



The
Scotland
5G Centre

5G Enabling Secure Digital Supply Chains: Increasing UK Resiliency

Realising Possibilities,
Transforming Futures



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5G Enabling Secure Digital Supply Chain: Increasing UK Resiliency

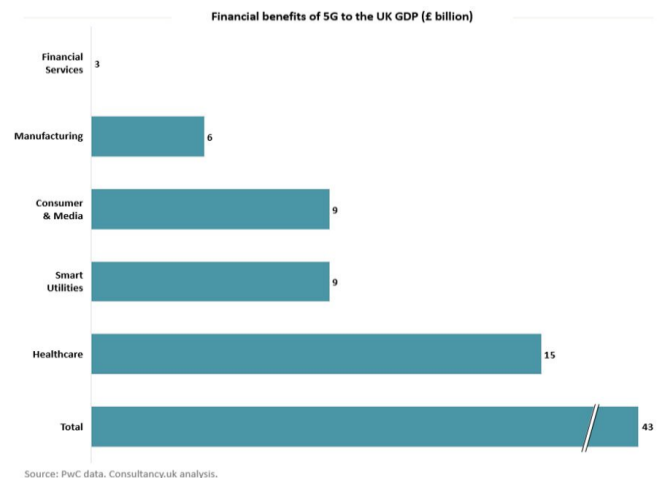
The Scotland 5G Centre is the National Centre in Scotland that supports the uptake of 5G and advanced connectivity in Scotland. Funded by the Scottish Government, we provide both support and advice for companies, academics and public sector wishing to explore and adopt 5G solutions. We are an integral part of the Scottish innovation ecosystem, providing access to a range of 5G testbeds (S5GConnect Hubs) spread across Scotland.

S5GConnect Hub Locations



Why is 5G Important?


Over the next 8 years, the application of 5G (in combination with other technologies including AI, VR, AR and edge computing) will have a substantial impact on the future UK economy. The recent PwC report (The Global impact of 5G)¹ reveals that productivity and efficiency gains enabled by new 5G technology will drive business, skills and service change worth **£43bn to UK GDP by 2030**. The report estimates that by 2030, 5G will increase GDP in the following key sectors:



Increasing UK Resilience

The use of 5G networks and applications will also contribute to UK resilience and sustainability through enabling more efficient supply chains, more flexible ways of working and better use of resources.

For example, the pandemic exposed many of the weakness in critical supply chains, and as a result, has fuelled interest in the use of digitally enabled supply chains.



Complete digitalisation of supply chains will provide resilient, secure, sustainable, transparent and more efficient supply chains and related processes.

The digital supply chain (Supply Chain 4.0) powered by 5G is able to capture and move big data securely and quickly with low latency. This in combination with the Internet of Things, advanced data analytics, AI, and automation will allow supply chains to become more resilient to risk, and be more responsive to new market opportunities.

Conventional supply chains consist of a series of largely discrete, siloed steps all the way from materials, manufacturing to distribution, and finally into the hands of the customer. Digitisation brings down those walls, and the chain becomes a completely integrated ecosystem that is fully transparent to all the players involved, from the suppliers of raw materials, components, and parts, to the transporters of those supplies and finished goods, and finally to the customers demanding fulfilment. The result will enable companies to react to disruptions in the supply chain, and even anticipate them, through digital twins modelling “what-if” scenarios, and adjusting the supply chain in real-time as conditions change.

5G networks will power the supply chain via automation and enhanced track and trace capabilities: innovative technologies, powered by 5G’s high bandwidth and low latency, will ensure everything runs smoothly.

