

The shape of things to come:

higher education global
trends and emerging
opportunities to 2020



Going Global 2012

Foreword

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The shape of things to come details the impact of demographic and economic drivers on the changing higher education landscape in the next decade.



Education is increasingly seen by governments as a major contributor to national wealth and economic development. In addition, the increasingly competitive external environment has called for continuous improvement of countries' quality assurance standards and international criterion of their education systems. In order to maintain global relevance, internationalisation of both teaching and research have become critical objectives for most tertiary institutions.

The shape of things to come: higher education global trends and emerging opportunities to 2020 provides a rigorous analysis of prevailing trends that are shaping higher education globally. It also looks into the next decade to determine how these will unfold.

The shape of things to come details the impact of demographic and economic drivers on the changing higher education landscape in the next decade. It aims to identify the most significant emerging

markets for international students and the fastest growing education systems, as well as predicting which countries' systems will be most open for international collaboration in teaching and research.

This study draws on well established relationships between gross domestic product (GDP) growth and tertiary education enrolments. This relationship is particularly strong for emerging economies with GDP per capita less than US\$10,000 where a small increase in the GDP contributes to a significant rise in the enrolment rate. This research found strong correlation in certain countries between student and trade flows. In some countries, such as Canada, Japan, China, South Korea and India, the correlation is above 70 per cent.

Another factor which is increasingly determining countries' international relevance is the impact of their research base. This report supports the strong body of empirical evidence that internationally produced research is of highest quality (research citation has been used as a proxy for quality) - not least because it provides solutions to global challenges and benefits more than one nation. This study found that 80 per cent of countries' research impact is determined by their research collaboration rate. In addition, Nobel prizes are increasingly won by researchers working in a country other than their country of birth. Over 60 per cent of the winners in 2010 and 2011 had studied or carried out research abroad.¹

Particular importance is paid to the role of emerging economies. Parallel to their growing importance to world trade, they are becoming increasingly popular study destinations and have seen significant growth in research production (and increased rate of international collaboration) and internationally filed patents.

In order to maintain a high standard of teaching and research, catering for the needs of domestic and international student audiences on the one hand and resolving global research challenges on the other, significant and continuing investment in education is required. In a growing number of countries, uncertainty and austerity are becoming the operating environment for education establishments. *The shape of things to come* highlights the scope for more effective application of research excellence into commercial activities which are an under used resource for generating inward investment and research income from local and global companies. This study outlines practices of engagement between the higher education system and industry in different countries and draws international comparisons.

Internationalisation of education is at the heart of what the British Council does. The British Council continues to engage actively in policy debates in the UK and abroad, and is committed to supporting the UK sector in its internationalisation work: attracting the brightest students and scholars to the UK to study and carry out research; seizing opportunities to deliver a UK education overseas; and providing support on the ground for teaching and research partnerships.

¹ British Council Analysis (2012) based on Nobel Prizes for Physics, Chemistry, Medicine and Economics. Analysis of data from 'Facts and Lists'. Nobelprize.org. www.nobelprize.org/nobel_prizes/lists/ – accessed on 19 Apr 2012. Detailed findings include: 44 per cent (8/18) of the Nobel Prize winners in 2010 and 2011 won the prize for work in a country other than their country of birth (from 2008 to 2011, the proportion was 33 per cent; 1997 to 2011, the proportion was 29 per cent; approximately 29 per cent in the 1960s and approximately 15 per cent in the 1920s).

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Executive summary

Global higher education sector today

Internationalisation of teaching and research are critical objectives for most tertiary institutions for many reasons. These include raising quality standards and global relevance, attracting the best students and staff, generating revenue, pushing the frontiers of knowledge through research and promoting internal diversity.

The fast-paced growth in global tertiary enrolments and mobile students has followed closely world trade growth and far outpaced world GDP growth over the past 20 years. Increasingly, this expansion is being seen by governments as means to deliver on national priorities and contribute to economic growth.

This research looks at four key trends in international higher education:

- i international student mobility flows in the next decade and the demographic and economic factors impacting on them;
- ii the emergence of new models of global higher education partnerships – this includes teaching partnerships and provision of degrees off-shore;
- iii patterns in research output and its growing internationalisation; and
- iv commercial research activities that higher education institutions in different countries engage in as a response to decreased investment in higher education across a growing number of countries.

To arrive at an accurate forecast on international student flows, particular attention has been paid to global tertiary enrolments and their projected growth to 2020. In addition, countries' outward and inward student mobility ratios have been studied to establish how many students from each sending country will study abroad and determine the respective study destinations.

