

Future of world trade

Top 25 sea and air freight routes in 2030

Economic Views:
Future of world trade
March 2011

View from the top

World trade has bounced back since the global economic downturn, but to what extent will this trend continue over the next 20 years? Will the rise of emerging economies fundamentally change the trade landscape? And what will be the most lucrative trade routes by 2030?

In this report, economists at PwC use bespoke modelling techniques to project bilateral trade, requiring either sea or air freight, between 29 economies over the next two decades. The analysis focuses on countries that are either already displaying high levels of foreign trade or are expected to experience fast growth in trade over the next 20 years, in order to identify the top sea and air freight routes by 2030. Our key findings include:

- China will overtake the US and dominate global trade in 2030, featuring in 17 of the top 25 bilateral sea and air freight trade routes.
- In addition, we see four key areas that could potentially present significant opportunities for transport and logistics firms over the period:
 - Trade within the Asia-Pacific region;
 - Trade between emerging and developed economies, inspired by the symbiotic relationship between Germany and China;
 - Trade between emerging economies, such as between those in developing Asia and Latin America; and
 - Trade between China and Africa.
- We also outline some of the challenges and opportunities for transport & logistics companies including:
 - Executing cross border transactions
 - Recruiting and retaining the best talent and skills
 - Mitigating corruption risks
 - Understanding the tax environment

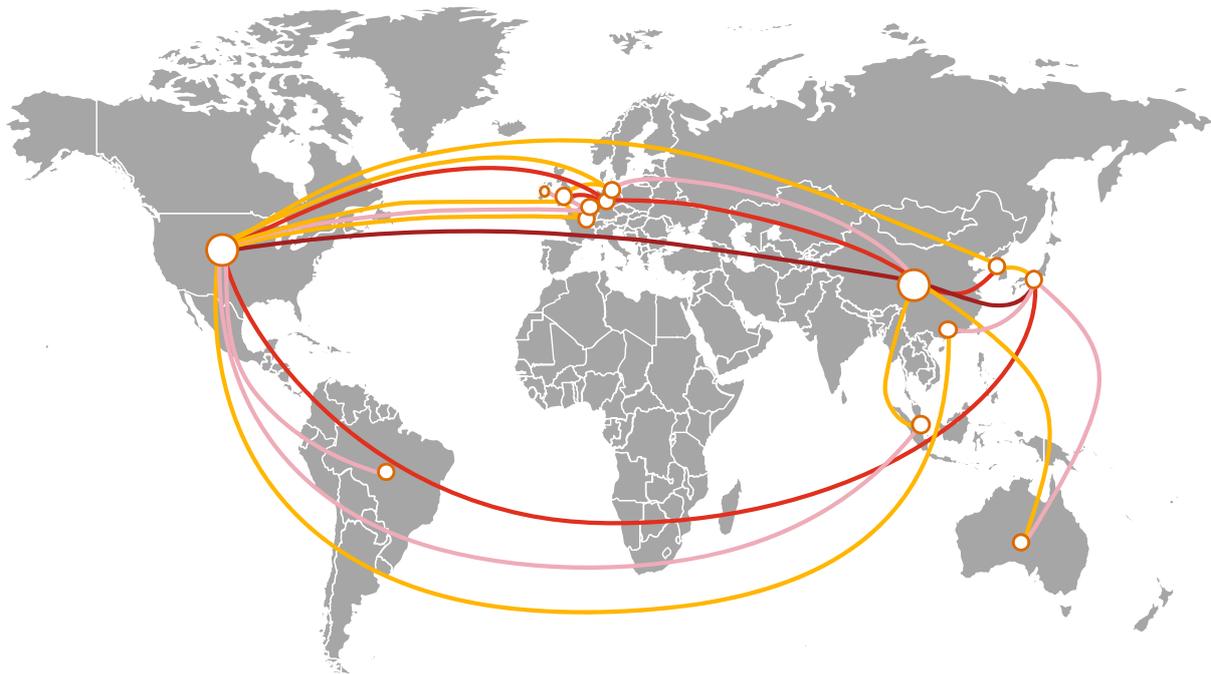
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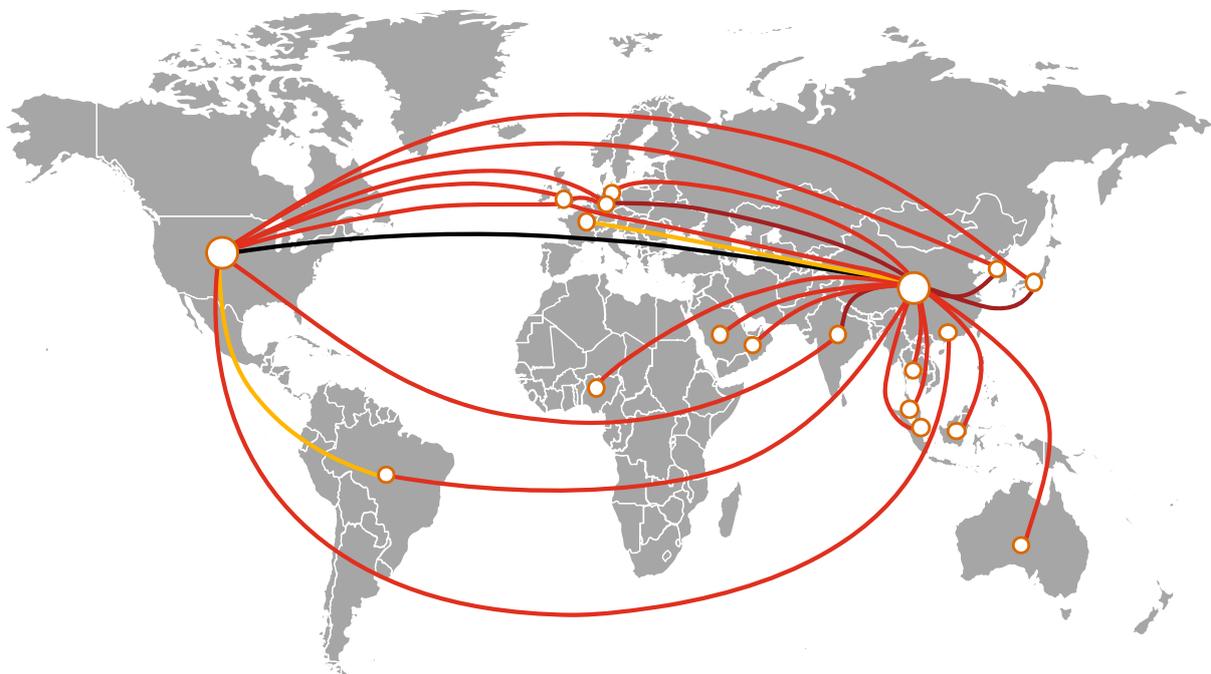
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Top 25 sea and air freight bilateral trade pairs in 2009



