

<b>Institution: University of Manchester</b>
<b>Unit of Assessment: 19 (Business and Management Studies)</b>
<b>Title of case study: Innovation research impact on UK and European water policy and regulatory practice</b>
<p><b>1. Summary of the impact</b></p> <p>University of Manchester research during 2005–2012 into water sector technological innovation provided an evidence base that changed UK and European policy and practice. The research led to an extended remit for an independent review of UK water sector competition to include also innovation; underpinned sections on innovation in new UK water policy; inspired incentive reforms by the economic regulator, Ofwat and informed strategy for two high-level European innovation/technology platforms. Lead researcher Thomas advised key stakeholders at House of Commons All Party Parliamentary Water Group sessions, at an independent review, via keynotes and opinion pieces for industry roundtables, conferences, trade journals, the media, and on an Ofwat advisory panel.</p>
<p><b>2. Underpinning research</b></p> <p>The underpinning research was done 2005–12 at the University of Manchester led by Thomas, including a book [3.1] and a key externally funded research project [3.2] commissioned by UK water sector collaborative research body UK Water Industry Research (UKWIR; co-supported by DTI, Defra, Ofwat) then subsequent activities by Thomas using this research. The 2006 UKWIR [3.2] research's objective was to characterise, and to quantify for the first time, technological innovation enablers and barriers in the UK water industry, starting from Thomas' previous qualitative assessment [3.1], then to make policy and practice recommendations to accelerate the development and uptake of new products and processes in the sector. The research provided an evidence base where before there were only unexplored or unconfirmed features. UK water utilities were previously considered to be risk-averse, low-risk/low-return operators with an antagonistic, blame culture towards innovation. The research challenged these stereotypes with in-depth case studies of functionally equivalent pairs of innovation successes/failures. Key research insights included:</p> <ul style="list-style-type: none"> <li>• Discovery of significant, unsuspected inventiveness in the supply-chain.</li> <li>• Underutilised but key strategic leadership and partnership roles for water companies in accelerating innovation development and adoption.</li> <li>• Longer innovation timescales than comparable industry sectors, i.e. slow response times to long-term challenges like climate change.</li> <li>• Lost skills as key innovation champions retired and were not replaced.</li> <li>• Lack of a sector-wide collaborative and open innovation vision.</li> </ul> <p>The research correlated these insights with institutional, financial and regulatory dynamics, and explored practical consequences for the UK's role in a global water market under sustainability and climate change constraints.</p> <p>The 2006 UKWIR research [3.2] expanded earlier foundational qualitative case study data collection by Thomas, including his water innovation strategy PhD (1998–2002) and his Principal Investigator role on a pilot EU FP6/JRC-IPTS water research policy mapping (ERAWATCH, 2004–2005). The result was a rich, novel dataset of interviews and surveys, opinions and evidence from over 200 stakeholders and 50 organisations. Thomas continued to build this evidence base via invited presentations and evidence submissions for: water policy and industry events around the UK (2006–09); the Cave Review of competition and innovation in water markets [3.3] (2008–09); the All Party Parliamentary Water Group (2007–09, 2012); trade journals [3.3,3.4] (2008, 2012); his blog (waterstink.com, 2009–); executive education on innovation for UK water companies (2009, 2012); and interactions with Ofwat (with the Chief Executive, Director of Strategy, Head of Policy Development, and Future Regulation Advisory Panel).</p> <p>Thomas has been a PhD (1998–2002), Research Associate (2002–05) and Research Fellow (2006–Date) at the University of Manchester. A University of Salford colleague, Prof. Roger Ford, provided technical validation and water technology commentary, and was second author for both</p>

the 2006 UKWIR report [3.2] and 2005 book [3.1].

### 3. References to the research

1. Thomas, D.A. and R.R. Ford 2005. *The Crisis of Innovation in Water and Wastewater*. Cheltenham, UK and Northampton MA, USA: Edward Elgar Publishers.
2. Thomas, D.A. and R.R. Ford 2006. *Barriers to Innovation in the UK Water Industry* (06/RG/10/1). London: UKWIR. <http://www.ukwir.org/ukwirlibrary/91297>.
3. Thomas D. 2008. Will the Cave Review address the UK water sector's innovation deficit? *Water & Wastewater Treatment*, **51**(9), 14.
4. Thomas, D. 2012. Don't just talk about water success, achieve it. *Utility Week*, 3 February, 11.

