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Making collaborative water innovation work: **What do we know so far?**

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TWENTY65 Annual Conference, 4th and 5th April 2017.

Signposting this Talk

- **Water innovation:** Why is it needed? And what does it mean?
- **Water collaboration:** Why involve more people? And what has stopped this in the past?
- **TWENTY65:** Quick overview of the project and our work
- **Our study:** A systematic literature review of collaboration for water innovation
- **Results:** What does collaborative water innovation look like? And what influences it?
- **Future:** What remains unanswered? And how will our research try to tackle this?

Context: A Water Problem?

- **Question:** Will water utilities be able to innovate to cope with future water demands?
- **Water use:** Access to, and availability of, clean, reliable and affordably priced water
- **Water challenges:**
 - Climate change
 - Growing populations
 - Aging water infrastructure
 - Land-use changes
 - Energy reduction
- **But is it fair to expect water utilities to meet these challenges alone?**

“Water utilities are being asked to perform **an impossible feat** of providing water of higher and higher quality while using less energy, fewer chemicals, having fewer outages, and drawing against a potentially insufficient supply” (Speight 2015: 308).

A Crisis in Innovation?

- What does **water innovation** mean?
- **Innovation:** Large or small, complex or simple, radical or incremental, a new product, service or process
- **Question:** Does the water industry have the capacity and willingness to innovate?
- **YES!** Wastewater energy recovery, desalination, water meters
 - Economic logic: keep ahead of competitors
 - High confidence in level of R&D investments
- **Maybe not...** Risk aversion, regulation, falling R&D spending, off-the-shelf products etc.
- **Disconnect between words and deeds** has led to concerns of a crisis in water innovation or deficit of innovation

Doing Things Together

- **Old style:** Highly centralised, top-down, technocratic regimes that limit the role of other stakeholders
- **Collaborative turn:**
 - More inclusive, open, and responsive process
 - Tackle ‘wicked problems’, a democratic deficit, breed better understandings
 - Emphasis on co-producing knowledge and action
- Why hasn’t collaboration for water innovation sprung up before?
 - **Researchers** focused on organisational innovation not inter-organisational;
 - **Practitioners** have lacked funding, leadership, commitment, and trust
- **Political-institutional support:** In the UK, UK Water Partnership, WINovation, and the Water Industry Forum

TWENTY65: Tailored Water Solutions for Positive Impact

Key Contacts: Principal Investigator: Prof Joby Boxall, University of Sheffield; Managing Director: Dr. Vanessa Speight; Water Hub Manager: Mrs. Caroline Wadsworth.

Funding: £3.9million over four years (201 scheme

Aim: To bring universities and water industry efficiency and adaptability into our water system so we all receive clean water, sustainably, by developing technologies and solutions will be developed taking into account environmental and societal constraints.

Research Themes: Inspecting and restoring water infrastructure using robotic autonomous systems; Tailoring treatment using demand-based technologies; Minimising carbon emissions through synthetic water-energy systems; The city as a water resource; Adapting to changing catchments; Understanding the potential for public engagement to improve water services; **Collaboration for innovation**; Foresight and integration.

Research study: We seek to identify the key factors that influences the effectiveness of water collaboration between different stakeholders across different stages of the innovation process (e.g. from idea generation to implementation etc). For instance, **what influences the success (or failure) of collaboration for water innovation?**