Global tertiary enrolments reached 170 million in 2009 (UNESCO Institute for Statistics, referred to hereafter as UIS). Four countries alone – China, India, US and Russia – have a combined share of 45 per cent of total global tertiary

enrolments. Other emerging economies with significant numbers of tertiary enrolments include: Brazil (6.2 million), Indonesia (4.9 million), Iran (3.4 million), South Korea (3.3 million) and Turkey (3.0 million).

A key feature of the global tertiary education sector has been the growth in internationally mobile students. Their number has risen from 800,000 in the mid-1970s to over 3.5 million in 2009. However, the global average outbound mobility ratio (mobile tertiary students divided by total tertiary enrolments) has remained remarkably stable from the early 1990s onwards at just over two per cent per annum, reflecting a stable 'propensity' to study abroad amongst the tertiary age cohort.

The major origin countries for internationally mobile tertiary students include China, India, South Korea, Germany, Turkey and France. However, while China and India together account for 29 per cent of global tertiary enrolments they contribute only 21 per cent of the international students, mainly because they have lower outbound mobility ratios than the global average.

Outbound mobility ratios vary significantly across countries, ranging from 50 per cent for Botswana and 30 per cent for Trinidad and Tobago and Mauritius, to less than one per cent for the UK, US, Australia, Russia, Indonesia, Philippines, Egypt and Brazil. Countries such as Hong Kong (China), Singapore, Ireland, Nepal, UAE and South Korea have above global average outbound mobility ratios, as do many European countries due to high mobility within Europe.

According to UIS data, the distribution of destination countries for mobile tertiary students is concentrated in the US, UK, Australia, France, Germany, Russia, Japan and Canada. Together these countries account for 60 per cent of total international students. Other countries play an important and increasingly large destination role at regional level: South Africa (Sub-Saharan Africa); Singapore, Hong Kong and Malaysia (South East Asia); and South Korea (North East Asia).

According to other sources, notably *Project ATLAS*², countries such as China

and Malaysia have much larger inbound student flows than reported by UNESCO data, mainly because they include growing proportions of non-degree students and exchanges. In addition, transnational education (TNE) programmes have seen increasing popularity globally with both local and international students; however, data on TNE student numbers remain incomplete. Data definitions used to capture domestic and international students still lag behind the emerging varieties of TNE provision. The importance of this cannot be overstated. Recognition of the current and growing future role of some Asian (and also Gulf state) countries as education hubs with increasing inbound tertiary student flows, thereby competing more directly with traditional destination countries, is critical for understanding how the global higher education landscape will look in 2020.

The major countries where inbound mobile students exceed outbound mobile students are the US, UK, Australia, France, Germany, Japan, Russia, South Africa and Canada. The major countries where outbound mobile students exceed inbound mobile students are China, India, South Korea, Kazakhstan, Turkey, Morocco and Vietnam. Malaysia is an interesting example where inbound and outbound flows were similarly large in 2009 offsetting one another, whereas previously it had a large net outflow of tertiary students. Malaysia was the UK's number one country for international students until the East Asia currency crisis in the late 1990s.

While bilateral student flows to China are not yet likely to rival the above in volume terms, they could have profound implications in future for tertiary institutions across the globe.

Drivers of higher education demand to 2020

A combination of demographic and economic drivers, bilateral trade patterns, and shifts in inbound and outbound student flows linked to growing global competition and rapid expansion of tertiary education capacity, will re-shape the global higher education landscape by 2020. Demographically, just four countries

² The goal of Project Atlas is to collect and report accurate, timely and comprehensive data on global student mobility. More details are available at: www.iie.org/Research-and-Publications/Project-Atlas/About

– India, China, US and Indonesia – will account for over half of the world's 18–22 population by 2020. A further quarter will come from Pakistan, Nigeria, Brazil, Bangladesh, Ethiopia, Philippines, Mexico, Egypt and Vietnam.

The importance of economic growth as a driver of future tertiary education demand is clearly illustrated by the strong relationship between GDP per capita at purchasing power parity (PPP) and gross tertiary enrolment ratios. Not only is the correlation positive and statistically significant, but more importantly, at low PPP GDP per capita levels, gross tertiary enrolment ratios tend to increase quicker for relatively small increases in GDP per capita. Amongst this study's shortlist of 50+ countries (including both developed and emerging economies, chosen for their importance to the tertiary sector and world economy), approximately half currently have PPP GDP per capita levels below US\$10,000. Thus, provided these economies grow strongly over the next decade, as many are forecast to, there is significant scope for their tertiary enrolment ratios to increase.

