



THE
FUTURE
OF **TRADE**

DMCC



Insights
from Global
Discussions,
an executive
summary

\$40 trillion worth of goods make their way along ever shifting import and export routes around the world every year, and while the perception of ongoing economic malaise persists as we enter 2016, there is a light at the end of the tunnel for global trade.

The future of trade is digital.



\$40tn
the total
value of
global
trade is a
measure of
real cross-
border
economic
activity

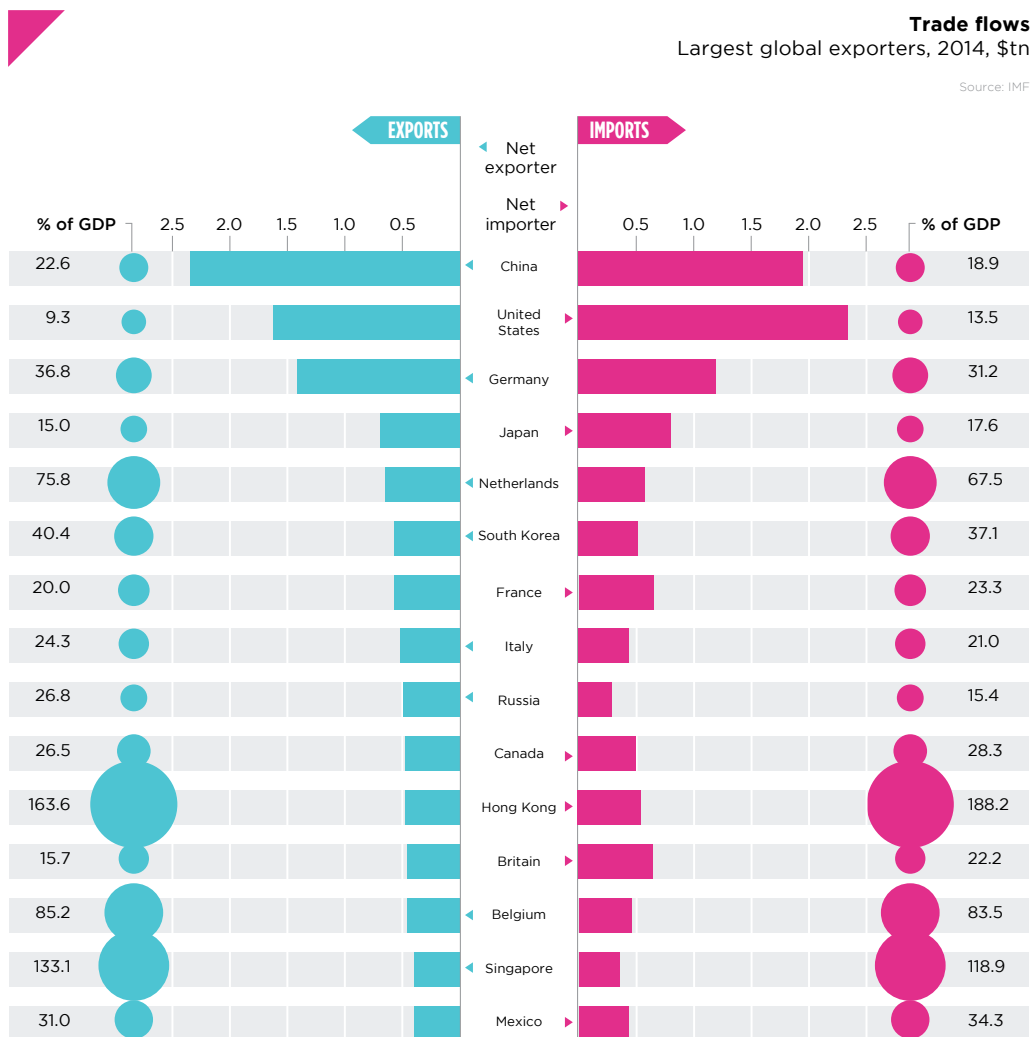


350m
The
number of
companies
that will
export for
the first
time if they
go digital

For the last 12 months DMCC has teamed up with FutureAgenda on an odyssey to discover the future of global trade. We gathered industry leaders, academics and experts in five key cities to discuss how global trade will change in the next decade and how it will drive the global economy into the next phase of growth.

Events in London, Hong Kong, Cape Town, Mumbai and Dubai brought together over 150 informed individuals. This report is a synthesis of the insights gained from these discussions and lays out the conclusions that emerged. It is an independent view of the probable changes over the next ten years and covers six key areas:

The Impact of Digital on Global Trade has never before been analysed in such depth. Our discussions revealed that the adoption of digital strategy by global importers and exporters presents such a profound shift in the future of trade that as many as 350 million more businesses could begin to export goods and services through digital commerce. This shift would provide the first significant boost to worldwide trade since the great recession and usher in a 'digital revolution in trade'. The adoption of such strategy on a global scale would add as much as \$29 trillion to the digital economy over the next decade, our research shows.



The adoption of digital strategy by global importers and exporters presents such a profound shift in the future of trade that as many as 350 million more businesses could begin to export through digital commerce

Shifting Power and Influence looks at the contextual global view of how economic power is changing, which countries and regions such as China and India are on the rise, which, such as Europe, are on the decline and also considers the pivotal role of the US. With uncertainty in some quarters about how new alliances may play out, it sets out the consensus of opinion.

Access to Funding highlights the growing concern over the lack of capital available from the world's banks to support more trade and looks at some of the reactions taking place. With a specific focus on some of the options emerging for better SME funding, it looks at how new initiatives may play an increasing role in the next decade, especially in emerging markets.

Securing Talent looks at the double challenge of being able to attract the very best talent to work in the world of trade and also in ensuring that the next generation

is equipped with the right mix of skills and abilities. As the elite global nomads take to the fore, it raises questions on how and where talent will align with the emerging trade infrastructure.

Supportive Regulation suggests how different parts of the world see changes in global and local regulation having impact. This looks at the growing preference of regional and bilateral agreements over global WTO pacts and also explores some of the opportunities afforded by proactive actions in specific locations to help make trade more effective and transparent.

System Efficiency brings together a number of views on how the overall effectiveness of global trade and distribution is likely to be improved over the next decade. From the adoption of increasingly open supply webs to enhancing the efficiency of the last mile, it also looks at the role of autonomous vehicles and new exchange and distribution model.



85%
The reduction in cost of exports with the adoption of a fully digital supply chain



\$29tn
the potential growth of the value of the digital economy over the next decade

The Impact of Digital



Introduction

In the years preceding the Great Recession, global trade had been growing at about 1.5 times the rate of global Gross Domestic Product (GDP) for about four decades, meaning that the global trade-to-GDP ratio experienced an upward trend. This phenomenon can partly be attributed to structural factors, for example the expansions of global supply chains that moved production to emerging markets. This is clearly observed in the data, with the rise in the trade-to-GDP ratio much more pronounced in East Asia and South Asia compared to other regions.

In turn, this and the general expansion in global trade was supported by the declining costs of trade that made trade easier. This includes the fall in policy costs, such as tariff and non-tariff barriers, but also transportation and communication costs that are crucial to organise global supply chains and finally also exchange rate costs and regulatory costs.

The Great Recession was a clear structural break in this trend, and since then a disconnect has emerged between the pace in growth for global trade and the pace in growth of global GDP, which has meant that the trade-to-GDP ratio has started to fall slightly.

This reversal in the trend raises an important question: Is this development cyclical, and thus something that will reverse once and if global growth picks up? Or is it something deeper, something structural?

On the cyclical side, one may point to the fact that investment has seen a very slow recovery compared to other components of global GDP since the Great Recession. This is negative for trade, as investment is one of the most trade-intensive components of GDP. Another factor is political uncertainty, which has

Figure 1

Trade (average of imports and exports), share of Gross Domestic Product, selected regions, %

Source: World Bank, Cebr analysis

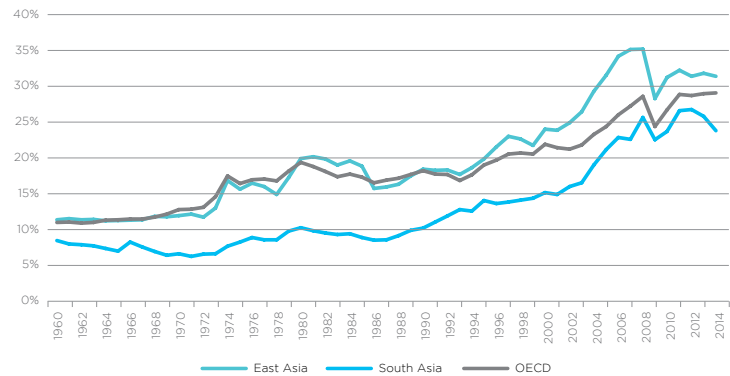


Figure 2

Import tariffs, share of import values, selected regions, %

Source: World Bank, Cebr analysis

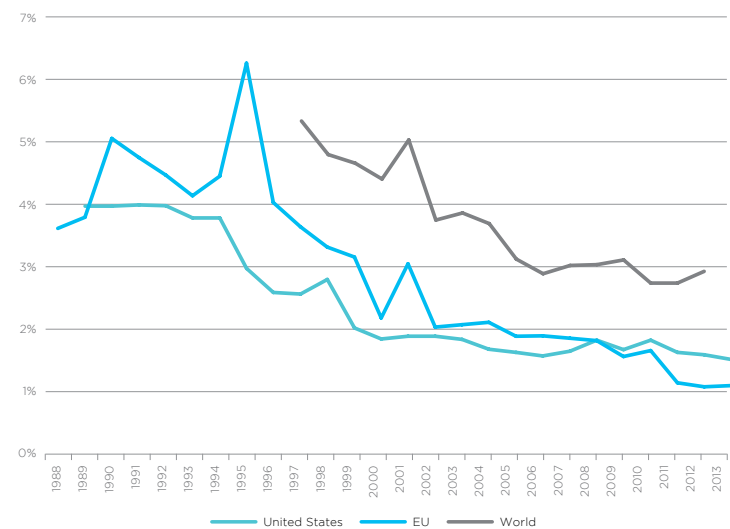
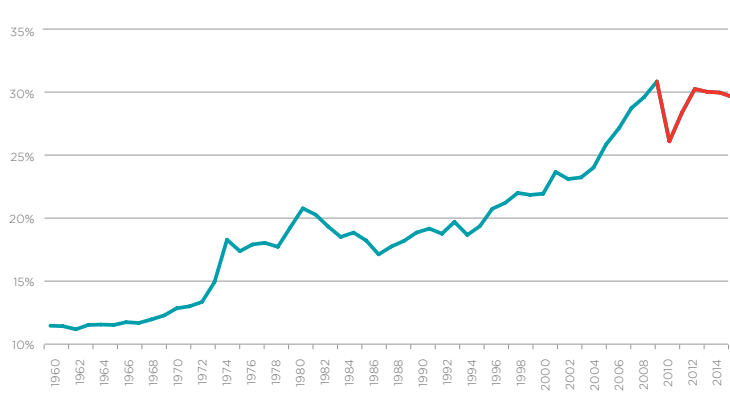


Figure 3

Global trade (average of imports and exports), share of global Gross Domestic Product, %

Source: World Bank, Cebr analysis



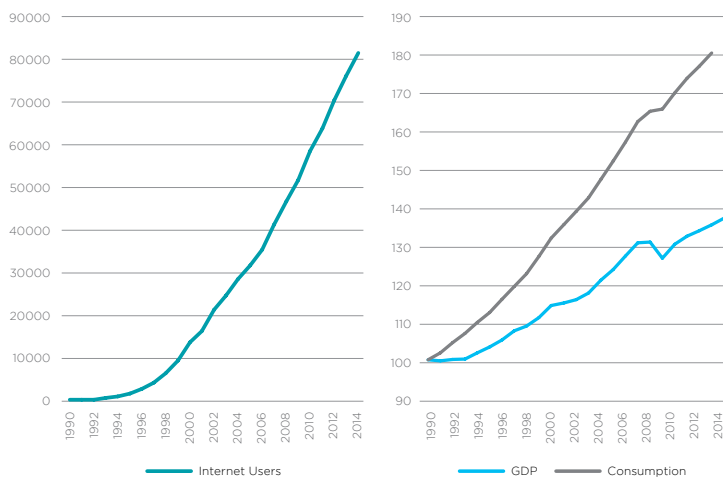
reached important highs in the post-financial crisis and could be a factor that discourages firms from trading with foreign partners.

Looking ahead to the future, while it might be true that the benefits of the internationalisation of supply chains are starting to reach their limits, there are important factors suggesting this might not be the end for trade. The integration of developing economies is an important one, with major infrastructure projects in African economies playing a key role. A much more important set of factors is that relating to the developments

in digital technologies and their impact on trade. The remainder of this report looks exactly at this issue. In particular, sections 1 and 2 look at the macroeconomic context for the digital industries from a regional and sectoral perspective, presenting the results of our Industry Digitalisation Index (IDI), which to the best of our knowledge is the first major attempt to measure progress with digitalisation across different sectors. Section 3 looks at the value of data: the trade in data and digital identities is something that we have not yet learnt to quantify and it could mean that trade is even currently higher than we think. Finally, section 4 looks at how new technologies such as 3D printing affect decisions over whether to produce domestically versus outsource production and hence drive shifts in global trade flows.

Figure 4
Global trade (average of imports and exports), share of global Gross Domestic Product, %

Source: World Bank World Development Indicators, Cebr analysis

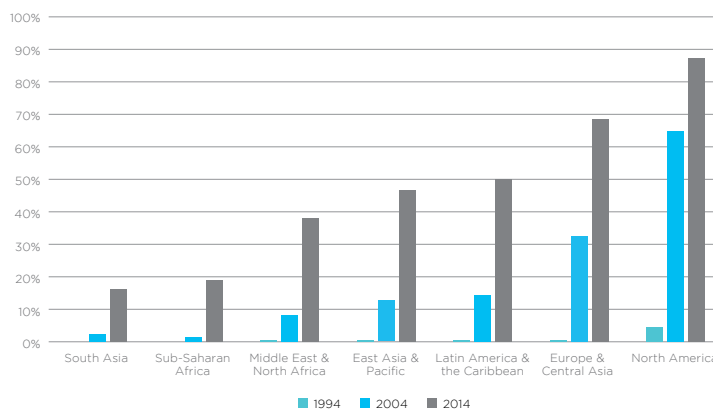


The macroeconomic context for the digital industries

The role of the development in digital technologies as the single most important phenomenon of the past two decades cannot be overstated. From a humble base of less than 1% of the global population, the share of Internet users has risen exponentially over the past two decades. Today, almost half of the world's population report to be users of the Internet. This is an increase of tremendous scale – the pace in growth of the global GDP or global consumption per capita levels over the same period has only been a very small fraction of this – in fact the three cannot even be compared on the same scale.

Figure 5
Internet users per 100 people by region, selected years

Source: World Bank World Development Indicators, Cebr analysis



Still, this is not to say that digitalisation has fully run its course. To the contrary, there is still a long way to go until the world is fully digitalised. Perhaps unsurprisingly, the miles covered on the road to full digitalisation vary considerably from region to region. As expected, North America and Europe are leading the way with almost 90% and 70% of the population using the Internet



respectively. At the other end of the spectrum, fewer than 20% of people in South Asia and sub-Saharan Africa use the Internet.

This is having direct implications on the space where trade and digital technologies interact. For example, the share of e-commerce sales in all sales is more than 8 times higher in North America, Europe, and East Asia & the Pacific compared with South Asia. Importantly, this gap is expected to persist going forward to the end of the decade according to our forecasts. This is partly because of the structural processes that need to take hold in order for e-commerce as a form of trade to really take hold – part of those has to do with consumer behaviour and habits, which can change only gradually. However, there is also another important element behind these forecasts and this is the potential for the lagging regions to essentially ‘skip’ the e-commerce stage of development, directly leapfrogging into other, more advanced forms of digital trade. This means that it is wrong to immediately conclude from looking at the above forecasts that emerging and developing markets will be excluded from the benefits of the digital revolution when it comes to trade.

One example of such a leapfrogging potential is that of mobile commerce. Indeed, our research shows that the fact that emerging regions have been later adopters when it comes to online commerce has allowed them to gain ground when it comes to this next technological level. In

Figure 6
E-commerce sales as % of total retail sales, by region (baseline scenario)

Source: E-Marketer, World Bank, Cebr analysis

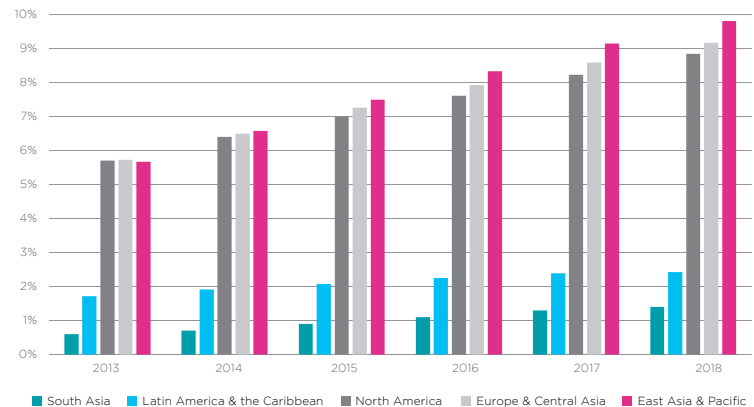


Figure 7
Mobile users who performed activity, as share of internet users, %

Source: Statista, Cebr analysis

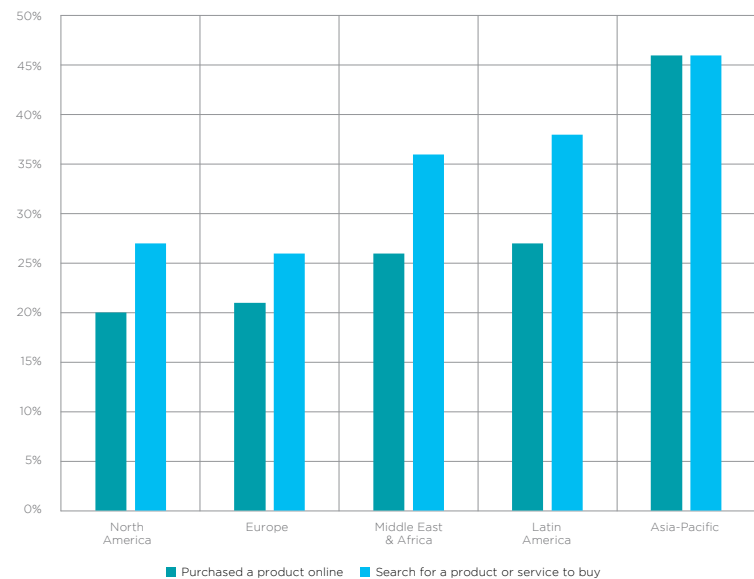
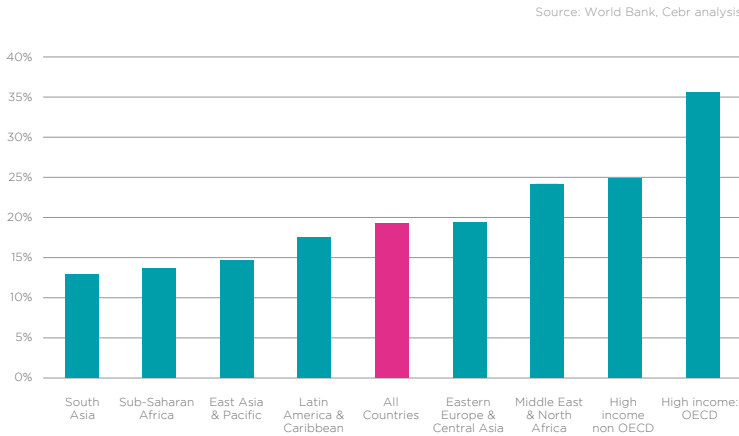


Figure 8
Score on mobile payment readiness index, top 15 economies (countries in blue are ‘developed’; countries in red are ‘emerging’)

Source: Statista, Cebr analysis



Figure 9
Percent of firms exporting directly or indirectly (at least 1% of sales), by region

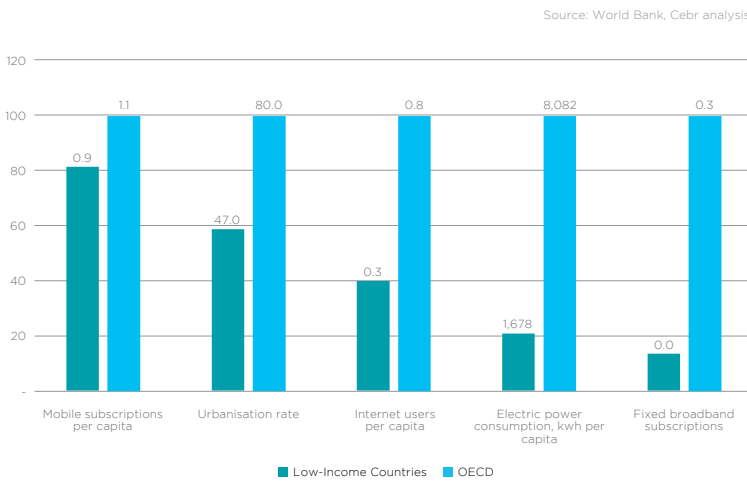


Source: World Bank, Cebr analysis



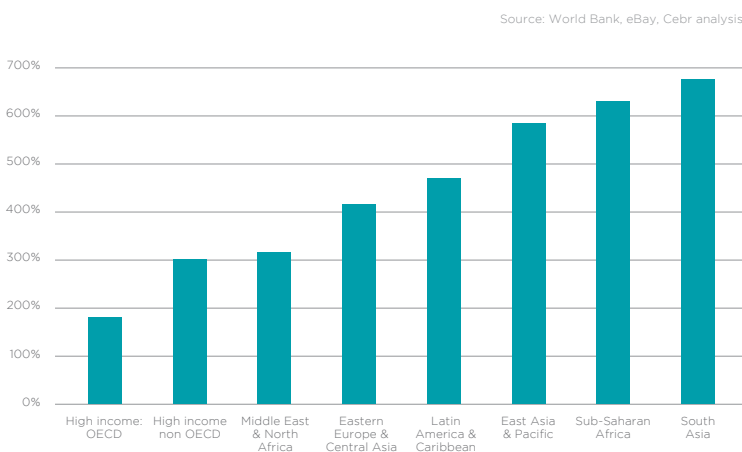
particular, we find that the share of mobile shoppers of internet users is highest in the emerging markets of Asia-Pacific, Latin America, and Middle East & Africa, and substantially lower in Europe or North America. This can partly be explained by the fact that there is more of a level-playing field between emerging and developed markets when it comes to technologies such as mobile payments. This is reflected in our analysis of Mastercard data that suggest there is a fairly even distribution of developed and emerging markets when it comes to mobile payments readiness. This in turn can be explained by the low fixed costs and set-up costs associated with using mobile technology as opposed to other digital technologies or forms of commerce more generally. This has allowed some developing economies – most notably Kenya – to really take the lead in mobile commerce and other uses of mobile technology.

