Digital Inside Out

Transforming Utilities

shaping tomorrow with you

FUJITSU

Contents

"Helping utility companies find cost efficiencies and improving customer experience via digital initiatives is a core part of Fujitsu's Digital value-proposition. We understand that to be truly digital, enterprises must look at their business inside out; empowering employees, retaining and growing customers and leveraging emerging innovation / digital technologies."
Mike Sewart, Director of Digital Services

New connections, new opportunities

Amidst mega trends that span climate change and price volatility to increasing urbanisation and ageing workforces, utility leaders are investing in digital to drive safety, cost efficiency and customer centricity. The Internet of Things (IoT) is at the heart of this opportunity – a hyper-connected ecosystem that can unite people, information and assets.

From smart meters and grids through to connected homes and cities, the digital opportunity is all about forging new connections. This presents possibilities in every aspect of the utilities value chain – spanning customer-facing touch points through to back-office services and in-the-field operations.

At the same time it also creates space for digital-first entrants to disrupt, igniting a myriad of business models that leapfrog traditional offerings to tempt customers with better choice and convenience.

The Internet of Things in numbers

By 2020:

30 billion connected devices in the home and in the utilities industry worldwide.[1]

50% of all European water meters should have smart capabilities.[2]

Over **$200 billion** worldwide revenue opportunity for utilities.[3]

44 zettabytes global data volumes.[4]

Digital inside and out

In the hyperconnected world, digital is no longer just a service channel or technology silo. It's a way of reshaping products, services and end-to-end processes for efficiency and customer-led growth.

At Fujitsu we believe that a digital 'inside out' perspective presents a radically different future for utilities. This is a world where we envisage greater intelligence, automation and business opportunity. Where we can reinvent customer processes, empower employees and rethink business models.

A world in which:

- 'Passive ratepayers' emerge as informed, environmentally-aware consumers.
- Processes are highly automated and driven by proactive energy management.
- Predictive asset maintenance amplifies performance whilst reducing cost.
- Intelligent grids detect energy loss, prevent outages and sense demand.
- Utility companies embrace new business models across adjacent industries.

This report lays out our insights on how utilities can leverage the digital opportunity across three dimensions – connecting assets, intelligence and the workforce.

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

1. "The Internet of Things", Utility Week, July 2014
2. "The Internet of Things is Now", Morgan Stanley, April 2014
3. Worldwide Internet of Things Spending, by Vertical Market 2014–2018 Forecast, IDC, June 2014
4. IDC, Digital Universe, April 2014

Connecting assets
For efficiency and growth

As the adoption of smart metering picks up pace, we see a proliferation of connected devices, machines, appliances and meters within homes, power stations and water plants. By harnessing the data generated by these objects, utilities can maximise asset performance and customer engagement.

Smarter operations

In an asset-intensive industry, the concept of connected assets is well understood, as utilities companies strive for the best operational outcomes – often with ageing infrastructures and shrinking budgets.

The data from connected assets offers new scope to proactively monitor the condition and performance of equipment. This drives intelligent automation and smarter decisions over when and how to intervene, evolving from time-driven to event-driven maintenance for an asset portfolio that is both high performing and cost efficient.

As a result, companies can 'sweat the asset' for longer whilst reducing the degradation of each network element through targeted maintenance. Instead of replacing broken components, engineers can remotely monitor their status and respond to a drop in performance with more cost-effective prevention. This reduces the costs of taking an asset out of service or being fined for lack of availability.

Smart Asset Management from Fujitsu

Fujitsu uses sensors and workflow to detect and track assets through their lifecycle.

This helps utilities reach exemplary levels of efficiency and safety by providing visibility of real-time input from sensors, industrial controls, smart meters, tools, and equipment.

Putting connected assets to work

Retail energy providers using smart vans with equipment pre-loaded per job would improve first-time fix rates for services such as boiler repairs. With the engineer route optimised in advance, fuel bills and company's CO_2 emissions are easily reduced.