Despite strong economic growth, many of the shortlisted economies are still forecast to have PPP GDP per capita below US\$10,000 in 2020 – including Nepal, Bangladesh, Pakistan, Nigeria, India, Morocco, Indonesia and Sri Lanka. This will constrain how soon these countries close the gap in tertiary enrolment rates on advanced economies. It also means the decade beyond 2020 should see continued rises in enrolment ratios and strong growth in tertiary education demand, subject to demographic changes.

The global higher education sector to 2020: a changing landscape

Total global tertiary enrolments are forecast to grow by 21 million between 2011 and 2020, or 1.4 per cent per year on average. This compares with global tertiary enrolment growth of five per cent per year in the previous two decades (and almost six per cent between 2002 and 2009), which indicates a significant slowing down in growth rates of tertiary enrolments to 2020. This in some ways should be expected with the sector maturing or slowing in some markets, and demographic trends no

longer as favourable as a result of declining birth rates over the last 20 to 30 years.

Between 2002 and 2009, China and India dominated global growth in tertiary enrolments, accounting for 26 million of the overall increase of 55 million. Their combined forecast growth for the period 2011–20 declines to 12 million, with growth in tertiary enrolments in China falling from 17 million (2002–09) to five million (2011–20). India's tertiary enrolment growth (in absolute terms) is forecast to outpace China's growth between now and 2020. Following China and India, other emerging economies with significant forecast growth in tertiary enrolments over the next decade will include Brazil (+2.6 million), Indonesia (+2.3 million), Nigeria (+1.4 million), Philippines (+0.7 million), Bangladesh (+0.7 million), Turkey (+0.7 million) and Ethiopia (+0.6 million).

By 2020, four countries – China, India, US and Brazil (replacing Russia) – are forecast to account for more than half of the world's tertiary enrolments. In addition, Indonesia, Turkey and Nigeria will become increasingly important players in the global tertiary education sector, while Russia, Iran and South Korea's global market shares are forecast to fall.

Forecasts of outbound mobile students are a function of a country's tertiary enrolments forecasts and outbound mobility ratios. In absolute terms, China (585,000), India (296,000) and South Korea (134,000) are still forecast to be the largest countries of origin for international students in 2020.

Whereas China was the source of a third of global growth in outbound mobile students between 2002 and 2009, its contribution to future growth is forecast to be much more limited. This is partly to do with its slower tertiary enrolment growth and partly due to an assumed slight fall in its outbound mobility ratio. Instead, India is forecast to be one of the main sources of future growth in outbound tertiary students (+71,000 between 2011 and 2020), followed by Nigeria, Malaysia, Nepal, Pakistan, Saudi Arabia and Turkey.

Forecasting international students inbound flows across all countries covered in this report is limited by data on student exchanges and students on TNE programmes, especially in Asia and the Gulf

States. However, it has been possible to produce inbound student flows forecasts for the major study destinations and a limited number of emerging economies. By 2020 using the consistent UIS data, international students will continue to gravitate towards the US, UK, Australia, Canada, Germany, France and Japan. Given the data limitations mentioned earlier, this forecast underestimates the shifting balance in student mobility towards wider Asia (e.g. China, Malaysia, Singapore, India, and South Korea).

In terms of growth in total inbound tertiary student numbers between 2011 and 2020, Australia is forecast to lead with growth of over 50,000 international students from the shortlisted countries, followed by the UK, US and Canada.

However, given increased investments in higher education and excess capacity in countries with less favourable demographics, it is possible in the long run that countries like China, Singapore, Malaysia and some Gulf States will become the fastest growing study destinations. It is difficult to estimate the extent to which these countries will displace international students to traditional destinations such as the US, UK, Australia and Canada. Under this scenario, the forecasts in this report – using UIS data – are potentially over-optimistic on inbound student flows to traditional markets and do not fully capture the possible change in net mobility balances. The forecast growth in international students to the major study destination countries over the next decade (around 130,000) is less than China's ambitious international student recruitment growth target of approximately 250,000. This does not include the international student targets of other countries.

In terms of changes to key bilateral tertiary student flows, a number of developments stand out. Firstly, outbound mobile student flows from China to the US, Japan and the UK; Japan to the US; and Greece to the UK, are forecast to fall most sharply in absolute terms. Markets with rising tuition fees are also likely to see declines in inbound student flows.