Figure 10
Developing economies versus OECD average, latest year, selected metrics



Source: World Bank, Cebr analysis

Figure 11
Percentage rise in number of businesses exporting if digitalisation of commerce took place, by region



Source: World Bank, eBay, Cebr analysis

Building on all this then the million – or rather trillion – dollar question then is ‘how will all this impact trade among and within the world’s regions?’ Estimates from eBay suggest that the adoption of a fully digital supply chain can bring the cost of exporting down by as much as 85%. We expect this to have a profound impact on the number of businesses exporting and the level of trade flows. Currently, only about 1 in 5 of businesses export across the world export. Again, this varies considerably by region, with the share of businesses exporting ranging from

less than 15% in South Asia to over 35% in the OECD.

The correlation between the share of businesses exporting and the pace of digitalisation across these regions is striking: the high income OECD economies that see the highest share of businesses exporting are also the ones where digitalisation has taken hold more extensively. Our analysis of World Bank data shows that there is a huge potential among lower-income countries to 'catch-up' with higher-income ones when it comes to digitalisation.

Building on this, Cebr's research suggests that full digitalisation of commerce could lead to 6-fold rise in the number of businesses exporting. Our estimates range from a 3-fold increase in high income OECD economies (as they have already reaped the 'low-hanging fruit') to nearly 8-fold in sub-Saharan Africa and South Asia. In terms of absolute numbers, this represents a population of over 30,000 new listed companies beginning to export. Estimating the equivalent for listed and non-listed companies is much harder but Cebr's research suggests this could range from 100 million businesses to 350 million businesses. In turn, this rise in exporting activity enabled by digital technology would also lead to increases in the value of the digital economy itself – a study by McKinsey suggests it could grow by as much as \$29 trillion over the next decade if the integration of digital strategy succeeds.

DMCC/Cebr Industry Digitalisation Index

Establishing the potential for digital development and the impacts of this on trade is important not only on a regional basis, but also on a sectoral one. This is exactly what this part of the research aims to do, where we construct an Industry Digitalisation Index (IDI) that tracks businesses' progress with digitalisation across

a number of sectors. While the IDI is currently based on data from Eurostat covering the EU, we assess that this is a good reflection of the structural progress with digitalisation in the global business community in its entirety.

The overall index is a composite measure of four separate functions of digitalisation in the processes of trade and general business activities, as follows:

Upstream supply chain phase: This component aims to measure the extent to which businesses are digitalising their practises when it comes to connecting with external suppliers. We look at measures like the share of enterprises purchasing online from suppliers, or the extent to which enterprises use the Internet to access external information.

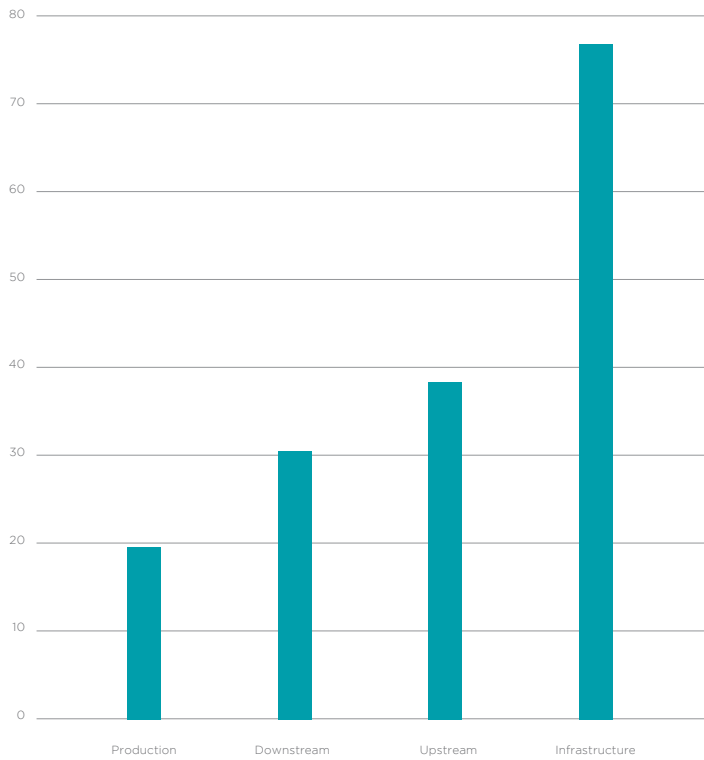
Production phase: This component aims to measure the extent to which businesses are digitalising their practises when it comes to their internal processes. We look at measures such as the share of businesses using automated exchange systems, the extent of the use of cloud computing and dig data, or the share of enterprises using open source operating systems.

Downstream supply chain phase: This component aims to measure the extent to which businesses are digitalising their practises when it comes to connecting with their clients – be it consumers, other businesses, or governments. We look at measures such as the share of enterprises selling online, or the share of enterprises providing the option of online ordering or reservation to their customers.

Digital infrastructure: This final component looks at businesses' progress in setting up a digital infrastructure to support the digitalisation of the production phases

Figure 12
Score on DMCC/Cebr Industry Digitalisation Index (IDI), average across all industries, by index component (1-100, where 100 is fully digitalised)

Source: Eurostat, Cebr analysis



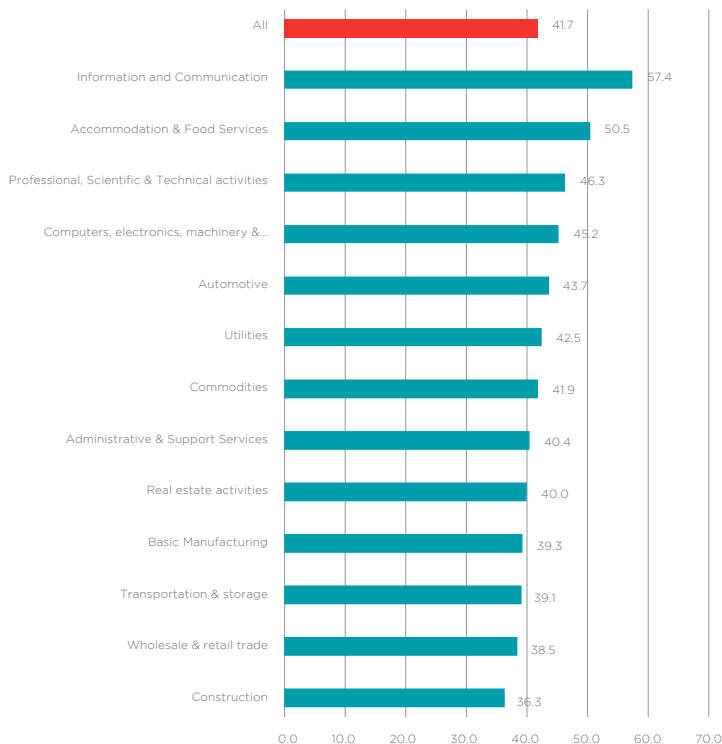
covered in the rest of the index. Specifically, we look at measures of connectivity such as broadband access and the share of employees that are provided with a portable device that allows them to access the internet.

Within those, as shown in Figure 12, the infrastructure component is by far the one where digitalisation is more advanced. In particular, we find that in each and every industry over 90% of businesses have access to either fixed or mobile broadband, while a comfortable majority of enterprises provides its employees with portable devices that allow a mobile connection to the Internet. A breakdown of the IDI scores of the different industries in each separate index component is provided in the Appendix.

Looking at the results of the overall index, these vary significantly by sector, suggesting that the expectation for benefits to be reaped by taking advantage of digital technologies would also vary on this dimension. In particular, our IDI shows that the Information & Communications and the Professional, Scientific, and Technical activities

Figure 13
Score on DMCC/Cebr Industry Digitalisation Index (IDI), by industry group (1-100, where 100 is fully digitalised)

Source: Eurostat, Cebr analysis



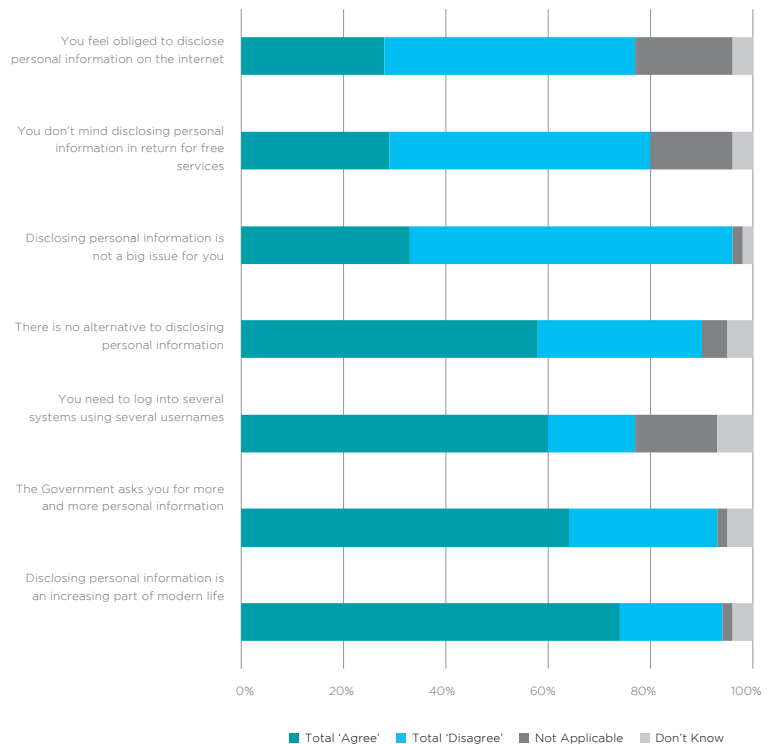
sectors are leading the way in using digital technologies in terms of connecting with suppliers as well as for their internal processes. Meanwhile, when it comes to connecting with consumers it is the Accommodation and Food services that lead the way, likely due to the technologies available to enable them to allow customers to make bookings and reservations online. On the other hand, sectors such as Construction or Manufacturing still have some way to go before they can be called truly digital.

Looking ahead, we expect the overall IDI to gradually increase towards the 100% rate within the next decade. However, we expect to continue to see persistent differences across sectors and differing levels of progress towards that goal among the four different components. Overall, while changes in the measures captured in the IDI tend to be structural, we expect our annual updates of the index to provide valuable insights into businesses' progress with digitalisation and use these to inform our view about the changing patterns in global trade.



Figure 14
Consumer attitudes to data protection and electronic identity in the EU, share of respondents

Source: Special Eurobarometer 359, Cebr analysis



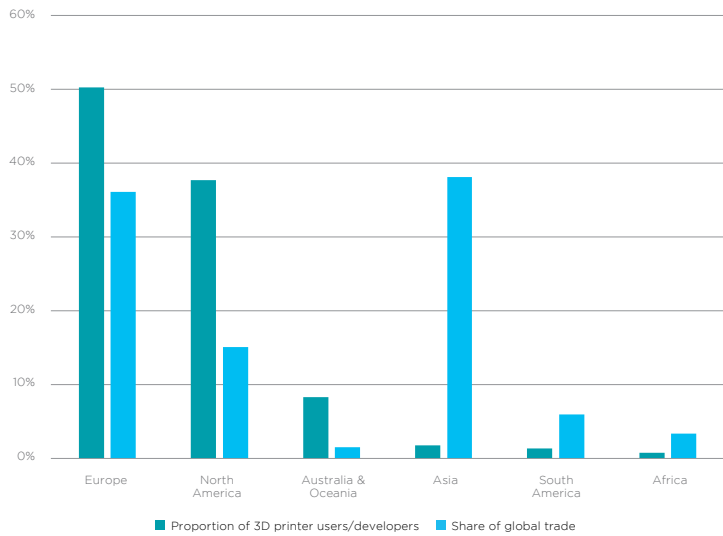
The value of data

It has never been easier for organisations to gather and store information. As the capabilities of digital devices soar and prices plummet it is increasingly cheap and easy for anyone to collect and digitise information that was previously unavailable, creating meaning through the use of powerful algorithms and analytical tools. Data have become the new raw material of business, an economic input almost on a par with capital and labour. Earlier research by Cebr has found that the adoption of big data analytics solutions for example can save UK businesses £216 billion by 2017, while the equivalent level of savings for Irish businesses would be £27 billion over the same time frame.

Meanwhile, a study by Liberty Global has estimated that the value of digital identities in Europe will be €1 trillion by 2020 as more and more gigabytes of data that reveal things that were previously

Figure 15
Value of imports from rest of world against proportion of users and developers of 3D printing, by continent

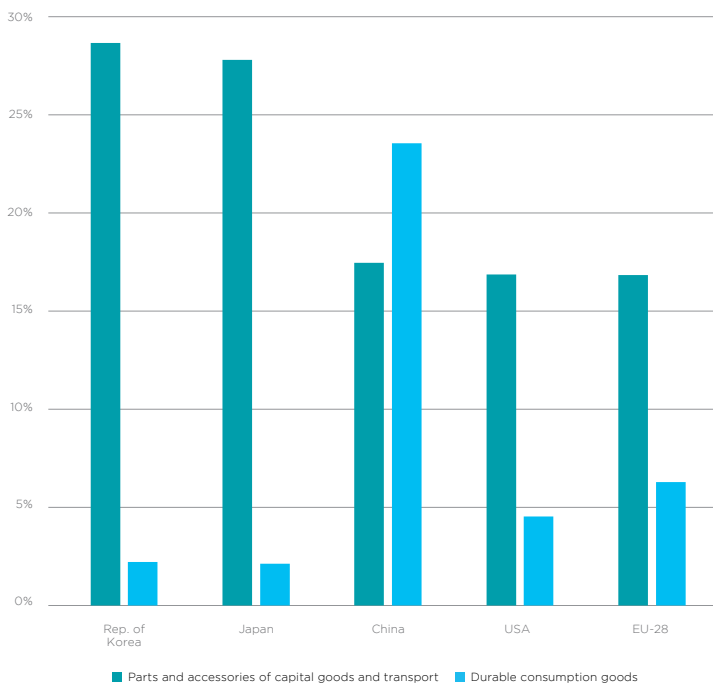
Source: P2P Foundation, International Trade Centre, Cebr analysis



unknown or unknowable. While question marks remain over how quickly and easily this value will be realised, Cebr's assessment is that the rate of disclosure of personal information required to enable this is something that will continue to rise exponentially as more and more trade moves online. Data by the European Commission's Special Eurobarometer that were analysed by Cebr show that even though the vast majority (~70%) of European citizens report concerns over how their personal data are used, an equivalent share of the population admits that disclosing personal information is becoming an increasing part of modern life.

Figure 16
Parts of equipment and consumer durables/semi-durables, share of goods exports, by world's top 5 exporting economies

Source: UN Comtrade, Cebr analysis



But it's not just people; Things are already generating data, informing everything from healthcare to rubbish collection, and in the next five years alone this will generate an estimated additional \$1.9 trillion globally. This extraordinary wealth of knowledge promises to transform every sector, bringing efficiencies and cost savings, but also entirely new service possibilities.

The impact of 3D printing

A major data-related disruption for trade in goods stems from the wider adoption of 3D printing, the digitally enabled synthesis of a material into a three dimensional product. Created via sharing a data file of the product's design, it allows many items to be printed locally using a printer and the right substances. This implies, if the applications are broad enough, that the consumer also becomes a producer. The implications for trade are profound.

Although the subject of much hype for over a decade, 3D printing has now found some strong areas of application. In the medical sector, the ability to print personalised implants is set to change the efficiency of many operations. In the aerospace sector the likes of



Boeing, Rolls Royce and Airbus are now printing elements direct from titanium and achieving huge improvements in cost as they reduce what is termed the 'fly to buy' ratio - i.e. how much material is purchased against how much actually ends up in the product. With the same technology pioneered with plastics and metal powders now being used to print food, some see the breadth of applications burgeoning. Indeed researchers in the US are already printing tissue for replacement body parts such as ears.

Crucially, the means of production is moving away from a centralised approach that requires large-scale production and shipping to the market. Some sectors see the advent of smaller and distributed production as a credible shift that will allow the creation of products, or spare parts, locally to the market or the customer. The main saving is made in "fixed costs" such as machinery and plant. These costs are not linked to the number of units produced - they are the same whether you

make one unit or a million - meaning that the cheapest way to produce using traditional manufacturing methods is at scale. Fixed costs are then spread over many units, and minimised for cheaper goods. 3D printing makes the fixed costs tiny: the only machinery is the printer and the data file that contains the blueprint. This upends the traditional logic of manufacturing, undermining the advantages of scale production and of shipping components from large-scale producers to large-scale assemblers to final consumers. The all-important data file is shared via the Internet and that could well be where the real value will shift.

Currently digital rights management principles are being used to enable the selling and sharing files but this is unlikely to last. Just as Napster led to the free sharing of music files, some see that 3D files will eventually become free or at least marginal in cost. The impacts of this are the reduction in the value of product creation and, maybe, the end of intellectual property for a

12%
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whole tranche of sectors. For trade the implications include not only a reduction in the volume and value of products being shipped but also, in an increasingly digital world, more localised new production. Over the next decade expect more local manufacturing, supported by an increase in localised cross-border trades. Cheap labour becomes a less important advantage when there is virtually no labour at all involved in production. But it also threatens some higher-wage manufacturers. To see why we need to look at the applications of 3D printing and the economies that currently specialise in these industries.