Case Study- Digital Enabled Supply Chain



Future Proofing UK’s Business’

“Companies need to proactively manage risk and increase resilience by building intelligent and resilient supply chains that are risk-aware, secure, transparent, adaptive, fast-moving and optimised.”¹

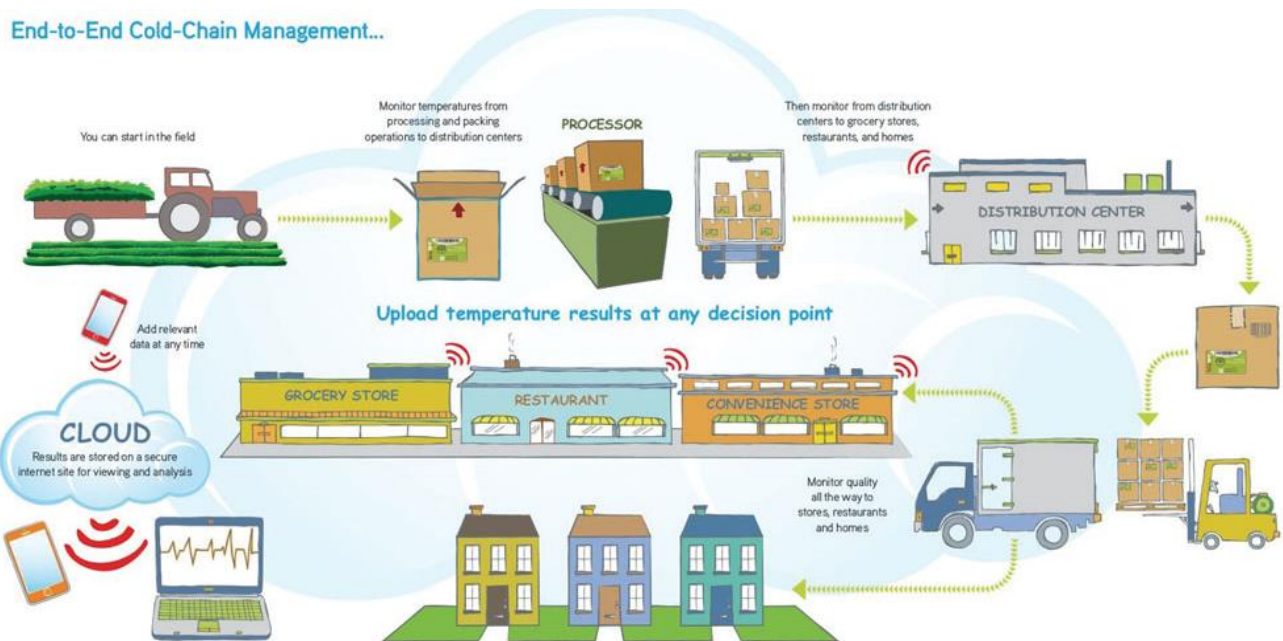
“Supply chains are extremely complex organisms, and no company has yet succeeded in building one that’s truly digital. Indeed, many of the applications required are not yet widely used. But this will change radically over the next five to 10 years, with different industries implementing DSC at varying speeds. Companies that get there first will gain a difficult-to-challenge advantage in the race to Industry 4.0, and will be able to set, or at least influence, technical standards for their particular industry. The advantage will by no means be limited to the greater efficiencies. The real goal will be the many new business models and revenue streams the digital supply chain will open up.”¹

¹ <https://www.accenture.com/gb-en/services/supply-chain-operations/resilient-supply-chain>

¹ <https://www.pwc.ch/en/publications/2017/how-digitization-makes-the-supply-chain-more-efficient-pwc-2016.pdf>

Supply Chain 4.0, Powered by 5G

Adopting a cloud based digital supply chain (as illustrated below) that connects multiple suppliers and customers along the chain will be made possible through 5G connectivity. As a result, we will see unprecedented levels of collaboration, real-time planning with the potential for a shared logistics structure and joint planning capability.



Example: The Food Supply Chain

The Food and Drink industry in Scotland is a key growth sector, bringing together Agriculture, Fisheries, Manufacturing, Distilleries, Brewing and Transport Logistics. The latest GDP figures for the last quarter showed an increase of 9.1% in growth¹. It accounts for 5% of all employment in Scotland and 10% of Scotland’s businesses (the majority of which are UK owned).


As a sector, Food and Drink contributes 13.4% of all Scotland Exports, and relies on its supply chains to deliver Scottish based produce to consumers. Demonstration of food provenance, integrity and product security are all critical characteristic factors of the supply chain.

