Digital Super Towns

vodafone

Unlocking Digital Potential in Wales

WPI STRATEGY

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Contents

About this report 2
About Vodafone 3
The need for action 5
How to create Digital Super Towns in Wales 7
Attracting, retaining and reconnecting digital talent 7
Catalysing growth in the digital economy 9
Speeding-up improvements to digital infrastructure 10
Measuring digital potential in the towns and cities of Wales 11
The three scorecard categories 11
Scorecard results – Pacesetters, Pillars and Prospects 12

Annex I 13
Scorecard Methodology 13
References 14

About this report

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About Vodafone

Vodafone UK's mission is to deploy technological innovation to unlock human potential. Vodafone directly employs around 200 people based in Wales and indirectly employ 480 people in Cardiff.

Vodafone is committed to rolling out good quality 4G coverage to the vast majority of the Welsh population. Vodafone has invested £1bn a year over the last two years and will invest a further £2bn over the next few years to continue to improve mobile coverage. Vodafone is adding new sites across Wales as well as upgrading existing 2G and 3G services. Towns and cities are only part of the equation, and Vodafone is also working hard to bring connectivity to rural communities.

Vodafone is also working with Wales in other ways. In May and June 2018, the Volvo Ocean Race – one of the most prestigious sailing events in the world – came to Cardiff for the first time in its 45-year history. The race festival site in Cardiff Bay attracted tens of thousands of visitors over two weeks. Vodafone contributed a temporary coverage boost and pop-up charging stations to support the smooth running of the event.

Key Messages

Action is needed if Welsh towns and cities are to take advantage of Fourth Industrial Revolution technologies, which will change how we learn, work, receive healthcare and deliver public services. By adopting the policies set out in this report, the urban areas of Wales will be better prepared to take the opportunities brought about by innovations like artificial intelligence, robotics, autonomous vehicles and the Internet of Things.

Attract, retain and reconnect digital talent by:

- Converting unused or underutilised public sector buildings into low-cost offices for digital start-ups.
- Creating a network of local digital mentors who host regular drop-ins at co-working spaces.
- Encouraging investors and high growth digital businesses to build relationships.
- Providing support to Welsh businesses to adopt digital technology.
- Reconnecting the digitally skilled to the digital economy following career breaks.

Catalyse growth in the digital economy by:

- Introducing a series of competitions to spur innovation in the use of data.
- Exploring how data can be used to understand the digital talent of different localities in Wales.
- Creating Digital Enterprise Zones in Wales, focussed on enhancing digital economies.
- Creating Welsh 'IoT councils' to support the adoption of new technology.
- Trialling digital marketing vouchers for SMEs in Wales with export potential.

Speed-up improvements to digital infrastructure by:

- Progressing the key areas of the Mobile Action Plan.
- Trialling ways to allow greater access to existing infrastructure to build more digital infrastructure.
- Experimenting with ways of removing the need for full planning permission for mobile infrastructure.
- Opening-up markets to more competition.

To maximise the effectiveness of policy initiatives requires a better understanding of local digital attributes. An analysis for this report measures the performance of major towns and cities in Wales on measures of the digital economy, digital skills and digital infrastructure. The results put each town or city into one of the following categories:

- **Digital Pacesetter** – A digital high performer when compared to others within the scorecard.
- **Digital Pillar** – A solid digital performer, but not yet at the levels of a Digital Pacesetter.
- **Digital Prospects** – A digital base to build on, but not yet at the levels of a Digital Pillar.

The below table shows how towns and cities in Wales are categorised by these definitions.

