



The innovation dividend: powering trade with technology

What impact will new technologies have
on the UK's trade over the next 30 years?

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Investment in innovation and technological change can drive a step change in trade and an acceleration of trade growth in a post-Brexit Britain, in contrast to the damage expected to be caused by the UK's departure from the European Union.

Our research into current trends points to three key outcomes that we expect to emerge:

- Investment in technology will help power trade growth in the future, which could see UK trade volumes rise to more than £4 trillion¹.
- The scale and type of investment in technology and connectivity will have a dramatic impact on trade outcomes. The greatest gains will come from advances in mobility and communication technology.
- UK trade along the Asia Pacific corridor stands to benefit most through rapid growth in trade volumes due to a rapid increase in economic prosperity in this region.

Direction of change: scenarios for the future

Our starting point for future trade assumes that current trade relationships remain broadly unchanged, with no major negative shocks to trade or the economic environment over the medium term. We later look at an example of how Brexit could change our forecasts.

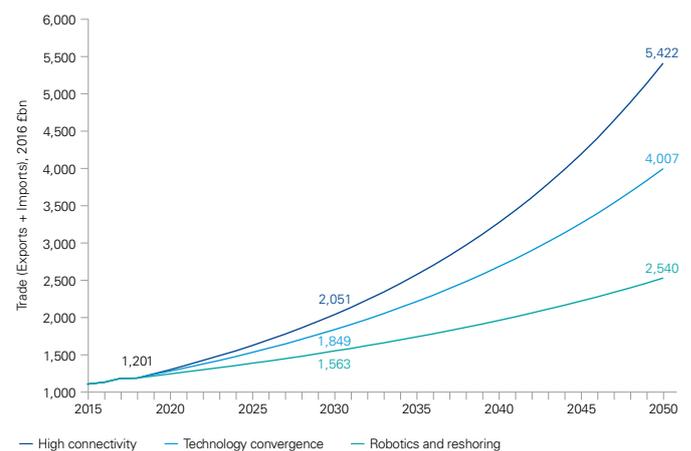
We then consider three different potential scenarios for technological change. Chart 1 shows the potential impact on UK trade of each of these scenarios up to 2050. We use a measure of total trade, defined as the sum of imports and exports.

In our central scenario, which we call **technology convergence**, we expect the UK economy's trade with the rest of the world to increase to £1.8 trillion by 2030 and to more than triple to £4 trillion by 2050, from its 2018 volume of £1.2 trillion.

Our more optimistic scenario, **high connectivity**, would enable the UK's overall trade to increase to £2.1 trillion by 2030 and to £5.4 trillion by 2050. In terms of openness as a proportion of GDP, this would put the UK in 2050 on a par with the Netherlands in the present day², as the ratio of trade to GDP would increase to 146% by 2050.

At the other end of the scale, a **robotics and reshoring** scenario could mean that the UK's trade volume increases more marginally from its 2018 level, to £1.6 trillion by 2030 and £2.5 trillion by 2050. UK trade would continue to grow, despite the less accommodating technology developments. But this would partly be a consequence of the UK becoming a smaller part of the wider global economy, courtesy of rapid economic growth in emerging economies, and in part due to economic growth in the UK economy.

Chart 1: Forecasts of UK trade volumes under different scenarios



Source: KPMG analysis

¹ All our trade forecasts in this report are in 2016 prices.

² World Bank World Development Indicators 2019, data for 2017; Netherlands: 151%.

So, what are the specific changes in technology that lead to these outcomes? Our three scenarios focus on future developments in value chains and transportation costs.

Our **high connectivity** scenario envisages advances in communication technologies, such as the internet of things, which underpin the development of more complex and far-reaching global supply chains. For individual manufacturers, this offers a route towards greater specialisation and exploitation of economies of scale. Advances in mobility and autonomous transportation lead to lower costs and greater efficiencies in logistics. For example, fully-automated vehicles would operate round-the-clock, cutting both the cost of transport and delivery times. Service sectors would benefit too, particularly from improving digital communications: services would increasingly become more tradable, closing the gap with goods trade.