Top 25 sea and air freight bilateral trade pairs in 2030



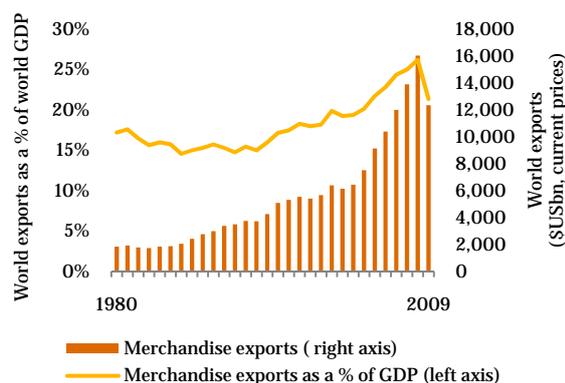
Key

| Size of bilateral trade flow (in 2009 \$USm for both charts) | Under 50,000 | 50,001-100,000 | 100,001-200,000 | 200,001 - 350,000 | 350,001+ |
|--|--------------|----------------|-----------------|-------------------|----------|
| | | | | | |

Introduction

The world economy has globalised at a tremendous pace over the past 30 years, exporting over a quarter of its merchandise output in 2008, up from 17% in 1980 (see Chart 1 below)¹. Economies have become more interdependent and the IT revolution has brought buyers and sellers from around the globe closer together. The pace of globalisation picked up markedly between the turn of the century and the onset of the financial crisis, due in part to the rapid export led growth seen in China and other emerging economies.

Chart 1: The evolution of global trade



Source: IMF

Global trade suffered a sharp decline in 2009, with the onset of the global economic downturn, when consumer demand faltered, businesses destocked and some governments introduced protectionist measures. The collapse in trade would have been even more severe had the emerging economies not acted as a key source of export demand during this turbulent time. For example China's high level of infrastructure investment during the recession helped buoy metals and capital goods markets.