Copies of outputs 1-4 available on request.

*Crisis of Innovation* [1] has 18 citations on Google Scholar and was peer reviewed pre-publication. It was later reviewed in the international journal *R&D Management* and sold several hundred copies worldwide.

*Barriers to Innovation* [2] was a competitively tendered externally funded research project, used an internationally recognised success/failure methodology (deriving from the US 'Project SAPPHO'), was subject to scientific advisory panel quality control (senior regulatory, policy, and water company board member representatives) and pre-publication peer reviewed by the UKWIR Director. It became an UKWIR library bestseller and was of suitable quality to be cited by Lord Sainsbury in his *Review of Science and Innovation* for the HM Treasury (2007, p.134) to characterise the UK water sector.

[3] and [4] are invited feature articles based on the key research and subsequent activities. These passed editorial review for trade journals with international circulation (*Water & Wastewater Treatment* has an average net monthly circulation of 8,680 [2010]; *Utility Week*, a net weekly average of 3,580 [2011]).

### 4. Details of the impact

#### Pathways to Impact

The pathway to impact began with Thomas' PhD on innovation in regulated water utility sectors (1998–2002) and a subsequent book (2005) that enabled him to win competitive UKWIR funding (2006) to research barriers to innovation across the whole UK water sector. This 2006 research for UKWIR provided a novel evidence base about UK water sector innovation characteristics and capacity [5.1,5.4]. It was soon read and cited by high-level water stakeholders (2006–2007: Ofwat; House of Lords science and technology committee; Lord Sainsbury/HM Treasury; Defra/DTI *Environmental Innovations Advisory Group*; *Commission on Environmental Markets and Economic Performance*) [5.2,5.3] adding to Defra/HM Treasury pressures for the upcoming independent Cave Review of the water sector, scheduled to address only 'competition', to be expanded to include also 'innovation'.

#### UK Impact 2008-2009

Thomas gave evidence to the Cave Review (2008–2009). Professor Cave and his team examined the 2006 research findings 'in detail', appreciating this novel evidence base in an area where little other research was available [5.4]: "I can say that we examined Dr Thomas' research in detail and found it useful to inform some of our Review's recommendations to Government"

During 2007–2009 the All Party Parliamentary Water Group invited Thomas to present his research evidence and to discuss policy reform (e.g. *Inquiry into the Future of the UK Water Sector*, April 2008). In 2009 the Prime Minister's highest independent strategic advisory body on cross-departmental science and technology (Council for Science and Technology) invited Thomas

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to discuss his research evidence (see *Improving Innovation in the Water Industry*) [5.5]. Thomas also presented at over 10 high-level UK industry panels and policy events.

**UK Impact 2010-2012**

In 2010 the Coalition pledged to consider the Cave Review findings, and as part of the 2011 Gray Review of Ofwat [5.6] concluded water sector regulation had to account for its effect on water sector innovation, thus aligning with Thomas' research findings. A new Water White Paper was published in 2011 [5.7] with sections on innovation within its 20-year forward strategy that echoed Thomas' research insights (e.g. 'key role' for water companies and the 'lack of co-ordination' in the sector that called for a united vision, p.93) and the subsequent 2012 Draft Water Bill's mentioned innovation [5.8] (e.g. the need for 'market reform and regulatory mechanisms in driving improvement and *innovation* in the industry', p.5).

Thomas understood Ofwat should play a key role in implementing policy reform, having identified their practices as a key influence on water sector innovation in his 2006 research. This would include not only design of incentives but also how to accommodate 15–25 year timescales for successful innovations, uncovered by his 2006 research, within Ofwat's five-year regulatory cycles. Ofwat's Director of Strategy, in charge of Ofwat's response to the Gray Review, indeed sought out Thomas' research insights to help with this process, after he heard Thomas discuss innovation aspects of the Water White Paper on a 2012 All Party Parliamentary Water Group panel [5.10]: *"It is fair to say the research of Dr Thomas helped us to formulate ideas about the pros and cons of different innovation incentive practices and options, so helped our on-going policy and strategy development."*

Thomas was invited to meet personally with both the Director of Strategy and Head of Policy Development, and to join Ofwat's Future Regulation Advisory Panel, to advise on the reform process [5.9]. He was further invited to smaller Panel roundtables specifically on innovation, his research insights on innovation in the water sector were taken by the Director of Strategy to several key meetings of the Ofwat Board, and he debated policy for innovation with Ofwat's Chief Executive on national BBC Radio 4 (Ofwat conceded 'the real challenge' was for the water sector 'to become more *innovative* in terms of how it delivers for its customers', Radio 4, You & Yours, 7 June 2012).