Town or City	Local Authority Area	Economy	Skills	Infrastructure
Barry	Vale of Glamorgan	Pacesetter	Pacesetter	Pillar
Bridgend	Bridgend	Prospect	Pillar	Pacesetter
Caerphilly	Caerphilly	Pillar	Prospect	Pillar
Cardiff	Cardiff	Pacesetter	Pacesetter	Pacesetter
Cwmbran	Torfaen	Pacesetter	Pillar	Pillar
Llanelli	Carmarthenshire	Prospect	Pacesetter	Prospect
Merthyr Tydfil	Merthyr Tydfil	Pillar	Prospect	Prospect
Neath	Neath Port Talbot	Prospect	Pillar	Pillar
Newport	Newport	Pacesetter	Pillar	Pacesetter
Swansea	Swansea	Pillar	Pacesetter	Pacesetter
Wrexham	Wrexham	Pillar	Prospect	Prospect

It is important to emphasise that the scorecard is based upon a Welsh town or city's relative performance, meaning its categorisation as a Pacesetter, Pillar or Prospect could change. For example, Swansea is currently categorised as an infrastructure Pacesetter – if it does not invest in FTTP connectivity and other towns or cities do then it will slip down the rankings.

The need for action

The Fourth Industrial Revolution is transforming our economy and society. It is being driven by digital technologies such as artificial intelligence, robotics, autonomous vehicles and the Internet of Things. It has been said that these technologies will connect the physical, digital and biologIcal worlds and have massive potential to change how we learn, work, receive healthcare and deliver public services.[i] This will potentially have huge benefits for individuals, communities and businesses across Wales.

The best possible digital connectivity is needed to fulfil the promise of the Fourth Industrial Revolution. Vodafone's vision for this connectivity is the 'Gigabit Society' – where households and businesses can access gigabit speeds, low latency and reliable performance from future-proofed fixed and mobile technology.[ii] To realise this vision requires concerted action. This report sets out a blueprint for what urban areas in Wales can do to prepare for the Fourth Industrial Revolution and create 'Digital Super Towns' across the country.

It is clear that policymakers in Wales are alive to the possibilities of digital technology. The Welsh Government's Economic Action Plan recognises that, *"…artificial intelligence and other forms of digitalisation are already transforming industries and individual firms, breaking down the traditional boundaries between different sectors of the economy"*.[iii] Not only this, but policy has been enacted to support digital growth:

- **Digital investment features in the Cardiff and Swansea City Deals.** The Cardiff Capital Region's digital strategy includes regional and community WiFi, 5G access and maximising the potential of Open Data.[iv] In addition, Cardiff has been allocated £6m by DCMS as part of the Local Full Fibre Network programme.[v] In Swansea plans have been made to transform parts of the city into cutting edge digital districts.[vi]
- **The Welsh Government has published a Mobile Action Plan**. While recognising the challenges of creating mobile connectivity in rural areas, the Mobile Action Plan recognises that there is a need to add network capacity in urban settings in response to rising demand and new technologies. The Plan also lists actions related to planning, regulation and public assets to improve mobile connectivity.[vii]

This report does two things to contribute to the debate in Wales about how to improve digital outcomes:

1. **Presents ideas for how to improve digital outcomes in Wales**. All of these ideas can be implemented in Wales under its devolved powers.
2. **Presents an analysis of the digital skills, economies and infrastructure of the major towns and cities in Wales.** To be able to truly maximise digital outcomes requires a better understanding of the digital strengths and weaknesses of local areas.

Vodafone's work with Welsh public services

Vodafone has been working with the Welsh Ambulance Service Trust to implement cost-saving and efficiency measures. A prime example is the overhaul of the ambulance service's paper processes. In the past, paramedics would fill out paper forms that were time consuming, that would contain inaccuracies, that would get misplaced and that would take weeks to be inputted into the right systems. Vodafone helped to improve the system by creating identical copies of the form on digital paper that could be completed with a digital pen. Using this method the paramedic's notes are encrypted and stored, and then transferred instantly when the digital pen is docked at a hospital or ambulance station. The paramedics did not have to learn anything new - the transition from old world to new world could not have been easier. There have been no more lost forms and no more missing data. Following the success of the scheme, the digital pen and paper was upgraded in March this year.

