



Consultation response

Ofwat's emerging strategy: Driving transformational innovation in the sector

September 2019

Affinity Water is committed to innovation and strongly welcomes the opportunity to provide our comments on Ofwat's consultation on the emerging strategy: Driving transformational innovation in the sector.

We welcome the case for additional intervention and Ofwat's proposal for financial support. We strongly agree that innovation must be at the core of companies if we are to deliver ambitious objectives in a resilient fashion. We set out below broad comments on how to promote innovation and our responses to the questions.

Introduction and challenge to companies

The definitions listed capture well the intent of innovation. We also believe that it is important to recognise the different competing models of innovation.

Empowering innovation comes from doing something very differently and may, in some cases, require significant capital. Empowering innovation is truly transformational thus creates more value, increasing economic growth through the creation of higher value, for example, leading to new commercial opportunities. The adoption of an outcome approach is an example of transformational innovation which has freed up thinking in the development of solutions, generated early system thinking and the increased implementation of green infrastructure solutions.

Sustaining innovation makes existing products incrementally better, may not use much capital and creates less value. Sustaining innovation allows the sector to 'keep up', maintaining the value the sector delivers.

Efficiency innovation tackles getting more for every pound spent, creating efficiency gains. Efficiency innovation focuses mainly on optimisation including optimisation of business processes, which may create job losses and free up capital.

In its consultation Ofwat promotes transformational innovation and it will be important to understand the intricacies of the models above and be clear on which we aim to support through the fund. If, for example, the capital freed up from efficiency innovation is transferred back into empowering innovation then it makes sense and the water sector will truly contribute to objectives of circular economy.

Additional financial support for innovation

We agree that additional financial support will enhance the potential for innovation. The levels of investment in research was reviewed in 2009¹ and showed a diminishing level of R&D investment over time. This can be partly explained by the fact that the return on investment for companies is low as implementation times can be very long and go through lengthy periods of regulatory compliance testing. Benchmarked against other countries and other sectors the report found that multi sector R&D expenditure was 40% below the worldwide average and that water, in contrast to other sectors, "*receives little support compared to other regulated sectors*". The report also found that "*Ofwat could agree a collaborative fund to address agreed priorities as part of the periodic review process*". We agree with Ofwat that the principles and early findings still stand. Furthermore, in its consultation, Ofwat refers to the example of Ofgem. Other successful examples include international alliances between companies to fund common programmes of research and development developed around common objectives. To free up innovative thinking, funding will have to recognise that innovation can fail to deliver the benefits expected and innovators should not be 'punished for trying'. Funding will also have to be protected from efficiency targets.

¹ Independent review of competition and innovation in water markets

Other potential industry activities

The collaboration needed to drive innovation in the sector will require common goals of global interest and service benefits. The development of an innovation strategy will support clarity in goals and agreement in priorities for the sector. In our view, a strategy will also have to recognise the different lifecycles existing across the components of the value chain. Large infrastructure will take long time to develop and has very long life span. For medium term infrastructure, such as MEICA equipment, innovation will take less time to develop and require much less capital. IT and communication allow companies to optimise controls. When thinking of strategy, it is often the people dealing with the larger lifecycle and larger infrastructure who lead the innovation approach. It will be important to unbundle the value chain and apply an innovation strategy across the whole chain, recognising that we need different types of people and skills than those wired in organisations through the current recruitment processes.

One of the key strengths of the proposal is to bring together the sector, companies, regulators and retailers, to work collaboratively and deliver a more sustainable and efficient service. The consultation sets out many areas to improve and stimulate innovation including the need for more collaboration, long-term thinking and the preparedness to accept failure. Amongst the challenges to innovation, the single most problematic area is that the culture of organisations may not be designed to come up with ideas and operationalise them. The consultation invites us for new ways of working and we believe that more can be done. Good examples of structures facilitating innovation are platforms creating a push and pull for innovation and where ideas can be shared. In these platforms², utilities can make an expression of their needs or their pain points which are shared with providers of technology and products at early stages of development. Similarly, developers and researchers can create a push by promoting the uptake of new solutions of products they are working on. Platforms create a network of *innovators*, which is key to transforming the culture of organisations.

There is much work done in the EU on open innovation. This includes the sharing of data and information as well as bringing people together and the sharing of practices. This work also tackles Intellectual Property (IP) issues and IP protection recognising that in open innovation people and companies are exposed and need to be rewarded. The ultimate goal is to encourage people and companies to come up with ideas in part for a share of implementation. This uses mechanisms such as IP share or IP transfers across companies where and when it is most needed. Typical examples of open innovation discuss ideas of research in New Zealand, pilot in the UK and full-scale solution in China. A well-known example is how IBM contributed to the development of open source languages, recognising the wider benefit of providing commercial support services. There are currently many examples of universities and companies with not used ideas. Embedded principles of open data and open innovation will create the mechanisms needed for organisations to benefit from sharing. It will be key to get sufficient frequency intervals of data, to ensure wide spread of a data sets as well as a large range of data dimensions. This will necessitate working in partnership with others, either to gather data as we move to real time sensors on a quantum scale (something we are discussing with Innovate UK), and to ensure that data sets have “enough” data. We would encourage Ofwat to consider the importance of real scale and multi-sector partnerships. This would then make it worthwhile for larger companies such as Google DeepMind to become involved in AI network analytics.

