for improvement, and that further review and discussion with team members will be needed in order to pinpoint the elements requiring attention.

Worked example of collaborative innovation assessment checklist

Factor nr	Factor statement	Is the factor statement relevant to the project circumstances?		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	(Read the statement below)	(Circle yes or no)		(Indicate your disagreement or agreement by circling the appropriate response below)				
Col 1	Col 2	Col 3	Col 4	Col5	Col 6	Col 7	Col 8	Col 9
PROJECT STAGE 1: DEFINING THE INNOVATION PROJECT								
Theme 1a: Clarity of purpose								
1	The problem, challenge, or opportunity which the innovation project seeks to address has been clearly established and is understood by all members of the team. Specific project objectives and success criteria have been set.	Yes	No	1	2	3	4	**5**
2	The relationship between the innovation project and government policy, legislation, and regulation is fully understood.	Yes	No	1	2	3	**4**	5
3	The relationship between the innovation project and end-user water utility strategy is fully understood.	Yes	No	1	**2**	3	4	5
Theme 1b: Vision								
4	A clear vision has been created for the outcome of the innovation project. Team members have actively contributed to and agreed the vision.	Yes	No	1	2	**3**	4	5
PROJECT STAGE 2: BUILDING THE PROJECT TEAM								
Theme 2a: Sponsorship and leadership								
5	A project sponsor has been appointed and is highly effective.	Yes	No	1	**2**	3	4	5
6	A project leader has been appointed and is highly effective.	Yes	No	1	2	3	4	**5**
Theme 2b: Team characteristics								
7a	Partner organisations are fully committed to collaboration and demonstrate collaborative role model behaviours.	Yes	No	1	**2**	3	4	5
7b	Collaboration team members are fully competent, possessing the required expertise to fulfil their role.	Yes	No	1	2	3	**4**	5
7c	Team members embrace a diversity of thought which collectively benefits the collaborative agenda, adding to team performance.	Yes	No	1	**2**	3	4	5
7d	The project team displays a high level of creativity together with the determination to find innovative ways forward.	Yes	No	1	2	3	4	**5**
7e	Individual team members are excited about the innovation project, fully engaged and committed to achieving the required outcome.	Yes	No	1	2	**3**	4	5
7f	Team members display an enthusiasm to collaborate.	Yes	No	1	2	**3**	4	5
7g	The innovation team possesses the capability and capacity to not only develop the innovation solution, but also implement the new approach across the end-user organisation.	Yes	No	1	**2**	3	4	5
7h	Individual team members have sufficient time available to effectively engage with the project and wholly fulfil their obligations.	Yes	No	**1**	2	3	4	5
Theme 2c: Roles and responsibilities								
8	Team members have a clear understanding of their individual role, the role of others, and their mutual dependency.	Yes	No	1	2	3	**4**	5
Theme 2d: Partner benefits								
9	A set of agreed benefits has been established for all members of the project team.	Yes	No	1	**2**	3	4	5

