Becoming a digital utility

Five challenges facing the UK Water Industry

shaping tomorrow with you

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Foreword

Welcome to Fujitsu's report into the UK water industry.

Fujitsu has provided technology and services to utilities companies around the world for decades. Specifically within the water sector we've helped companies in the UK, Japan and Australia improve efficiencies and performance, reduce costs, and adapt to changing customer and regulatory expectations.

But the changes about to affect the UK water industry during AMP6 are among the most significant we've ever seen anywhere in the world.

That's why we commissioned this report. We wanted to better understand the forces driving these changes and how water companies can best respond. In particular, given our area of expertise, we wanted to understand what role technology could play in addressing them and helping achieve the ODIs committed to under AMP6.

We regularly speak to executives at water companies across the UK and we consistently hear one thing from them: they want to innovate and find new ways of doing things that are better, faster, cheaper, safer, more efficient and more effective. They know that new technologies – which have fallen in price and increased in processing power – have opened up a world of possibilities to improve their organisations. They also know that the new regulatory focus makes deploying smarter technology a priority. The challenge is knowing where to start.

In our view, as we explain in these pages, the key is connecting their assets, intelligence and workforce to drive operational excellence.

I hope this report provides some helpful ideas on the way ahead.

James Johnston
Utilities and Services Director, Fujitsu

Executive Summary

AMP6, lasting from 2015-20, will be a period of fundamental change in the UK water industry. Our research identified five challenges facing the water industry over this period, and ways in which technology can be a key part of responding to each of them:

- **The Regulatory Challenge –** shifting from a focus on CAPEX to TOTEX, while still securing good returns for their shareholders. New technology can drive a cultural shift towards predictive and preventative maintenance, and make better use of data to understand the total cost of ownership across the network.
- **The Customer Challenge –** delivering a better customer experience with a greater focus on SIM. More customer complaints are caused by billing problems than for leaks, so better digital systems that improve the customer experience will make a big difference.
- **The Competitor Challenge –** adapting to the increased competition from new retail providers, for instance through digital-first retail brands or updated product offerings.
- **The Economic Challenge –** driving efficiencies to maintain their margins in a world of lower bills and lower inflation, particularly through new technologies that reduce environmental impacts and reduce costs.
- **The Future Challenge –** planning for a world of increased demand and scarcer resources. Smart meters can be used to encourage less water consumption, while Internet of Things-connected infrastructure can report on performance to optimise the network and stop leaks before they occur.

Water industry executives need to consider how to better use technology to connect their assets, intelligence and workforce to drive operational excellence.

Purpose of Research

It seems certain that AMP6, lasting from 2015-20, will be a period of fundamental change in the UK water industry.

The regulator Ofwat has made it clear that it wants to create a more innovative, dynamic, customer-focused industry, and to achieve this it has or will shortly be introducing a range of initiatives such as SIM scores, a TOTEX approach, business retail competition and outcome delivery incentives.

Over the next five years these initiatives will drive a major change in the culture of the industry and in the ways individual water companies work. It's no exaggeration to say that this will be the biggest transformation the industry has experienced since privatisation in 1989.

In this context, and as a major supplier to the water industry, Fujitsu wanted to understand what role technology would play in driving or responding to the changes likely to take effect over the next five years.

So we commissioned research into water companies' current behaviour and their future plans, we surveyed water executives to hear their thoughts about how the sector is changing, and we analysed a wide range of public sources, including Ofwat and CCWater data.

The result is a portrait of an industry in flux, facing five serious challenges: from an assertive regulator, ever-more demanding customers, new competitors, a difficult economy and an uncertain future.

Over the following pages we explore these five challenges in turn, considering how technology can help water companies adapt to a changing environment and stay on top as the sector they knew transforms around them.

Regulator Challenge
Moving to a TOTEX World

The shift to a TOTEX world, encouraged by Ofwat, is one of the defining features of AMP6.

The shift to a TOTEX world, encouraged by Ofwat, is one of the defining features of AMP6. The new system is designed to spur innovation, particularly in the services customers receive and in how executives design, build and maintain their infrastructure. The imperative in this new environment, in which total expenditure replaces a focus on large-scale capital expenditure, is for water companies' boards to continue securing good returns for their shareholders. To achieve that, executives will need to drive efficiencies within their businesses. What role can technology play in doing this?

Long Term Solutions

The best savings for businesses always come from focusing on long-term solutions, and it's here that technology has a crucial part to play.