In contrast, outbound flows from India to Australia, the UK and US; China to Australia; and Nigeria to the UK, are forecast to be



the largest absolute rises in bilateral flows. There may of course be other significant flows not recorded in the data, and therefore not possible to forecast, such as inflows to China, Singapore and Gulf States.

Bilateral student flows within Europe may also shift in response to widening tuition fee differentials, especially given the current economic climate. While overall this is unlikely to affect aggregate flows as it may simply shift bilateral patterns rather than increase overall outbound mobility ratios, there is likely to be a shift from high to low tuition fee countries. That said, the trend of rising postgraduate provision taught in English may provide additional stimulus for greater mobility to non-English speaking European countries, for example from countries such as India, Pakistan and Nigeria to countries such as the Netherlands, Scandinavian and Baltic countries, Germany and France.

New global higher education partnerships

Opportunities for global engagement in higher education are not limited to internationally mobile students. TNE and collaborative research partnerships are also expected to continue their growth to 2020. To identify future opportunities for TNE, whether through joint or independent initiatives, a number of key drivers need to be considered. These include the total number (and growth rate) of tertiary enrolments, student mobility rates and a variety of practical barriers to TNE, from language issues to the legal and political framework in the potential host country.

It is likely that TNE programmes will continue to be developed in established host country markets such as Malaysia and Singapore (especially as they also have ambitious international student targets), while China and India will inevitably generate further interest, subject to continuing legislative uncertainties and artificial barriers to market entry.

There are significant TNE opportunities in countries such as Pakistan, Nigeria, Indonesia and Vietnam, but a combination of security issues, legislative barriers and the relative lack of openness of the local

education system with regard to foreign education limit these at present. The penetration of existing markets also needs to be considered – a country like Malaysia, for example, is a more mature TNE market than one such as Indonesia, and its needs and opportunities will be different.

The volume of global research output is dominated by a few large countries, including the US, Germany, Japan, China and the UK. Rates of international research collaboration are much lower in the US and China than in smaller, more economically interdependent countries such as Switzerland and the Netherlands. But volume dictates that the majority of future research collaboration opportunities to 2020 will continue to come from the major players such as the US and China.

Researchers with international experience create the most highly cited research articles.³ The countries generating the highest average citation impact per document include Switzerland, the Netherlands, the Nordic countries, the UK and US. At the institutional level, demand for international collaboration strongly follows quality, and Harvard produces the highest number of collaborative research articles, followed by Toronto and Oxford. The UK has at least eight universities with an average research citation impact more than 80 per cent above the global average and will continue to be a desirable global collaboration partner. There is a strong correlation between international research collaboration rates and citations per document. While not proof of causality, the association is positive (i.e. the direction expected) and significant (for 2010, 80 per cent of the variation in citations per document across countries is 'explained' by international research collaboration rates).

There is scope for more effective application of research excellence into commercial activities, and this could strengthen future economic growth potential. Universities remain an under-used resource for generating inward investment and research income from global companies, though it varies from country to country. Particularly beneficial are expected to be: collaborations with countries leading

on internationally-filed patent applications (e.g. US, China, Japan and South Korea); those with the highest rates of commercial joint-working (e.g. India, Australia and Brazil); and those involving smaller, research-intensive countries which excel in niche technological growth markets (such as Switzerland, the Nordic countries and Israel), and have research citation impact significantly above the world average.

In conclusion, just as the last decade witnessed a changed landscape in the higher education sector – one which has significantly benefited advanced and emerging economies alike – so too does the next decade herald significant change. This change will both intensify competition and equally provide opportunities for strengthened collaborations globally. Just as the world economy is shifting east and south, the evidence suggests, with a lag relative to the shift in economic power, the global tertiary education sector is now starting to move east, but at this stage less so south.

For advanced economies, while still maintaining a large, if potentially shrinking, international mobile student population in the long run, and whilst continuing to collaborate together on research, a proportion of activity in TNE and research, both academic and business, will need to follow east if opportunities are to be exploited.

A summary of future higher education opportunities for global engagement is in the table and chart on the following page.