Worked example of collaborative innovation assessment checklist

Factor nr	Factor statement	Is the factor statement relevant to the project circumstances?		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	(Read the statement below)	(Circle yes or no)		(Indicate your disagreement or agreement by circling the appropriate response below)				
Col 1	Col 2	Col 3	Col 4	Col5	Col 6	Col 7	Col 8	Col 9
PROJECT STAGE 3: ESTABLISHING A COLLABORATIVE ENVIRONMENT								
Theme 3a: Cultural dynamic								
10a	There is a strong sense of trust between collaborating partners.	(Yes)	No	(1)	2	(3)	4	5
10b	The project environment feels psychologically safe where team members are comfortable voicing their thoughts and opinions and raising difficult issues without fear or embarrassment.	(Yes)	No	1	(2)	3	4	5
10c	Team members are treated equally with different social values and norms accepted and respected.	(Yes)	No	1	2	3	(4)	5
10d	Sensitivity is shown to the potential for actual or perceived power imbalances developing amongst partner organisations, with timely action taken to address concerns or issues.	(Yes)	No	1	2	3	4	(5)
10e	The overall team culture is strongly aligned with the pursuit of delivering value from innovation.	(Yes)	No	1	2	3	(4)	5
10f	Stakeholder relationships are nurtured on a collaborative basis.	(Yes)	No	1	(2)	3	4	5
Theme 3b: Collaborative capability								
11a	Facilitation support is utilised when required.	(Yes)	No	1	2	(3)	4	5
11b	Collaborative training interventions are put in place when required.	Yes	(No)	(1)	2	3	4	5
Theme 3c: Communications								
12a	An effective communications approach has been put in place which ensures there are clear and concise information flows which are both timely and "valuable".	(Yes)	No	(1)	2	3	4	5
12b	Arrangements have been put in place to enable casual, unplanned and opportunistic informal communication.	(Yes)	No	1	2	3	(4)	5
12c	Language is used which is accessible to all, clear, easy to understand and inclusive.	(Yes)	No	1	2	(3)	4	5
12d	Mechanisms have been established to ensure effective communication between geographically spread collaboration partners.	Yes	(No)	(1)	2	3	4	5
Theme 3d: Risk and failure								
13a	Individual partner attitudes to risk have been reconciled to arrive at an agreed approach for managing risk.	(Yes)	No	(1)	2	3	4	5
13b	The team recognises that not every innovation project will succeed. When a project does fail, it is seen as an opportunity to learn and generate insight that can benefit future innovation opportunities.	(Yes)	No	1	2	(3)	4	5
Theme 3e: Commercial dimensions								
14a	An approach to managing Intellectual Property Rights has been established which is seen as fair and equitable by team members.	(Yes)	No	1	2	(3)	4	5
14b	A commercial approach to incentivisation has been established which is seen as fair and equitable by team members and delivers a positive outcome.	Yes	(No)	(1)	2	3	4	5

Worked example of collaborative innovation assessment checklist

Factor nr	Factor statement	Is the factor statement relevant to the project circumstances?		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	(Read the statement below)	(Circle yes or no)		(Indicate your disagreement or agreement by circling the appropriate response below)				
Col 1	Col 2	Col 3	Col 4	Col5	Col 6	Col 7	Col 8	Col 9
PROJECT STAGE 4: MANAGING ACTIVITY								
Theme 4: Project management								
15	A project plan and timeline has been established. Team members have actively contributed to development of the plan and are committed to it. The planning approach adopted is fit-for-purpose and appropriate to the circumstances of the project.	Yes	No	1	2	3	4	5
16	Project progress is regularly monitored, reviewed and communicated. This is accompanied by a forward-looking perspective describing what remains to be done, by when and the risks to be managed.	Yes	No	1	2	3	4	5
17	A clear mechanism has been established to provide funding to complete the innovation project.	Yes	No	1	2	3	4	5
18	The value proposition from the proposed innovation is clearly understood and continues to be updated throughout the life of the project, alongside the related investment case.	Yes	No	1	2	3	4	5
19	A whole business strategic view is taken in assessing the value from a proposed innovation, rather than adopting a silo perspective.	Yes	No	1	2	3	4	5
20	Governance frameworks and business processes are sufficiently rigorous, whilst at the same time incorporating the necessary organisational flexibility to deliver value, promoting rather than stifling innovation.	Yes	No	1	2	3	4	5
21	A clear decision-making process has been established, incorporating transparent criteria and with accountability clearly defined.	Yes	No	1	2	3	4	5
PROJECT STAGE 5: REALISING BENEFITS								
Theme 5: Implementation								
22	The collaborative innovation team possess the change management capability to effectively transfer the innovation into operational use and realise benefits.	Yes	No	1	2	3	4	5
23	A collaborative approach is taken to the implementation stage, where collaboration partners involved in creating the innovation also contribute to transferring the innovation into operational use.	Yes	No	1	2	3	4	5
24	A comprehensive implementation plan has been collaboratively compiled, which addresses the typically wide-ranging scope and scale of transferring innovation into operational use.	Yes	No	1	2	3	4	5
25	Operational staff of the typical water company end-user are fully engaged in the implementation phase of the innovation project.	Yes	No	1	2	3	4	5
PROJECT STAGE 6: CONTINUOUSLY IMPROVING COLLABORATIVE CAPABILITY								
Theme 6: Continuous improvement								
26	The plan includes specific activities to reflect on project progress and identify lessons learned.	Yes	No	1	2	3	4	5