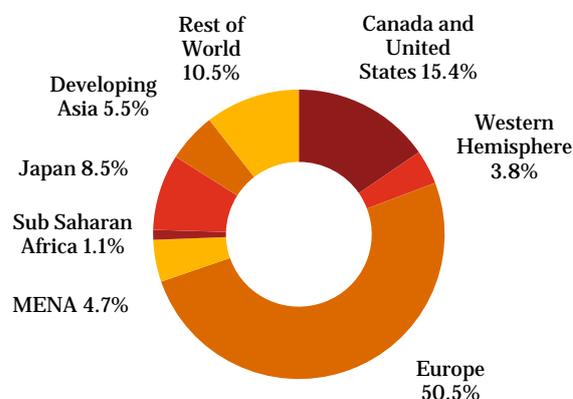
Global trade has bounced back robustly over the past year, and is estimated to have ended 2010 above its 2008 peak². Trade as a proportion of world GDP is expected to continue to increase in the short term, as the world economy gains strength and confidence. However, this trend is unlikely to continue indefinitely, as there are limits to the atomisation of the supply chain, due to geography, transport costs, clustering and technology. There are also limitations that apply to interactions between businesses and

consumers. For example, not all business processes can be outsourced when physical delivery of the goods is local (e.g. a supermarket). This suggests that there is an optimal level of globalisation that maximises efficiency, but above that, the costs may outweigh the benefits. If the global export to GDP ratio stabilises, the volume of goods shipped, however, should still increase at the rate of world GDP growth. This is expected to ensure that transport and logistics firms have room to grow even in the longer term.

A trend expected to affect global trade in the nearer future is emerging economies rebalancing towards domestic consumption (and imports) as they become more developed. Early signs of this trend have already been witnessed in China, where net goods exports fell from US\$40bn in November 2008 to US\$17bn in September 2010.

The patterns of global trade have shifted noticeably over the last twenty years. In 1990 the developed economies dominated the trade map (see Chart 2 below). Europe was responsible for over half of the world's exports, but these were mostly intra-European flows.

Chart 2: 1990 distribution of world merchandise exports by exporting country/region



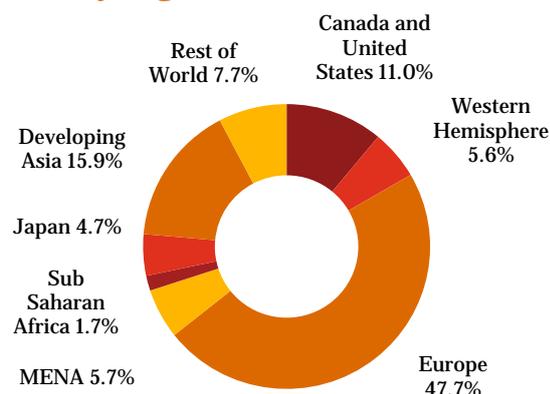
Source: IMF

The intervening twenty years saw global manufacturing shift swiftly to lower cost countries, most notably China. These countries boasted cheap labour and good trade links with which to provide Western markets with cheap consumer goods. This pattern is reflected in the change in distribution of world exports - by 2009 the emerging economies, and developing Asia in particular, had gained significant share (see Chart 3 over page).

¹ All data in this report relates to merchandise exports only.

² According to the Bureau for Economic Analysis.

Chart 3: 2009 distribution of world merchandise exports by exporting country/region



Source: IMF

By 2030, the world economy is expected to look quite different, with the emerging and developing economies making up a significant share of global output. This will undoubtedly affect global trade volumes and flows. Transport and logistics companies will need to adapt to the change in trade patterns to ensure they maximise their profit opportunities. Planning for the trends that will shape the trade landscape over the next 20 years would be of benefit for a company in this highly globalised marketplace. The first mover advantage is likely to be important and establishing a presence on a route that becomes a significant global trade flow before your competitors is likely to be highly valuable.

In the 3rd volume of our series 'Transportation & Logistics 2030' PwC predict that new transport corridors will emerge, especially between Asia and Africa, Asia and South America, as well as Intra-Asian.³ This projection, based on the results of an expert survey according to the Delphi methodology, has been further verified and substantiated by the model calculation underlying this report.

This report is aimed at helping shed light on the key merchandise trade routes that companies should target by 2030.

³ Transportation & Logistics 2030. Volume 3: Emerging Markets - New hubs, new spokes, new industry leaders? PricewaterhouseCoopers, 2010

Current bilateral trade relationships

The globalised world economy is a huge interconnected web, but it can be distilled down into thousands of bilateral trade relationships. The amount of trade on a given route is an indication of the revenues that transport and logistics firms can collectively extract from moving goods back and forth between two economies.