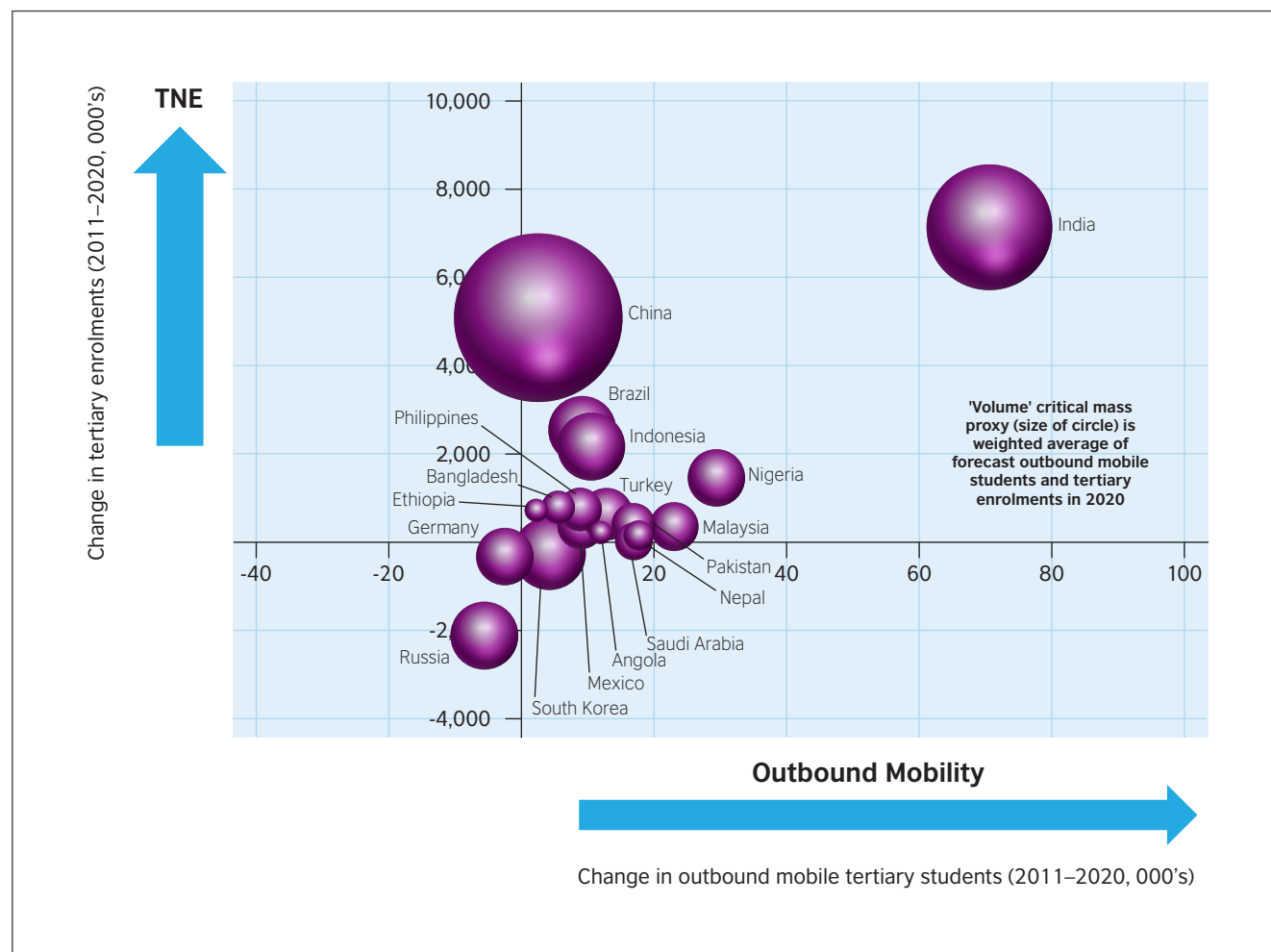
³Department for Business, Innovation and Skills (2011), International Comparative Performance of the UK Research Base

Summary of future higher education opportunities for global engagement (2020)