Vodafone is also working on some other public sector projects in Wales, including:

- Giving ambulances WiFi hotspot capability for rural communications. 30 hubs have been deployed as a proof of concept, with the results being reported later this year.
- Reviewing connectivity in the Welsh Fire Service contact centre. After finding weak connectivity, 4G connectivity was provided across the contact centre within 24 hours. Vodafone is now looking at how it can assist the fire service with inbound emergency and non-emergency calls, and at how IoT can drive efficiencies.

How to create Digital Super Towns in Wales

If Welsh towns and cities are to realise the opportunities arising from the Fourth Industrial Revolution, policymakers need to take action in the following three areas:

1. **Attracting, retaining and reconnecting digital talent**. People are the cornerstone of a successful digital economy and growing the stock of digital talent will support the adoption and use of new technologies. Towns and cities in Wales should focus on 'Brain Gain' policies – of those qualifying from a HE institution in Wales in 2015-16, over a third end up working elsewhere in the UK.[viii]

2. **Catalysing growth in the digital economy**. With the right conditions in place, innovation that encourages digital activity can be unlocked. Collecting and analysing data about the digital capabilities of Welsh towns and cities will inform the design of policy.

3. **Speeding-up improvements to digital infrastructure**. Cumbersome policy and regulatory frameworks hinder the ability to invest, build, maintain or repair digital infrastructure. Only gigabit-capable networks will support the technology that can revolutionise how Welsh households, offices, classrooms and hospitals work.

Adopting the policies set out here would be the start of something transformative, converting urban areas across Wales into Digital Super Towns that take full advantage of the Fourth Industrial Revolution.

Attracting, retaining and reconnecting digital talent

A strategy for any Welsh town or city to grow its stock of digital talent should be based upon making it attractive for digital entrepreneurs to locate in the area, retaining digital companies as they grow and giving opportunities to those on a career break to reconnect to the labour market. The recommendations are:

- **Attract digital entrepreneurs with low-cost workspace and access to advice.** There are numerous examples of how digital start-ups – often linked to a university – have only flourished because of the collaborative environment and support offered in low-cost co-working spaces. Welsh towns and cities hoping attract digital entrepreneurs should therefore consider:

    I. Conducting an audit of unused or underutilised public sector buildings to find spaces that can be converted into low-cost offices for digital start-ups.
    II. Creating a network of local digital mentors who host regular drop-ins at co-working spaces. These mentors should also form a link to local universities to support students who have ideas for digital business after they graduate.

Both of these ideas are relevant to the launch of the Coworking Collective in Cardiff, which aims to *"…connect, engage and support the growing number of coworking spaces and creative hubs in the Cardiff City Region and further afield"*.[ix]

- **Retain digital talent by supporting businesses to scale-up.** A lack of growth capital and inadequate permanent office space can deter growing digital businesses from putting down lasting roots. Welsh towns and cities should therefore consider:

  I. Encouraging investors and high growth digital businesses to build relationships that may result in funding. This is an approach adopted by the UK Business Angels Association, which has set-up hubs in places like Leeds, Bristol and Belfast so that investors and entrepreneurs can become more visible to each other.[x] Welsh towns and cities could build on this model.
  II. Providing support to Welsh businesses to adopt digital technology. For example, businesses are using the IoT to cut costs, reduce risk, increase revenue and become more efficient. Evidence gathered by Vodafone suggests big returns on investment for IoT adopters, with revenue increases averaging 19% and cost reductions averaging 16%.[xi] Trade and Invest Wales could look at how Fourth Industrial Revolution technologies can be used to improve export performance.

- **Reconnect the digitally skilled to the digital economy.** There are huge economic gains to be made from helping people return to work after a career break. Vodafone's ReConnect programme recognises this, by targeting talented women on career breaks – in most cases to raise a family – who want to return to full-time or flexible work. To support the growth of returner programmes:

  I. The Welsh Government should run returner information campaigns promoting the benefits to business of offering flexible employment terms and raising awareness among women about flexible labour market opportunities that exist in the local area.