The largest bilateral trade relationship in 2009 was between Canada and the United States. To avoid flows of exports between close neighbours, which will be of less consequence to air and sea freight firms, we have chosen to exclude all bilateral trade pairs that do not require air or sea freight to exchange goods. The bilateral pair with the largest amount of air and sea trade in 2009 was China and the United States. In the last ten years, China became a global production cluster and its main customer was the United States, which led to an explosion in trade between the two countries. Table 1 below shows the top 25 air and sea freight bilateral trade pairs in 2009.

Table 1: Top air and sea freight bilateral trade pairs in 2009

| Rank | Air and sea freight bilateral trade pair | | Trade value (2009 US\$m) |
|------|--|----------------|--------------------------|
| 1 | China | United States | 290,960 |
| 2 | China | Japan | 207,677 |
| 3 | Japan | United States | 146,523 |
| 4 | China | Korea | 140,342 |
| 5 | Germany | United States | 118,773 |
| 6 | Germany | United Kingdom | 113,209 |
| 7 | China | Germany | 102,171 |
| 8 | United Kingdom | United States | 97,624 |
| 9 | Japan | Korea | 69,008 |
| 10 | United Kingdom | Netherlands | 68,062 |
| 11 | Korea | United States | 66,443 |
| 12 | United Kingdom | France | 62,388 |
| 13 | Hong Kong | United States | 58,016 |
| 14 | China | Singapore | 56,446 |
| 15 | France | United States | 54,414 |
| 16 | China | Australia | 54,163 |
| 17 | Netherlands | United States | 51,989 |
| 18 | Japan | Hong Kong | 45,941 |
| 19 | China | Netherlands | 43,319 |
| 20 | United Kingdom | Belgium | 43,177 |

| | | | |
|-----------|----------------|-----------|--------|
| 21 | United Kingdom | Ireland | 42,943 |
| 22 | United States | Brazil | 41,984 |
| 23 | Japan | Australia | 41,661 |
| 24 | United States | Belgium | 41,491 |
| 25 | United States | Singapore | 40,025 |

Source: IMF; PwC analysis

The country that features most in the top 25 in 2009 is the United States, appearing in eleven of the trade pairs. The sheer size of the economy and its high propensity to import goods makes up for the fact that it is not very export focused. In contrast, Korea is able to feature in the top ten due to its high level of exports, which made up 45% of GDP in 2009.

The rapid rise of China is reflected in the 2009 data, with it being in seven of the trade pairs. Chinese bilateral trade relationships are primarily with developed economies and are mainly focused on China's export of manufactured consumer goods. The trade flow between Singapore or Hong Kong and other countries partly reflects the role of these two countries as re-export zones. The bilateral trade between the two most populous countries in the world, China and India, is not large enough in 2009 to make the top 25, but is ranked the 26th largest. The 2009 top 25 is still dominated by developed countries, with the exception of China.

Future bilateral trade relationships

The shifting landscape of global trade will provide opportunities for transport and logistics firms, as volumes on trade routes respond to global macroeconomic trends.

The divergence in economic growth prospects between emerging and developed economies is expected to be mirrored in future trade patterns. Trade routes between emerging economies and developed economies and between emerging economies and other emerging economies are expected to become more significant over the next twenty years.

In order to arrive at the top 25 air and sea freight trade pairs, we began by selecting 29 economies on the basis of the present size and expected growth rate of their trade flows. We then used our long term GDP model to project GDP and exports per country to 2030. Finally, we forecast how the destination of each country's exports is expected to evolve over the forecast period, to arrive at projections of merchandise trade for bilateral air and sea freight

pairs by 2030. These projections were calculated in 2009 US dollars (i.e. constant prices), so the current and future bilateral pairs are directly comparable in size. For example, we expect the volume of trade between the US and China to be over twice as large in 2030, as it was in 2009. Table 2 below highlights the top 25 sea and air freight bilateral trade pairs in 2030 from our analysis.

