Knowledge-related challenges in Dutch river innovation

Exploring barriers to knowledge management in Self Supporting River Systems

de Vries, Jort; Vreugdenhil, Heleen; Bout, Astrid

Publication date
2025

Document Version
Final published version

Published in
Crossing boundaries

Citation (APA)
de Vries, J., Vreugdenhil, H., & Bout, A. (2025). Knowledge-related challenges in Dutch river innovation: Exploring barriers to knowledge management in Self Supporting River Systems. In V. Chavarrias, & A. M. Van den Hoek (Eds.), *Crossing boundaries: NCR DAYS 2025 Proceedings, Book of Abstracts* (pp. 64-65). NCR (Netherlands Centre for River Studies).

Important note
To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Knowledge-related challenges in Dutch river innovation

Exploring barriers to knowledge management in Self Supporting River Systems

Jort de Vries[a,b], Heleen Vreugdenhil[a,c],, Astrid Bout[d]

a,Deltares, Postbox 177 2600 MH, Delft, The Netherlands b, University of Groningen, Department of Spatial Planning & Environment, Landleven 1, 9747AD, Groningen, the Netherlands c, Delft University of Technology, Faculty of Technology, Policy and Management. Jaffalaan 5, 2628 BX Delft, The Netherlands d, Rijkswaterstaat Oost Nederland, Eusebiusbuitensingel 66, 6828HZ, Arnhem

Keywords: Transdisciplinarity, Knowledge Management, Innovation

Introduction

Complex knowledge from different stakeholders is vital to solve increasingly complex societal challenges (Stock & Burton, 2011). However, stakeholders involved in Self Supporting River Systems (SSRS, 2025), experience that integration and utilization of such knowledge is challenging. To start solving such barriers, different stakeholders need to understand each other's knowledge explicitly, preventing potential biases, cherry picking, and misinterpretation, to facilitate efficient and transparent transdisciplinary knowledge processes (Nonaka and Takeuchi., 1995; Derksen., 2014). When combining knowledge among stakeholders, barriers can arise due to differences in understanding, and valuation of knowledge deriving from differing perceptions, goals and workways (Böcher and Krott., 2016; Spaapen and van Drooge., 2011; Derksen., 2014; de Vries et al., 2024). E.g., scientists use knowledge to describe and explain the world, policymakers to influence development, and companies to earn and solve practical problems, all implying different criteria and valuations for knowledge (Böcher and Krött., 2016; Derksen, 2014). Additionally, knowledge can be disseminated in sub-optimal ways, possibly also due to different preferred disseminationstructures (Muhonenet al.,2018; Benneworth and Olmos-Penuela., 2018; Spaapen and van Drooge., 2011). As such, the innovative capacity of knowledge depends significantly on politics, established structures and rules, funding, and partnership patterns (Ahmed et al, 2023; Nonaka and Takeuchi., 1995). For innovation capacity of SSRS to be improved, there is a need to understand barriers to knowledge uptake.

Method

To better understand how knowledge processes for innovation in sustainable river management can be improved, this study explores barriers in Knowledge uptake. Perspectives are taken from knowledge theories like knowledge management (KM), to identify barriers to knowledge flow and knowledge integration(KI), to conceptualize the flow of knowledge between knowledge developers and users, see figure 1 (Nonaka and Kono, 1998; Böcher and Krott, 2016). In this research, we first assess the experiences of experts from universities, knowledge institutes, RWS, and engineering companies, to explore experienced barriers and enablers in knowledge processes. We have interviewed university researchers (17), researchers in knowledge institutes (5), innovation and knowledge experts in RWS (4), and representatives from engineering companies (3), all working in river-management or related disciplines between sept-dec 2024. The interviews specifically considered the familiarity with current knowledge uptake and innovation practices, experiences with current practice and barriers to successful knowledge uptake for innovation. These were analysed to understand the main barriers for current practices.

Results

Currently, SSRS aims to facilitate knowledge integration between 4 types of stakeholders: universities and knowledge institutes who develop innovative ideas, companies which develop ideas and implement innovations, and RWS which employs knowledge institutes and companies to develop knowledge, and companies to physically implement changes, see Fig. 1.

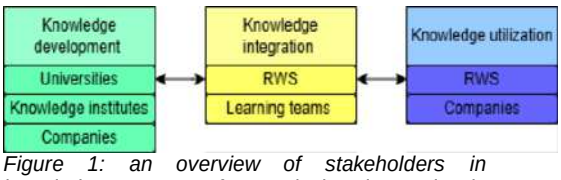

Figure 1: an overview of stakeholders in knowledge processes for Dutch river innovation in relation to the KI model.