<https://www.twenty65.ac.uk>

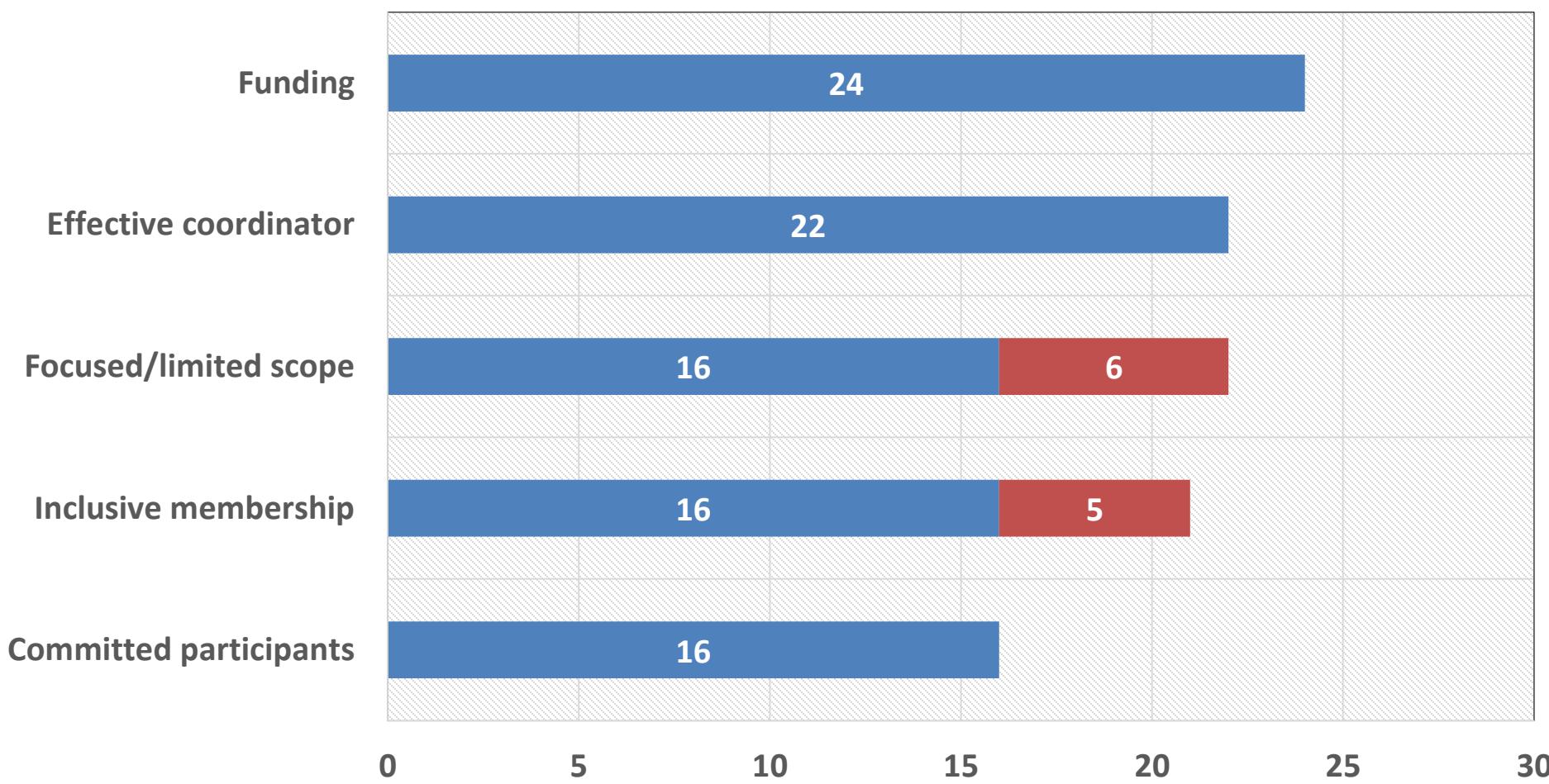
Research: Data & Methods

- **Method:** A systematic literature review of empirical peer-reviewed articles published between 1996 and 2016.
- **Data:**
 - ISI Web of science; 843 keyword searches (e.g. water, innovation, collaboration etc)
 - Returned 2944 papers
 - Applied an inclusion/exclusion criteria
 - 48 peer-reviewed publications retained and ranked 1-5* (e.g. robustness, relevance)
 - 26 publications analysed (0.88% of initial search) met the inclusion criteria
- **Questions:** What influences the success (or failure) of collaboration for water innovation? Where within the innovation process do studies focus? Which stakeholders are identified as essential to successful collaborations? And what recommendations were made?

Results: What is Collaborative Innovation?