An estimated 12% of businesses are using 3D printing in some capacity. But surveys reveal the applications at present are mainly in prototypes and experimenting, rather than final production. The consumer market has yet to take off. However, the main user base of 3D printers is in the large advanced markets of US and Europe, whose combined share of the 3D printing “community” is 88%. These are where the majority of global imports also go; indicating that the major import destinations are also the regions best-placed to substitute when 3D printing technology starts to supplant certain traditional methods.

The economies that may be especially vulnerable to its effects are, at present, those highly exposed to advanced component engineering



– a form of intermediate production. Precision engineering has very high fixed costs and firms that procure these from suppliers may try to bring some of it in-house through 3D printing. The economies most specialised in these uses, that is, parts of durables and equipment, are the advanced East Asian economies Japan and Korea. Less vulnerable to substitution will be finished consumption goods, as these offer little by way of savings, based on 3D printing’s current applications. This stands China in better stead than its neighbours. Nevertheless, the technology will be highly disruptive.

Conclusion

The decline of trade, as a share of economic activity, is a paradox in a world where connectivity is on the rise and the cost of transport and organising production across national boundaries becomes ever lower. It is especially surprising considering major economies continue to make liberalising trade deals that reduce the cost of selling products in different countries.

This decline in importance is likely to be temporary. Emerging markets have so far followed a similar path

Mobile commerce is more important in e-commerce in many poorer parts of the world than it is in OECD economies



to the OECD countries as they develop economically in many respects, but the pace of new technological adoption has often been faster. Digital development has proceeded much faster in many poor economies, as has the growth in trade. The ability to “leapfrog” certain technologies means that in some respects they are more advanced. For instance, mobile commerce is more important in e-commerce in many poorer parts of the world than it is in OECD economies. This suggests that a rapid change will come as e-commerce becomes a more important part of total consumption: the potential growth of trade in emerging markets is much larger, while the speed at which it happens will also exceed the pace of the transformation in developed economies. The ease with which digitally enabled trade can cross borders suggests that as poorer countries improve connectivity, the share of exporters will eventually increase greatly.

Our index of trade digitalisation shows the information and communication sectors in the lead when it comes to using data to

integrate processes with consumers, with suppliers and internally. Consumer-facing businesses are performing the best, whereas those lagging are businesses such as manufacturing and construction – the ones involved in the business of the physical goods production, rather than the emerging economy of data.

A disruptive technology for goods production will be the future development of 3D printing. By blurring the line between producers and consumers – one which has been fundamental to our understanding of economics until now – it promises to change the logic behind trade in goods profoundly. The fixed costs of production, which have been fundamental in shaping the organisation of manufacturing industries, become a far smaller share of the total. The future will therefore depend to a large degree on how the breadth of applications develops. If 3D printing has a small number of niche applications, the change will not be huge. On the other hand, if firms find ways for 3D printed components to substitute for progressively larger numbers of products, manufacturers will have a seriously disruptive technology to contend with. This in turn would mean real problems for the exporting economies that specialise in these forms of goods production.

The value would shift to the value of the blueprints themselves, with the value of the physical goods falling. This will be the commonality between all the developments considered: an investment in digital technologies means that organisation and transport costs fall, and the spending on physical inputs can be reduced. On a global scale, this means trade in data eating into trade in goods. Trade will still be hugely important to the global economy, just in a different way.

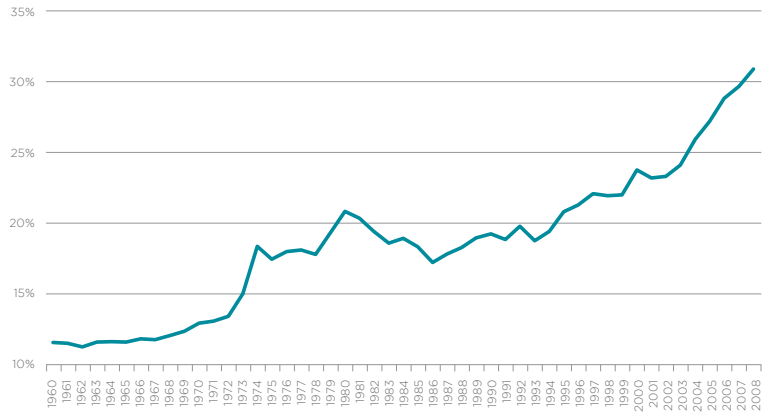
The Impact of Digital

GRAPHICS
ADDENDUM



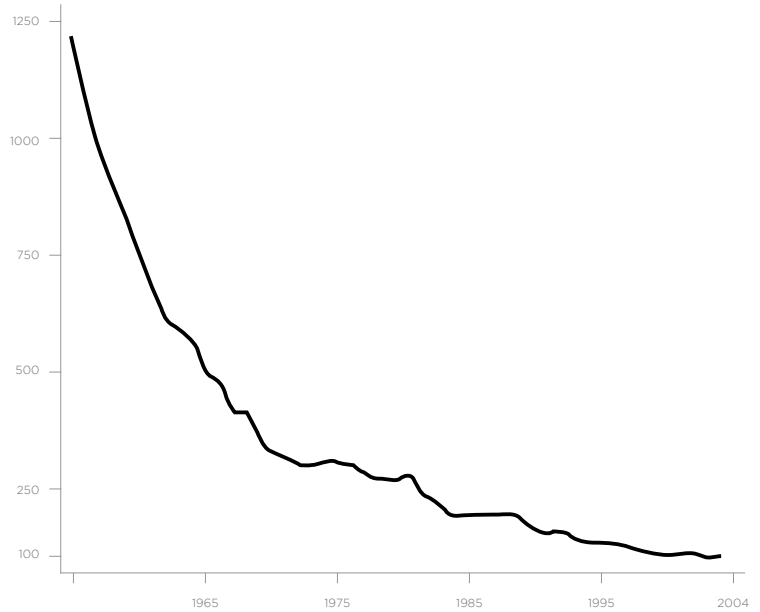
Global trade (average of imports and exports), share of global Gross Domestic Product, %

Source: World Bank, Cebr analysis



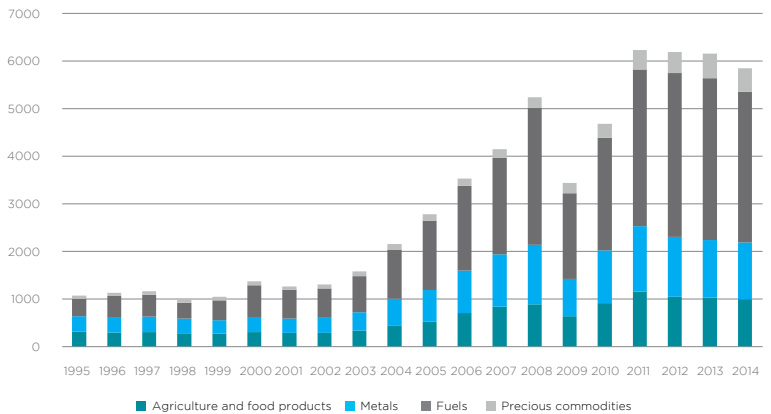
Worldwide air revenue per ton-km, 2000=100

Source: 'Transportation Costs and International Trade in the Second Era of Globalisation,' D. Hummels (2007), Journal of Economic Perspectives



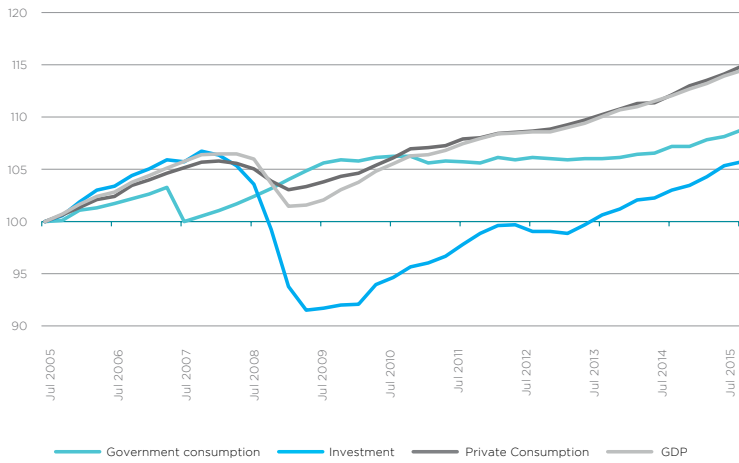
Global trade (average of imports and exports), share of global Gross Domestic Product, %

Source: United Nations Conference on Trade and Development, Cebr analysis



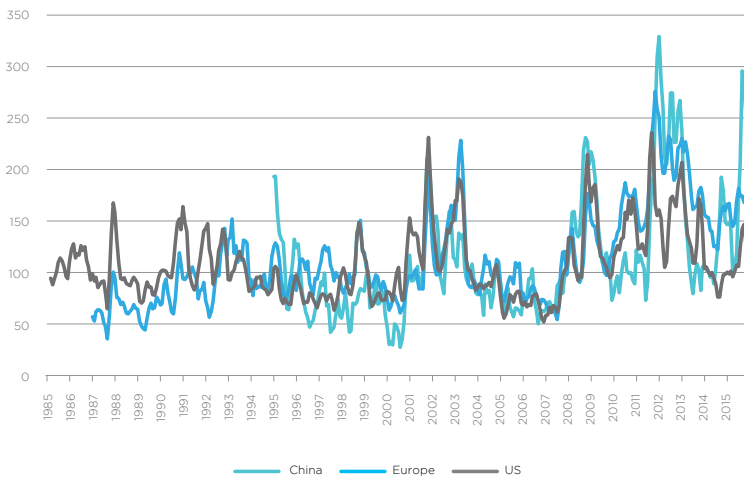
GDP components in advanced economies, July 2005=100

Source: OECD, Cebr analysis



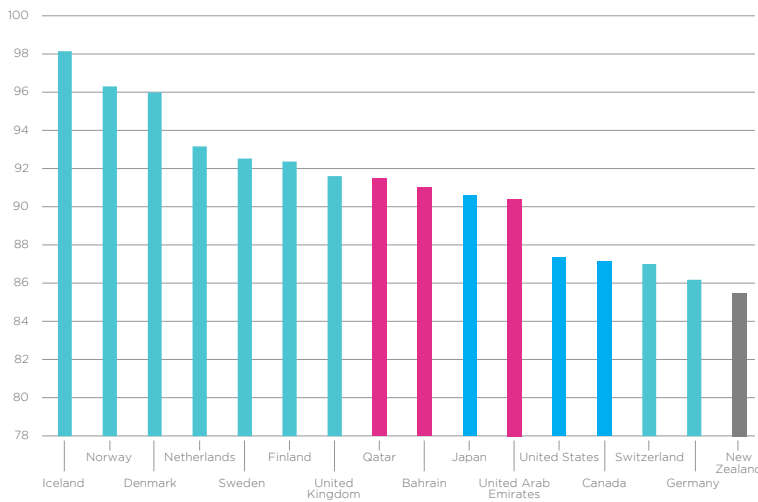
Index of Economic Policy Uncertainty in selected economies

Source: Economic Policy Uncertainty, Cebr analysis



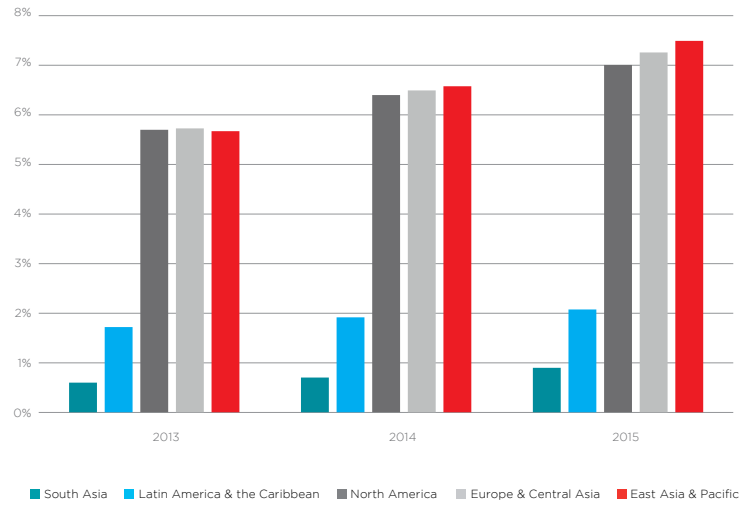
Internet subscriptions per 100 people in 2014, top 15 economies

Source: World Bank World Development Indicators, Cebr analysis



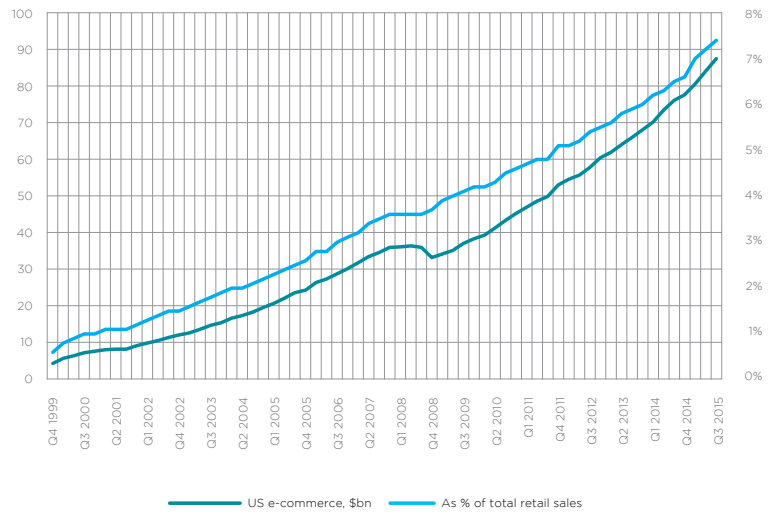
E-commerce sales as % of total retail sales, by region

Source: E-Marketer, World Bank, Cebr analysis



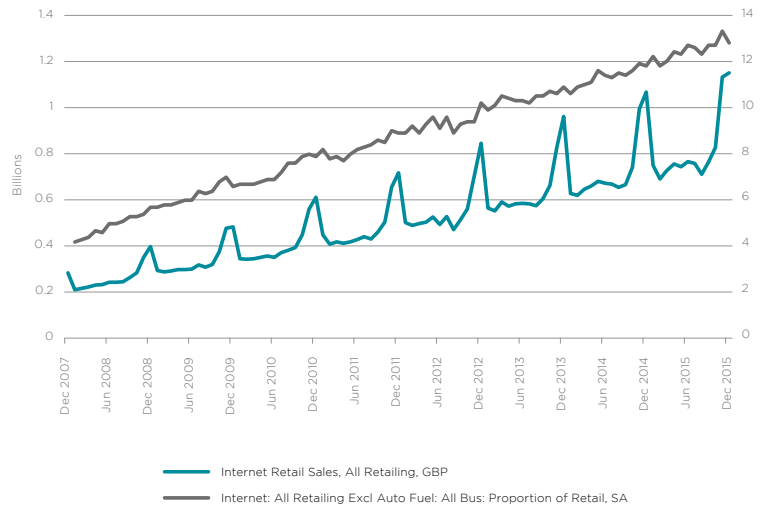
US e-commerce, \$ bn (LHS) and as % of total retail sales (RHS)

Source: US Census Bureau, Cebr analysis



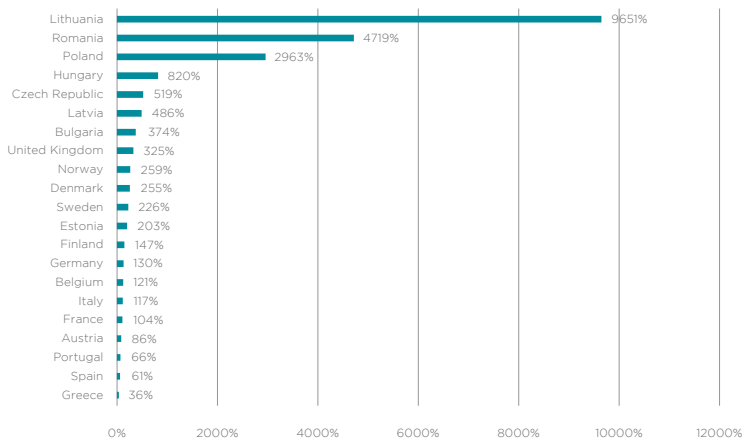
UK e-commerce, £ bn (LHS) and as % of total retail sales (RHS)

Source: UK Office for National Statistics, Cebr analysis



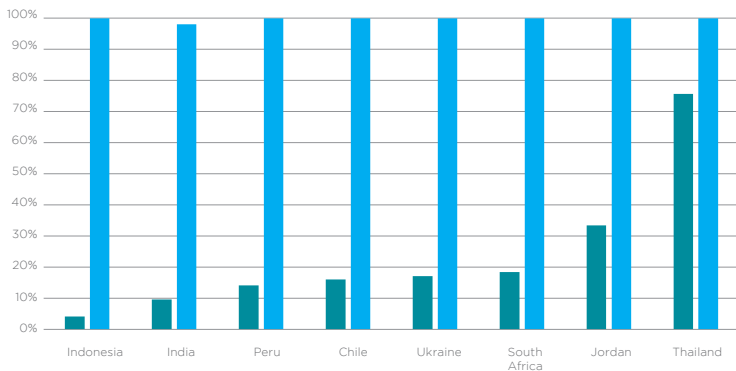
Retail via Mail Order Houses or Via Internet, Constant Prices, % change between 2005 and 2015, selected economies

Source: OECD, Cebr analysis



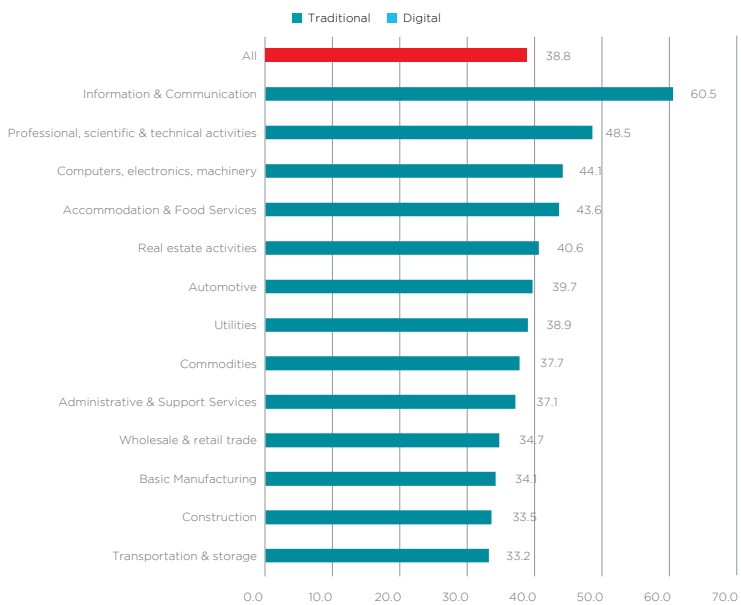
Percent of firms exporting, traditional versus eBay trade, selected economies

Source: World Bank, eBay, Cebr analysis



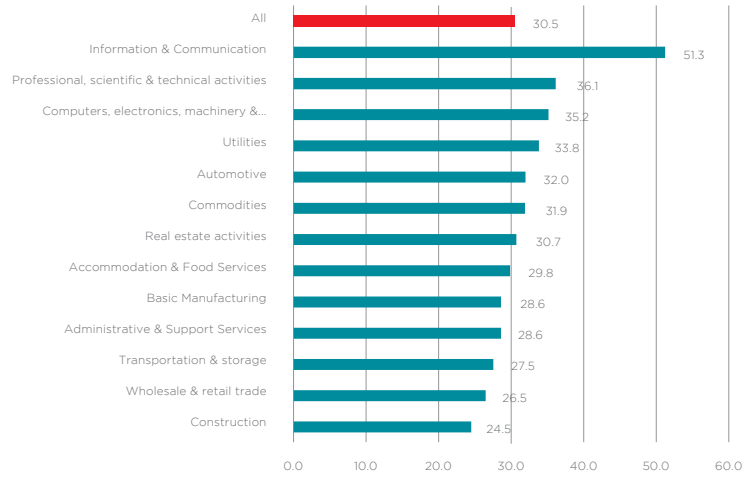
Score on DMCC/Cebr Industry Digitalisation Index (IDI), for Component A (Upstream supply chain phase) by industry group (1-100, where 100 is fully digitalised)