Worked example

Collaborative innovation checklist review

PART 1 COLUMN TOTALS			
Box A =	Total number of relevant factors identified indicated by a "yes" response in column 3	Box A =	41
Box B =	Column total relating to circled "Strongly disagree" items (column 5)	Box B =	6
Box C =	Column total relating to circled "Disagree" items (column 6)	Box C =	20
Box D =	Column total relating to circled "Neutral" items (column 7)	Box D =	36
Box E =	Column total relating to circled "Agree" items (column 8)	Box E =	32
Box F =	Column total relating to circled "Strongly agree" items (column 9)	Box F =	25
Box G =	Combined total of (Box B + Box C + Box D + Box E + Box F)	Box G =	119

PART 2 COLLABORATIVE INNOVATION SCORE PERCENTAGE		
Collaborative innovation score % = (Box G x 100) divided by (Box A x 5)	Collaborative Innovation Score % =	58%

PART 3 COLLABORATIVE INNOVATION INDICATOR BANDS

As a broad guide, a Collaborative Innovation Score within the following ranges can be characterised as described below.

- **less than 50%, suggests focussed improvement action is required.**
- **between 50% and 75%, suggests a profile with a combination of strengths and weaknesses, and hence with significant opportunities for improvement.**
- **greater than 75%, suggests a profile with substantial strengths, and some remaining opportunities for improvement.**

PART 4 IMPROVEMENT OPPORTUNITIES

Adopting a focussed approach by setting an initial ambition of attaining a minimum "4" rating across all relevant factors, can help drive collaborative innovation improvement. Review the shape of the checklist profile, focussing on lower score items and identifying priority areas for attention below.

Lowest scoring factors, and hence primary areas for focus, include:

a) Factor 7h: team members having sufficient time available to effectively engage with the project
b) Factor 12a: Lack of an effective communications approach
c) Factor 13a: Individual partner attitudes to risk have not been reconciled to arrive at a team approach
d) Factor 16: Lack of effective progress monitoring approach
e) Factor 20: Lack of flexibility in governance frameworks to better enable innovation
f) Factor 22: Lack of change management capability within the project team

(Whilst the assessment checklist signposts broad focus areas for improvement, further review and discussion with team members will be needed in order to pinpoint the precise matters requiring attention)

Appendix B: References

Cave, M. (2009). *Independent review of competition and innovation in the water market: Final report.* Department for Environment, Food and Rural Affairs (DEFRA).

Cox, L. (2017). *Collaborating to innovate in the water sector.* Masters dissertation, University of Sheffield.

Cropley, D. H., & Cropley, A. J. (2015). *The psychology of innovation in organizations.* Cambridge: Cambridge University Press.

Dobbie, M., Brown, R. & Farrelly, M. (2016). Risk governance in the water sensitive city: Practitioner perspectives on ownership, management and trust. *Environmental Science and Policy,* 55, 218-227.

Garwood, J. & Birdi, K. (2020). The dams and flows of inter-organisational innovation collaboration: Insights from the water industry. Paper presented at the *Institute of Work Psychology (IWP) International Online Conference* 2020 June 22nd - 25th 2020.

Oliver, D. (2019). *Investigating the impact of trust on influencing stakeholder relationships in the collaborative innovation process within the water industry.* Masters dissertation, University of Sheffield.

Perry-Smith, J. E., & Mannucci, P. V. (2017). From creativity to innovation: The social network drivers of the four phases of the idea journey. *Academy of Management Review,* 42(1), 53-79.

Porter, J. and Birdi, K.S. (2018). 22 reasons why collaborations fail: Lessons from water innovation research. *Environmental Science & Policy,* 89, 100-108.

Ramay, U. (2016). *Investigating barriers and facilitators in collaboration for the innovation process within the water sector.* Masters dissertation, University of Sheffield.

Sabatier, P., Leach, W., Lubell, M. & Pelkey, N., (2005). Theoretical frame-works explaining partnership success. In: Sabatier, P., Focht, W., Lubell, M., Trachtenberg, Z., Vedlitz, A., Matlock, M. (Eds.), *Swimming Upstream: Collaborative Approaches to Watershed Management. Cambridge,* MA: MIT Press.