Table 2: Top air and sea freight bilateral trade pairs in 2030

| Rank | Air and sea freight bilateral trade pair | | Trade value (2009 US\$m) |
|-----------|--|------------------------------|--------------------------|
| 1 | ◆ | China United States | 594,741 |
| 2 | ◆ | China Japan | 336,183 |
| 3 | ▲ | China Korea | 281,140 |
| 4 | ▲ | China India | 263,063 |
| 5 | ▲ | China Germany | 201,382 |
| 6 | ▼ | Japan United States | 189,785 |
| 7 | ▲ | China Singapore | 178,291 |
| 8 | ★ | China Indonesia | 169,356 |
| 9 | ▼ | Germany United States | 167,467 |
| 10 | ★ | China Malaysia | 162,376 |
| 11 | ★ | China Nigeria | 151,570 |
| 12 | ▼ | Germany United Kingdom | 144,131 |
| 13 | ▼ | United Kingdom United States | 143,725 |
| 14 | ★ | China Thailand | 141,201 |
| 15 | ★ | China Saudi Arabia | 140,320 |
| 16 | ★ | China Brazil | 136,295 |
| 17 | ★ | United States India | 125,826 |
| 18 | ★ | China United Kingdom | 121,603 |
| 19 | ★ | China United Arab Emirates | 120,318 |
| 20 | ▼ | China Australia | 117,340 |
| 21 | ▼ | Korea United States | 116,741 |
| 22 | ▼ | Hong Kong United States | 111,972 |
| 23 | ▼ | China Netherlands | 102,373 |
| 24 | ▼ | China France | 92,581 |
| 25 | ★ | United States Brazil | 90,756 |

◆ Retains position; ▲ Moves up; ▼ Moves down; ★ New entrant

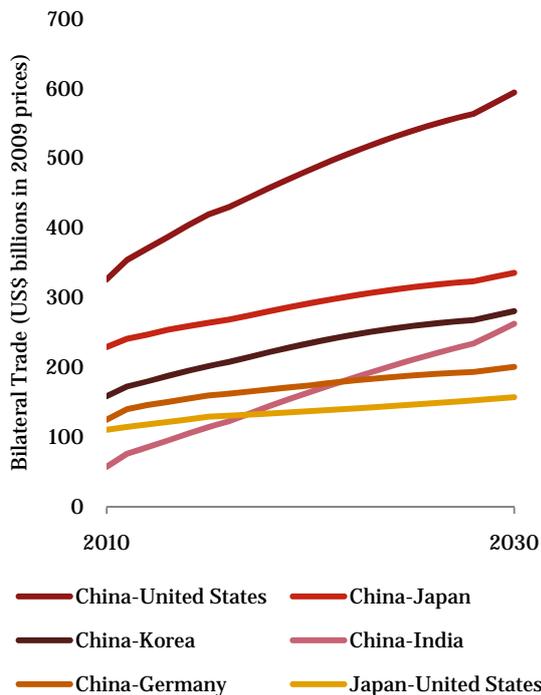
Source: PwC projections.

As can be seen from Table 2 above, the United States loses its dominant position to China, which appears in 17 out of the top 25 pairs. Other developed countries, such as Japan and the United Kingdom, though less dominant than before, continue to play an important role in trade.

2030 is expected to see increased trade between China and developed countries. There is also likely to be some rebalancing in the trade flows however, which up until now have been mainly exports from China to developed economies. For example, the growth in exports from the US to China is forecast to outstrip that in the other direction over the next twenty years. However, in 2030, China's exports to the US could still be nearly three times the reverse flow in absolute value. In 2009, China's main imports from developed countries were electrical and electronic products and machinery. By 2030, we expect China to be a major importer of a whole range of consumer goods, the higher end of which is likely to be supplied by developed or newly industrialised (e.g. South Korea) economies. This will help to rebalance existing flows between developed economies and China, reducing some of the inefficiencies caused by the current imbalances (e.g. shipping less empty containers back to China).

Chart 4 below shows the growth path of the bilateral trade pairs that are at the top of the list in 2030.

Chart 4: Evolution of 2030's largest bilateral pairs



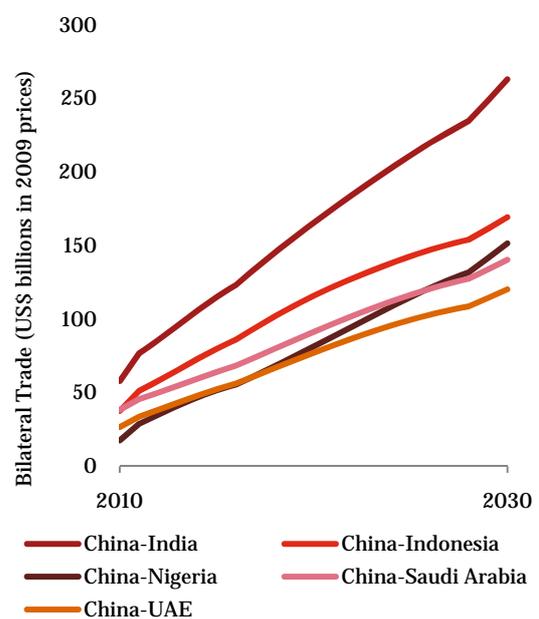
Source: IMF; PwC projections

China and India constitute the fourth largest bilateral pair. The rapid growth of consumer demand in both countries is likely to fuel the demand for imports. In India, we do not expect export growth to be solely focused on services. India's export of