Power or gas distributors can reserve checks for equipment that needs attention to save the high costs of routine engineering visits. They can also deploy remote infrastructure checks or drones to automate maintenance effort, saving site visits for more complex network issues.

Water companies able to remote monitor their pipes for blockages would reduce the impact of a sudden problem while meeting the need to reduce Capex and Opex under AMP6. With advance warning of where problems lie, engineers could remedy the issue before any customers were affected.

9 in 10 UK adults are confident or highly confident in using digital services.[5]

More than 25% say that digital excellence makes them feel more loyal to the company or brand providing it.

5. http://www.fujitsu.com/uk/Images/Digital-Inside-out.pdf

Customer-led innovation

The benefits of connected assets create downstream customer value through lower bills and higher service levels – crucial as competition intensifies. But operational improvements can also be experienced first hand by consumers in the home.

For example, as shown by Cliomote's remote heating apps, consumers can control devices from their smartphones, switching them on and off to save money or become energy efficient. This could be extended to include service operations, sharing data about a device's vital statistics, triggering maintenance actions or alerting people to faults. And if a service engineer is needed, they can arrive at a customer's home armed with the right parts for a guaranteed first-time fix.

Utilities can also explore new business models and customer offerings with adjacent industries. For example, partnerships with white goods retailers would allow customers to purchase appliances with pre-built energy contracts or instant replacement of parts.

By increasing the levels of automation for simple tasks, connected devices can empower self-serve channels. These achieve better cost efficiency whilst meeting customers' desires for speed and simplicity – reserving telephony channels for more complex queries.

At the same time, connected devices increase the opportunity to have more meaningful, value-add interactions in a traditionally low-touch industry. We believe this can make a dramatic improvement to customer perceptions – with our insights showing that 80% of consumers believe that digital services improve the overall experience when dealing with organisations. This is particularly pertinent for utilities, when the same research indicates that less than half of consumers are satisfied with digital services, and only one in ten believe they have improved in the last two years.[6]

For example, providers could help people visualise and understand their energy consumption at an appliance level, as shown by pioneers PlotWatt, Smappee and Bidgely. Equally, smart devices can learn to react to a person's habits, preferences and routines – automatically adjusting supply and feeding intelligence back into the grid for an accurate demand-supply balance.

63% think utilities' digital services are important in their daily lives

73% of utilities' consumers choose digital

67% are satisfied with the digital services offered by utility companies

Top 5 reasons why consumers choose digital[7]

1. Speed

2. Simplified processes

3. Cheaper

4. Ability to do things anywhere, on the go

5. Keep track of interactions

6. Fujitsu Digital Inside Out Research (taken from document by Graeme Wright: 'Utilities – Fuelling Growth with Digital')
7. http://www.fujitsu.com/uk/Images/Digital-Inside-out.pdf

Catching up with other industries[8]

Which industry would consumers most like to see improve their digital services?

Local Government 24%

Utilities 20%

Central Government 20%

Which industry has improved its digital services the most in the last two years?

Retail 32%

Financial Services 26%

Utilities 10%

Fujitsu delivers supply chain efficiency at Airbus

Airbus uses Fujitsu RFID labels to manage individual aircraft components. This allows all of an aircraft's parts to be tracked with complete traceability for a more efficient, transparent and compliant supply chain – from manufacturing to maintenance across multiple companies and countries.

Fujitsu gathers sensor data to tackle traffic trends

Fujitsu's SPATIOWL cloud service uses location information gathered from sensors and vehicles. This creates value by gathering insights on vehicles in motion, people and facilities. In Indonesia this innovation is being used to tackle traffic congestion and in the Philippines to calculate power-consumption profiles of electric vehicles and optimum routes to charging stations.

8. http://www.fujitsu.com/uk/Images/Digital-Inside-out.pdf

New opportunities in the connected home

Data captured is fed back to the Smart Grid for accurate demand-supply.

Smartphones become a hub for full-home control.

Automated rules schedule maintenance tasks on in-home devices – informing service engineers of problems and parts needed.

Homeowners are given personalised energy-saving advice using insights from smart meters and individual appliances.