Source: Eurostat, Cebr analysis



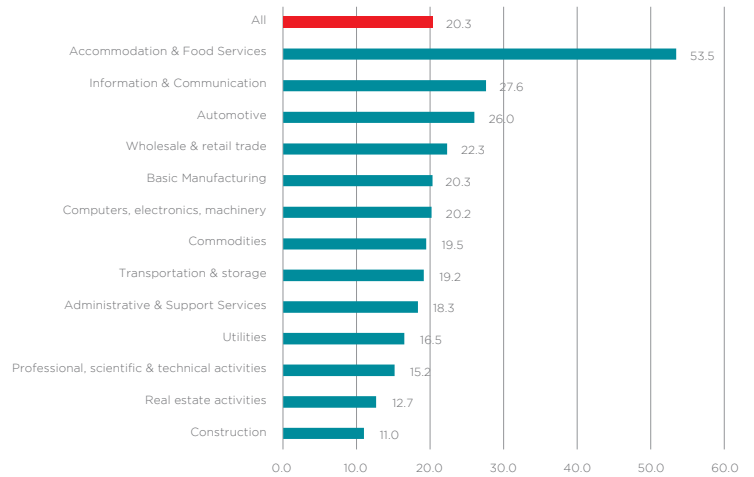
Score on DMCC/Cebr Industry Digitalisation Index (IDI), for Component B (Production Phase) by industry group (1-100, where 100 is fully digitalised)

Source: Eurostat, Cebr analysis



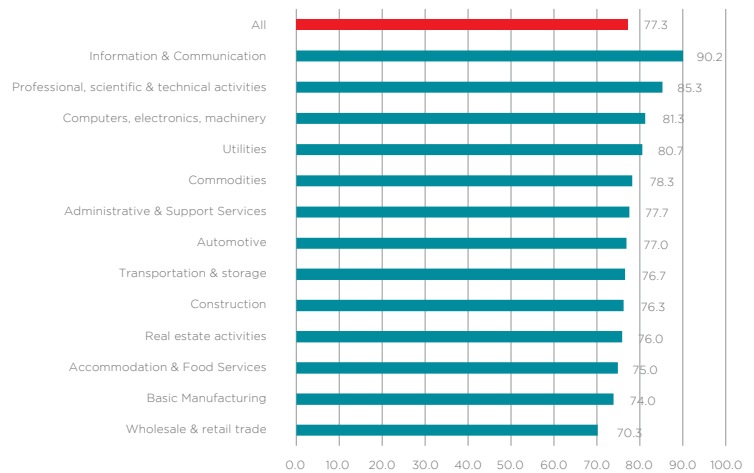
Score on DMCC/Cebr Industry Digitalisation Index (IDI), for Component C (Downstream supply chain phase) by industry group (1-100, where 100 is fully digitalised)

Source: Eurostat, Cebr analysis



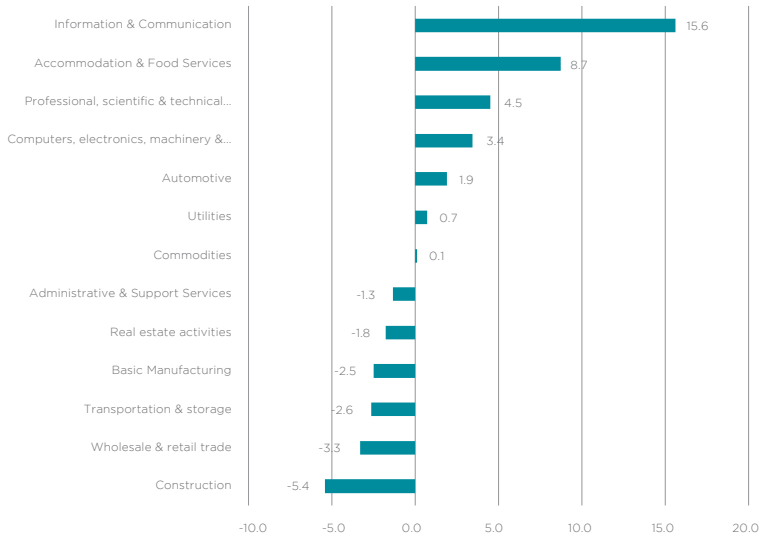
Score on DMCC/Cebr Industry Digitalisation Index (IDI), for Component D (Digital infrastructure) by industry group (1-100, where 100 is fully digitalised)

Source: Eurostat, Cebr analysis



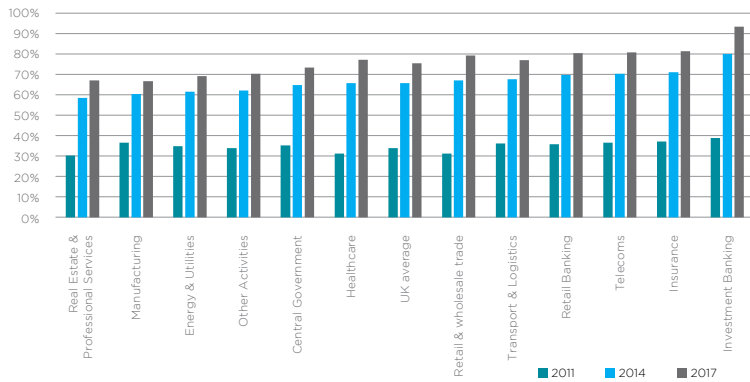
Score on DMCC/Cebr Industry Digitalisation Index, by industry group (distance from the mean)

Source: Eurostat, Cebr analysis



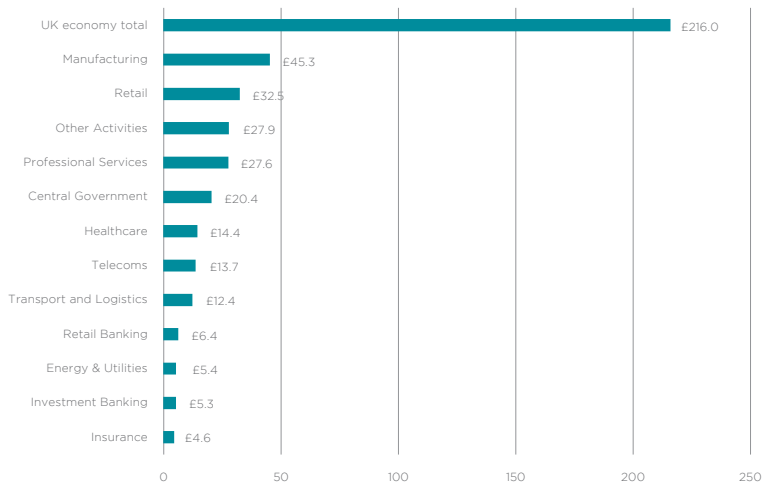
Score on DMCC/Cebr Industry Digitalisation Index, by industry group (distance from the mean)

Source: Eurostat, Cebr analysis



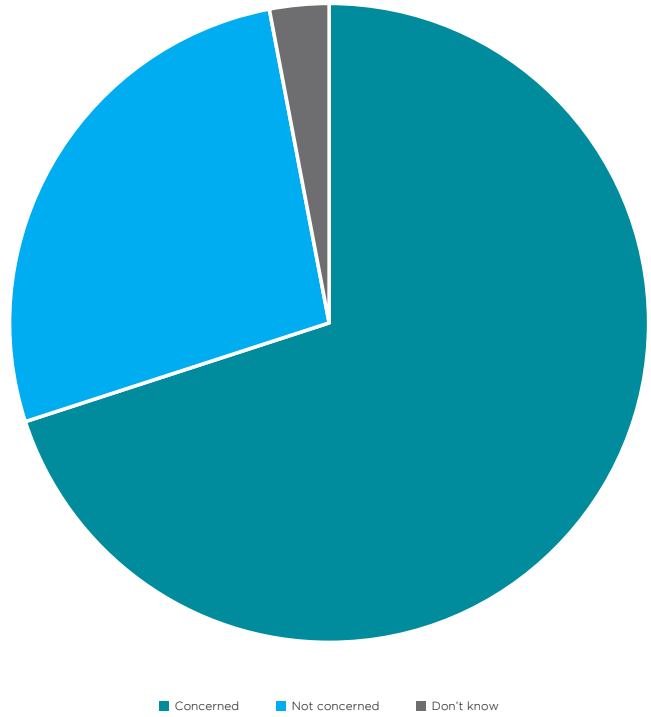
Value of data equity for private and public sector businesses in the UK in 2012-17, £ billion in 2011 prices, by industry

Source: SAS, Cebr analysis 'Data enquiry, unlocking the value of big data'



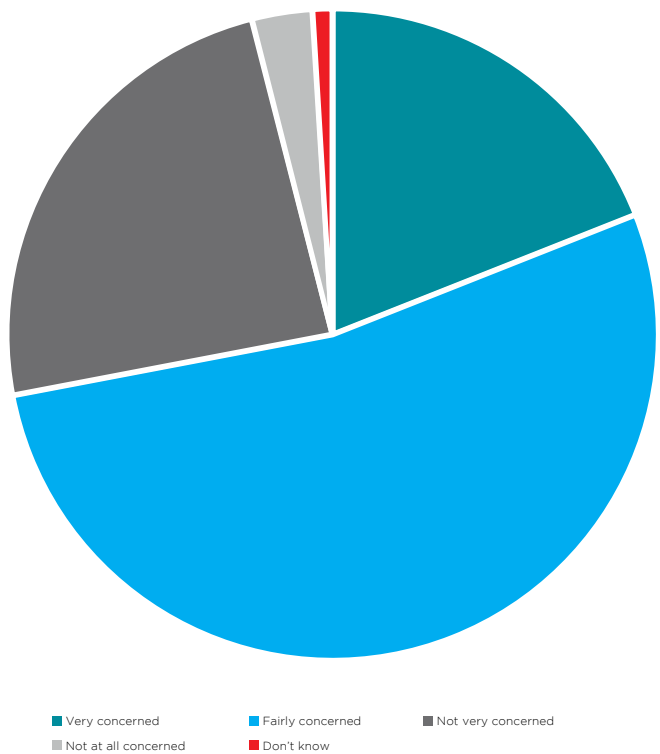
Consumer attitudes to data protection and electronic identity in the EU, Share of respondents (Survey conducted in 2010 and published in 2011); Companies holding information about you may sometimes use it for a different purpose than the one it was collected for, without informing you (e.g. for direct marketing, targeted online advertising). How concerned are you about this use of your information?

Source: Special Eurobarometer 359, Cebr analysis



Consumer attitudes to data protection and electronic identity in the EU, Share of respondents (Survey conducted in 2010 and published in 2011)

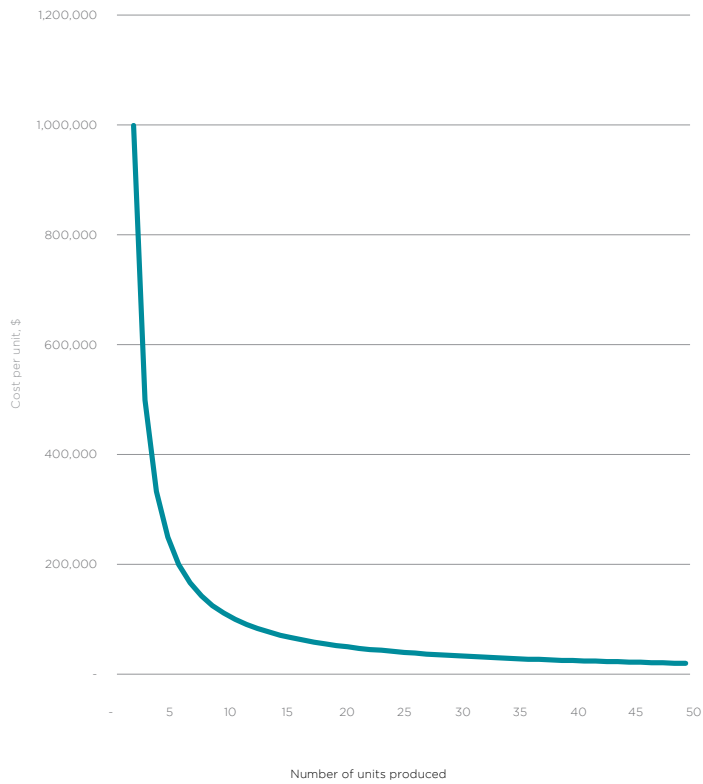
Source: Special Eurobarometer 359, Cebr analysis





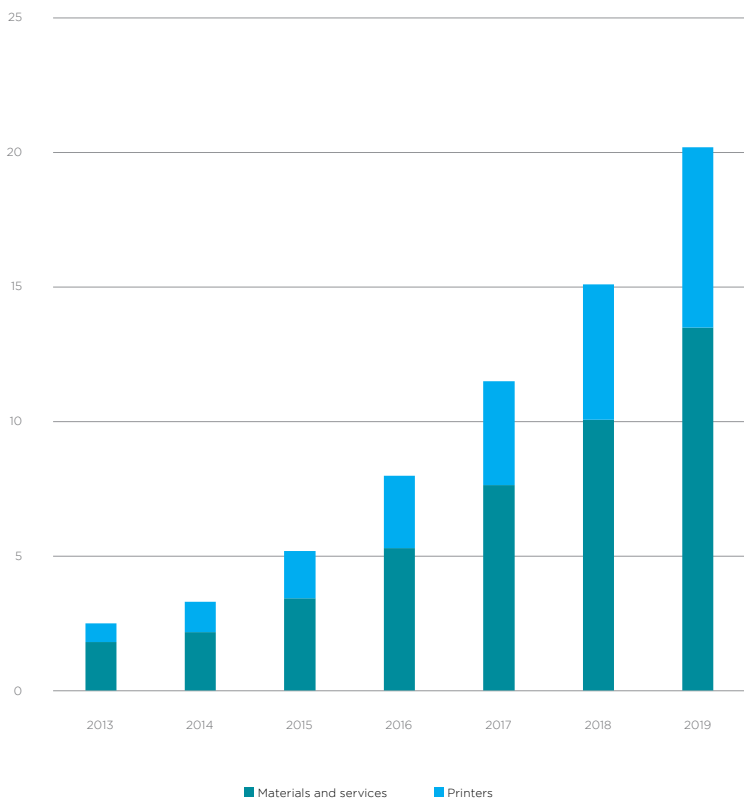
Cost per unit, where firm has fixed costs of \$1m and each unit costs an additional \$50 in inputs like materials, labour, and energy

Source: Cebr



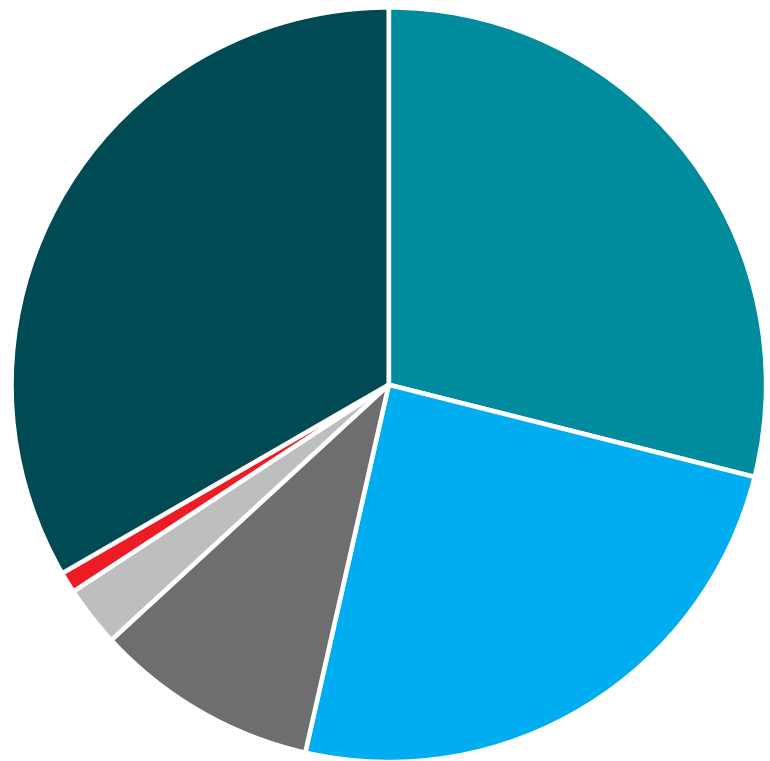
3D Printing market worldwide, \$bn

Canalys, Cebr analysis



Uses of 3D printing, share of businesses

Source: PwC/ZPrime, Cebr analysis



- Experimenting
- Prototyping only
- Prototyping and production
- Building products that cannot be made from traditional methods
- Production of final products/components only
- Not implementing

Shifting Power and Influence



Many of those who attended Future Agenda discussions expressed the view that we are witnessing the end of an era in international trade. Overall western markets are weakening compared to the new opportunities from emerging economies. Asian countries, which have benefitted from a youthful workforce and rising middle class, are beginning to influence world trade and play a greater role on the diplomatic stage. True, Africa and South America have yet to make a significant impact, but with a wealth of natural resources at their disposal, the next ten years should begin to change this. What is clear is that the structures set up in the wake of the Second World War may no longer be fit for purpose. As the US appetite to act as overall arbiter diminishes and Europe faces its own constitutional challenges, change is in the air. Some are surprised at its speed but others accept it as a return to the status quo.

Spurred by easy, global connectivity, individual loyalties are also changing and this is beginning to influence the way that markets react to each other. Like-minded individuals are connecting online and building new networks that extend well beyond national borders. Customers are connecting with producers and the need of a third party to facilitate is being eroded. In addition, changing manufacturing techniques and new technologies such as 3D printing are influencing what is traded. Goods, will always need to be bought and sold and moved from one place to another, but as new alliances are being built and old associations become less relevant, the future is anything but certain.

What is clear is that over the next decade we will see increasing influence on trade from trans-


national movements. Whether these stem from the creation and widespread adoption of a global digital currency platform or the increasing influence of ideologies, many see underlying shifts which will moderate the way we look at power in the future. However, recognizing the balance in the world of today, this chapter explores key geographies.

Europe


There is general consensus that the Euro experiment has had its day. Some see potential fragmentation into a multi-currency free-trading block will lead to the reduction of European influence on the global stage. Certainly in Asia many believe broadly that there are three possible options. First the Euro will be split in two, probably on a North and South divide; second, a couple of major former currencies will be reintroduced, or third, there will be a complete re-fragmentation of the euro zone into individual national currencies and economic interests. In the US opinion leaders were more prosaic suggesting that the region will muddle through continuing, certainly in the medium term, to struggle with 'disappointing growth, high unemployment and persistent sovereign debt issues.' Few in Europe continue to hope for a global leadership role. While most think that, although Germany will remain the primary power within the EU, overall Europe's influence will be eroded by its internal problems such as the UK's threat of "Brexit" and the migration problem. Europe's days in the economic sunshine are, in the opinions of many, in relative decline.