Maintenance has always been a costly part of a water companies outlay, but has too often been reactive. A cultural shift away from the heroic emphasis on 'fixing things' and towards more planned, predictive and preventative maintenance will reap dividends over time. For instance, this could involve greater use of sensors on key pieces of equipment to report reduced performance levels, allowing engineers to replace old parts before they completely fail, or measure 'downtime' to intercept problems before they escalate.

A focus on making better use of technology with the workforce is important as well. Too often engineers can make long and expensive visits to water facilities, only to find that the faulty part in question is not one they're familiar with.

That means they often have to go back to base to get the right equipment before returning again to fix the problem.

Relatively simple technologies can cut out these kinds of issues and save time and money. Video conferencing systems on smartphones, for instance, would allow engineers to quickly ask for advice from their more experienced colleagues and show them the problem. Video headset displays would be invaluable in awkward or dangerous situations where real-time input is needed.

These are subtle technological improvements that can quickly create cultural change among an organisation's frontline workers. This could be vital in an industry with an ageing workforce, where one challenge is to attract younger employees who expect digital technology as standard. But just as important is encouraging change in the back office, where processes and procurement often remain untouched for years at a time.

> *Digital technology brings the capability to provide more accurate billing and payment processing, as well as faster response times for changing addresses and bills, removing and adding services, and many other functions. Through technology, water utilities can now gain new insight into customer needs and provide more value not only to individual households but also to agricultural areas with irrigation systems.*
>
> **Jenny Zhang, WaterWorld, 2015**

Procurement Procedures

Changing how procurement think about the cost of what they're buying can help deliver large efficiencies over a multi-year horizon. For instance, thinking about the total cost of ownership over the lifetime of a part or product – from installation to performance monitoring, maintenance and decommissioning – is much more important than just knowing the up-front price tag. Water companies need to have access to better quality data on product performance, and to use that data correctly, to make smarter buying decisions.

Informed, data-driven decisions

The same principle of making informed, data-driven decisions applies across the supply chain too. In AMP6 many water companies are establishing longer-term supplier relationships, often of 12–15 years in length, to create efficiencies. But such efficiencies can only be guaranteed if these relationships are being monitored and measured carefully, with regular feedback on performance and outcomes. If water companies remotely monitor all of their equipment, for example, they can work out if a particular supplier's parts are regularly failing and then switch to another provider to save money in the long run.

And it's not simply a case of investing in sensors and smart, internet-enabled devices to generate this data. Connected infrastructure needs to be matched with a connected workforce able to make use of connected intelligence. In other words, water company executives need to have the right information to make the right decisions, wherever they are. Digital dashboards – and the mobile devices to help them access this data wherever they are across the network – should be high on water companies' shopping lists too.

Customer Challenge
Delivering a Better Customer Experience

When Ofwat introduced the SIM mechanism in 2010, it was broadly welcomed by the water industry.

The rationale was clear: move away from simply measuring performance, towards a metric that put customer experience at the heart of the process.

But some concerns remain about the validity of SIM and whether it could be improved to more fairly reflect the experiences customers have.

Our research, for instance, found that some water company executives remain cool towards SIM: "It's getting better," one water executive told us, "it is moving in the right direction but quite sensitive to individual events."

In particular SIM is currently seen as unfair on the bigger providers operating in highly populated areas, and we found evidence to support these worries. Our analysis confirmed that higher population densities are indeed correlated to higher levels of leakage reports.

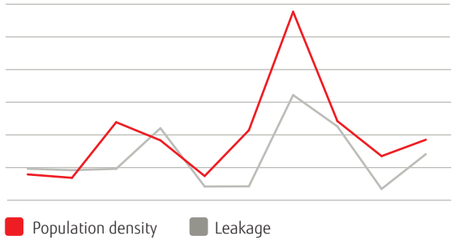
The reasons for this aren't clear, but it seems plausible that operating a larger network with higher demand, and more people around to notice when things go wrong, might make them more likely to generate and receive poor customer feedback.

The executives we surveyed felt that this was part of a wider problem: that the SIM method lacks the necessary sophistication to ensure the incentives and penalties for water companies are symmetrical and fair. While they certainly thought SIM was better than what went before, the executives wondered whether it was sufficiently evolved to reflect what really matters to customers, or if it is still a slightly blunt instrument for such a complex industry.

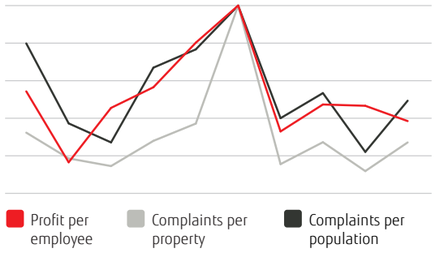
Nonetheless, our analysis found that SIM scores are changing (and improving) as the water industry evolves.