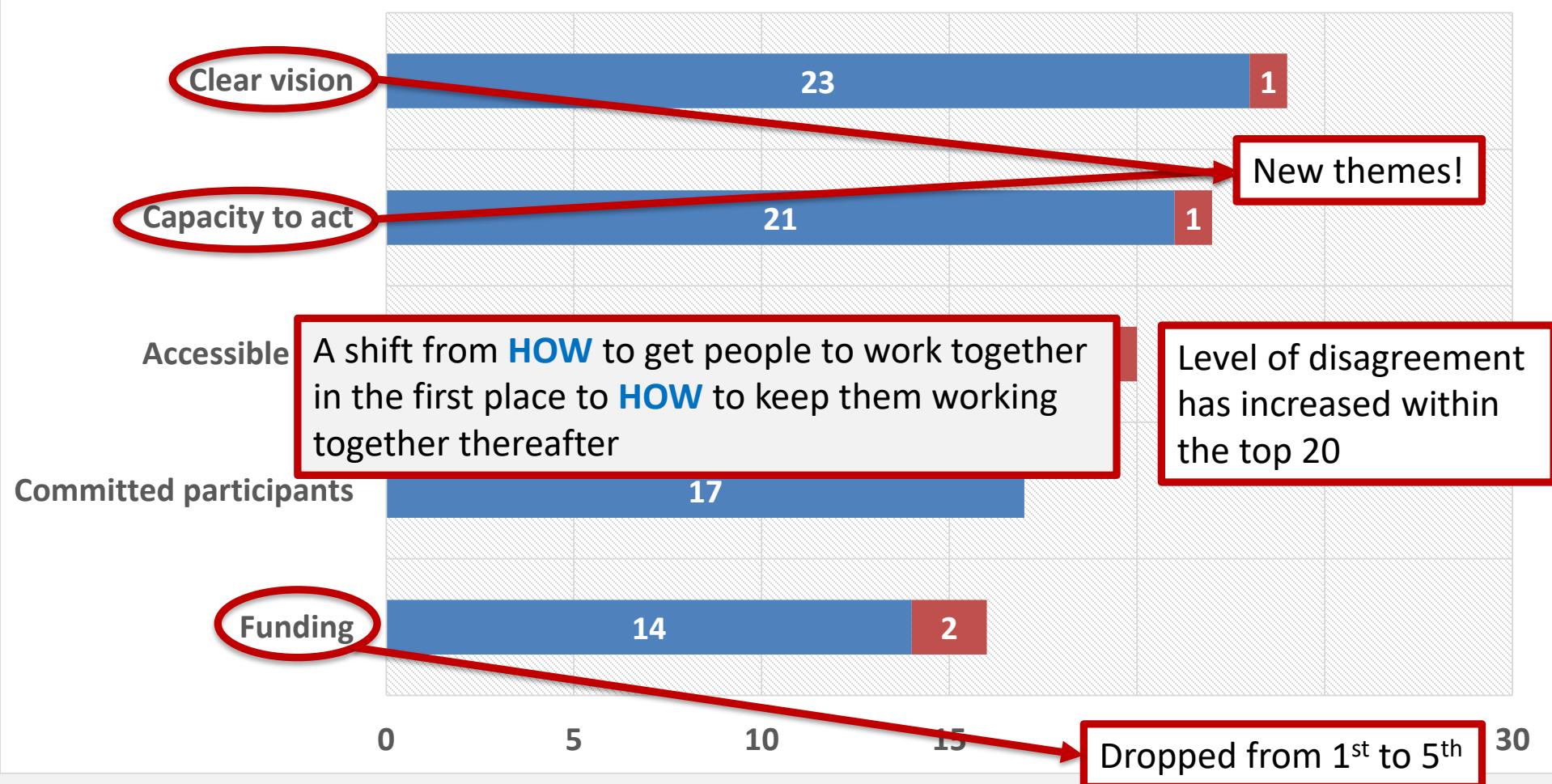
- **Overview:** 238 distinct conclusions, grouped into 22 emergent themes (e.g. clear vision, power inequalities etc).
- **Breadth and Depth:** Different size groups, different compositions, different timescales, different countries, different research methods, different innovations, and different problems.
- **Definition:** Not a single paper reviewed defined collaborative innovation.
- ‘An innovation process in which the members of **different** groups, communities or networks share ideas, knowledge, resources, and work collectively to develop new products, services or processes’.
- We know **very little** about collaborative water innovation ($n=26$), and there is **disagreement** about what we do know.

Results: Top 5 Themes in 2001



Number of studies (n=46) reviewed in 2001 that affirm ([blue shading](#)) or contradict ([red shading](#)) the importance of these top 5 themes. Source: Leach and Pelkey 2001.