International tertiary education opportunity	Future opportunities ⁴
International student mobility	• Largest outbound mobile student flows by origin (2020): China (585k), India (296k), South Korea (134k), Germany (100k), Turkey (84k), Malaysia (82k), Nigeria (67k) • Fastest growing (absolute) outbound mobile student flows (next decade): India (71k), Nigeria (30k), Malaysia (22k), Nepal (17k), Pakistan (17k), Saudi Arabia (16k), Turkey (13k) • Largest inbound mobile student flows by destination (2020): US (582k), UK (331k), Australia (277k), Canada (176k), Germany (155k) – China and Malaysia are also likely to feature here • Fastest growing (absolute) inbound mobile student flows (next decade): Australia (51k), UK (28k), US (27k), Canada (23k) – again China will surely feature here • Major bilateral mobile student flows (2020): India to US (118k), China to US (101k), China to Australia (93k), South Korea to US (81k), China to Japan (64k), India to UK (59k) – flows to China, and possibly India also • Fastest growing (absolute) bilateral mobile student flows (next decade): India to UK (20k), India to US (19k), China to Australia (17k), Nigeria to UK (14k), India to Australia (11k) – flows to China, and possibly India also • Fastest declining (absolute) bilateral mobile student flows (next decade): China to Japan (-14k), Japan to US (-8k), China to US (-8k), China to UK (-7k), Kazakhstan to Russia (-5k), Greece to UK (-4k) – the impact of China's aggressive pursuit of international students could well lead to some well-established bilateral flows declining
Size and growth of domestic tertiary education systems	• Largest tertiary enrolment levels (2020): China (37.4m), India (27.8m), US (20.0m), Brazil (9.2m), Indonesia (7.7m), Russia (6.3m), Japan (3.8m), Turkey (3.8m), Iran (3.8m), Nigeria (3.6m) • Fastest growing (absolute) tertiary enrolment growth (next decade): India (7.1m), China (5.1m), Brazil (2.6m), Indonesia (2.3m), Nigeria (1.4m), Philippines (0.7m), Bangladesh (0.7m), Turkey (0.7m), Ethiopia (0.6m) – growth in certain markets could be larger still if ambitious international student recruitment targets are met • Largest falls in outbound mobile students (next decade): Japan (-10k), Greece (-10k), Poland (-8k), Singapore (-6k), Russia (-6k), Germany (-2k) – China is one to watch here given its demographic outlook and ambitious domestic tertiary sector expansion plans
TNE	• Dual and joint degrees: China, US, France, India, Germany • Franchising and validation: Asia, Latin America, possibly Africa (Nigeria) • Branch campuses: Far East, possibly Middle East • Online: Gulf countries, Asia, possibly Scandinavia
Academic international research collaboration	• Largest growth in research output: Volume growth to be driven by collaborations involving US and Chinese institutions • Highest collaboration rates: Research collaboration rates are higher in many smaller countries, such as Switzerland and Belgium (50–70%); they are lower in China (around 15%). Overall opportunity for collaboration depends on both the volume of research and propensity to collaborate • Highest average citation impacts: Switzerland, Netherlands, Denmark and US – collaborating with these countries in theory should help to maintain and increase research average citation impacts • Three core opportunity groups: Specifically for the UK, future growth in collaborations likely to be with (i) the US and other established high volume research leaders (Germany, France, Italy, Canada, Australia); (ii) high average citation impact leaders (also Switzerland, Netherlands, Denmark) and niche opportunities in smaller, technology-intensive countries such as the Nordic countries, Switzerland and Israel; and (iii) a chance to tap into rapid research output growth in key emerging markets, most notably China but also Malaysia, Iran, Saudi Arabia, India and Qatar
Business international research collaboration	• Large companies: Growth in collaboration opportunities with multinationals; large US, European, Chinese, Indian and Latin American companies; niche opportunities in research and technology-intensive countries e.g. Israel, Switzerland, learn from approach in Nordic countries, Netherlands. Opportunities in countries with high tertiary sector-large firm innovation collaboration rates (e.g. Finland, Sweden) and unexploited opportunities in countries with low tertiary sector-large firm innovation collaboration rates (e.g. Brazil, UK, Spain, Italy) • Smaller companies: Further growth opportunities in small and medium enterprises (SME) collaboration rates for research and development (R and D), focused on niche, high-value technology areas and/or links to multinational supply chains. Opportunities in countries with high tertiary sector-SME innovation collaboration rates (e.g. Finland, Belgium, UK) and unexploited opportunities in countries with low tertiary sector-SME innovation collaboration rates (e.g. Brazil, Italy) • Leading countries in internationally-filed patent application: Japan, US, South Korea and in volume terms, China and India • Innovation: Continuing promotion of open innovation models, with fluid collaboration between business and the higher education sector

⁴All forecast values have been calculated from analysis of data on the 50+ shortlisted countries (see page 10)

Future higher education opportunities for global engagement – major countries (2020)



Source: Oxford Economics

International Education Opportunities – Outbound Mobile Students and TNE

Future higher education opportunities for global engagement – top country listings (2020)