China

China continues to be a major global force, consuming a vast array of commodities including over half the world's production



40%
The amount of the world's copper production currently consumed by China

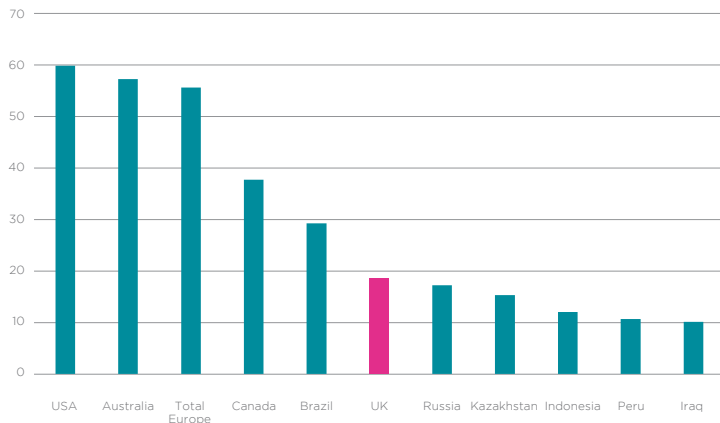


25%
The quantity of global GDP growth over the last decade attributed to China



Chinese FDI to top 10 recipient countries 2005 - 2013, USD billions

Source: Accenture 2014



of aluminium and nickel, over 40% of its copper, zinc, tin, steel and lead and more than 30% of the global cotton and rice. IMF figures show over the past decade it has averaged over 25% of the world's GDP growth. Other nations have benefitted from China's hunger. Over a third of Australia's 2014 exports went to China. For South Korea the figure is 25% and for Brazil it is 20%. Recently slower growth has dragged down emerging markets, like Brazil, Indonesia and Zambia which were too dependent on supplying iron ore, coal and copper. Germany exports more to China than any other EU member state. However, as it matures the world will need to adjust, expect China to focus on its own service sector rather than buying commodities from other nations.

Some are questioning the long term sustainability of the Chinese

economy, especially with the burden of its ageing population. The view from our Hong Kong discussion however was positive with many believing China is set to increase its influence, particularly in the financial and trade sectors; some even suggested that the Renminbi could usurp the dollar as the world's reserve currency. Others, in Dubai, London, Mumbai and Cape Town were less bullish, predicting steady progress for the next decade but not domination. More broadly the formation of the ASEAN Economic Community will help shape regional trade flows as regulatory barriers between member states are gradually lifted.

India

Many agree that in the long-run India's demographic dividend will pay out. The question is when? Certainly with a perfect population pyramid, a massive domestic market, a growing middle class, more successful home-based multinational private companies and world class expertise in IT and process innovation, all the ingredients for India to be a top 3 economy are certainly there. But India is still a knotty place to do business. Many prefer to see it as a long term bet which will ride high on a highly connected Indian diaspora and a number of very progressive business leaders.

The current government has certainly big ambitions. It is aiming to double India's exports of goods to \$900 billion a year by 2020 and is using its Foreign Trade Policy to integrate government initiatives such as 'Make in India' and improve India's share of global trade from 2% to 3.5% by 2020. Although not part of the TPP or the TTIP, India is participating in the Regional Comprehensive

China set to increase its influence



Economic Partnership (RCEP) that will create a free trade agreement across 16 ASEAN economies. HSBC sees that the UAE's growing role as a regional trading hub will make it India's top export destination by 2030. It makes sense, the UAE and India have strong historical commercial and cultural links.

With 1.3bn people and its growing middle class, little need for military expansion to secure resources and many leading edge service businesses, few doubt that in the end India has the potential to be the world's #1 economy. But progress on reform has been slow.

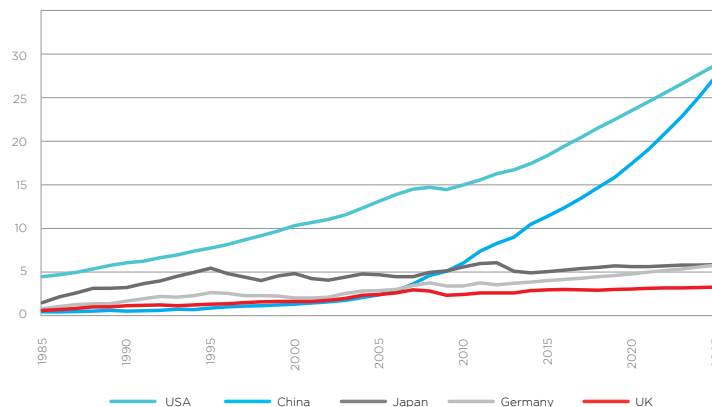
Russia

The outlook for Russia is challenging. Its population, although not ageing, is expected to decline by 10% over the next decade; it has lost access to secure water and food supplies which were previously available through its former Soviet Union neighbours. Falling oil prices have also impacted growth.

Across all the BRICS countries, Russia has suffered the deepest recession post the economic crash. GDP growth averaged at 2.4 percent from 2011 to 2014 despite high oil prices and renewed access to credit markets. On top of this industrial output is declining steadily and negative growth is likely to continue for several years unless oil prices recover and western sanctions are lifted. Foreign direct investment has all but disappeared and led to weak status for Russian debt and a near complete decline in its syndicated loan market. Having gained post-Perestroika from multiple international oil and gas deals, most economists see that Russia is a nation that will have an uncertain future - and likely one less focused on increasing its global financial interaction.

Top five economies in the globe, GDP projections to 2025 in current USD trillions

Source: China Invests West - a report by Cebr for Pinstet Masons



Middle East

There are multiple facets at play in the Middle East and wherever you go in the region there are multiple opinions. Discussions in Beirut, Abu Dhabi and Dubai have some elements of commonality but also a lot of difference. When you add views from outside the region, yet more geopolitical complexity appears. However, from our 15 workshops in the region, three main drivers of change are emerging:

- A declining role for the US, driven by the elimination of its need for energy imports and a lack of political appetite for further military engagement.
- The need for many OPEC economies to accelerate the shift from oil-dependency and increase economic diversification, improve education and open a greater variety of employment opportunities to nationals. Not only is there the climate change challenge in terms of long-term demand for oil and gas, but perhaps more significantly is the need to educate and, importantly, motivate nationals to take on alternative careers outside the well-funded public sector.
- The potential to take advantage of geography and trade routes to act as a growing, pivotal gateway for China and India, not only to

the Middle East but also, and significantly in the long-term, to Africa.

Africa

Africa as a continent has, on average, grown its economy by at 5% per annum over the last decade. It is already as urbanized as China and has as many cities of over 1m populations as Europe. With a steadily growing population heading towards 2bn, its 1.1bn workforce will be the world's largest by 2040.

However there are many Africas: from the oil exporters of Nigeria, Angola, Libya and Algeria to the more diversified economies found in Egypt, South Africa and Morocco. Elsewhere there are many countries such as Kenya, Tanzania, Ghana and Cameroon currently transitioning from a purely agricultural base.

For years, Africa's growth has been shaped by commodity prices – the continent has a third of the planet's mineral resources, 10% of the world's oil reserves and produces nearly 70% of the global diamond trade. While this has been good for growth in the past, the dependency on a few key commodities has led to high levels of uncertainty which is why several nations have been pushing to diversify into areas such as manufacturing, services and tourism. Nigeria is still very much an oil exporting economy, its service sector now accounts for 60% of its GDP - and 'Nollywood', its \$3 billion film industry, is the second largest in the world. Some African states, including, Kenya, Nigeria and the DRC, are seen as leaders in mobile technology to delivering innovative health and financial platforms. South Africa continues to be a major driver in the region. However, it is not a proxy for Africa as a whole – lucky,

as its growth has fluctuated and averaged only 2% over the past decade.

Despite longstanding commercial ties with Europe, Africa now conducts half its trade with developing regions - the so-called "South-South" trade. China has doubled its share to 17% over the last decade, and wider connections across Asia, South America and the Middle East are all expanding. India has a 6% overall share and Brazil 3%. Both are expected to grow significantly. Many also see increased intra-African trade; bilateral agreements between nations with differing political standpoints but common growth agendas are linking with emergent cross-continent agreements, the growth of trading zones and increased investment in infrastructure. Many African nations remain flawed but over the next few years, a number of breakaway countries will show economic and political progress, and barriers to trade will be lifted as infrastructure is improved.

Latin America

Latin America's economy began to slow in 2011 in tandem with a gradual fall in global commodities prices. This has caused export growth to deteriorate, dampened investment and prompted capital outflows that have weakened currencies.

While Brazil continues to be seen by some as one of the 4 BRIC nations that will have influence in the future, others see the end of the commodity boom will curtail further growth and may lead to recession; future growth for the next decade is projected to be under 3%. Furthermore, although the country has a wealth of natural resources and an expanding population, its future growth is seen by some to be limited by a slowdown in China and a lack of internal reforms. Looking

ahead Brazil will probably remain one of the most closed economies in the G20 with a large external deficit. Expectations are low even in the capital itself; in Sao Paulo we heard that 'Brazil will never be a leader – always a follower'.

Beyond Brazil, judgment on the prospects other South American countries is mixed. The 'outward looking', export-oriented countries like Chile, Peru and Ecuador on the Western seaboard have delivered several years of consistent growth and are expected to maintain this for the decade ahead. With Chile, Peru and Mexico all now in the TPP, many see they will continue to develop economically. By contrast the more 'inward looking' Argentina is generally seen to be stumbling from one crisis to another. Recently supported largely by public spending, the hope is, however, for more responsible growth under future governments.

United States

Lastly, and perhaps most significantly, we come to the US. Even though its reliance on international trade remains one of the lowest of any developed economy, it has been at the centre of a global trading framework since the end of the Second World War. As such it has used its influence to both support growth and mitigate risk. Some see that it will continue to do this for the foreseeable future, others consider that we are near a point of inflection, one in which the US, increasingly self-supporting in trade and energy, will turn its focus inwards. If this happens there is a fear there will be increasing volatility in many regions.

Thanks to post Second World War infrastructure agreements it has remained the US's interest to ensure the prevalence of a free trade economy. However, conflicting interests are now stifling the ability



'Brazil will never be a leader'

of the very institutions, such as the WTO, that were established to do the job. With global agreements failing to progress, the US has focused on smaller, but still significant, regional and bilateral trade agreements.

What happens to the US trade policy will depend on the results of the next election but it is likely that there will be continued uncertainty around its long term position on a number of military and economic matters. Change will take time so on balance, the majority view is that at least for the next decade the US will remain as the world's naval policeman and 'guarantee' to keep global trade routes open.

Implications

Bringing all this together, we are clearly witnessing the transition to a new order: New national interests, new trading routes, new products and services are all emerging. The next decade will see the post-war routes gradually being eclipsed by the power of the Indian Ocean region where new port construction and proposed railways stretching from China to Turkey and from coast-to-coast across Colombia indicate the shape of things to come. South-south trade, which has doubled in the decade from 2000 to 2010, is likely to account for over a third of global trade by 2025. How to ensure the development of trade in this environment will be key to success.

1.1 bn
The size of Africa's workforce, which is estimated to be the largest in the world by 2040

33%+
South-south trade is likely to account for over a third of global trade by 2025

Trade Funding and Finance



According to IMF and WTO figures, world trade increased six-fold from 1980 to 2015 while global GDP roughly doubled. As of 2014, the EU, China and the US were the leaders accounting for 14.9%, 14.3% and 13.4% respectively, but the EU and US share of global GDP was higher at 23.9% and 22.5%. As more regional agreements come into play over the next few years, the growth of trade is expected to continue, albeit mitigated by a short-term slowdown in commodities trading and slower growth in China. Indeed, cross-border commerce is growing faster than domestic commerce and so will become increasingly important and influential. Cross-border flow of goods, services and finance could well increase threefold to \$85 trillion by 2025.

The role of money in trade

Money enables people to compare quickly and easily the value of different commodities, to easily exchange one thing for another, and to store wealth conveniently and as such is fundamental to all aspects of trade, domestic and international.

Today, the sum total of money in the world is about \$60 trillion of which c. 1/10th is held as coins or banknotes. The remaining 90% is held as digital money on computers servers. As a result the vast majority of transactions by value are executed by moving electronic data from one computer file to another without any exchange of physical cash.

There are multiple benefits to digital money not least that it is cheaper than cash to handle which by most estimates, costs society as much as 1.5% of GDP; it has low administration costs, reduced security costs and is traceable thus reducing the risk of loss of funds from corruption (e.g... according to a recent McKinsey

report, it is estimated that 75-80 percent of the \$22 billion in benefits of shifting India's government payments to electronic would come from reducing leakage of funds in government transfer schemes ending up in the wrong hands).

Widespread adoption of digital money and connectivity has significantly increased the amount of trade taking place in emerging economies. Small businesses have benefitted from the growth of mobile and fixed line networks underpinned by maturing technology standards and protocols such as credit and debit card payment schemes. Increased connectivity is also at the core of efforts to increase financial inclusion through digital money, where a lack of bank and cash infrastructure and ability of individuals to authenticate their credentials is traditionally cited as an underlying challenge. Vodafone's M-Pesa solution, first launches in partnership with Safaricom in Kenya demonstrates how connectivity can assist in leapfrogging traditional cash based infrastructure and create an environment where businesses can flourish. Launched in 2007 there are now 19.9 million active users of M-Pesa worldwide.

But while many have hailed digitization as the "end of cash", its death appears premature. Physical money has been with us for thousands of years for a reason. Cash is essentially untraceable, it's easy to carry, it's widely accepted and it's reliable, even if the power goes out. There is, arguably, simply no alternative system of payment that is as convenient, reliable and anonymous. After all not all traders want to be on the public radar.

The role of currencies

At the same time, as money is changing in order for wider trade to flourish, there is a growing need



500%
IMF data show trade grew six-fold from 1980 to 2015 while GDP doubled



\$22bn
The value of benefits from shifting India's state payments to electronic

99%

Proportion of all non-financial companies that are small or medium sized

\$6bn

The rapidly growing value of the alternative funding market in the United Kingdom



for new forms of social interaction and ability to communicate across cultures. This may well emerge first around new, high growth trading routes. Many are looking for new mediums of exchange: As such some believe that, rather than the dependence on the USD, we may see growth in alternative currencies and money networks, and the first state issued fiat digital currencies. Momentum behind the former is already clear with 9 major global banks already signed up to the Open Ledger Partnership (Barclays, BBVA, Commonwealth Bank of Australia, Credit Suisse, JPMorgan, State Street, Royal Bank of Scotland, and UBS), a partnership to draw up industry standards and protocols for using the block-chain in banking, initiated by R3 and overseen by the not-for-profit Linux Foundation. Few expect much clarity on which will be the dominant currency any time soon as companies, like individuals, will increasingly choose to use a basket of different options for trading dependent on their needs. While government backed official currencies will certainly still have a place, the rise of digital systems based on Block-chain platforms

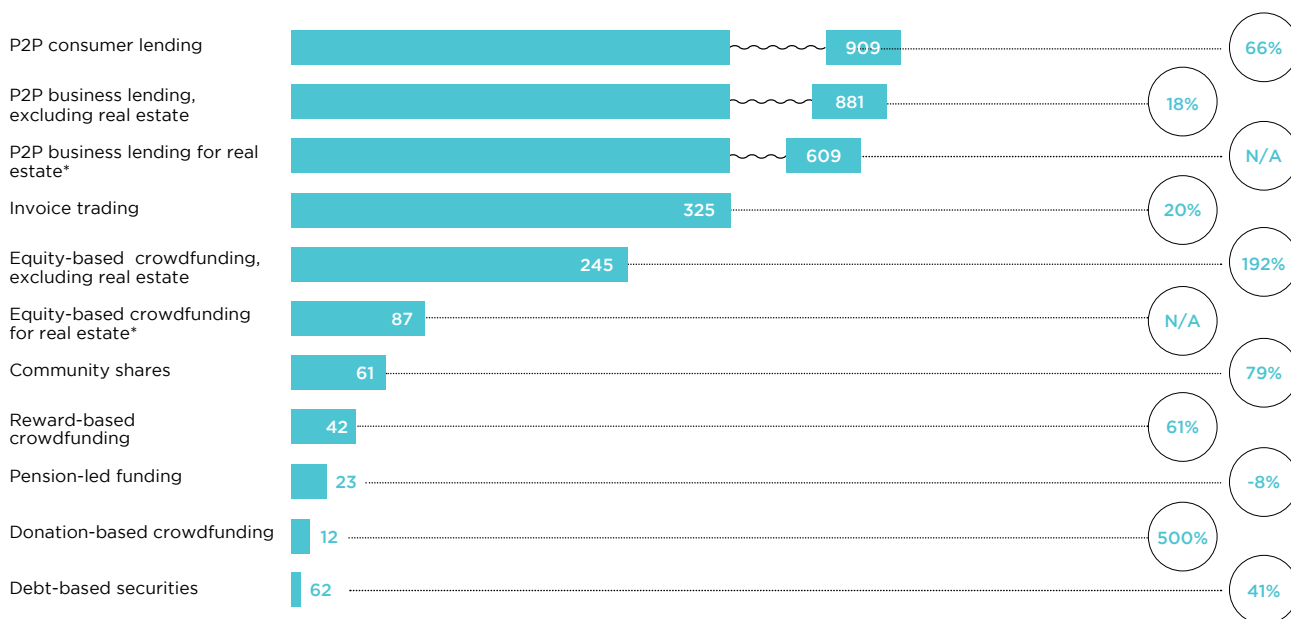
are seen to have an alternative set of benefits. As de-dollarisation takes place, we will likely see the emergence of a host of new trading currencies but there will inevitably be concern about viable alternatives. The digital, open source, IP sharing economy plays by different rules and agreements. As such, new trading options can quickly be designed, trialled, improved and scaled without the need for regulation.

The role of banks

Digitization notwithstanding, banks and the banking sector have an important role in the movement of money, providing access to finance and managing risk for business large and small. International trade exposes exporters and importers to substantial risks, especially when the trading partner is far away or in a country where contracts are hard to enforce. Firms can mitigate these risks through specialized trade finance products offered by the banking sector. Banks do not simply lend out money deposited by savers rather they create deposits when they make loans and therefore expand the money supply. In so doing, some would

UK Alternative Finance Industry 2015

Source: Nesta/Cambridge 2016



argue, they create most of the money in circulation and are key to the free flowing of the global economy.

In the main banks are only limited in how much money they create by their own assessment of the implication of new lending for their solvency and profitability. The 2008 crash demonstrated the vulnerability of this and yet it is still tricky for regulators to wrestle back some control. Many believe there are still too few limits over when and how much banks lend and for what purpose, albeit policy makers have had some degrees of success in ensuring that banks actually do release some of their funds. Regulation however has to be balanced by an understanding that trade finance is a key tool for internationally active firms and that distress in the financial sector and rising costs of providing trade finance for banks can have negative effects on trade itself.

Banks still have their work cut out to regain trust in the market and perhaps it is therefore unsurprising that after the harrowing experiences many firms

faced during the financial crisis, small-business owners have had enough and are actively looking for alternatives. Small firms are the lifeblood of the global economy. In Europe for example around 99% of all non-financial companies are SMEs, that is, firms with fewer than 250 employees and less than €50m in annual turnover. They account for 58% of value added and 66% of jobs. They are more reliant than big firms on domestic demand and bank lending, and have suffered acutely as both have dried up during the euro crisis. With this in mind some are turning to the rapidly growing alternative-finance market, which includes crowd funding and peer-to-peer lending. In Britain the alternative-finance market is probably now worth about £4 billion (\$6 billion), according to a report by NESTA. It's not for everyone but East London, which is primarily made up of tech-firms that use this sort of unconventional financing, has seen the biggest drop in SME credit of any area in Britain since 2013. Across Africa and South America, it is in the SME market where entrepreneurial activity is at its greatest and so where capital

is needed. Finance is the key issue across accessibility, cost and inclusion. However access to finance in these regions is often difficult for SMEs because of the restrictive structure that prevents SME growth; banks are not lending at the moment; regulation is outdated and restrictive and, as a result, transaction costs are rising. This is causing a big problem for SMEs as the banks struggle to work out how to contribute better, manage their reputation and take acceptable risk.

Some see that there may well be a bottom up answer to the fast growing problem – one coming from more cooperative collaboration between SMEs across sectors and maybe even national boundaries. In partnership with the mobile phone networks and Internet giants keen to expand their user networks in the emerging economies, this may result in an increase in peer-to-peer lending that will circumvent banking altogether. In addition, in regions where government is seen as an inefficient provider, pressure shifts towards more public private partnerships. Across healthcare, education, transport and trade, new approaches are being developed that will include NGOs, technology and new business models. As we experience greater instability, conflict and even risk expect increasing regional volatility and

instability. As a consequence, trade may quickly move to those states best able to build adaptive capacity, functional redundancy and resist protectionist pressures.