Connected assets transform the working day

All jobs are scheduled for the day in order of importance and based on the most efficient route.

Assets are scanned to record maintenance work, whilst a remote 'how to' library offers engineers over-the-shoulder advice using 2-way video links via head-mounted displays.

Vehicles can be scanned to locate stock or assign the right engineer from a shared knowledge base.

Equipment maintained as per manufacturers' warranties, prolonging life of assets.

Network-connected sensors enable condition-based maintenance, reducing unnecessary site tasks to increase productivity and reduce CO_2.

Data flows freely from asset to operational systems, guiding workers via augmented reality tools – displaying insights and historic trend analysis to increase productivity and safety.

Connecting intelligence
For competitive edge

Information is the greatest untapped resource and it's growing at a staggering rate in an increasingly connected world. This holds invaluable insights on customers and assets, and is the lifeblood of new digital services and business models.

Data fuels intelligent utilities

Through advancements in cloud, connectivity and analytics, we can now unlock unimaginable value from vast amounts of data that was previously out of reach. As a result, the ability to analyse information and build knowledge has become a key business competency.

More than ever, utilities need to apply scientific data analysis for in-the-moment insights on Big Data – data that is large in volume, variety and velocity. This is derived from a multitude of sources, including sensors, human activity, social channels and machines.

By making the right connections between data points, utilities can achieve more effective and sustainable operations, and provide premium, real-time services for a growing audience of connected customers.

At the same time, data-led machine learning can be used to recognise patterns, images and language as part of automated processes. This allows utility companies to support human activities with smart machines in order to:

- Limit the likelihood of human error for safer working conditions.

- Maintain assets as per pre-configured rules and manufacturers' warranties.

- Reduce the risk of non-compliance with regulatory requirements.

- Capture insights and trends on an asset's performance or environmental conditions.

> *We have to adapt to disruptive new business models but without undermining the core strengths which have been built up over a long period of change.*
>
> James Johnston, Director, Cloud Sales, Fujitsu UK & Ireland

Powering new business models

As we harness data to improve operations, leaders are also thinking about how to use data to fuel future revenue streams and business models.

This opens up infinite possibilities for utilities to interact with adjacent industries, reaching new audiences or expanding portfolios by co-creating digital services through partnerships. For example:

- Using data captured by connected assets for more dynamic home and insurance solutions.

- Re-selling data from smart grids, meters and devices for entirely new revenue streams.

- Exposing data on individual parts and equipment for better visibility and collaboration across supply chains.

- Capitalising on an open-data movement that is expected to make a significant impact on the global economy through the creation of new services for the public sector.

Fujitsu creates knowledge from Big Data[9]

- Fujitsu offers cutting-edge technologies such as ultra-fast parallel processing, complex event processing, data mining and cloud services for Big Data. Customers can use services on an as-needed basis, tapping into the expertise of our 'Data Curators' who have specialist analytical skills.

- Fujitsu Laboratories collaborate with the Insight Centre for Analytics, Ireland in the research and development of 'Linked Open Data (LOD)'.

- Our 'DataPlaza' is a forum for linking and aggregating data. It lets organisations access external data such as social media, creating an open ecosystem that energises data use.

9. From page 22 of the Fujitsu Technology and Service vision PDF

Security becomes a point of differentiation

As with all industries, digitalisation has a dark side, as we face the threat of cyber attack, industrial espionage and security breaches.

Consumers also share this issue, with our research showing that over a third consider security concerns as the biggest barrier to digital services adoption.

The credibility, security and privacy of information will undoubtedly carry greater importance in the future. To be considered a trustworthy brand, information security and data protection policies must be watertight.

36% of consumers said that security concerns were a barrier to the use of digital services.[10]

Information and Operational Technology converge

Operation Technology (OT) supports physical elements such as devices, sensors and plant equipment, while Information Technology (IT) applies the technologies needed for information processing.

OT and IT have historically been managed as two different domains, with separate standards and models. However, over the last few years, IT based technologies and protocols such as MTQQ for equipment control have been developed and adopted by OT.