electrical and electronic equipment has grown nearly four-fold in the last five years and machinery and apparel have also shown strong growth. The abundance of cheap labour, and improvements in infrastructure and the ease of doing business are expected to promote further manufacturing export growth in the next twenty years.

The bilateral pair that shows the greatest increase by 2030 is China-Nigeria (as shown in Chart 5 below), with China exporting manufactured goods, while importing oil and other primary commodities.

Chart 5: Evolution of fastest growing bilateral pairs



Source: IMF; PwC projections.

Trade flows between China and oil-rich Middle Eastern countries are also predicted to grow rapidly. This will be primarily driven by increased oil demand in China, as it continues its economic expansion and urbanisation.

Trade pairs between China and three other Asia-Pacific economies (Malaysia, Indonesia and Thailand) are the other new entrants in the top 25 list in 2030. Indonesia may be particularly well placed to become the next manufacturing hub and sell low end manufactured products back to the Chinese. Wage costs in Indonesian manufacturing are significantly lower, with average monthly manufacturing wages being \$US90 in 2008,

compared to \$290 in China⁴. Low wage costs, an open economy and proximity to fast growing economies could make Indonesia an attractive location for manufacturing operations in the future.

The trade links between developed economies are well established and have less growth potential than those including emerging economies, so are projected to become less important in the future. The highest ranked bilateral pair that does not include China is Japan-US, which is in seventh place in 2030. The Germany-US pair also loses ground, slipping from fifth to ninth place between 2009 and 2030. We expect a shift in global trade away from developed economies and towards emerging economies, driven by increasing urbanisation and consumer demand in emerging economies and a continuation of the shift in the location of low and mid end manufacturing towards emerging economies.

In the following section we discuss the key opportunities arising from these trends.

Key opportunities

The projections of bilateral trade relationships lead to a number of key opportunities for transport and logistics firms:

- Trade within the Asia Pacific region
- Trade between developed economies and emerging economies
- Trade between emerging economies
- Trade between China and Africa

Intra Asia-Pacific trade

Trade routes between economies in the Asia-Pacific region make up eight of the top 25 trade pairs in 2030. This reflects a trend mentioned in the previous section of rapidly increasing trade between China and other fast growing Asian economies.

It is not just trade relationships with China that are predicted to flourish, however - trade between other Asia-Pacific countries is predicted to increase markedly. For example, bilateral trade between Indonesia and Thailand is projected to be almost five

times as high in 2030 as it was in 2009. The developing Asian economies have benefitted from growth fuelled by exports to developed economies, but as they become wealthier they are expected to consume more and consequently trade more with each other.

Trade between developed economies and emerging economies

A major trend in global trade in the lead up to the financial crisis was for emerging economies (particularly China) to export cheap consumer goods to developed countries. The developed economies were severely damaged by the recent recession and their recovery is likely to be slower than their emerging economy counterparts, especially in those countries now undertaking fiscal consolidation (e.g. many parts of Europe).

This does not mean that flows between emerging and developed economies do not have growth potential over the medium to longer term. Emerging economies are likely to become a key source of new demand for exports, as they become richer. The developed economies cannot compete in low end manufacturing, but exporters of goods such as pharmaceuticals, designer clothing, green technologies, high end manufacturing and healthcare technologies could thrive by selling to emerging economies. High end manufacturing will continue in developed economies due to skilled labour availability, R&D infrastructure, falling wage disparity between developed and emerging economies and the prestige and reputation of their companies (e.g. German made cars, French handbags).

Growth in demand for luxury goods is forecast to be nearly two and a half times more than that for overall consumption in China in the next five years⁵. China is also predicted to account for nearly 20% of global demand for luxuries by 2020. Last year, Germany outperformed its Euroland partners, registering 3.5% annual GDP growth, compared to a 1.7% Euroland average. The expansion of capital and luxury goods exports to China helped the German economy overcome the economic weakness in their traditional (European) export markets. Trade between Germany and China is predicted to be the fifth biggest flow in the world in 2030. This is expected to be a two way

⁴ Source: International Labour Organisation.