The digital disruptors

The most disruptive new entrants to banks and the way companies trade may prove to be the cryptocurrencies, for example Bitcoin, and the associated underlying and de-centralised block-chain technology. Alongside the commercial innovation sits moves by both Governments and Central Banks to accelerate the transition towards digital money. For example, the Bank of England's Chief Economist confirmed that "work on central bank-issued digital currencies forms a core part of the Banks 2015 research agenda". While reduced costs form part of the logic to do this, so too does the inherent ability of digital money to carry a negative interest rate, something which it is not possible to do with cash. In Denmark, the Government has gone further announcing in 2015 that selected retailers will be able to refuse cash, paving the way for a truly cashless society. Supporters say that not only will this enable banking systems to become more productive but that it will also ensure that taxes will be paid and only legal transactions will take place, putting pressure on both the informal and black economy. As the Financial Times puts it: "Electronic money also permits innovations to reward law-abiding businesses. Value added tax, for example, could be automatically levied – and reimbursed – in real time on transactions between liable bank accounts. Countries that struggle with tax collection could go a long way in solving their problems by restricting the use of cash. Greece, in particular, could make lemonade out of lemons, using the current capital controls

The most disruptive new entrants to banks and the way companies trade may prove to be the crypto-currencies, for example Bitcoin, and the associated underlying and de-centralised block-chain technology.

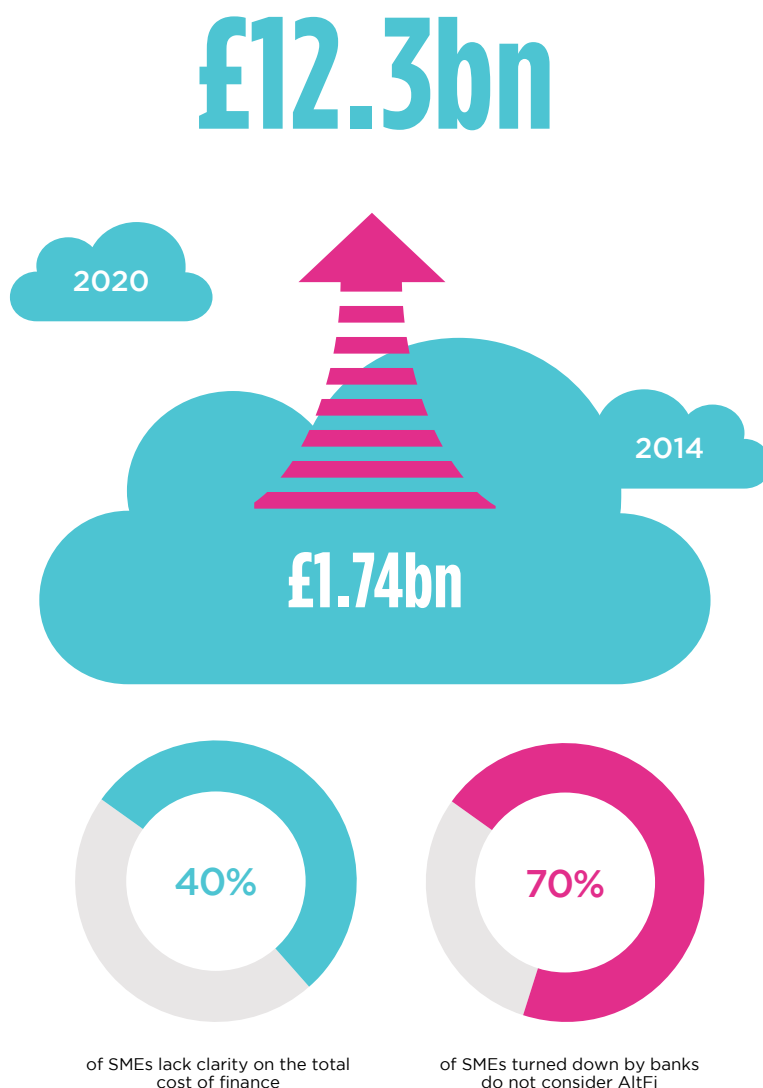
to push the country's cash culture into new habits."

Looking ahead towards 2025, the increasing tide toward more digital money is likely to lead to the existing payments and banking chain spreading out and fragmenting as innovation and competition proliferates. This may lead to further growth in non-traditional financial institutions seeking to control the payments interface and developing their own financial services (e.g. Amazon Payments, Amazon Lending Programme) and retail offers (e.g. Alibaba, Google Shopping) – and lead to the further commoditisation of core banking functionality. To enable this, there is also likely to be further collaboration between organisations (e.g. device manufacturers, telecoms players, associations, banks e.g. Google Wallet).

Over the next ten years expect consumer to continue to adopt digital or contactless payment over cash and digital wallets to eclipse the physical wallet. Practically this will mean that checkouts will move from place to device as payments continue to shift from an active to a passive process (e.g. as exists today in exiting your Uber ride). eCommerce and mCommerce will become greater than face to face transactions. The benefits to consumers will be that the most appropriate payment choice can be selected effortlessly (e.g. with which bank, credit or debit, short or long term) and because the transaction becomes richer in data, critical insight into individuals, with appropriate permission, can be harvested to enable ever more tailored and relevant offers. Adjacent to this, consumers will increasingly be able to trade off for price between money and data, and there will be the consequent emergence of global information exchanges.

Growth of UK AltFi market

Source: Verus360



Infrastructure investment

The last ten years has seen huge investment in infrastructure and its associated trade in a number of emerging economies. A major new railroad across South America is being proposed, as is a new canal through Nicaragua to complement and compete with the Panama Canal. In addition there is a major upgrade of railway infrastructures between Europe and the Pacific as well as new lines and improvements in Africa. This even higher level of international investment in infrastructure has not occurred before in such a

\$18tn

Corporate debt in emerging markets has increased five-fold in the decade to 2014

\$140bn

The value of Chinese investment overseas at its peak in 2013



concentrated period and in part has been enabled by the US Federal Reserves quantitative easing programme. Now that the Fed has brought QE to an end companies in emerging markets from Brazil to China are finding it increasingly hard to repay their debts. Some experts say the QE policies by the Fed and other central banks have left a legacy of oversupply from which it will take years to recover. Corporate debt in emerging markets has increased five-fold in the decade to 2014, and now stands at \$18 trillion, or over 70% of GDP.

What is particularly notable however is that the vast majority of the continued funding is coming from one country - China. With an estimated \$4 trillion of foreign reserves in its various sovereign wealth funds, China has plenty of cash. Despite the slowdown in its GDP growth, Chinese investment overseas has grown eightfold over the past decade peaking at \$140bn in 2013. According to the American Enterprise Institute, of the countries to benefit, the US tops the list with over \$80bn of investments since 2005, followed by Australia, Canada, Brazil and

Indonesia. With resources the primary driver, energy, transport and metals have been the three largest areas of focus for the Chinese state, followed by property, finance and agriculture. Companies such as Nexen, Rio Tinto, Adaz, Repsol, Smithfields Foods and Glencore alone have been the focus of over \$55bn of investment from the likes of CNOOC, Chinalco and Sinopec. Looking forward, although short-term concerns about the Chinese economy are widely shared, few expect this longer-term trajectory of spend to change course significantly.

One particular trade-focused area of activity first proposed in 2013 is the \$40bn 'One Road, One Belt' initiative to re-open ancient commercial trade routes with the West. It is aiming to achieve \$2.5 trillion of additional annual trade with nations along the proposed routes within the decade. At the forefront of this has the rail-route between China and Germany that is already seeing over 20,000 TEU containers being carried each year. In 2015, the first rail containers from China arrived in Rotterdam shortening the delivery time of

One trade-focused area of activity is the \$40bn 'One Road, One Belt' initiative to re-open ancient trade routes with the West. It is aiming to achieve \$2.5 trillion of additional annual trade with nations along the route in 10 years

goods to 14 days compared to the alternative 60 days by sea. In the future trains are expected to travel the 10,800km from Chongqing in China to Duisburg in Germany in only 10 days and so provide a fast two-way modern caravan of goods flow. Although requiring collaboration between the 40 countries located along the historic silk routes, with China taking the initiative, support is significant. An estimated \$8 trillion of funding is required and, according to the WEF, Beijing itself is rumored to be allocating up to \$300bn. Success will depend on governance rules and efficient decision making just as much as funding but the incentive is significant.

Opportunity for Bottom Up Solutions


So, maybe, just as with mobile payments, cardiac surgery and micro-insurance the future answers may emerge from outside of China and the west? Just as m-Pesa in Kenya set the standard for the future of money transfer, so has Narayana Health in Bangalore reinvented the process for cardiac surgery, cutting costs by 95%, and across the emerging economies, from Peru to Bangladesh it

has been micro-insurance and micro-loans that have started to financially empower the masses. The solutions for better funding for trade may well emerge from Africa, India or Latin America. There is clearly a need for more capital availability globally, and especially in the emerging economies. To overcome continued constraints on banks, the need for better SME lending may well see yet more peer-to-peer initiatives, smoother regulation and more flexible access to capital.

If globalisation 1.0 was the western driven model that assumed universality of one culture, then some, such as Lionel Barber of the Financial Times for one, sees that is has passed. As we move forward, globalisation 2.0 relies on the interdependence of several cultures. The launch of the Asian Infrastructure Investment Bank is just one signal of an alternative model emerging. Couple that with the One Belt, One Road initiative, the growth of digital payments and new forms of peer-to-peer exchange, and a new model for funding local, regional and maybe even global trade could be just around the corner.



14
days to
transport
containers
from China
to Europe
by rail
compared
to 60 days
by sea



40
countries
need to
collaborate
for One
Belt One
Road
trade route
to work

A New Geography of Talent



Across the world it is difficult for companies to recruit the right people for the right jobs. Paradoxically many professionals can't get work, finding themselves either with the right skills in the wrong place or with the wrong skills to cope in an increasingly technical and interconnected world. This mismatch of skills and requirements is having a knock on impact on economies from Europe to South America and many places in between. The next decade will see realignment with governments, corporations and individuals becoming increasingly focused on getting the right people with the right skills in the right place to ensure growth. Predictions vary, but in every Future Agenda discussion on this issue there was agreement, education and training is falling behind corporate need so unless action is taken, the gap between skills required and workers available will continue to grow.

Education for all

For millions of people, especially the children of poor and minority families, getting more education is the best advice. Whatever way it is delivered, schooling is the most effective pathway to a sustaining career and wage. However to actively contribute to society in the future many experts believe that young people need to be taught different skills. Quite what those skills are is still under debate and as a result many are struggling with how they can be delivered. By 2025 not even the most optimistic revolutionaries believe that we will have changed the whole system at a global level. But pockets of innovation will exist all around the world. Innovative teachers and institutions will be testing, enhancing and so proving the new approaches. Every child deserves the opportunity to be educated. The potential lies in shifting the dial on how and what they learn.

For those who can afford it, a degree is a good investment. In the US for


example on average graduates get paid 15% more per annum than those without qualifications. The same benefit however cannot be said for employers. In theory a university degree should make an employee more productive and yet it does not always seem to be the case. In some countries, particularly in the US, universities build their reputation on research output rather than the quality of their students so employers find it difficult to measure the quality of education their employees have received. Without a recognized standard which measures capability many employers simply don't even try to find out what students have actually learned, preferring instead to recruit graduates from high prestige universities, not because of what they were taught at college, rather because of the effort they made to get there. Given the increasingly international and so competitive nature of education we can expect a more rigorous process to be developed over the next decade.

Elite global nomads

The privileged few, fortified by sought-after skills and protected by the passports of their choice, dominate the top echelons of the corporate world. Their lifestyles, irrespective of location, remain broadly unchanged. For them tapping into local culture is an option but not a necessity. Their peers also hail from diverse corners of the globe and many will find more in common with those in similar circumstances than the friends and family who stayed at home. Many wield huge power. They work on a global scale and are able to use their corporate influence to drive material change in ways that national governments can only dream of. Unilever, for example, has set a target for 2020 that aims to help more than a billion people improve their health and hygiene and help to reduce obesity. The Tata Group spends around 3% of its net profits, (USD17 million in 2014), on



15%
On
average
the amount
graduates
are paid
more than
those with
no degree

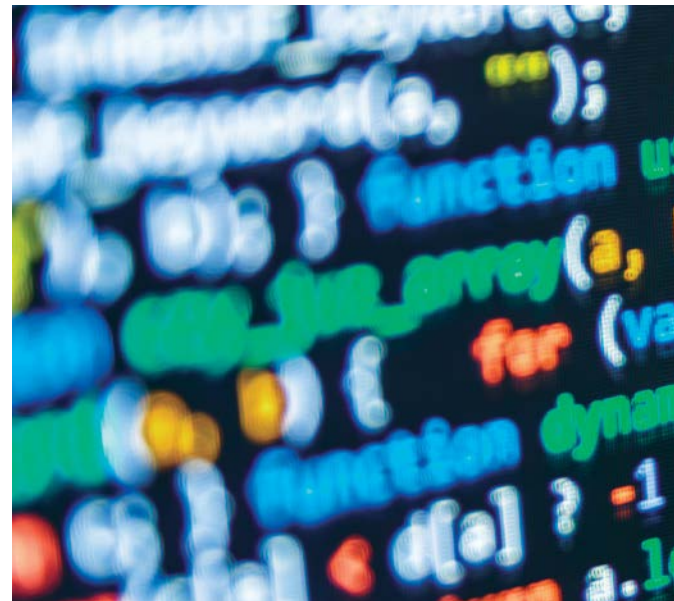


\$17m
Amount
Tata Group
spends a
year on
education,
health and
environment

programmes related to education, health and the environment.

Those who migrate for professional reasons often use their education as a ticket to riches, making their homes in centres such as Silicon Valley, New York, Singapore or London. They are right to do so; many rich countries are picky about who they allow to enter so increasingly new arrivals are generally qualified in some way. In 2013, in the US, for example, 41% of immigrant workers had at least a bachelor's degree. In 1970, that share was just 20%. These elite few not only want to work on great projects, be challenged on the job, and enjoy a stimulating workplace they also want to live in open-minded, diverse cities with lots of other creative and talented people and varied career opportunities around them. They want to have fun. It is here where governments and in particular local government can make a difference. It's about creating the right social environment to attract key workers.

Often mid-sized cities build their own appeal because of their educational systems and the entrepreneurial mind-set of their citizens: think of Stanford in the US, Oxford or Cambridge in the UK. Some larger cities have learnt from this and worked hard to create their own



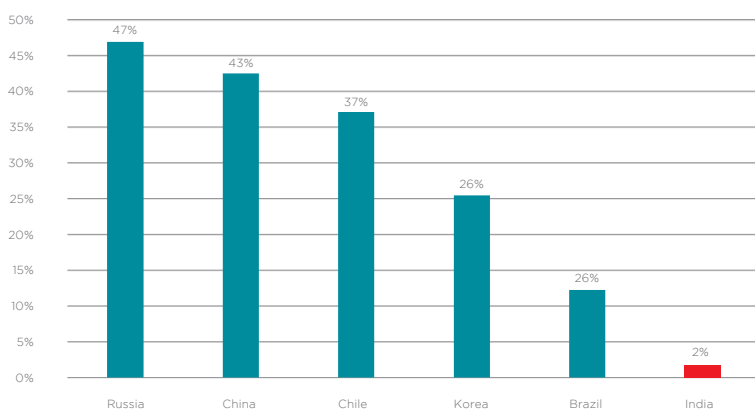
entrepreneurial and academic hubs. INSEAD were one of the first movers in the space and set up in Singapore and New York University now has an established campus in Abu Dhabi; others have similar, but smaller satellites. In 2015 New York (1st) and London (2nd) are still the world's two most competitive cities but looking ahead there is a risk that they could out price themselves – even the super rich have limits eventually. Without heritage some of the newer cities in Asia, Africa and South America may still find it hard to compete particularly when their selling points of convenience and efficiency are challenged by the likes of gridlocked traffic and poor air quality; safety is also an issue. However, as the trade axis tilts, and the opportunities for corporate development expand, expect this tiny but influential group of global nomads to look towards new locations in the centres of trade, think of Jakarta, Hanoi Nairobi or Lima.

Certification, qualifications and soft skills

Alongside new skills, professional certification is set to become a key issue over the next decade as it often lags behind professional requirement. Its lack of effectiveness means that companies have to spend unnecessary time and money

Percentage of students in upper secondary education enrolled in vocational programmes (2008), selected countries

Source: Global economic benefits of vocational education and training – a report by Cebr for City & Guilds





We work in an increasingly connected world

identifying suitable candidates. Consider for example the market for web and mobile designers. Without certified standard skills, learning on the job matters but it is difficult for employers to know who to hire and whose experience is valuable because the technology is changing so fast; equally employees have limited incentives to put time and effort into learning on the job if they are uncertain about the future prospects of the particular version of technology their employer uses. Workers will more likely invest when standardized skills promise them a secure career path with reliably good wages in the future.

In addition to this, as enterprises of the future respond to the increasingly networked corporate world where relations with suppliers, outsourcing partners and customers become more dispersed and nuanced, the ability to negotiate, encourage collaboration and manage cross cultural relationships is increasingly important. However those with soft skills such as empathy, and the ability to collaborate seem few and far between. The most valuable workers are often those who are good at interacting with others, exchanging ideas and providing a service. This is not taught at school or university and is seldom communicated in the work

place itself. Until this is addressed technically literate, degree educated candidates, who may well have ambitious salary expectations but fewer social skills, will struggle.

Digital overload

Many blame talent shortages on the speed of change generated by the digital economy. Some argue that if Moore's Law were applied to the technical requirements of work, soon it will be necessary to acquire new skills every two years or so. It's just really hard to keep up. Certainly, efficiencies are being made across multiple sectors and all sorts of jobs, from accountancy to engineering to nursing, are being transformed because of the existence of robotics and computer science. But it is still unclear whether 'robots' will mean the end of work for humans or whether they will augment human capability. Despite all the noise, it is more than likely we will still need accountants, engineers and nurses as it's not so much that the requirement is changing it's just the skills required to do traditional jobs are changing faster than many expected and we are therefore unprepared. In addition to this, the digital economy is hungry for highly skilled workers. This is particularly evident in Asia where e-commerce is mushrooming and early adoption is seen as a way

41%
of all
immigrant
employees
in the
global
workforce
have a
bachelor's
degree

#1
In 2015
New York
was ranked
the most
competitive
city in the
world with
London
second

57%

of women aged 25-34 are thinking of taking up some kind of international career

350k

The number of Chinese who came home from overseas study in 2013

to “leapfrog” inefficient, legacy infrastructures.

For some it is almost as difficult to stay in work and to maintain relevance as it is for those outside work to get a job. To address this it seems likely that over the next ten years greater emphasis will be put on specific qualifications but such is the rate of change the normal skills life cycle is shrinking. Employees will need to train, re-train and train again just to stay in the game.

Going global

Qualifications can only go so far in providing career training. Almost irrespective of location, foreign experience and the ability to adapt in different cultures will continue to count for a lot for ambitious professionals and many Asian countries are on the front foot in this area. China for example has been encouraging students to learn abroad since the late 1970s; currently Chinese youths make up over a fifth of all international students in higher education in the OECD, with more than a quarter of them in America. In fact today there are more US-based Chinese PhD students than American. Meanwhile the number of Chinese students, having benefitted from a few years abroad, are now coming returning home; more than 350,000 Chinese returned from overseas study in 2013, up from just 20,000 ten years earlier. Americans on the other hand are less adventurous with fewer than 10 % of them studying abroad, mainly in the UK or Canada.

International experience however can also be gained at home. For example 28% of UK employees are now working in an international role without having to move abroad. A taste of foreign climes is still attractive however particularly it seems to women. A recent report by the Centre for Economics and Business Research (Cebr) found that women between 25-34 years old are driving



the greatest demand for international career opportunities – with over half (57%) currently considering taking up a more international role compared to just 29% of men. The report also uncovered that, despite the clear benefits to business, the demand for travel is often driven by employees rather than the companies they work for; 62% of employees say they speak about international opportunities but only 13% of employees say the opportunity to live abroad actually happens. As the next generation of senior managers take over there is every expectation that this anomaly will change.