In particular, Affinity Water is committed to open data. We would welcome early dialogue with Ofwat to enable it to publish operational data on a live or near live basis. The challenges in doing so particularly include data standard specification so that data is comparable, published in an open format and is usable by interested parties.

² Innovation platforms WetNetworks (supported by Venturi database), IWA innovators platform

While data hacks are highly valuable and we have benefitted from incorporating insights into our own processes particularly on leakage we believe that open data should be the norm not the exception, allowing us to run digital hacks on a global basis as the norm.

We feel this would have particular benefits in terms of leakage and PCC. It would also demonstrate our commitment to transparency and data quality and foster strong trust amongst customers and stakeholders for example information about abstraction would foster greater trust with environmental groups.

As part of our holistic catchment management innovation project we are also engaging in an open source environmental project. This combines several open source environmental data sensor kits to collect environmental data ranging from water quality to air quality, soil moisture, river flows, and weather data. This would in turn be published using github or a similar platform.

This would allow us to do several things. Firstly, environmental data could be analysed using MANOVA techniques to expand our understanding of the interrelationship between exogenous factors and bursts given different pipe, flow and connection types and conditions.

Secondly, it would allow us to create a digital twin of a catchment. We are already using augmented reality models of a catchment as a means of communication but digital twinning would allow highly sophisticated prioritisation of different drivers of environmental outcomes in a catchment. Using tools such as Microsoft HoloLens has helped firms in the automotive sector to prioritise changes in product design and manufacturing processes. It has also been shown to have significant benefits in terms of human factors engineering for customers.

Thirdly, symmetric and trusted information is critical to a fair market. We intend that our catchment data trials do not merely become yet another pilot but facilitate the expansion of and creation of new markets to bring about much better environmental outcomes. For example, by working with other water companies, river catchment partnerships, academics, river groups and regulators with the Environment Agency at the forefront we have found where urban runoff is a particular risk to water quality in surface water bodies. The next step is to think further about market mechanisms to create run-off buffers that enhance the natural environment. Given that a number of users of the water have a strong interest in reducing the overall cost of improvement of the quality of water bodies.

The application of environmental digital twinning and markets have much larger application at a catchment and landscape scale. Affinity Water is, in partnership with Cambridge Water, the first water only company to use the EnTrade platform to pay for eco-system services (PES). Environmental Land Management (ELMS) can deliver enormous benefits: markets in soil management can help improve water quality, reducing treatment costs, and can improve aquifer recharge. We hypothesise that the effect, scaled up, could be significant, potentially leading to much better ecological outcomes. In trials we have shown that precision farming can also reduce the use of nitrates by more than the overall percentage reduction in nitrate usage in forty years. This creates public value in a number of ways, in particular by reducing air pollution significantly.

Moreover, we believe that natural capital has broad applications in the assessment of the economic public value aligning investment with wider public interest outcomes. For example, groundwater flooding causes economic costs through flood damage, higher insurance premiums and flood defences. Aligning that spending with other public goods, such as restoring chalk stream flows, could reduce the overall costs to consumers of flood prevention and of sustainability reductions.

We will publish data from the sensors on as near a real time basis as possible and make the new sensor design open source using a creative commons licence so that others can adopt and adapt the technology creating further environmental innovation.

Open innovation is a key component of creating an innovation eco-system. However, for insight to become useful a company's processes must be flexible and adaptable to accommodate new

ways of working. To facilitate that we are undertaking a major transformation programme, adopting proven methodology from other sectors, to introduce Six Sigma into Affinity Water. This will then allow us to be fast followers, picking up ideas from other water companies in the UK and internationally as well as completely different sectors. We are also working with a number of international universities and accelerators from San Francisco to Singapore to Cambridge, Massachusetts to pick up new innovations early.

Some data insight and the Six Sigma process will show gaps in industrial technology, which will require major industrial scale trials. For example, self-healing concrete will aid greatly in the repair of major trunk mains but it does not make economic sense for one company to trial on its own at scale. Moreover companies would need to work closely from an early stage with quality regulators. We are discussing this with BRE and the CPA, which in turn will bring benefits to UK manufacturing. The offshore renewables industry offers an interesting model here where the ORE Catapult has co-developed solutions to large industrial challenges that no one company had a sufficient risk appetite to solve on its own. Sub-sea cabling jointing, array profiling, and accelerated life-cycle testing at scale have contributed to previously un-thought of reductions in the cost per megawatt of offshore wind.

It is also key that we shift culture. Research in the Harvard Business Review has shown clearly that inclusion is critical and that diverse ways of thinking are critical to anticipate and adopt new technology. Coupled with lean, diverse thinking will find more creative solutions to the problems identified by a structured problem finding analysis.