If the chain is disrupted as we saw during the pandemic, it can have a deleterious effect on a range of industries, employees and the economy in general.

On the other hand, if improved and made robust, growth will be further increased and risk from future threats diminished. In this key growth sector, digital supply chains powered by 5G will strengthen resilience, efficiency and reduce both cost and risk.

Supply Chain 4.0 – The Digital Supply Chain

Through the adoption of Supply Chain 4.0, powered by 5G, the future possibilities are endless.



For example, inbound delivery trucks can drive autonomously and have their location tracked via satellite.

After arrival at the automated warehouse, all operations from picking, transportation to the automated production line, are handled by robots or automatic guided vehicles, and information on their flow is continuously fed back to the control system over the network.

By sharing the dispatch and onward shipping information with the customer, control is smoothly handed over to the next stage in the supply chain. For small quantity deliveries, or delivery to the end customer, drones and small robotic delivery trucks are dispatched to cover the last mile. This tighter overall control of supply lends itself to pivoting toward local or regional suppliers.

Covid-19 has irrevocably changed the foundation of information sharing as well as global value chains and services. While the pace of transformation was already accelerating before Covid-19, the pandemic has encouraged businesses to invest more heavily in digital solutions to give them the agility to weather the crisis.

Embracing digital transformation during the pandemic has increased the resilience of food supply chains by facilitating improved production and business scenario planning.

Digitally enabled food chains present an opportunity for greater transparency for consumers. As well as knowing what's in their food, consumers are also significantly interested in tracing where it has come from and how it is made, with an increasing focus local sustainable production.

The UK imports food from over 180 countries (which comprises around 50% of food consumed) and this ensures that absolute UK food supply is resilient to supply interruptions from specific countries.

Food Traceability

Tracking food from farm all the way to the point of sale enables faster and more robust data capabilities that lead to improved efficiency and communications. 5G will reduce lag times, inaccuracies in product location due to slow data reporting and even product-loss due to mass recalls. Farmers can use 5G-enabled IoT sensors that identify sections, aisles or rows rather than the entire farm. Where produce needs to be recalled, sensors can help determine exactly which products are affected, eliminating the need to recall an excessive amount of merchandise.

5G will enable efficient, immediate and automated tracking of every facet of the food journey, with little to no need for human interaction. 5G-enabled IoT devices and sensors on products can send real-time information about where products are, without workers having to scan barcodes, or handle the food.

Food Production

Using predictive algorithms based on real-time monitoring of conditions in the field, the farmer can make proactive decisions to prevent crop diseases, intervene with targeted irrigation and avoid damage to the harvest, ultimately reducing wastage of precious food and resource

¹ <https://www.gov.scot/publications/growth-sector-statistics/>

Food Waste

The WWF estimates **that 1.2 billion tonnes of food are lost on farms**, during and after harvest each year. This is equivalent to 15.3% of food produced¹

Crop damage due to natural causes such as soil conditions, weather, and infectious diseases puts farmers on the backfoot, but this technology enables them to monitor the state of the crops very closely, allowing them to prevent damage before it happens.

Through optimising crop production in this way, we can minimise wastage during the food production phase, saving valuable time and money for the farmer and drastically reducing subsequent greenhouse gases caused by food waste – of which there is 2.2 giga tonnes of CO2 emissions, equivalent to the emissions from 75% of all cars driven in the US and Europe over a year.¹

¹ <https://www.trtworld.com/life/1-2-billion-tonnes-of-food-lost-on-farms-alone-more-than-ever-imagined-48556>

¹ <https://www.vodafone.com/business/news-and-insights/blog/gigabit-thinking/from-the-field-to-the-bakery-how-5g-is-revolutionising-the-food-chain>

Conclusion

Businesses must evolve with technology. The use of IoT, AI and 5G to aggregate and analyse data across the logistics chain will be a game changer, enabling businesses to improve visibility and increase automation across their supply network. This creates agile and resilient supply chains that will be better able to anticipate and respond to changing market trends and withstand any shocks caused by the next big disruption.