As part of the move to a TOTEX world, water companies are shifting their spend from CAPEX to OPEX, with intensive investments winding down and greater emphasis placed on day-to-day management and servicing of the network. This shift seems to deliver benefits to a company's SIM score, as long as the opex spend is focused on the people delivering the service to customers: our analysis found a clear correlation between opex spent on staff and higher SIM score.

Correlation between population density and leakage by company



Correlation between profit, complaints by population and property



An opportunity for faster and simpler digital systems

Our research also found that customer complaints are far more likely to be for billing problems than for leaks. So it's no surprise that SIM scores can be positively influenced by something as simple as better complaints handling.

The implications of this are obvious. There is a huge opportunity for faster, simpler digital systems that improve the customer experience and increase their awareness of what their water supplier is doing.

This can start with simple things such as better customer handling. Phonecalls need to be routed to the most knowledgeable staff and answered first time so the matter isn't escalated. Online interfaces need to be improved to answer the most common questions and give easy access to data about water consumption or what their monthly bills pay for.

Newer communications methods – from emails and texts to social media channels – should be used better to make customers aware of planned maintenance or network investment, and build communities that understand and support the water company's work.

Improve your SIM scores through analysis

Given that our research identified a link between dense populations and high levels of complaints, water companies might also be wise to analyse their service area and focus their communication efforts in particular on those conurbations that are likely to have the biggest impact on their SIM score. Financial incentives are on offer to companies who can demonstrate improved SIMs. Introducing digital systems quickly could make achieving those financial gains much more likely.

So using technology to gather new insights and real-time feedback, and applying what you've learnt quickly and precisely, are the keys for improving customer experience. As one water company executive we spoke to succinctly put it: "it's about listening to customers and communicating with them."

Competitor Challenge
Competition from New Retail Providers

One issue on the agenda for every water company is the arrival of retail providers in the non-domestic market in 2017. What might this mean for their business?

While the arrival of retail market competition in England has been years in the planning, the Scottish market has operated the same model since 2008 and that experience has allowed water companies to test out new ideas within a familiar UK landscape.

Three Strategic Options

Broadly, there seem to be three strategic options for water companies in the newly competitive, post-2017 world:

- Retreat, and sell off their business retail arm to someone else
- Retrench, and focus on defending their existing operational area or
- Respond to the opportunity, and expand out of area.

It is this third option that is most different from the status quo – so how will water companies structure their businesses to thrive in this new environment?

One option, following the Silicon Valley mantra of 'disrupt yourself', is for the water companies to invest in their own digital-first retail brands, with Chinese walls between these new units and the parent company. This would help them maintain their direct relationship with customers, avoid the risk of being disintermediated, and let them experiment without affecting the ongoing work of the main business. It also makes sense given the likelihood that retailers will make little impact on water companies' bottom lines, in the short term at least. The alternative is to spin off these digital-first brands as separate businesses to truly unleash their disruptive potential.

The Digital Disruption Threat

Digital disruption is high on the agenda for executives in many businesses these days, making them wake-up in cold sweats worrying about the potential for an Uber-like start-up to emerge in their sector. In today's digital world the speed at which such threats can crop up, and the fundamental impact they can have on long-standing industries, cannot be underestimated. But the idea of an 'Uber for the water industry' – terrifying as it is for many executives – in our view seems unlikely given the circumstances of the water sector. Unlike transportation, water is heavily regulated, resource-intensive and the infrastructure is by its nature limited.

However, that doesn't mean that digital-first models can be dismissed. A more fruitful analogy for water companies might be with the financial services sector than with transport. Financial services is also heavily regulated and dominated by well-established players who, on the face of it, have built up impregnable infrastructures and customer bases.

Yet digital innovation among so-called 'fintech' start-ups – such as Transferwise and Zopa – is frightening the incumbent players. These start-ups aren't trying to do everything the established banks do. Instead, they are picking away at the bank's services and 'unbundling' them – doing one thing much better than any bank could and building their entire business around that. Transferwise excels at international money transfers, for example, which it does through its app for a fraction of the price a high street bank can. The result is a slow whittling away at a bank's proposition, and a quiet exodus of customers from traditional services to more exciting rivals.

There's a strong potential for water companies to experience the same unbundling. Start-ups could focus on digital services that provide data-led insights on a customer's water usage, for instance, or build off the information from smart meters. Relatively quickly they could usurp the incumbents and leave them looking like dinosaurs...