Our **robotics and reshoring** scenario anticipates that developments in artificial intelligence (AI) and machine learning, as well as advances in 3D printing, will be the dominant drivers of change. With much greater potential to fully automate processes, this scenario sees value chains truncate as more tasks become concentrated in roboticised production factories. With a heavy emphasis on capital inputs, these are located in advanced economies leading to a process known as reshoring. Developments in 3D printing, meanwhile, allow manufacturers to move the production of customisable components closer to their customers as digital information flows replace the transport of manufactured goods.

Our **technology convergence** scenario is the out-turn that we consider most likely. It's a baseline that falls somewhere between the two more extreme scenarios for future trade. Different sectors and companies would make different use of different technologies. We expect this scenario to feature:

- lower mobility costs, leading to lower transportation costs for goods;
- 3D printing in widespread use for industrial and high-end consumer goods, due to its suitability for small-scale production;
- more complex supply chains for low-cost, high-scale industrial manufacturers, making use of co-ordination opportunities powered by the internet of things;

- fully-automated and vertically-integrated manufacturing facilities for other manufacturers;
- a greater and increasing share of services trade (particularly important for services-focused economies such as the UK).

In the **technology convergence** scenario, the forces driving more supply chain complexity and fragmentation are offset by the opportunities of large-scale automation and 3D printing. Some companies may choose to continue operating with a global value chain, increasing both the length and complexity of their supply chains. Others will prefer to concentrate their production in automated facilities, depending on the suitability of tasks for automation.

This choice would largely reflect the type of market that the business operates in and its broader strategy. High levels of customisation and small-scale production are more suited to 3D printed manufacturing due to constant unit costs during the bulk of the production process; large-scale mass market production is more likely to be organised through complex international value chains.

Additionally, continuing advances in mobility technologies are potentially powerful. We expect the first fully-automated products to reach the public early in the 2020s, with a full switch to autonomous vehicles to follow between 2035 and 2040. This would bring a range of benefits, increasing the utilisation and efficiency of goods vehicles, and reducing the costs of transport and logistics.

The bottom line, as Chart 1 shows, is that trade volumes continue to rise in all scenarios, even if we allow for a substantial shift in the patterns of production led by a switch to more capital-intensive production technologies.

Key destinations for future trade

One reason to be optimistic about the prospect of increasing trade under each possible direction of technological change is the growing importance of the Asia Pacific region as an engine of global growth. As development in this region continues to close the gap with other advanced countries, its demand for UK goods and services will steadily increase.

Chart 2 shows that even in a scenario where the development of trade is hampered by a technology shift towards automation and robotics, exports to this corridor would still continue to grow by an average of 3.9% a year in real terms over the period to 2050. Under the most optimistic scenario for trade, this forecast rises to 6.6%, though our baseline scenario envisages a 5.5% annual increase.

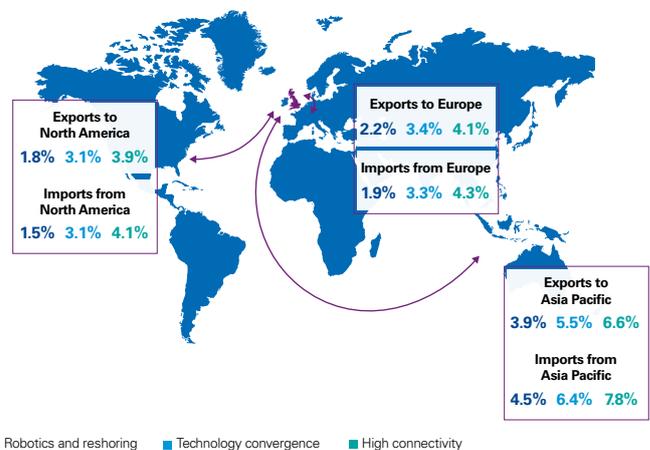
Trade with other regions will also increase under each of these scenarios. For example, we expect exports to Europe, including the remaining 27 EU countries, to grow by between 2.2% and 4.1% per year, compared to growth of 2.4% that we have seen over the last 20 years. These scenarios do not include any specific assumptions about Brexit. In practice, any outcome that hinders trade in either goods or services between the UK and the EU would result in slower trade growth between the UK and Europe.