Rank	Domestic tertiary education system		International student mobility – outbound		International student mobility – inbound	
	Size	Growth	Size	Growth	Size	Growth
	2020	Next decade	2020	Next decade	2020	Next decade
1	China	India	China	India	US	Australia
2	India	China	India	Nigeria	UK	UK
3	US	Brazil	South Korea	Malaysia	Australia	US
4	Brazil	Indonesia	Germany	Nepal	Canada	Canada
5	Indonesia	Nigeria	Turkey	Pakistan	Germany	See point b
6	Russia	Philippines	Malaysia	Saudi Arabia	France	
7	Japan	Bangladesh	Nigeria	Turkey	Japan	
8	Turkey	Turkey	Kazakhstan	Iraq	Russia	
9	Iran	Ethiopia	France	Zimbabwe	See point a	
10	Nigeria	Mexico	US	Angola		

Note: Asian countries shaded in grey

- a** China, Malaysia and India will be amongst the top ten host countries by 2020. Due to the data issues discussed in this report the exact position of these host countries is difficult to forecast with certainty although China has potential to be one of the top three hosts of international students.
- b** China, Malaysia, Singapore and India will be in the top ten fastest growing hosts of internationally mobile students.

1. Introduction

Background

The tertiary education sector has seen a massive expansion over the past decades. It generates significant and multiple direct, indirect and catalytic economic impacts (e.g. human capital, research, innovation and trade promotion) which result in well-established benefits pertaining to both individuals and wider economies.

The tertiary education sector has characteristics similar to other industries in having a sizeable portion of demand that is both domestic (driven by home students' demand and needs of the respective national priorities) and international. The international component is given a growing prominence by increasing international student and academic faculty, TNE activities, academic and business research collaborations, and for some countries, makes a sizeable contribution to exports and GDP.

In the UK, for example, wider education exports in 2008–09 were estimated to be £14.1 billion⁵ (and are forecast to rise to almost £27 billion by 2025). The 2008–09 figures are equivalent to 1.0 per cent of GDP and 8.4 per cent of total service exports. Education's share of total service exports compares to 28 per cent (banking or 32 per cent including financial service exports), 17 per cent (professional, scientific and technical activities)⁶, 14 per cent (travel and tourism) and 12 per cent (ICT).⁷

Although there are some complexities with making direct comparisons, based on these figures education is the fifth largest service export sector in the UK economy. In other economies such as Australia and New Zealand, education is likely to rank even higher up the league table of service export sectors where the sectors could be said to be given greater economic strategic priority.

The objective of this research is to look at the future shape of the global higher education sector and its growing internationalisation – both of teaching (onshore and offshore) and research.

Internationalisation of teaching and research are critical objectives for most tertiary institutions. There are a number of motivations for this, including institutional profiling, raising quality standards and global relevance, attracting the best students and staff, generating revenue, and promoting internal diversity. While some universities use TNE to support wider research and academic collaboration, others may also seek to mitigate against the perceived threat of a decline in inbound international students – for example as a result of recent and predicted future growth in domestic tertiary systems (both quantity and quality) in key inbound student markets such as China, India, Malaysia and other major economies such as Brazil and Russia.

Most notably, today's world is increasingly global and interdependent, and both research and education are necessarily following suit. Students increasingly demand cross-cultural exposure on their courses, to prepare them for international careers; researchers naturally look overseas to develop solutions to global problems, and there is clear evidence that internationally co-authored articles are more frequently cited.

To justify claims that an institution provides a true international education, and to attract top students from around the world, it is necessary to clearly demonstrate a strong physical global footprint; a sizeable body of international students (16 per cent of all students in the UK are from abroad) and lecturers (25 per cent of UK's lecturers are from outside the UK)⁸; a strongly internationalised course content; and a suitable number of opportunities for exchange and overseas study.

Universities also contribute to global development and poverty reduction, through a combination of collaborative research (particularly in areas where they are internationally strong, such as medical sciences or business and leadership), direct teaching and capacity-building initiatives with partner institutions in the developing world.

The Development Partnerships in Higher Education Programme (DeHPHE), for example, which runs from 2006 to 2013, has funded around 160 projects involving a lead institution in Africa or Asia partnering with one or more UK universities or research institutes to tackle a particular local development problem.

In addition, the tertiary sector is becoming more aware of, and engaged with, its role as a driver of national economic competitiveness, with education and technological development – its core business – firmly accepted as the twin drivers of modern productivity.

Choice of shortlisted countries

The focus of this research is global. But to avoid analysing small countries with marginal opportunities – due to their limited critical mass – a shortlist of the top 50+ largest tertiary education countries was identified (see annex A).