Utilities can reap the benefits of IT-OT convergence as information moves freely across harmonised data models and between the digital and physical world. This can, for example, optimise distribution networks or support dynamic tariffs by uniting data generated by meters, micro- or renewable- energy sources and weather conditions.

But is does mean that managing the two worlds of technology separately needs to change if the business is truly to become digital and maximise the full benefits across the asset base, the workforce, and the customer.

Fujitsu's workflow solutions improve operations and agility

Fujitsu's customers are taking advantage of IT/OT convergence with a software platform that quickly deploys process-driven applications to connect different objects and sensors. For example, when a sensor reaches a pre-defined value a business process can be triggered which prompts a set of actions.

RATP, France's public transport operator, is a case in point. It used the automated workflow solution to create a new process for incident management. This allows field officers to report bus-line incident data and photo incidents on an Android-based mobile application. The data is then shared instantly with the main office, increasing the speed of incident management.

10. Digital Inside Out: Creating a digital-first Britain, Fujitsu, 2015

Connecting the workforce
For empowered employees

How can you produce the most value in the digital world? By putting your people at the centre. A connected workforce is an empowered workforce.

Empowering employees

Our research shows that a healthy 61% of utilities employees think that digital services make their lives easier. And encouragingly, 64% are satisfied with these digital services, compared with just 46% two years ago.

Despite this, almost three quarters (74%) think that their utility employers should invest more in digital in the next two years – higher than in any other sector.

These figures clearly indicate that the utilities workforce is seeking better digital enablement. In fact, in our research, over a third of utilities employees agreed that they're not getting the most value out of digital services.

So what does an empowered workforce look like?

At Fujitsu, we have a vision for human-centric technologies and systems that work together to create a better place to live and work. This means:

- Helping people to share knowledge, to collaborate and innovate – across organisational boundaries and via their device of choice.

- Providing a safe and secure working environment.

- Giving access to the right information any time, anywhere and in a digestible format.

- Allowing people to add more value by freeing them up from manual tasks.

Top 3 benefits of digital to employees in utilities[11]

1 Ability to work remotely and flexibly

2 Real-time access to information

3 Time savings

Connecting Assets

Tagging and Sensory Technologies

Network Integration and Services

Edgeware Applications

Connecting Intelligence

Cloud Platform and Integration Services

Data Centre Services

Connecting Workforces

Actionable Analytics

Application Support and Development

Complete Service End-User Support

---

11. http://www.fujitsu.com/uk/Images/Digital-Inside-out.pdf

Fujitsu connects and empowers the workforce

Metawater is a leading Japanese service-provider addressing the challenge of repairing and maintaining the country's ageing water supply. With demand for these services growing, the company faced two main issues: how to transfer skills from engineers approaching retirement and how to improve efficiency.

Metawater uses Fujitsu Augmented Reality technologies for its inspection routines as part of its platform, Water Business Cloud. This takes data from embedded sensors which monitor water levels and conditions.

Employees can use a smart tablet to scan equipment and instantly access on-screen guidance and knowledge about a specific part. In-built cameras and dedicated software allow engineers to view components with relevant technical detail overlaid on the screen. If the engineer cannot solve the problem, they can record the details and pass it on to more experienced colleagues in real-time.

This has allowed engineers to improve the efficiency of inspection and maintenance work, whilst helping people share experiences. In addition, modern workplace tools help attract new recruits into the industry and provide reassurance that the highest possible levels of safety are being met.

Helping employees to help customers

When we asked utility employees where digital investment should be spent, Customer Service came out on top. We see three quick wins to support this:

1. Using social media to reduce the burden on call centres.

2. Ensuring accurate field data and customer information to reduce contact volumes.

3. Introducing smart assets to minimise issues and cut complaints.

Shaping a future-ready workforce

One of the biggest issues facing utility companies is 'brain drain' – the loss of skilled staff as they retire. But by staying ahead of workplace trends – such as Bring Your Own Device and in-the-field mobility – utilities can plug the talent gap.