Future trade and the Brexit effect

Technology may not provide a solution to the thorny issues of Brexit. Innovation may never resolve the question of how to manage the border with Ireland nor circumvent the non-tariff barriers likely to spring up between the EU and the UK after Brexit is complete. Over time, technology certainly does have the potential to drive trade in the opposite direction to Brexit – and in a more significant manner if our central scenario comes to pass.

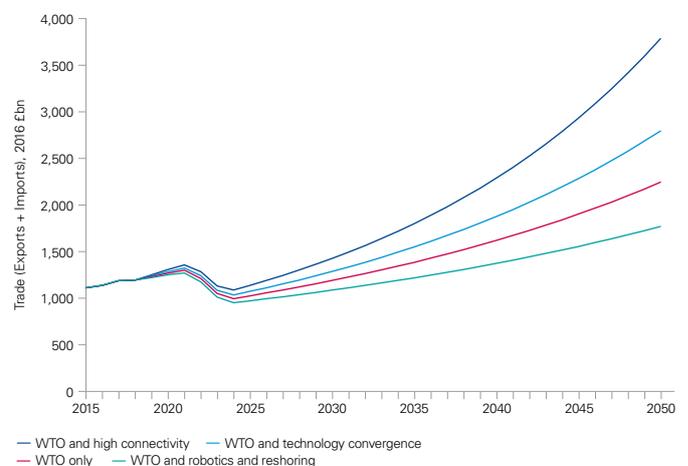
Following a Brexit that sees the UK forced to trade with the EU on World Trade Organisation (WTO) terms, the volume of UK trade could suffer a significant setback that could leave the volume of trade in 2030 to be same as in 2018 at £1.2 trillion (as depicted in the 'WTO only' scenario in Chart 3). This could correspond to the medium-term impact of the UK leaving the EU without a deal and subsequently failing to negotiate any additional free trade agreement with the EU27. UK trade is then projected to rise to £2.2 trillion by 2050 under this scenario.

Chart 2: Forecasts of UK trade across different corridors, % average annual growth 2019-50



Source: KPMG analysis based on WIOD 2016, ONS data

Chart 3: Forecasts of UK trade under different scenarios, assuming no-deal Brexit



Source: KPMG analysis

The effect of Brexit could be similar to moving the UK further west, into the Atlantic Ocean. It could make trade more costly, and after adjusting to this change, growth would resume at a slightly lower pace from a lower base.

Under a **technology convergence** scenario, which also captures the impact of a no-deal Brexit, faster overall growth in trade could see UK trade recover to £1.3 trillion in 2030, and rise to £2.8 trillion by 2050, compared to £4 trillion without considering the Brexit effect on trade.

As Chart 3 shows, the potential impact of a no-deal Brexit on our two alternative technology scenarios is also expected to be significant. The results show a drop in the overall volume of future trade in 2050 from £5.4 trillion to £3.8 trillion and from £2.5 trillion to £1.8 trillion in our **high connectivity** and **robotics and reshoring** scenarios respectively.

Overcoming the Brexit effect

Despite Brexit, our view is that the UK economy is likely to become ever more open to trade in the coming decades. There are potential factors that may slow that trend, particularly if the UK moves towards technologies such as automation. And Brexit remains a negative influence on trade of as yet unknown proportions.

Businesses should embrace the opportunities stronger trade will provide, while factoring in the competitiveness pressure such growth could entail. At the same time, it is paramount for government to heed lessons from the recent past, and pursue more active policies to support some of the short-term casualties from growing trade.



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