⁵ Source: CLSA Asia-Pacific Markets, Dipped in Gold: Luxury Lifestyles in China and Hong Kong, Feb 2011

symbiotic relationship, with Germans importing cheap consumer goods and the Chinese importing high end manufactured goods.

Trade between emerging economies

Recent trade between emerging economies has centred largely on natural resources. Where trade in manufactured goods has taken place, it has been mostly between neighbouring countries.

In the early stages of economic development emerging economies lack sufficient demand for consumer goods to export high volumes to each other. The breakneck speeds at which economies such as China and India are expanding means that their consumer bases are continually expanding. Newly middle class households in these economies increasingly desire consumer goods. This is illustrated in the rapid ascent of China and India up the bilateral pair rankings, finishing 2030 as the globe's fourth largest trade route.

China has supplied the world with cheap consumer goods in the past ten years, but as it becomes richer this will put upwards pressure on wages and its comparative advantage will fade, with production likely to shift into lower cost economies, such as Indonesia, Vietnam and Bangladesh. In parallel to this shift the Chinese consumer should have more buying power, ensuring that flows between emerging economies will play a prominent role in the future of global trade.

There are two regions that play host to a number of fast growing emerging economies - Asia and Latin America. We consequently expect that trade between these two regions will grow strongly in the next twenty years, potentially providing substantial opportunities for transport and logistics firms.

Trade between China and Africa

The trade flow between China and Nigeria is projected to be one of the fastest growing in our analysis. It is forecast to be nearly eight times bigger in 2030 than in 2010. This is indicative of a wider pattern in China's trade flows, with Africa becoming a more important trading partner. This trend has become particularly prominent in the last ten years, with bilateral trade between China and Africa rising from US\$8bn to US\$73bn in current prices between 2000 and 2009.

Trade between China and Nigeria is currently quite small, but both economies are predicted to expand rapidly in the next twenty years. China has also been very proactive in investing in the oil industry in

Nigeria. In May 2010 the China State Construction Engineering Corporation agreed a \$23bn deal to build three oil refineries in Nigeria. These investments are seen as strengthening China's hand in other negotiations, where it is looking to secure 6bn barrels of Nigerian oil, a sixth of the country's crude oil reserves. Similar investments and agreements for natural resources have been struck across the continent, including those for oil in Sudan, Angola and Algeria, copper and agriculture agreements in Zambia and mining in South Africa. It has also invested heavily in transport infrastructure in the region (e.g. Kenya). Trade flows from China to Africa mainly consist of Chinese consumer goods.

In the next twenty years the flows of merchandise exports between China and Africa is expected to be a key growth area for global trade. China has a large stake in the energy and mining sectors of the continent and will require more of these resources as it continues its rapid economic expansion. As Africa becomes richer and more people can afford consumer goods, trade flows in the other direction are expected to build up. The bilateral flows between other African countries and China may not be of sufficient size in 2030 to be amongst the largest in the world, but they do have very high growth potential and could be lucrative routes for transport and logistics firms in the future.

What this means for transport & logistics companies

The changing picture of global trade is already providing opportunities and challenges for those operating in the transport & logistics (T&L) industry as they look to re-shape their operations and take advantage of the new transport hubs and corridors.

Seventy-three percent of T&L CEOs say their companies are changing their strategies to respond to the growth potential in emerging markets⁶.

When entering new markets, long-term planning and careful execution are essential. Companies should not only think about securing deals and developing operations but also about testing opportunities and safeguarding their assets, whether physical, human or intellectual. Economic and political stability, varying business regulations, possible inflation, and

⁶ Source: 14th Annual Global CEO Survey, T&L summary, PwC

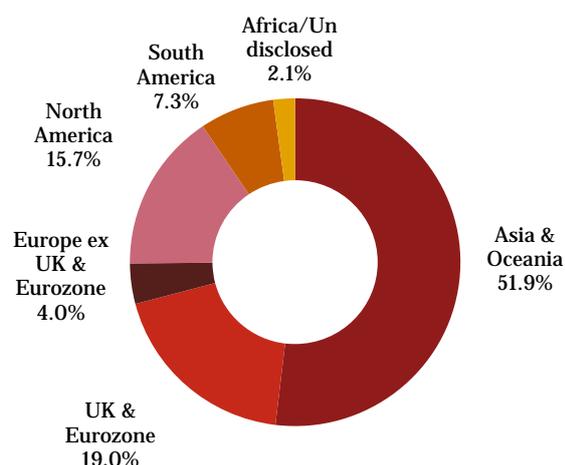
competition among countries are also factors to consider when assessing market entry.