A modern workplace experience helps change perceptions of utilities as a manually intensive industry, appealing more to next-generation employees. Equally, it can help attract sought after skills in areas such as data science – creating the right blend of skills as the industry shifts from an engineering to customer culture. Our research amplifies this point, with 75% agreeing that their decision to accept a job is impacted by workplace technology choices.

A contemporary workplace experience

Wearable devices provide instant alerts to changes in conditions, promoting the health and safety of workers.

A remote 'how to' library offers engineers over-the-shoulder advice and 2-way video links via head-mounted displays.

Maintenance work is supported by a full audit trail, for traceability of all in-house or third party involvement.

Engineers have at-a-glance access to all relevant information.

Paperless processes reduce error and time to completion.

Equipment is tagged to ensure it is delivered on site, in time for planned work.

Infrastructure on the move

Allows all working teams, including partners and third parties, to collaborate as a single unit.

RFID 'smart tag' technology scans stock and locates items needed to complete engineering tasks.

Local infrastructure forms a pop-up site – in a van and on the move.

Mobile site communications can be quickly assembled.

Cloud-based systems provide immediate access to workplace systems, e.g. Office365.

Connecting it all together

For utilities, digital has far-reaching implications for commercial gain and social value, particularly as we seek sustainable options for a growing global population with dwindling energy resources.
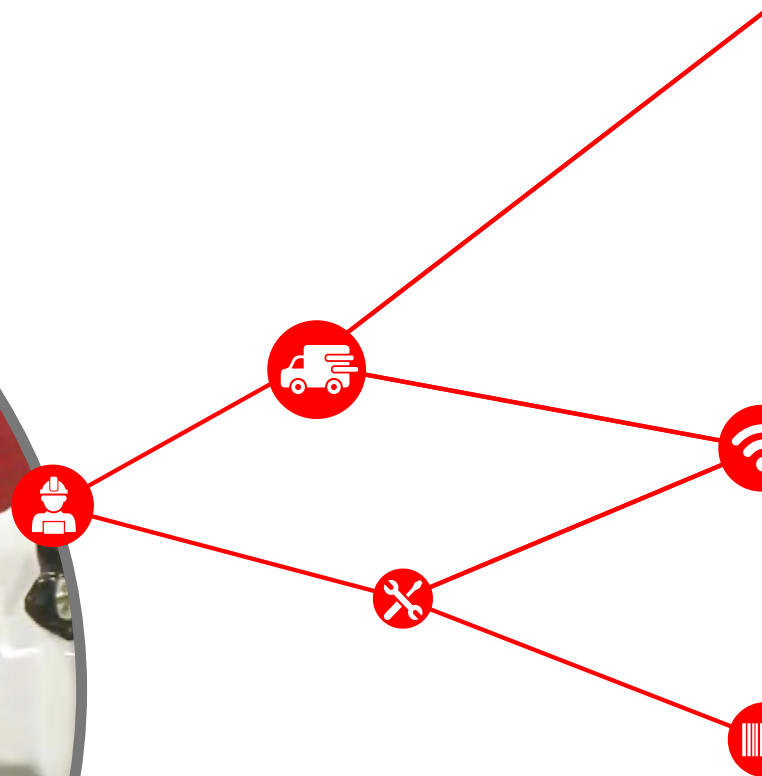
No longer an 'added convenience', digital is now a fundamental way of life for utility companies – a catalyst for operational efficiency and an integral part of the customer experience.