Looking ahead what should students study? Every case is different but it is clear that there will always be a role for those with the ability to articulate, analyse and adapt so giving students language and cultural skills in order that they can more easily collaborate and compete on an international platform is a good start. Studying in away from home can help immensely. In addition science, technology and engineering and maths (STEM) students are likely to remain in demand. China and India are ahead of the game in this arena. Two thirds



Concept of a global career and the key elements that it captures

*The value of global careers to the UK - a report by Cebr for L'Oreal



of all STEM graduates will come from those countries by 2030.

In some instances companies are taking learning in-house and providing practical tuition to their most valued employees. There are multiple benefits to this. For example Unilever used its programme not only to teach management skills but in 2013 it ran initiatives that helped it to communicate on a more sustainable strategy to its employees. Corporate education initiatives provide relevant teaching with concrete case studies making them more practical than the theoretical approach taken by many business schools. They are also a lot cheaper. Their downside is, of course, that they risk creating a circle of self-endorsement, as they don't benefit from the outside challenge factor which students at a traditional business school are likely to receive from others studying the same course.

If, as many argue, we are to have a smoother transition from education to work, then it's clear that we need to make education more aligned with the future of work. There is universal

agreement that in the future few of us will have a job for life. Indeed many people are already doing jobs that were not conceivable when they left college. The future of work is likely to be about portfolio careers via multiple projects with different organisations and networks. If that is the case then maybe the education system should react in a similar fashion and become more flexible?

The next ten years will see a dramatic increase in the use of technology for learning. As generation "mash-up" matures, many ask why learning should only come from one institution at a time when MOOCs, YouTube, Google and even Facebook are all providing us with knowledge? True, learning from multiple centres presents an administrative challenge in tracking and so crediting and maintaining a recognised standard of achievement - but it is not insurmountable and maybe we could adapt the system? If curricula are likely to become more flexible to changing global and local social and economic needs, how we see the level of competence to be awarded an IB, BSc or even PhD may well also change.

Standards Driving Trade



A good share of new international regulation is increasingly aimed at freeing up trade to make it simpler and less bureaucratic. Whether at global or regional levels, governments around the world are seeking to improve the trading landscape for the goods their country produces, some more successfully than others. Often the aim is to create agreements that can make international commerce easier and so increase the volume of trade between nations. However, the piecemeal nature of most regulation is not equally beneficial. There are a number of agreements, standards and protocols established by one group or nation, that others see as increasingly constraining. Whether concerning tariffs, currency exchange or quality standards, some nations find that the trade standards of others are essentially restricting trade.

One of the overall ambitions of most governments is to facilitate better intra-regional trade and so drive cheaper transport costs, reduce production costs and increase employment. Some however believe that paperwork and regulation go hand in hand which does little to further trade - a recent report from the World Bank said bureaucracy related to tax-collection at state borders is a big reason why India's long-distance truckers are parked 60% of the time. In South Asia only two borders - Afghanistan / Pakistan and India / Nepal - are open to trucks but even then complying with regulatory requirements means that driving across the border takes an average of 30 days. It's often quicker and easier to go by sea via Dubai. It is argued that removing regional trade barriers could increase the GDP for Bangladesh and Sri Lanka by 17% and by 15% in India. While systems are being modernized and

customs controls reformed, there is still a long way to go. Many see that in the age of globalisation, there is an increased need for a universal system of trade rules, and this has been a major focus over the years for the WTO, GATT and others. Recently many of the developments in global trade have been led by the US, which has used regulation to project its vision of free markets onto the global economy. The US has set the direction, created many of the rules and, some say, although it has enabled global trade to develop significantly, it has also gained significantly more from this than others. In particular, over the past decade or so, the vast majority of international transactions have had to go through the US clearing banks, even those not in USD. This can, at times, lead to blocking of transfers due to triggers set up as part of the US anti-terrorism regulation. On top of this the challenge in maintaining the post-war system has become increasingly difficult as multiple and conflicting interests have stifled the ability of the very institutions such as the WTO, that were established to do the job. Looking forward as the Indian Ocean becomes as important for trade as the Pacific, questions are being raised as to how the US will maintain its leadership and control - and the role that standards will play in this.

Regional Alternatives

So, with global agreements failing to progress, the number of regional trade agreements has grown considerably - from around 70 in 1990 to more than 270 at the time of writing. Europe, for one, has built the EEC and then the EU into a major trading zone, the US has also focused on a growing number of smaller, but still significant, regional and bilateral trade agreements. For



270
The
number of
regional
accords
in place
today
compared
with 70 in
1980



\$400bn
The total
value of
world food
trade and
a vast
slice of
the global
trade pie

44%
of US
exports are
accounted
for by the
TPP trade
pact with
12 Pacific
nations



example, since the 1994 NAFTA integration of the US, Canadian and Mexican economies, bilateral free trade agreements have been established between the US and 17 other countries. Most recently the focus is on two mega-deals – the now agreed Transpacific Partnership (TPP) and the pending Transatlantic Trade and Investment Partnership (TTIP).

The TPP has linked twelve Pacific countries, including Japan but excluding China, that collectively account for 44% of US goods exports and 85% of US agricultural exports. It cuts tariffs for key industries and also eliminates regulatory and custom barriers to trade for some services. Critics see that it favours US technology companies and banking institutions and further cements the role of the dollar in international trade. Supporters think it will strengthen trade enforcement tools and help to advance security, stability and prosperity throughout the Asia Pacific region. Some also see it will pressurize China to adhere more closely to international standards by raising governance standards for

many of its associate trade partners. The TTIP links the US and the EU, and is also preoccupied with the provision of services and regulatory co-operation around standards on matters like food testing and car safety. Supporters see that this will reduce costs for business, boost growth and lower consumer prices, cementing the world's democratic powers at an unstable time. Opponents have concerns that the existing tough European standards around product testing and welfare rights are being diminished.

The proposed TTIP agreement is specifically coming under scrutiny for lowering, rather than raising, food standards. Worth over \$400bn, the volume of world food trade is enormous and standards are pivotal. As the TTIP priority will be to maximise trade and there is a proposed shift in power from national governments to a new international trade committee, partnerships including Friends of the Earth and the Centre for Food Safety see the ability of local regions to set robust standards around foods including GMOs, synthetic biology and cloned

animals is under threat. As the US regulation around the genetic engineering of plants, animals and microbes is quite light, the argument goes that the TTIP will open the door for such foods to enter the EU, bypassing current regulation and standards. Cloned animals, for example, are not tracked in the US as they are in the EU, so there would be few means of preventing them entering the food supply. Also because the focus is on the 'least trade restrictive' the ability, for example, of individual countries to inspect food for pests and diseases will be reduced as will the freedom to introduce higher local standards, which often raise the quality bar for everyone. Passions are certainly high as some experts go as far as to see TTIP as a 'Trojan Horse that will threaten our food safety and environment.'

The Obama administration has consistently argued that the TPP and TTIP are central to advancing America's global leadership and assuring an international marketplace based on openness and transparency. China on the other hand has long suspected that the TPP is designed to keep it out, given its rules on things like state-owned enterprises and internet access. Many, particularly in Asia, are keen for an alternative, non-US driven agenda, seeing their needs are better met through the RCEP (Regional Comprehensive Economic Partnership) as a separate FTA (Free Trade Agreement) that brings 16 countries together, but does not include the US.

Role of Non Tariff Barriers

Within the global and local trade context, there has been a gradual shift away from tariffs, in developed economies but this has been coupled with the introduction of more so called 'non tariff

With free trade areas such as the EU, NAFTA and potentially both the TTP and TTIP all restricting the use of tariffs to tax international trade, alternative ways for countries to protect their own interests have gained ground

barriers' such as environmental or safety standards which can, in some cases, restrict imports. Whereas many developing countries still use tariffs as a primary source of income for governments and public spending, the developed economies have been able to shift away from this. Non tariff barriers have become an increasingly popular means regulating international trade, of supporting weak industries and, as such, have become especially attractive to interest groups keen to support one sector or market.

With free trade areas such as the EU, NATFA and potentially both the TTP and TTIP all restricting the use of tariffs to tax international trade, alternative ways for countries to protect their own interests have gained ground: Quotas, licenses, anti-dumping regulations, standards, import credits, export subsidies etc. are all in use. Such customs procedures, technical standards and labeling / packing requirements are not directly aimed at restricting trade but add to administrative bureaucracy and often lead to the same result.

Automation

In parallel with the above, better and more widely adoption of automation is helping to monitor trade and maintain standards. Coupled with the growth in the



\$115
The
sum, per
container,
to be
saved
under
customs
automation

use of sensors and other M2M mobile technologies, expanding automation is helping to make connections among and between customs agencies more efficient. There are increasingly better information flows not just between different governments but also between trading partners across manufacturing, shipping and trucking. As more technology helps to streamline processes, customs agencies are correspondingly gaining more insight and understanding of individual transactions that, in turn, is helping to improve both vetting and risk management.

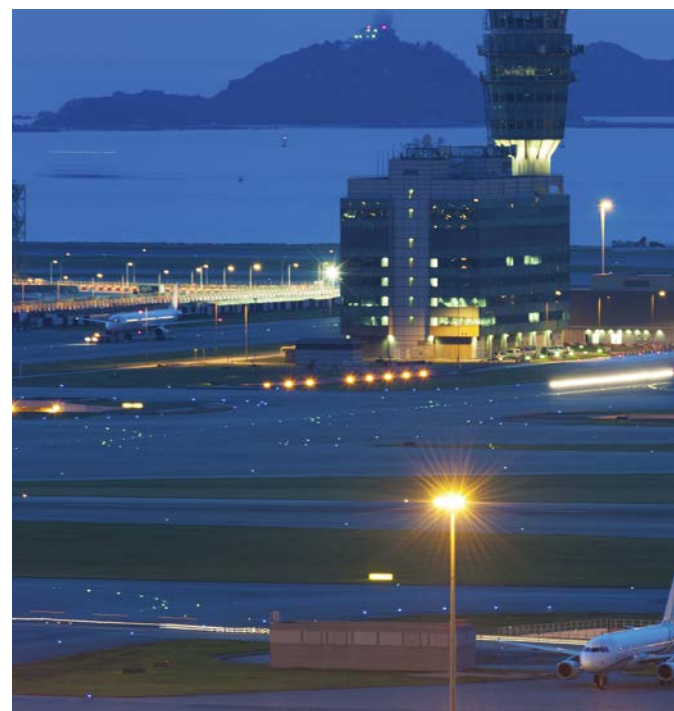
The key benefits of automation will include reduction of paperwork and lower transaction costs. As different parties all agree the standards for exchanging data, they will gain by, for example, more easily identifying low-risk traders and having increased transparency that will enable more agencies to share data to more easily allow cargo to cross borders. For example, going forward, agencies will be able to easily identify every supplier

along a supply chain as well as their locations, financial viability and global relationships. The days of stamping paper documents is fast being replaced by electronic verification via RFID and other M2M and IoT platforms.

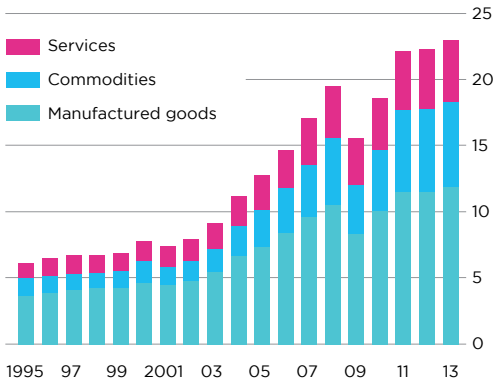
But to make this work effectively there needs to be clearer, recognized digital standards that allow all parties to collaborate. Here again the US is very much in the driving seat. Sector or regionally focused consortiums such as the IIC (Industrial Internet Consortium) formed by AT&T, Cisco, GE, IBM and Intel are a key step forward but the aim is for global standards with scale to be established across all industries all probably using a global unique entity identifier.

Those setting the standards and protocols are not only able to set the rules but are, by implication, defining the landscape. Those that want to benefit from increasing automation and system efficiency will have to agree to these rules and so this becomes another lever to make countries and companies

Standards will increasingly be used as a way of defending domestic markets, manifesting change in target export markets and maintaining a degree of control over importers. Without them it might be a completely free market and few nations really seem to want that

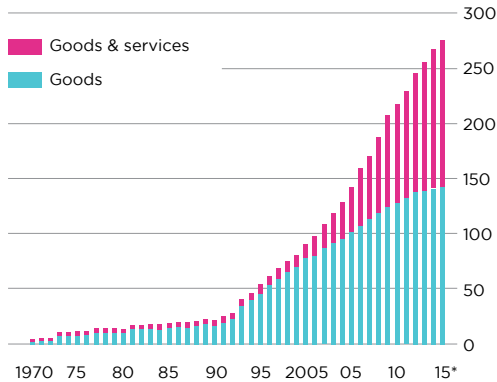


Exports, \$tn



Source: UNCTAD; WTO

Cumulative number of trade agreements



adhere to the same processes. With the promise of greater efficiency from predictive analytics that will make the global trade system safer and more secure, the case for joining in is compelling. According to the World Bank, “automating customs processes can save as much as \$115 per container.”

The world’s customs and border agencies have long known that the growing complexity of global trade requires more effective mechanisms for sharing and analyzing data. Although the cost of cross-border transactions, as measured in both time and money, will rise, agencies

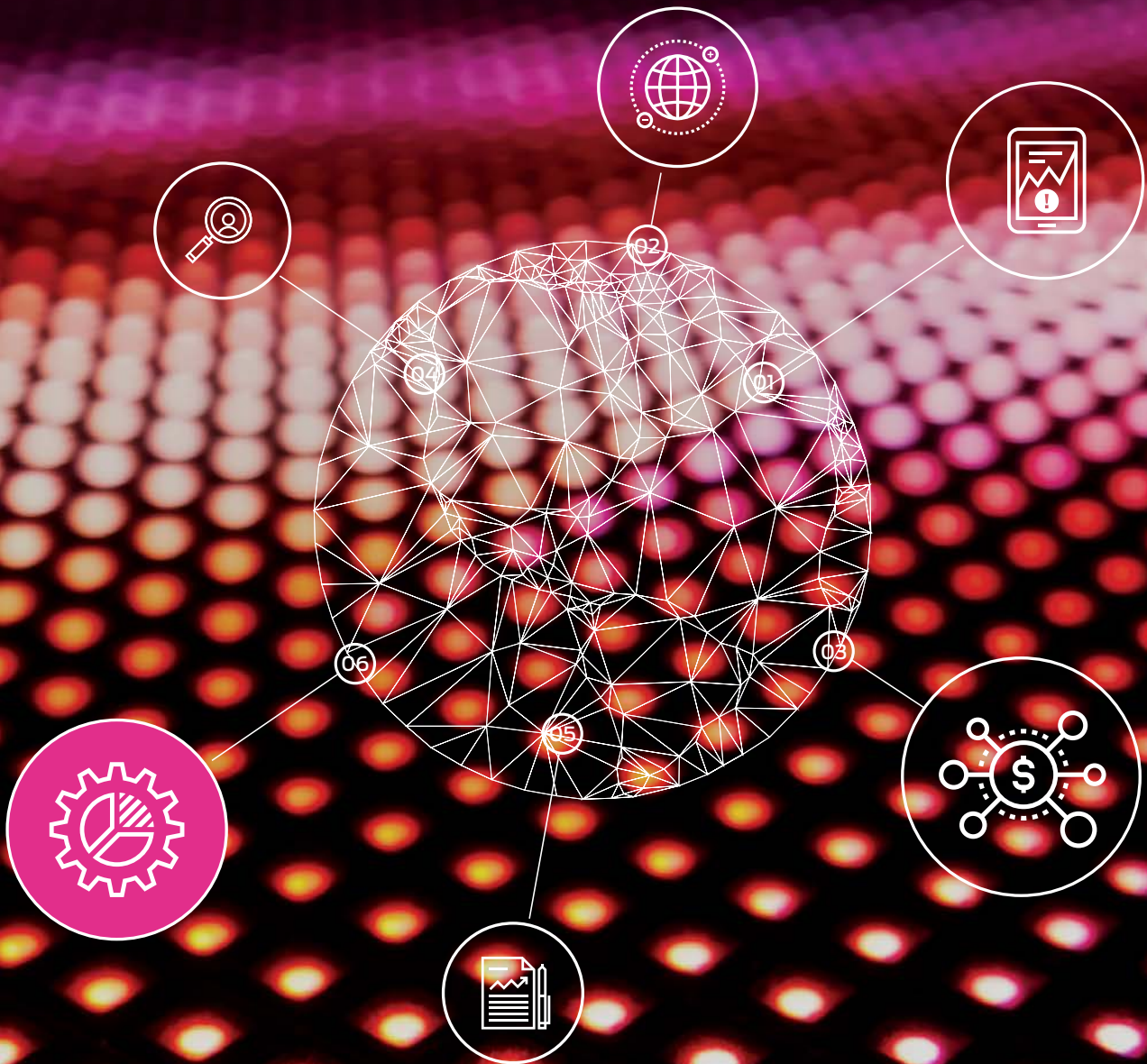
and their commercial trading partners, should think carefully about what data they can use which will provide real value to their operations.

In Conclusion

While some argue that it is the global and regional mega trade agreements that are setting the future trading landscape, it is clear that underneath these varied standards are actually driving trade. Whether they be safety standards for food, cars or services, communication and data standards for increased automation, they are the gateways for many imports and exports. They are being used positively to enable better, faster and safer trade, but they are also used negatively especially as non-tariff barriers to restrict trade. As the WTO has tried in the past and the likes of the TTP and TTIP are now targeting, international and regional trade agreements are deemed necessary to facilitate a smoother overall system. However within these it is clear that standards will increasingly be used as a way of defending domestic markets, manifesting change in target export markets and maintaining a degree of control over importers. Without them it might be a completely free market and few nations really seem to want that.



Systems Efficiency



Over the next decade, as trade continues to evolve, many see significant improvements occurring in the overall efficiency of the system. At both global and regional levels, there will be enhancements that reduce waste, improve transparency and smooth the flow of goods. Some of these can be directly linked to the shift to digital, improved access to funding and more appropriate regulation (all covered in other chapters), but many also apply to the physical movement of goods – the fundamental logistics and supply chain issues upon which the whole system is based.

Open Supply Webs

It wasn't long ago that companies sought to manage their own supply chains to optimize delivery to production facilities and then on to distributors and retailers. Today companies increasingly sharing their networks competitors and collaborators alike. Key to this shift is increasing transparency, the need for fast global access to products and services and rising consumer expectations on product quality, cost and availability.

Moving things is big business. Over 80% of everything we use or consume, it's been estimated, has, at some point or another, been on a ship, either as a finished product, a component or an ingredient. Whether importing cocoa from Cote d'Ivoire, sending LCD displays from Seoul or exporting T-shirts from Bangladesh, the need for companies to plan, manage and execute the timely provision of products worldwide is a major source of competitive advantage. For some, logistics prowess has altered the basis of competition. As one workshop participant observed "Companies don't compete – supply chains do."

Technology is playing a huge role in the transformation of supply

chains. Digitalisation is not only widening access to markets and improving efficiencies but it is also significantly increasing transparency in terms of consignment location tracking and cost of shipment, making what was previously hidden within the organization visible to all. 3D printing, although still in the search for mass-market applications, is redefining the means of product delivery. Rather than shipping product halfway round the world, we may soon be able to print off components in our home – obviating the need for a supply chain except for the necessary materials and the 3D printer itself. In addition more companies are also able to offer local finishing services such as customer specific product assembly – electronics, cars and so on. In fact Amazon has already filed patents for installing 3D printers in delivery trucks, thus taking the concept of real time to a new level

According to Deloitte, supply chains have evolved into value webs that span and connect whole ecosystems of suppliers and collaborators. Simply by connecting people these webs can reduce costs, improve service levels, mitigate risk and drive learning and innovation. Moreover, as new technologies generate more data and so provide greater transparency, the move to the web approach may well accelerate and accommodate more players. Organisations such as Caterpillar are 'driving towards a lean, responsive, and resilient global supply network' and are seeking to better 'lead coordinate a vast and decentralized web of interconnected suppliers.'

