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Public innovation: An Australian regulatory case study

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ABSTRACT

The urban water sector must innovate to meet a multitude of challenges. In Australia, innovation needs to occur primarily within the existing framework of public ownership. Supporting innovation necessitates understanding all the potential regulatory levers which could influence its adoption. This paper analyses the place of public utilities within Melbourne's urban water regulatory terrain and examines how innovation thrived or withered amidst the various regulatory influences through an empirical case study. We conclude that water regulatory systems are overlapping, heterogeneous and more sophisticated than often assumed. Yet despite this inherent regulatory complexity, innovation can occur inside trusted public institutions.

1. Introduction

Continuing to provide adequate, safe and affordable urban water, while also managing the negative environmental consequences of current practices, is going to be a significant challenge in many countries (Dovers, 2008; OECD, 2015; The National Academies of Sciences, Engineering and Medicine, 2015). This challenge will be magnified if the urban water sector is simultaneously expected to contribute to wider policy goals such as sustainability, liveability and resilience. Rising to meet these challenges requires the development of smarter and more integrated approaches to water management and service delivery (Gleick, 2000; Wong and Brown, 2009). Yet reform of this nature is never easy, not least because reform must inevitably contend with the pre-existing institutional structures and frameworks of regulation. This paper explores how urban water innovation either thrives or withers within the confines of particular institutional and regulatory arrangements. Specifically, we set out to answer two related questions:

1. Firstly, what range of regulatory influences steer Australian public water utilities?
2. Secondly, how does innovation occur amidst such regulation?

This article builds on earlier research work such as that undertaken in urban water infrastructure, and focusing on issues such as risk management, risk perceptions and alternative water sources (Furlong et al., 2017a, 2017b; Dobbie and Brown, 2014a, 2014b; Dobbie et al., 2016, 2014).

1.1. The Australian urban water sector

Within Australia's federal system of government, water is formally a state responsibility. However, there has been a creeping involvement by the federal government in urban water issues, reflecting both the increasing national importance of security of supply and wider trends in state/federal power relations (Dovers, 2008; Godden, 2008; National Water Commission, 2014). Thus, in contemporary Australia, urban water is best understood of as shared policy space.

The Australian model for urban water service provision reflects that of other developed nations, with water being collected, distributed and treated in large infrastructures centrally organised at the city level (OECD, 2015). The Australian urban water sector is comprised primarily of Government-Owned Utilities (GOUs), which in most metropolitan areas have been corporatised since the 1990s (Productivity Commission, 2011; Byrnes, 2013). Australian GOUs are diverse and heterogeneous (Productivity Commission, 2011). There is significant variation between states in terms of the institutional models adopted, with some GOUs owned by state governments and others by local governments. Some GOUs service an entire state, whilst others have smaller service areas.

Alongside these GOUs exists an extremely small private utility

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sector. This private utility sector is principally concentrated in the state of New South Wales, and no other jurisdiction has demonstrated such express policy enthusiasm for private water utilities. Indeed, privatisation of the water industry is specifically constrained in the state of Victoria by a constitutional requirement that water remain a state government responsibility. It seems highly likely that, at least in the medium term, Australia's urban water sector will retain a significant level of public ownership.

Urban drainage in Australia is principally focused on ensuring that unwanted stormwater is removed from the urban environment and quickly conveyed to rivers and oceans. Historically, stormwater has been viewed as a nuisance, liable to cause flooding that could damage property and harm people, rather than a potential resource. Yet, urban stormwater has the potential to play an important role in meeting supply needs. From the perspective of yearly volume, the amount of water falling as rain in much of the Australian urban environment is sufficient to meet the local water use needs of many locations (Troy, 2008; Stormwater Victoria, 2015).[2] Due to its localised nature, stormwater management for flood mitigation has traditionally been a responsibility of local municipalities but has evolved differently across the major Australian cities. In Melbourne, Victoria, the function is shared with a specialised GOU.