Looking ahead, our digital imperative will amplify and, as new connected ecosystems emerge, we must be ready to seize opportunity at scale. This means creating value by integrating physical and digital worlds for innovative ways of working and seamless customer experiences.
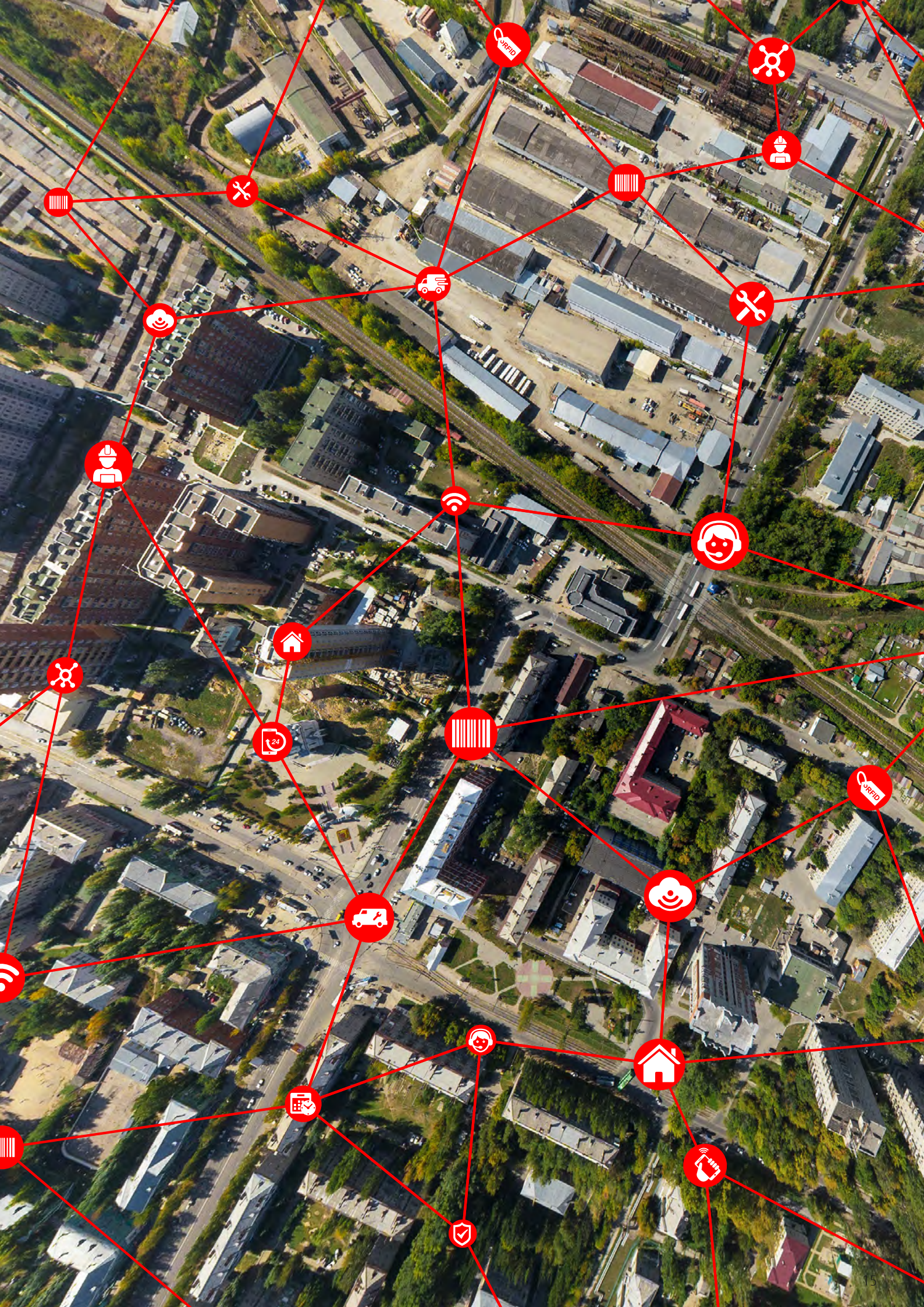
As a partner for innovation, Fujitsu is ready to step up to this new era by connecting and empowering your people, information and infrastructure.

> "*Utilities need to develop an effective strategy to address people, process, technology and data to get significant value from analytics. Utilities need to recognise where analytics can provide business value and implement effective tools and templates to take advantage of it.*"
>
> IDC Energy Insights, 2015

FUJITSU

22 Baker Street
London W1U 3BW
Tel: +44 (0) 870 242 7998
Email: askfujitsu@uk.fujitsu.com
Web: www.fujitsu.com/uk

@fujitsu_uk

ID. 3349/08.15