Catalysing growth in the digital economy

Better data will help policymakers to understand their digital economies and will support the adoption and use of Fourth Industrial Revolution technologies. However, issues such as standardisation and access can restrict innovations in the use of data. The below two recommendations have been written with this in mind:

- **The Welsh Government should introduce a series of competitions to spur innovation in the use of data.** Offering a competition prize to find solutions to seemingly intractable problems has a long history of success. For example, the invention of the marine chronometer in 1761 and the first flight between New York and Paris in 1927 were both linked to prize awards. Today, high-profile competitions are focused on rising resistance of antibiotics and low-cost space exploration. Vodafone recently judged a competition in Germany that encouraged towns and cities to become a digital city. The competition concept should be applied to innovation with data. The Welsh Government could pilot the collection, standardisation and analysis of data sets in partnership with a local authority, which would then be made publicly available with a challenge set related to its use. For example, the challenge could be using the data to create an app that provides new information to the public, or the challenge could be to provide an analysis of the data that provides new insight into a local economy.
- **Explore how data can be used to understand digital talent of different localities in Wales.** The UK Government is trying to improve data sharing between its various agencies. For example, it is looking at how to identify businesses that have the potential to scale-up, with a view to encourage them to access support.[xii] The Welsh government should work with the UK government on this type of exercise to better understand the stock of digital talent within towns and cities in Wales.

Policymakers can also do more to create the conditions that will help digital economies to thrive. This could include changes to planning regimes, tax regimes and regulatory regimes, as well as new schemes to help businesses:

- **Create Digital Enterprise Zones in Wales**. The concept of Enterprise Zones – giving defined geographic areas extra policy tools to support economic activity – has been around for decades. In Wales, Enterprise Zones have been established in Anglesey, Cardiff Airport and St Athan, Central Cardiff, Deeside, Ebbw Vale, Haven Waterway, Port Talbot Waterfront and Snowdonia.[xiii] Digital Enterprise Zones would be focussed on enhancing digital economies and create test-beds for the adoption and use of next generation digital technology. Whether this is creating supportive local conditions for a full fibre, trials of 5G or innovations such as connected or autonomous vehicles or IoT, Digital Enterprise Zones can be used to help understand how advancements in digital technology can be implemented.
- **Create Welsh 'IoT councils' to support the adoption of new technology**. The councils would be modelled on the type of work that is being done by the Digital Catapult centres, which supports the adoption of advanced digital technologies. There are currently digital catapults in Brighton, Northern Ireland, the North East and the Tees Valley and Yorkshire. These councils would also enable Welsh local government to take ownership of new technologies including smart street-lighting.
- **Trial digital marketing vouchers for SMEs in Wales with export potential.** Export advice suggests that businesses should internationalise their websites by using translation services and by using colours, images and branding that are culturally appropriate. Trade and Invest Wales could trial a voucher scheme for SMEs to procure digital marketing services to use in selected foreign markets.

Speeding-up improvements to digital infrastructure

Welsh towns and cities can only take advantage of the possibilities brought by the Fourth Industrial Revolution technologies if digital infrastructure is as good as it can be. The problem is that outdated policy and regulatory frameworks have hindered rather than helped the ability to invest, build, maintain or repair digital infrastructure.

The following recommendations will support Wales to become more ambitious with its digital infrastructure, and support the creation of a 'Gigabit Society':