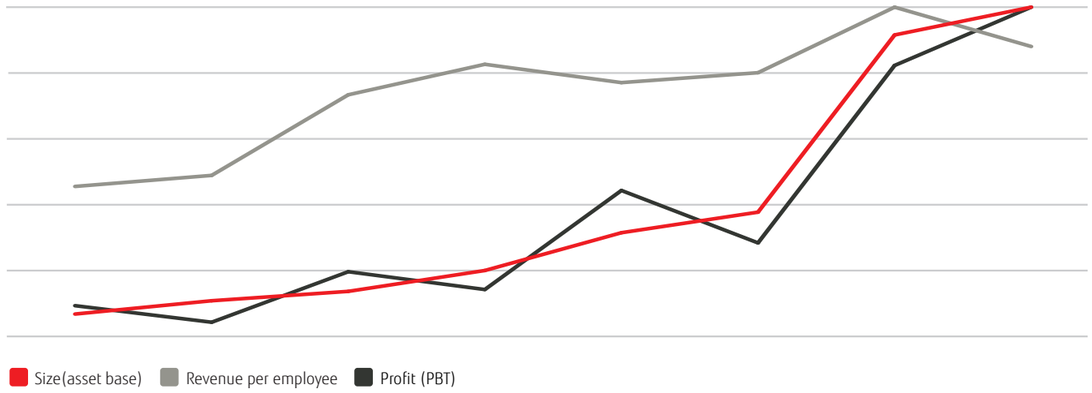
As a different approach, water companies could look at other defensive manoeuvres that position them for a world of greater competition and, potentially, greater consolidation. Our analysis of water companies' revenues and profits confirmed that larger businesses are more efficient, and we have seen Ofwat expressing its openness to the idea of M&A within the industry, so perhaps moves in this area are on the horizon.

We've also started to see more consolidation in product offerings too. A company like SSE, for instance, is pioneering a multi-utility model whereby it offers gas, electric, telecoms and, in Scotland, water as well.

There's an established model for this 'quad-play' offering in the media industry, where broadband, home phone, mobile and TV services are offered by brands such as Virgin Media, BT and TalkTalk. The experience in that industry suggests the power of offering a single bill is highly attractive to customers who value simplicity above all else. It also means individual parts of the service can be offered 'free' or at a discount – could we soon see a multi-utility giving water away for free within a bundle of services?

Whatever the scenario, it looks like the status quo isn't an option for water companies over the next few years.

Correlation between asset base, revenue and profit



Economic Challenge
Lower Bills and Lower Inflation

Following privatisation in 1989, the UK water industry enjoyed a backdrop of relatively stable GDP growth and inflation for almost two decades.

But this all changed in 2008. The global financial crash required drastic measures to keep the UK economy afloat and interest rates were cut to 0.5%. What was intended as a temporary measure however has, remarkably, continued for 77 months (and counting) without a change.

In this context, inflation at below 1% – and potentially even below 0% – has been described as 'the new normal' by the Bank of England. For the foreseeable future, we will be living in a low-inflation economy.

Compounding this challenge, from the perspective of the water industry, are two other trends: a regulatory framework committed to reducing bills; and an increase in how many people live in cities, where it is more expensive to operate due to the greater complexity of the urban environment. When these three factors are allied together – low inflation, lower bills and higher costs caused by greater urbanisation – the result is an urgent need for water companies to drive efficiencies that help them maintain their margins, despite such downward pressures on prices.

With this economic background, what can smart utilities do to give themselves the greatest level of efficiencies? More and better use of technology seems like an important component in any menu of solutions, as technology provides lower-cost ways of doing things that last over the longer term, as opposed to one-off cost-cutting measures.

In particular water companies are looking at environmental options to help them reduce overheads and achieve long-lasting savings. As energy costs form a large part of water companies' operating expenses, and as there has been a gradual rise in energy usage within the water industry in recent years, more utilities are using renewable energy across their estates and exploring ways to reduce their carbon footprint.

Anglian Water, for example, has resorted to off-site manufacturing and innovative technologies that use less oxygen to treat the greater volumes and concentrations of effluent it has to manage. One area Anglian focused on was the removal of nitrates from its drinking supply: its innovative Nitreat technology, now widely adopted throughout the industry, led to a 22% reduction in nitrate footprinting and generated both CAPEX and OPEX savings. We can expect to see similar projects in future aimed at tackling the most environmentally costly areas of water companies' work, or even the wholesale divestment of units with high environmental pollution levels.

Meanwhile Thames Water has initiated a 15-year programme to roll out smart meters across its service area, as part of a programme to reduce its carbon footprint and save energy. These meters will transmit regularly to Thames's IT systems, helping it monitor water usage in real time and reduce consumption by 10%.