1.2. The innovation imperative

Australia is the driest inhabited continent and has a highly variable pattern of rainfall (Australian Bureau of Statistics, 2012).[3] Accordingly, security of water supply is a perennial concern. Australian communities became particularly aware of the finite nature of their traditional, climate-dependent sources of supply during the Millennium Drought, which affected the eastern portion of the continent between 1997 and 2009 (Ferguson et al., 2013). In response to the Millennium Drought, several state governments made significant supply side investments, particularly in large-scale desalination plants, to provide climate-independent sources of water (Productivity Commission, 2011; Byrnes, 2013). Yet, these investments were extremely expensive and have been criticised for being ill-considered and a missed opportunity to innovate in a more sustainable fashion (Productivity Commission, 2011; Head, 2014; Low et al., 2015).

Australia's urban water sector also faces the twin challenges of replacing aging infrastructure and simultaneously coping with a significant amount of urban growth, all in the face of a changing climate (National Water Commission, 2014). Growing populations require both the provision of new delivery infrastructure and the securing of new resources. Yet another challenge is the ongoing management of urban stormwater run-off, which increases with urban densification and the extension of the urban area. Moreover, urban run-off is increasingly being recognised as a major environmental pollutant (Wong et al., 2013).

Importantly, too, these challenges are arising against a background of changing community expectations. Australian society now demands more liveable urban environments with green, open spaces and clean waterways (National Water Commission, 2011; Johnstone et al., 2012). Innovating to meet these myriad challenges is perceived to be vital for the ongoing success of the Australian urban water sector. Of course, as Van de Walle (2009) rightly states, governments are by their nature "constantly dangling in an uneasy equilibrium between competing values". So as innovation decisions are made, governments usually need to make trade-offs in values. These values trade-offs are rarely explicit in the water research literature and two background assumptions often made are that such innovation can and should be made with no loss in economic efficiency.

2. Research design and methods

2.1. Innovation in urban water

In the utility sector, innovation is commonly discussed in terms of finding new and more efficient ways to meet consumer supply and demand (Cave and Wright, 2010). As a result, the literature tends to place significant emphasis on the role played by systems of economic regulation, with their focus on the control of price and competition in water markets (Cave and Wright, 2010).

Yet in its broadest sense, innovation is about all the ways an activity may be done in new and, by implication, better ways. The adoption of new approaches to water management that are more integrated across the entire water cycle represents a significant category of urban water innovation (Low et al., 2015; OECD, 2015). Such water sensitive innovations encompass both supply- and demand-oriented measures, with many also providing ancillary benefits in terms of drainage, public amenity, environmental and health improvements. One example is the use of bio-filters, a technology that passes contaminated water through a layer of media (such as sand) on which a biological film grows, to passively capture and treat stormwater for urban irrigation purposes. While draining the urban environment, this technology simultaneously provides an environmental benefit, by preventing the degradation of urban waterways from pollution and excess water flows and providing water to irrigate street trees. In addition to their inherent attractiveness, street trees lower the city temperature and provide increased air quality. As innovation in this broader sense encompasses far more than becoming more economically efficient, then it stands to reason that the regulatory influences that might help, or indeed hinder, innovation are likely to extend beyond the boundaries of the economic regulation sphere.

Classic economic theory suggests that there is a greater likelihood of innovation occurring within competitive markets with private ownership (Ballance and Taylor, 2005; Productivity Commission, 2011). Yet public ownership remains the dominant model for urban water both in Australia and internationally, and competitive markets in the water sector are rare (Ballance and Taylor, 2005; Davis, 2005). Nor does this look set to change significantly in the medium term. Therefore, understanding how innovation occurs and how it may be promoted within public ownership is an issue of great importance and one that is under-explored in the literature on innovation.

2.2. Research questions

There is an extensive international literature on the potential regulatory impediments to water sensitive innovation that supports the general assertion that many possible regulatory barriers to innovation exist (Watson et al., 2013; Mukheibir et al., 2014; OECD, 2015). A key theme of this literature is that complex and uncertain regulatory environments, with overlapping responsibilities and unclear rules, have significant potential to act as an adoption barrier for new technologies and practices (Brown and

[2] Of course from the perspective of timing, there will clearly continue to be a need for flood controls to manage the mismatch between the high, temporary volumes falling during storms and the lower volume of water demanded throughout a whole year.

[3] Having said this, it ought to also be acknowledged that around 35% of the Australian continent is effectively desert and that the population is highly urbanised (at 89.2%), with around 85% of the population living within 50 km of the sea (mostly on the east coast). In other words, urban water issues are vital to most people, and most urban areas enjoy good rainfall.

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