- **Progress the key points in the Mobile Action Plan.** The first iteration of the Mobile Action Plan was welcome and set the direction of policy. The opportunity now is to focus on delivery. Setting ambitious deadlines for achieving policy goals will be a statement of intent, showing that Wales is gearing up for the next generation of mobile technology.
- **Trial ways to allow greater access to existing infrastructure to build more digital infrastructure.** One way of doing this would be to conduct an audit of how easy it is to access public sector sites across Wales, something that is often talked about, but that has had only limited progress to date. Another way would be to map dark fibre assets for potential future use. Mobile sites need to link back to the fixed network to deliver mobile data services, which will be especially important for future services like 5G. In addition, reduce bureaucracy attached to noticing, permits, traffic management and lane rental charges for new fibre build.
- **Use Welsh towns and cities to experiment with ways of removing the need for full planning permission for mobile infrastructure.** Combined authorities in England are trialling some interesting initiatives. The Greater Manchester Combined Authority has produced MappingGM, which provides open access to mapping tools and data on planning metrics. Tees Valley Combined Authority is streamlining its planning processes. Towns and cities in Wales could test how to move towards all mobile infrastructure being categorised as Permitted Development (whilst maintaining Prior Approval in more sensitive areas).
- **Open up markets to more competition**. Full fibre is currently only available to around 3% of UK premises. By way of contrast, Spain and Portugal have 60% and 80% fibre penetration respectively. One reason for this disparity has been allowing BT to continue to focus on the copper network, something that will not be adequate for future needs. An important part of changing this would be apply greater force to the obligation for BT to open its ducts and poles to competitors.

Measuring digital potential in the towns and cities of Wales

Towns and cities need to understand their digital strengths and weaknesses if they are to improve their digital outcomes. We created a scorecard of digital potential for Welsh towns and cities, analysing how they perform on measures of the digital economy, digital skills and digital infrastructure. The methodology we used is by no means perfect – local data related to digital issues is patchy. Nevertheless, the scorecard illustrates how digital potential varies across Welsh towns and cities with a population of more than 40,000 people.

The three scorecard categories

1. **Digital economy**. The digital economy means different things to different people. Some think of it as disruptive tech start-ups. Some think of it as global tech companies, such as Apple and Google.[xiv] Some think of it as the digital resources like websites to cloud storage.[xv] Some think of it as the fourth industrial revolution innovations, which include Artificial Intelligence and the Internet of Things.

   With such a range of perspectives, estimates of the digital economy's size have inevitably varied.[xvi] To reflect this, the scorecard of digital potential uses two categories of indicator for the digital economy:

   - **Indicators of overall economic health** – Measures include labour productivity and the health of the local labour market.
   - **Indicators of the digital economy** – Measures include the local businesses within digital industries and the local businesses that use a high proportion of digitally skilled workers.[xvii]

2. **Digital skills**. It is a widely held view that digital skills are as important as numeracy and literacy.[xviii] As a result, many organisations across government, industry and the voluntary sector are trying to teach digital skills. This activity tends to focus on distinct groups. For example, research has shown that those in lower social grades, the elderly, the unemployed and the disabled have less complete digital skill sets.[xix]

   To reflect some of these considerations, the skills indicators included in the scorecard of digital potential are:

   - **Indicators of future digital skills** – Local schools will influence an area's future digital capability. Measures include attainment in maths and English, which is the foundation of the digital economy.[xx]
   - **Indicators of existing skills deficiencies** – Lower socio-economic groups tend to have lower levels of basic digital skills. Therefore, the proportion of an area's population in lower social grades is used as a proxy for digital skills levels.

3. **Digital Infrastructure**. Keeping digital infrastructure up to date is a challenge – as the current generation of technology is rolled out, the implementation of the next generation needs to be considered.[xxi] For instance, some places still rely upon 20th century copper telephone networks for broadband infrastructure; but copper networks are not fit to support the digital economy of the future.

   Unlike the topics of the digital economy and digital skills, there is good data available to measure the quality and coverage of digital infrastructure. The indicators used in the scorecard of digital potential are:

   - **Indicators of mobile infrastructure quality** – The measures include 4G coverage within premises and geographic locations as well as the coverage on roads.
   - **Indicators of broadband infrastructure quality** – The measures include the proportion of premises that have superfast and ultrafast broadband availability. Measures of average upload and average download speeds are also included.