Generally a more pro-innovation stance in the UK water sector emerged during this impact period as the impact of Thomas' evidence base diffused into various policy and industry developments. A high-level Water Sector Innovation Leadership Group and Water UK Innovation Forum were formed. The Technology Strategy Board funded a £3.5 million water innovation platform in 2012; with the editors of international trade journal *Utility Week* approaching Thomas to write an article in response to it. UKWIR was able to use the evidence base provided by the 2006 research to gain water industry subscriber support for key follow-on projects (*A Road Map of Strategic R&D Needs to 2030* [2007], *UK Water Innovation: Which Way Forward in Europe?* [2010], *Research and Innovation in the UK Water Industry* [2011] and *Research and Innovation Mapping Study for the UK Water Research and Innovation Framework* [2011]). Thomas continued to inform reform processes through invited attendance at events (e.g. national water policy conferences Future Water 2012 and 2013; WRc Open Innovation Day 2012) and via his dedicated water blog (waterstink.com) read by various key UK water stakeholders.

**European Impact**

Thomas' 2006 research also had impact at European level. The former UKWIR Director presented it to the newly formed, high-level European Innovation Partnership on water in 2012. This DG Environment sponsored group of key EU water stakeholders, chaired by Environmental Commissioner Janez Potočnik, used the research to inform their strategic thinking about the European water sector and innovation [5.1]. Thomas was then invited in May 2013 to an expert panel in Brussels to discuss with representatives of the Partnership how to revise regulatory impact assessment methodology to incentivise better water innovation. In his role as European Water supply and Sanitation Technology Platform President (until 2012) the UKWIR Director also presented the research to the EC WssTP (2004–) to ensure it would address the barriers to

innovation identified by Thomas' research [5.1]: "I can say that it definitely played a part in the group's strategic thinking and that part of the remit of the WssTP that I chaired was to de-risk water sector innovation so as to overcome some of the key barriers identified in your Barriers to Innovation research."

### 5. Sources to corroborate the impact

All sources are cross-referenced in section 4.

1. Letter from the Director of UKWIR 2000–2011 and President of EC Water supply and sanitation Technology Platform until 2012.
2. Environmental Innovations Advisory Group [EIAG] 2006. *Environmental Innovation: Bridging the gap between environmental necessity and economic opportunity*. London: EIAG, DTI and Defra, November. Cites the research (p.36) as an evidence base on UK water innovation. Also cited in Commission on Environmental Markets and Economic Performance; November 2007 (BERR, DIUS, Defra).
3. HM Treasury 2007. *The Race to the Top – A Review of Government's Science and Innovation Policies*. London: HM Treasury, October.
4. Letter from Professor Martin Cave, Imperial College Business School, Deputy Chair Competition Commission.
5. Council for Science and Technology [CST] 2009. *Improving Innovation in the Water Industry: 21st Century Challenges*. London: CST, March.
6. Department for Environment Food and Rural Affairs [Defra] 2011. Review of Ofwat and consumer representation in the water sector [a.k.a. Gray Review]. London: Defra. Notes 'a culture of compliance rather than innovation, with [water] companies focussing on meeting Ofwat's requirements rather than their customers' (p.26).
7. Department for Environment Food and Rural Affairs [Defra] 2011. *Water For Life*. White paper, Cm 8230. London: Defra, December. Section on innovation (pp.92–94) noting the 'key role' of the water companies; announces £3.5M Technology Strategy Board fund.
8. HM Government and Welsh Government 2012. *Draft Water Bill*. Cm 8375. London: July. Press release states the Bill is about 'driving innovation' in the sector.
9. Ofwat Future Price Limits statement of principles, [http://www.ofwat.gov.uk/future/monopolies/fpl/pap\\_pos201205fplprincip.pdf](http://www.ofwat.gov.uk/future/monopolies/fpl/pap_pos201205fplprincip.pdf); on 'incentives [that] will encourage companies to find more innovative ways of delivering, increasing the opportunity for outperformance from such innovation' (p.16) and price controls to 'not stifle innovation with inappropriate rules' (p.26).
10. Letter from the Director of Strategy at Ofwat