Important as these initiatives are, they need to be underpinned by a strong framework of long-term policies and objectives if they are truly to generate efficiencies that maintain the water companies' margins. That means properly aligning water companies' supply chains so that they are incentivised to consciously reduce their carbon footprint.

Again, Anglian Water has led the way here, with strategies such as a stringent governance process to limit capital carbon and operational carbon against a defined baseline. With the right frameworks in place, water companies and their supply chains can confidently explore new ways to reduce their overheads, cut their environmental impact, and generate efficiencies that produce long-term savings.

Future Challenge
Planning for Higher Water Demand

The long-term challenge for UK water companies is coping with a world of increased demand and scarcer resources.

Rising Demand
Demand will rise as the UK's population increases from 64m now to a predicted 70m by 2027. And water will become scarcer as climate change takes effect: the latest forecasts suggest that the UK's weather will be significantly warmer and drier by the end of this century than it is now.

In the face of this profound challenge, our research found that water companies have developed a range of internal and external approaches to better managing water availability and are exploring new strategies to diversify their water supply over the next five to 10 years.

From an internal perspective water firms must improve at three things if they are to manage availability better: customer management, distribution management and resources management. All of these offer opportunities for better use of technology.

Customer Management
Customer management means encouraging them to use less water and adopting water-saving techniques, for instance via smart meters, apps or even, in future, wearable technologies that monitor consumption. (If water companies are to drive significant savings, however, they will need to think harder about how they can incentivise and reward the right behaviour, beyond merely measuring usage and reporting it back to their customers.)

Distribution Management
Distribution management is all about reducing leaks and optimising the network. This is where Internet of Things-connected infrastructure and sensors that report on network performance are so crucial; they can also help a company shift from costly reactive maintenance to cheaper and more effective preventative maintenance. And in the future we could even imagine that drone technology will be used to identify leaks (as they currently are in Israel) or spot minute movements in the position of pipes before problems occur.

Resource Management
Finally, resources management can be improved with the use of advanced software to help on resource planning, identifying likely demand 'hotspots' and anticipating the need for alternative reserves.

Solutions
From an external perspective, water firms are focused on mitigating any bottlenecks in the availability of water. They are exploring, first, environmental solutions that reduce their dependence on rainfall and, crucially, reduce their energy usage through greener systems such as smart meters and lower-carbon treatment methods.

Secondly, they are deploying more cross-border solutions and sharing resources with neighbouring water companies. Severn Trent and Anglian Water are even carrying out intra-company bulk transfers from their surplus to deficit regions.

Lastly, they are experimenting with other solutions such as local inset agreements and new infrastructure such as dams and pipelines to add more flexibility to the network. Looking beyond AMP6, water trading – managed by state-of-the-art IT systems – is a possible alternative to investing in capturing water locally.

Solutions (continued)
And while at the moment fine-tuning of the network (such as pressure levels, leaks and energy consumption) is done manually, there's no reason why in the future these kinds of interventions couldn't be automated through digital infrastructure.

No single solution exists to the complex, long-term challenge of greater demand for water and scarcer resources. Water companies are right to explore a variety of ideas as they look to protect and diversify their supplies. As time goes on and the easiest changes are implemented, the task will be to identify more sophisticated answers to a problem that will be with us for decades to come.

Conclusion

Every five years the UK water industry faces a new set of challenges and opportunities. But at the start of AMP6, it's fair to say that the issues in water executives' in-trays are more substantial and more complex than in any previous period.

Ofwat is changing some of the basic aspects of the industry – such as competition levels and customer satisfaction scoring – that have been familiar from previous decades. Customer expectations are increasingly rapidly. The economic situation is more challenging than in years past. And the long-term challenges of increased water demand and greater scarcity feel more pressing than ever before.

Technology has been defined as the ability to do 'more with less'. That's certainly something the water industry needs right now. Water companies need to deliver better customer service, better shareholder returns and better levels of efficiency, even though they have less flexibility (and less money to invest) than in previous years.

The technology solutions we have outlined in this report range from large, structurally complex deployments that will transform companies over the long term (such as Internet of Things-connected pipes) to small, low-cost gadgets that provide quick fixes to daily issues (such as video headset displays for engineers). Together, these solutions help connect a water company's assets, intelligence and workforce to drive operational excellence.

The message is clear: whether the problem is big or small, technological solutions should be top of water executives' minds.

Methodology
Fujitsu commissioned Coleman Parkes to survey 15 water executives in early 2015, and research water companies' current activity and future plans through publicly available information. Coleman Parkes also analysed a wide range of other public sources, including Ofwat and CCWater data.

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