Results: Top 5 Themes in 2016



Number of studies (n=26) reviewed in 2016 that affirm (blue shading) or contradict (red shading) the importance of these top 5 themes. Source: Authors' own.

Research: What Influences Collaborative Innovation?

STARTING CONDITIONS: Things to do before collaboration has begun.

- Be aware of, and sensitive to, any power imbalances.
- **Make sure those involved have the capacity to take actions or influence change.**
- **The roles and responsibilities of institutions involved are clear and have the capacity (staff, knowledge, influence) needed.**
- Adequate funding has been set aside to run the process and implement recommendations.
- **Participation should require little money, time or resources from those involved.**
- Efforts are made to keep the level of conflict, new or old, between actors to a minimum.

Research: What Influences Collaborative Innovation?

COLLABORATIVE PROCESS: Things to do during collaborations.

- Trust must be built through acting in good faith, sharing materials, and not disadvantaging others.
- **Efforts are made to ensure different values, norms and cultures are treated equally.**
- Actors should be encouraged and supported to stay involved throughout the process and beyond.
- **Must be willing to take risks and accept failure if it happens.**
- All actors are fully committed to the process.
- **Adequate time is set aside to plan and take actions.**
- **Everyone has access to the data/evidence used to make decisions.**
- A strong or clear vision is agreed upon.
- **All information used to make decisions is clear and accessible (non-technical).**

Research: What Influences Collaborative Innovation?

INSTITUTIONAL DESIGN: Structures for running collaborations.

- Participation must be open to all stakeholders.
- **Activities should be limited to small geographical areas where local commitments are at stake.**
- Clear decision and process rules are established and enforced.
- Clear methods for evaluating and measuring the outcomes of collaborative efforts are implemented to gauge progress.

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Research: What Influences Collaborative Innovation?

FACILITATIVE LEADERSHIP: How to steer collaborations.

- Strong leadership is needed from both the person in charge of the collaboration and the organisations involved to set agendas, overcome impasses, and reach the best solution is reached.
- An effective coordinator or bridging organization is required to facilitate conservations and coordinate actions between different actors.

CONTEXT: What is currently missing.

- Sometimes the introduction of new Government legislation, policies or regulation is needed to support new practices or reward new action.

Conclusion

- **Good News:** Rich variety of conclusions (238); a large variety of actors already involved; a wide variety of research methods; and healthy levels of disagreement.
- **Collaborative Turn:** A shift from **HOW** to get people to work together to **HOW** best to run that process.
- **Not So Good News:** Very small number of papers ($n=26$); no definition of collaborative innovation; and most factors can be both a driver or barrier.
- **Disciplinary Differences:** Both innovation and collaboration studies identify different barriers (e.g. risk aversion, regulation) but **WHY?**
- **Next Steps:** Interviews with UK actors involved in collaborative water innovation ($n=20-30$).

Thank You!

Any Questions?

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References

- Ansell, C.; Gash, A.; 2007, Collaborative governance in theory and practice, *Journal of public administration and research theory*, 18(4), 543-571.
- Benson, D.; Jordan, A.; Smith, L.; 2013, Is environmental management really more collaborative? A comparative analysis of putative ‘paradigm shifts’ in Europe, Australia and the USA. *Environment and Planning A*, 45(7), 1695-1712.
- Kiparsky, M.; Sedlak, D.; Thompson, B.; Truffer, B., 2013, The innovation deficit in urban water: The need for an integrated perspective on institutions, organizations, and technology, *Environmental engineering science*, 30(8), 395-408.
- Kiparsky, M.; Thompson, B.; Binz, C.; Sedlak, D.; Tummers, L.; Truffer, B., 2016, Barriers to innovation in urban wastewater utilities: Attitudes of managers in California, *Environmental management*, 57(6), 1204-1216.
- Leach, W.; Pelkey, N.; 2001, Making watershed partnerships work: a review of the empirical literature. *Journal of Water Resources Planning and Management*, 127(6), 378–385.
- Speight, V., 2015, Innovation in the water industry: barriers and opportunities for US and UK utilities, *Wiley Interdisciplinary reviews: water*, 2(4), 301-313.
- Thomas, D.; Ford, R. 2005, The crisis of innovation in water and wastewater, Edward 1st ed, Elgar Publishing House: Cheltenham.