Its not all plain sailing however. Although a number of companies have already moved to proprietary webs, or shared webs across



80% of everything we use or consume has at some point in its life been on a ship



67% of companies are actively planning to start using some kind of analytics in the chain



17%
of
companies
have
already
started to
use data
analytics in
the supply
chain



50%
of the
cost of all
deliveries
is incurred
during the
last mile of
the journey

partners, the cost of supporting multiple options has, for some organisations, increased liability. While flexibility has increased, so has the base-line cost of supporting a more complex global infrastructure.

This largely technology enabled improvement of inter-firm coordination has also coincided with a long-term political shift – that of trade liberalization by some nations and regions around the world. Together the forces that have enabled offshoring, on-shoring and global outsourcing have changed the nature of trade and production. However, a key issue here has been the balance of local and global. Nestle, for example, sees that ‘food is a local issue’ and so has a core principle to ‘centralize what you must, but decentralize what you can.’ Webs that enable better collaboration are replacing traditional, closed arrangements associated with old-model supply chains.

It is argued that open supply webs allow companies to achieve better global distribution than previously available because their supply chain efficiency is improved by opening space and assets to other companies’ short-term needs, geographic reach is extended and customers gain from fast and reliable provision from globally dispersed facilities. Companies are therefore able to exploit a more open supply web and have access to more distributed manufacturing, assembly and distribution facilities which can be used for both short and long term contracts without having to make large investments, take on long-term leasing or strategic partnerships. As we move forward, the core questions will be how will organisations seek to balance the reward of greater efficiency against the apparent commercial risk of partnerships

with competitors. The reality, so some see, is that the transparency and effectiveness of a more flexible approach will become the main driver in making the open supply web the norm for the future.

Autonomous Vehicles

While many are excited about the impact autonomous vehicles will have on moving people, others see that it is their ability to move goods will be the real change over the next decade. The concept of self-driving, autonomous vehicles has been talked about for years with little on the roads yet to show for the hype. The reality is however getting closer and, over the next decade, many expect to see some pivotal advances introduced at scale in some parts of the world, though at different speeds in different sectors and in different regions.

For several years now, warehouses and fulfillment centres have been using autonomous vehicles that move products and packages around as directed. While in the past they have largely followed pre-determined routes and, so required a fixed infrastructure, the next generation of vehicles is using 3D vision guidance systems. This allows for self-driving vehicles that have complete, flexible navigation that is unlocking a raft of opportunities for a wider range of applications. Self-driving vehicles won’t just transport goods, they will also load and unload packages quickly and safely. In addition they will automatically join together to transport large products and whenever an obstacle is encountered they instinctively re-plan routes. Some facilities are already planning for swarms of such vehicles communicating and coordinating tasks among themselves and so allowing the system to adapt capacity to daily

fluctuations and changing customer requirements. The people-less warehouse is not far away.

This technology can easily migrate from within buildings to the outside and start to change how goods are moved around cities. If multiple white vans can be replaced by a swarm of autonomous electric delivery vehicles then the efficiency improvements will be significant. Although they will be slow moving for safety reasons, supporters argue that they will be able to navigate through urban districts, choose routings that avoid congestion and deliver goods when and where required. This will work not just for deliveries to end consumers but also in the B2B environment. Offices, restaurants, retailers and even manufacturers, it is argued, will gain from the network efficiencies that will be realized.

The last mile is the most difficult and expensive leg of a package's journey and a key problem for distribution typically incurring up to 50% of the delivery cost. Whether from adopting drone technologies, to reconfiguring how we all receive stuff, many see the revolution in autonomous vehicles will be around small urban deliveries - slow-moving, driverless, electric pods delivering packages to homes, offices, drop-off points and even traditional car boots. No surprise that many are looking at Amazon to take the lead here although the Starship project from the founders of Skype, a self-driving robot that can hold up to 10kg of goods and is able to navigate around pedestrians, is gaining interest.

Amazon Prime Air videos are already showing how a 30-minute drone delivery system might work and the company has filed patents for several advanced vehicle systems. But other, equally nimble players, are also making bets on

While many are excited about the impact autonomous vehicles will have on moving people, others see that it is their ability to move goods will be the real change over the next decade. The reality is getting closer

future options. Uber's ambition is to offer "transportation as reliable as running water, everywhere for everyone". "Everything" is also in its sights. The company has also begun experimenting with local delivery services, with the aim of becoming as disruptive in logistics as it has been in the taxi business.

Another option being explored is to make self-driving passenger vehicles carry packages. As we move into a world of driverless taxis and autonomous cars, many see an opportunity to use them for moving goods around whenever they are not moving people. So, rather than sitting stationary in a car park or on the street, when not required by



Uber effect is to transform logistics



Company's experience with big data analytics

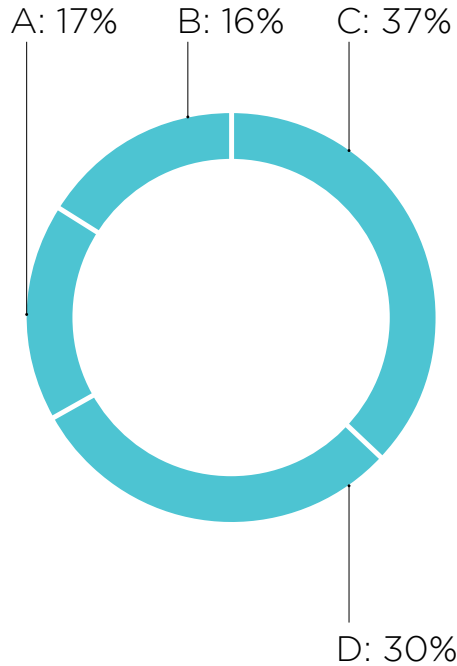
Source: Accenture 2014

A
Already implemented analytics in one or more supply chain process/functions

B
Awareness from publications, conferences and/or colleagues

C
Engaged in serious conversations to implement analytics in the supply chain

D
An active organisational initiative (with supply chain being an integral part) to implement analytics in the next 6-12 months



20% cost-saving in an Amazon warehouse using Kiva robots

Source: Amazon

1m horizontal and vertical accuracy achieved by Galileo GPS satellite navigation

Source: European Space Agency

60% of containers destined for the North of England are currently routed via south-coast ports

Source: Liverpool City Region Local Enterprise Partnership

\$4bn raised by 3D companies in public offerings since 2010

Source: Gigaom

70% higher performance achieved by companies that acknowledge supply chain as a strategic asset

Source: PwC

57% of chief executives ranked supply chain optimisation and traceability as a first priority for technology investment

Source: Gartner

240kph clocked by Audi's driverless RS7 car circuiting Hockenheim racetrack

Source: Audi



Company's current use of big data analytics in supply chain

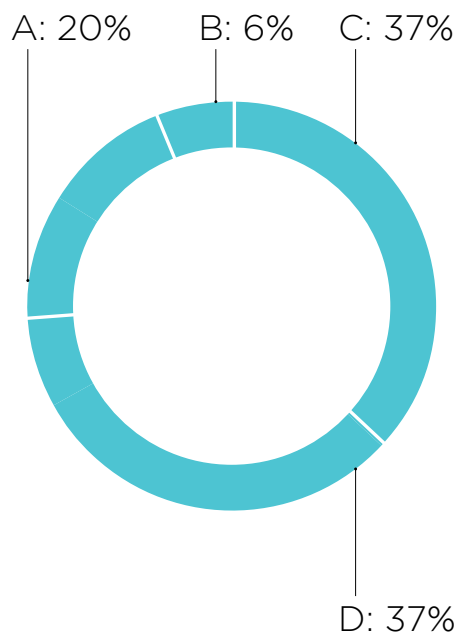
Source: Accenture 2014

A
Big data analytics is used in some areas within the supply chain and used on an ad hoc basis

B
Not applicable - we only make use of traditional analytics and do not use big data analytics

C
It is operationalised - big data analytics is embedded into key supply chain processes

D
Big data analytics is used in all areas of the supply chain, but only on an ad hoc basis

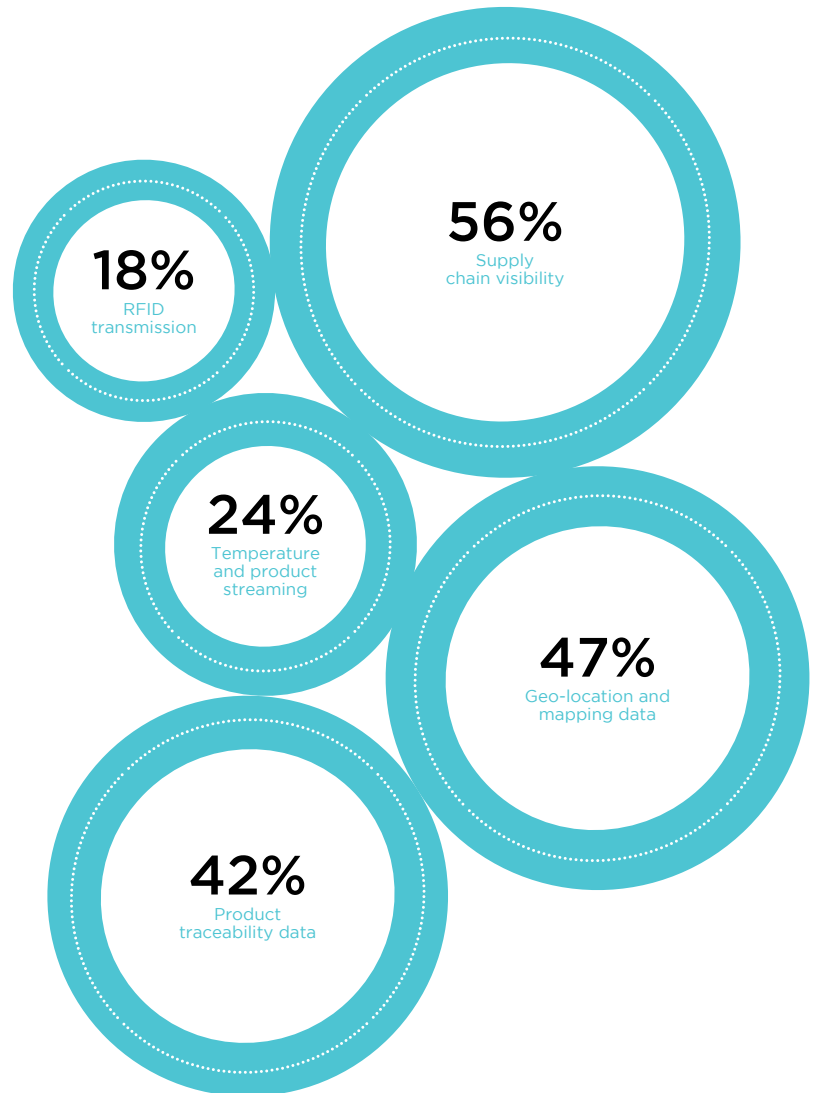


Technology is playing a huge role in the transformation of supply chains. Digitalisation is not only widening access to markets and improving efficiencies but it also increasing transparency in terms of location tracking and cost of shipments

Supply chains have evolved into value webs that span and connect whole ecosystems of suppliers and collaborators. Simply by connecting people these webs can reduce costs, improve service levels, mitigate risk and drive innovation

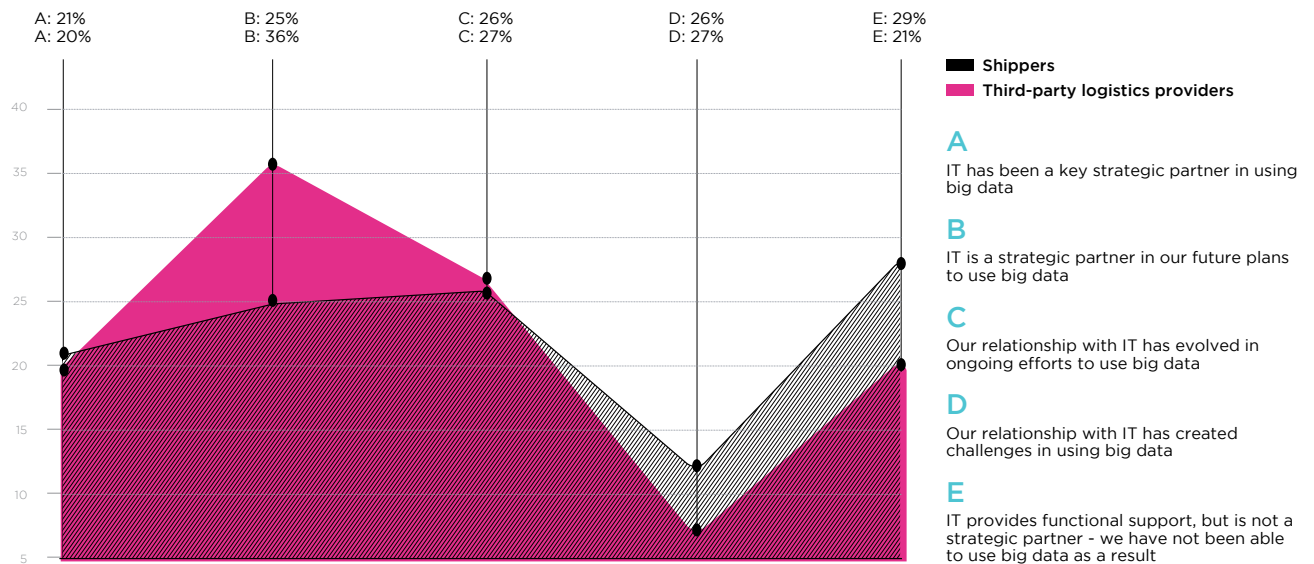
Companies' ability to use data sources for big data opportunity

Source: Supply Chain Insights 2013



Supply chain - IT disconnects restraining big data progress

Source: Capgemini 2014



A core aim for many is, no matter what system is deployed, to deliver goods the same day they are purchased and provide shoppers with one less reason to go to stores. The challenge is to achieve this at a low cost

human customers they can be seen as a shared resources and provide a crowd-sourced fulfillment of first mile and last mile delivery.

Another level up in complexity, but one even more attractive in terms of overall system efficiency, is to coordinate the simultaneous movement of people and goods. If someone is using a taxi to take them home then the same vehicle can deliver a package to a neighbour. Coordinating putting the right package into the right vehicle in this scenario is no easy task but Volvo for one has already developed its on Call app to give access to shared vehicles and not just driverless ones. By overlaying package distribution with known customer journey plans and routes, Volvo sees that delivery companies will pay for access to cargo space, put the packages in the car and the customer would use a digital key to open the car and collect their parcel when it has arrived at its destination. Audi have already taken a different but related approach. Trials in Munich have allowed Audi owners to use their car as a shipping address for online orders. Using the Audi in-car communications system, delivery drivers track the location of the vehicle and use a one-off digital access code to unlock the boot and deliver a package. The trials to date have been in partnership with Amazon and DHL but the principle can clearly extend.

In addition to short journeys by automated vehicles the advent of truck platoons or trains, lines of long distance trucks electronically coupled to each other running along the highway, is upon us. Already in off-road applications such as mining and farming, many of the ingredients of autonomous and driverless vehicles for the movement of goods will get large-scale traction. Daimler's Freightliner highway pilot has been given approval to operate in Nevada and rivals such as Volvo and Scania are undertaking similar trials in Sweden.

Perhaps Uber with its rapidly extending infrastructure and heavy investment in algorithms and artificial intelligence to help them route deliveries is the only newcomer who can match up to the size and scale of incumbents such as UPS, FedEx and their counterparts. UPS alone can deliver 35m parcels a day and is investing heavily in new technologies to make these deliveries cleaner and more efficient. Rather than compete the default for many is to rely on these companies to act in a 'third party' logistics role. As one alternative, shared capacity models have been tried out as other organisations have collaborated in Uber-esque networked business models that also seek to bring down driver and vehicle costs per delivery. Amazon's Flex programme in the US is one of the more recent of these allowing independent drivers to make between \$18 and \$25 an hour delivering packages.

A core aim for many is, no matter what system is deployed, to deliver goods the same day that they are purchased and provide shoppers with one less reason to go to physical stores. The challenge is to achieve this at a low cost. Fulfillment costs currently



account for 15% of sales for many companies and so reducing these whilst improving service is a fine balance. But it is not only Amazon who is looking to make an impact, Alibaba and Google are also testing the use of drones. Alibaba carried out a three-day trial in Beijing and Shanghai in 2015 and, after successful trials in Australia during 2014, Google's 'Project Wing' is aiming to have a commercial drone business up and running by 2017. Whilst gaining approval from the FAA, CAA and other regulators is currently in negotiation, many see these and similar activities starting to have significant impact by 2020.

What remains to be determined are the all-important issues that sit around the core platforms. Mobile operators are already sharing data, but who owns the shared data required to make the whole system work and how it is accessed? This is matter of trust, value and liability and, depending where you are in the world, the balance between government, tech companies and vehicle manufacturers shifts significantly. This needs to be addressed, as most business models require visibility of 100% of the vehicles on the road – 99% is not good enough.

And then there is the tricky issue of risk. From an insurance perspective the advent of autonomous vehicles should mean that cars

don't crash and we don't need motor insurance. But insurance companies see the risk simply shifting from the owner to others - the vehicle manufacturer, the road network or the whole system. With the costs of system failure significant, this is a big issue that few seem to have yet resolved. In addition the elimination of the need for drivers has social and economic implications, but within the logistics arena would lead to significant cost savings.

Autonomy is not far away. The technology is being proven, the money is being invested and the potential for safer, less congested roads is a big social benefit. Governments are starting to discuss regulatory issues in both the US and EU and some of the ingredients such as automated connections like eCall are becoming mandatory in major markets in the next few years. By 2025 we will certainly see more assisted driving and autonomy on highways for both cars and trucks, where everyone is going in the same direction with controlled entry and exit, and maybe full autonomy in cities for goods delivery pods. However, at the moment, it looks like full autonomy in cities for passenger vehicles is a few years away.

Taken together the combination of open supply webs, autonomous vehicles and greater use of real time algorithms will, many argue, provide significant improvements in system efficiency. In some parts of the world, and in some parts of the value chain, advocates are seeking net cost savings of over 50%. Elsewhere, while the impact may not be so significant, there is nevertheless a recognition that these developments will, sooner or later, change the way we think about moving goods and hence our perceptions of trade.

30

The time, in minutes, of drone deliveries already under testing by Amazon

35m

The number of parcels delivered around the world in a day by UPS alone

Future of Trade Conclusion

As the science fiction novelist William Gibson is famous for saying ‘the future is already here, it is just unevenly distributed.’ This is clearly true for the future of trade. The mega-trends of globalisation, digitization and more efficient systems are all in play around the world. Over the next decade, these will continue to evolve and enhance the overall landscape within which trade operates. Equally the signals of other sources potential change are also becoming more visible. For example, as highlighted in this report:

- Block-chain as a platform is enabling us to rethink not only currencies but also other complex systems that can benefit from a distributed ledger;
- China’s sustained investment in international infrastructure, and especially the One-Belt-One-Road project, is providing funding for global change;
- Standards are being used more proactively as levers for and against trade in an increasingly multinational TPP and TTIP environment;
- Europe is in decline, India is ambitious for the future, China is readying itself for the next phase of its growth and the US is starting to be less certain in a long-term role as the world’s naval policeman;
- At the same time, while Latin America is in a state of flux, many see that Africa will ultimately be a primary

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source of long-term growth, but not necessarily in the short term.

How these varied changes play out and interact is the big question. Will they be orchestrated together as part of a smooth transition to a more unified, global trading system, albeit unlikely to be operating through any significant new global agreements? Or will they develop and evolve piecemeal, with different parties pushing their own interests and seeking to take advantages of the opportunities that provide them individually with greatest benefit? We cannot predict. We can however anticipate and prepare ourselves for both journeys. The end point of a more efficient, interconnected, open, transparent and networked system of global trade is clear. How we get there directly, or indirectly, is still up for debate.

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Dubai is perfectly positioned at the centre of the world of trade, connecting East with West and North to South. DMCC, the world leader in global trade, is at the heart of Dubai with a mandate to develop a world class commodities hub and attract foreign direct investment. DMCC is Made for Trade.

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