Mergers and acquisitions

The changing shape of world trade is already reflected in the global distribution of deals in the industry.

In 2010, acquirers primarily focused on consolidating their local markets, particularly in the Asia and Oceania region, where relatively fragmented developing markets are common. The Asia and Oceania region is likely to account for much of the deal activity in 2011, although the number of inbound deals may increase as acquirers seek to capitalize (as much as domestic regulations allow) on its expected relatively high economic growth rates.

Chart 6: Percentage of T&L deals in 2010 by region



Source: *Intersections 2010 global deal series, PwC*

Carrying out complex cross-border transactions in unfamiliar countries provide their own set of challenges. These include among other things; the ability to obtain majority economic/management control of a target and operating under different legal jurisdictions which can limit the ability to manage risk and achieve full integration.

Talent and skills

65% of T&L CEOs say the supply of skilled candidates is limited with shortages varying across subsectors and regions. The airlines sector is short of pilots, for example, and in some countries truck drivers are in short supply. CEOs in the industry are more likely to see ‘availability of key skills’ as the most significant potential business threat to mitigate

over the next 12 months than their peers in other industries.

However, T&L CEOs are taking a more proactive approach than their counterparts in other industries with 43% planning to make ‘a major change’ to their strategies for managing talent, compared to 31% of the total sample.

Businesses will have to consider new approaches to recruiting and retaining key people and be aware of potential skills shortages in new markets.

Bribery and corruption

While many of the emerging economies represent real opportunities, they are also countries generally recognised to represent significant challenges in terms of corruption risk. Usual business practices in these markets may be quite different and with increasingly stringent penalties for unethical and corrupt practices being placed on Western businesses, boards must recognise and mitigate this risk. T&L companies in particular must focus on risk exposure when dealing with public and private bodies such as customs and shipping agents.

Taxing questions

Understanding the tax environment of a new market is another key consideration, here we show the ease of paying taxes and the total tax rate for a number of large emerging markets. The UK and US are also shown to provide some developed country comparators.

Table 3: Cross-country tax comparison

| Country | Ease of paying taxes (Global ranking, 1 being the easiest) | Total tax rate (Global ranking, 1 being the lowest) |
|--------------|--|---|
| Vietnam | 124 | 54 |
| Indonesia | 130 | 77 |
| South Africa | 24 | 43 |
| Turkey | 75 | 112 |
| Argentina | 143 | 177 |
| Brazil | 152 | 168 |
| Russia | 105 | 123 |
| India | 164 | 157 |
| China | 114 | 158 |
| US | 62 | 124 |
| UK | 16 | 76 |

Source: *Paying taxes 2011 by PwC, The World Bank and the International Finance Corporation.*

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We work with cities, regions and countries to create or update their economic vision blueprints and strategies. Our analysis takes into consideration our worldwide macro views and leverages our proprietary data on demand and supply trends in different regions and sectors. Using a mix of primary and secondary research, modelling, forecasting, benchmarking and gap analysis, we answer the following questions for our clients:

- What economic goals are realistic?
- Who are our main competitors?
- How we compare against the competition?
- What should we do to improve our global standing?

Geographical market selection

We assist growing multinational companies to assess opportunities in new geographical markets. This is done through bespoke econometric analysis using in-house models that project demand and supply dynamics. Typically we forecast demand in potential new markets as measured by revenue. To this we can add projections of costs and other risks that affect market attractiveness.

Business scenario analysis

We use our knowledge of macro trends and our econometric toolkit to help companies understand the risks and opportunities in their business through the following techniques:

- Revenue forecasting, using econometric models that link our economic forecasts and industry indicators to revenue;
- Stress-testing key business metrics by creating and applying upside and downside macroeconomic risk scenarios; and
- Price elasticity analysis, pointing at a product's optimal price in a given market and estimating its impact on key business metrics.

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We assist clients in demonstrating the value they bring to their host economies in the context of wider economic trends. Our findings are typically used for media profile-raising as well as to support government relations, and comprise estimates of a company or industry's impact on GDP, employment and long-term productivity growth, as well as other wider socio-economic benefits.

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