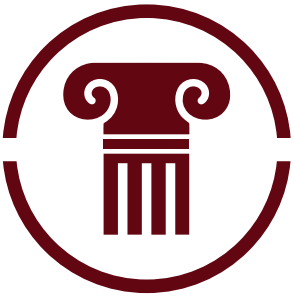
Scorecard results – Pacesetters, Pillars and Prospects

The scorecard of digital potential presents three categories of digital potential:

Digital Pacesetters

Digital high performers when compared to others within the scorecard

Digital Pillars



Solid digital performers yet to reach the performance of Digital Pacesetters.

Digital Prospects

A digital base on which to build, but have not yet reached the performance levels of Digital Pillars

Regardless of these categorisations, every town or city has digital potential that that it can translate into productivity gains. But it is not a given that digital potential will translate into productivity gains. For example, a town or city's school students may be likely to achieve high levels of digital skills; encouraging those students to remain in that town or city after finishing school could be a barrier to realising digital potential.

It is also important to emphasise that because the scorecard is based upon a Welsh town or city's performance relative to others, its categorisation as a Pacesetter, Pillar or Prospect could change in the future. For example, Swansea is categorised as an infrastructure Pacesetter based upon its current position – if it does not invest in FTTP and other towns and cities do then it will slip down the rankings.

The table below presents how Welsh towns and cities are categorised as Pacesetters, Pillars and Prospects on measures of the Digital Economy, Digital Skills and Digital Infrastructure.

Town or City	Local Authority Area	Economy	Skills	Infrastructure
Barry	Vale of Glamorgan	Pacesetter	Pacesetter	Pillar
Bridgend	Bridgend	Prospect	Pillar	Pacesetter
Caerphilly	Caerphilly	Pillar	Prospect	Pillar
Cardiff	Cardiff	Pacesetter	Pacesetter	Pacesetter
Cwmbran	Torfaen	Pacesetter	Pillar	Pillar
Llanelli	Carmarthenshire	Prospect	Pacesetter	Prospect
Merthyr Tydfil	Merthyr Tydfil	Pillar	Prospect	Prospect
Neath	Neath Port Talbot	Prospect	Pillar	Pillar
Newport	Newport	Pacesetter	Pillar	Pacesetter
Swansea	Swansea	Pillar	Pacesetter	Pacesetter
Wrexham	Wrexham	Pillar	Prospect	Prospect

Annex I
Scorecard Methodology

The process for developing the rankings within the scorecard is as follows:

1. The three scorecard categories have been chosen for analysis for two reasons. The first is that they are the areas of digital most discussed in the context of public policy. The second is that they can all be measured in some way using publicly available data at a local level.
2. A list of desirable indicators under the headings of Digital Economy, Digital Skills and Digital Infrastructure was drawn up following a review of previous research and after conversations with those with knowledge of digital productivity.
3. Data for all the identified indicators was collected for all local authority areas where possible (see below table for a list of indicators). This data was then taken to create a distribution of performance on each indicator. This distribution was then split into quartiles.
4. Each local authority was assigned a score based upon its position within the distribution. The higher up the distribution the local authority was, the higher the score on the indicator.
5. Following this, towns or cities were identified within each local authority. Only towns or cities with a population of more than 40,000 were included in the analysis.
6. The categorisation of Pacesetters, Pillars and Prospects was achieved by ranking each town or city in order of their scores, creating a league table of digital potential. This league table was then split into thirds to assign towns and cities to each category.

Scorecard indicators used under each category

Digital Economy	• Labour productivity • Employment • Industries with high levels of digital employment intensity • Digital business stock • Digital business growth
Digital Skills	• % A*-C in Science • % A*-C in Maths • % A*-C in English • % who achieve Level 2 • Socio-economic group
Digital Infrastructure	• 4G coverage indoor/outdoor premises, geographic (outdoor) and roads • Superfast Broadband availability • Ultrafast Broadband availability • Median download speed • Median upload speed

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