Knowledge for innovation is currently integrated in the SSRS in three main ways: 1. reporting: academic knowledge is disseminated to policymakers and companies in reports, 2: through informal dissemination, usually key experts from different stakeholder groups have short lines, 3: innovation cards about every innovation currently undertaken are updated by involved stakeholders so everyone who is interested knows the state of things. Table 1

summarizes the main barriers in the knowledge process for innovation.

Table 1: Barriers for innovation from a knowledge perspective (preliminary results)

Barrier	Description
1.Current knowledge uptake structure is not working	Knowledge integration lacks structure and occurs ad hoc through projects or key individuals. Available tools like innovation cards are doubted and too dependent on regular updates
2.Limited visibility and involvement universities	University researchers were unaware of the learning teams and remained confused about the work processes after reviewing the website.
3. Limited uptake and visibility of knowledge within RWS	There is no central coordinator, leading to an ad-hoc process, while the size of RWS and high stakes in Dutch rivers create risk aversion and limited contact.
4. limits to free knowledge-flows and lack of upscaling in private sector.	Regular contracts alongside open learning spaces create a client-contractor dynamic, hindering true partnerships. Long-term contracts can stifle innovation if new solutions emerge mid-term.
5. Too few people feel responsibility and ownership of knowledge and innovations	Assigning managers of companies/government departments as knowledge owners is ineffective as they are often too busy, and acting as intermediaries slows down knowledge transfer, especially when they have other responsibilities. Ownership of knowledge is limitedly felt among knowledge institutes and companies.
6. Financial flows do not encourage innovation	Funding uncertainty hinders innovation, as contractors and institutes prefer upfront payments while RWS controls budget allocation, and other stakeholders invest limitedly. Contracts often fail to reward efficiency, incentivizing traditional methods over innovation.

Discussion/conclusions

Learning spaces have strong potential for innovation but are not fully utilized. Implementing solutions like stakeholder-driven innovation roadmaps, enabling rather than managing collaboration, and clearer communication can enhance their effectiveness. Accepting that some innovations may fail would reduce performance pressure and encourage experimentation. A central contact point for innovation dissemination could improve knowledge sharing, while process innovations in financial flows and contracts could better support new ideas. During the continuation of this study, KM and KI will be employed to unpack processes that lead to knowledge production and utilization for innovation in Dutch river management, to further unpack barriers identified in this study, as well as enablers and provide advice for overcoming them.

References:

Ahmed, F., Johnson, D., Hashaikeh, R., & Hilal, N. (2023). Barriersto Innovation in Water Treatment. Water, 15(4), 773.

Böcher, M., Krott, M., (2016). Science Makes the World Go Round: Successful Scientific Knowledge Transfer for the Environment. Springer, New York.

Derksen, J., (2014). Kennis en Beleid verbinden. Boom/Lemma, Den Haag.

Muhonen, R., Benneworth, P., Olmos-Penuela, ˜ J., 2018. From Productive Interactions to Impact Pathways (No. 201802). University of Twente, Center for Higher Education Policy Studies (CHEPS).

Mauser, W., Klepper, G., Rice, M., Schmalzbauer, B. S., Hackmann, H., Leemans, R., & Moore, H. (2013). Transdisciplinary global change research: the co-creation of knowledge for sustainability. Current opinion in environmental sustainability, 5(3-4), 420-431.

Nonaka, I. and Takeuchi, H. (1995) The Knowledge Creating Company: HowJapanese Create the Dynamics of Innovation. New York: Oxford University Press.

Spaapen, J., Van Drooge, L., 2011. Introducing 'productive interactions' in social impact assessment. Res. Eval. 20 (3), 211–218.

Satheesh,S.A.,Verweij,S.,van Meerkerk,I.,Busscher,T., & Arts, J. (2023). The impact of boundary spanning by public managers on collaboration and infrastructure projectperformance. Public performance &management review, 46(2), 418-444.

SSRS., (2025). Leerruimtes voor Self Supporting River Systems. Accessed. https://www.ssrs.info/.

Stock, P., & Burton, R. J. (2011). Defining terms for integrated (multi-inter-trans-disciplinary) sustainability research. Sustainability, 3(8), 1090-1113.

Van Alphen, S. (2020). Room for the river: innovation, or tradition? The case of the Noordwaard. Adaptive strategies for water heritage, 309.

Van Ryneveld, M., and Sproule, S. (2009). 'Knowledge uptake by technical professionals and decision-makers for developmental water services Part 1: Methodology, knowledge and context'. Water SA, 35(4).

Benneworth, P., & Olmos-Peñuela, J. (2018). Reflecting on the tensions of research utilization: Understanding the coupling of academic and user knowledge. Science and Public Policy, 45(6), 764–774