The shortlisting exercise was based on the following criteria:

- current number of domestic tertiary enrolments
- current number of outbound and inbound mobile tertiary students
- current outbound and inbound mobility ratios
- current and projected size and growth of 18–22 age group population
- current and projected size of respective economies (in US\$ GDP terms)
- forecast rate of economic growth
- current and projected number and growth in households with incomes above US\$30,000.

The 50+ countries included are evident from the analysis presented throughout the report, and represent a strong mix of diverse and geographically distributed nations.

⁵ Estimate by London Economics for the Department for Business, Innovation and Skills

⁶ This may include some activities also included in education's service exports

⁷ Source: WTTC, Oxford Economics

⁸ HESA 2012 Staff record

As all forecast values have been calculated from analysis of data on these 50+ shortlisted countries (rather than an exhaustive global list of countries) this should be borne in mind when considering the numerical values of forecasts quoted in this report. These forecasts in many instances could be underestimates.

Report structure

This report has five chapters. It starts with an introduction to the study objectives and states the increasing importance of higher education and its growing internationalisation.

Chapter 2 analyses key trends that have shaped the higher education landscape over the past few decades. This includes: tertiary education enrolments; international student mobility flows, TNE developments, international research collaborations and international research involving business activities.

Chapter 3 outlines the drivers of higher education demand. It looks at countries' demographic projections to 2020 and the changes in the 18–22 population group. It uses well established relationships between nations' wealth and tertiary enrolments. This relationship is positive and particularly strong in emerging economies with household income below US\$10,000. This chapter uses GDP per capita projection to establish the size of countries' tertiary education systems in 2020 and determine which countries will close the gap on tertiary enrolment rates in advanced economies.

Chapter 4 draws the higher education landscape in 2020. Having established that international student mobility is a function of tertiary enrolment projections and countries' outward mobility ratio, growth in international students globally will be much lower than in previous decades. It will mirror the slow down in tertiary enrolments (down to one per cent per annum from five per cent per annum previously). However, TNE is expected to see increased variety of models of delivery and growing opportunities in the Middle East and Asia. Academic international research collaborations among countries are set to grow and so are the research collaborations with multinationals and SMEs.

Chapter 5 draws future higher education opportunities for global engagement.

Given the wealth of data and analysis used to draw the trends expected to shape the world's higher education to 2020, most of the data tables and supporting research evidence and analysis, as well as supplementary information are provided in Annexes A–E:

- Annex A: International student mobility ratio forecasts
- Annex B: Additional evidence on TNE
- Annex C: Future higher education opportunities for global engagement – world region analysis
- Annex D: International higher education definitions.
- Annex E: Supplementary charts and graphs.

2. Global higher education sector today

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2. Global higher education sector today

Box 2.1: Global higher education sector today – key facts

Tertiary enrolments – 170 million globally in 2009, with just four countries (China, India, US and Russia) accounting for 45 per cent of the total; growth has averaged five per cent per annum (the world's 18–22 age population over the same period grew by one per cent per annum, implying a significant rise in the global gross tertiary enrolment ratio).

International student mobility – 3.5 million mobile students in 2009, up from 800,000 in the mid-1970s; global tertiary mobility rate stable at two per cent since early 1990s; major countries where inbound mobile students exceed outbound mobile students are the US, UK, Australia, France, Germany, Japan, Russia, South Africa and Canada; major countries where outbound mobile students exceed inbound mobile students are China, India, South Korea, Kazakhstan, Turkey, Morocco and Vietnam.

TNE – globally some 200 branch campuses now exist around the world, serving around 120,000 students, with 37 more set to open by 2013; UAE remains the most popular host country (with 37 campuses), and the US by far the most popular source (accounting for 78 campuses worldwide); more than 500,000 students in 2010–11 studying entirely overseas for a degree delivered in full or in part by a UK institution.

Academic international research collaboration – largest producers of collaborative research articles in 2010 are the US (143,000 in 2010), UK (62,000), Germany (58,000) and China (47,000); international collaboration rate is highest in Switzerland (62 per cent).

Business international research collaboration – rates of joint-working on research and development (R and D) between large companies and universities are highest in Finland, at 70 per cent (compared to 25 per cent in the UK)

Before looking at future opportunities, it is important to first establish important facts and patterns about the global tertiary education sector today – in terms of domestic tertiary enrolments, international student flows, TNE and academic and business research collaboration.

This chapter therefore acts as the baseline for the opportunities analysis to 2020.

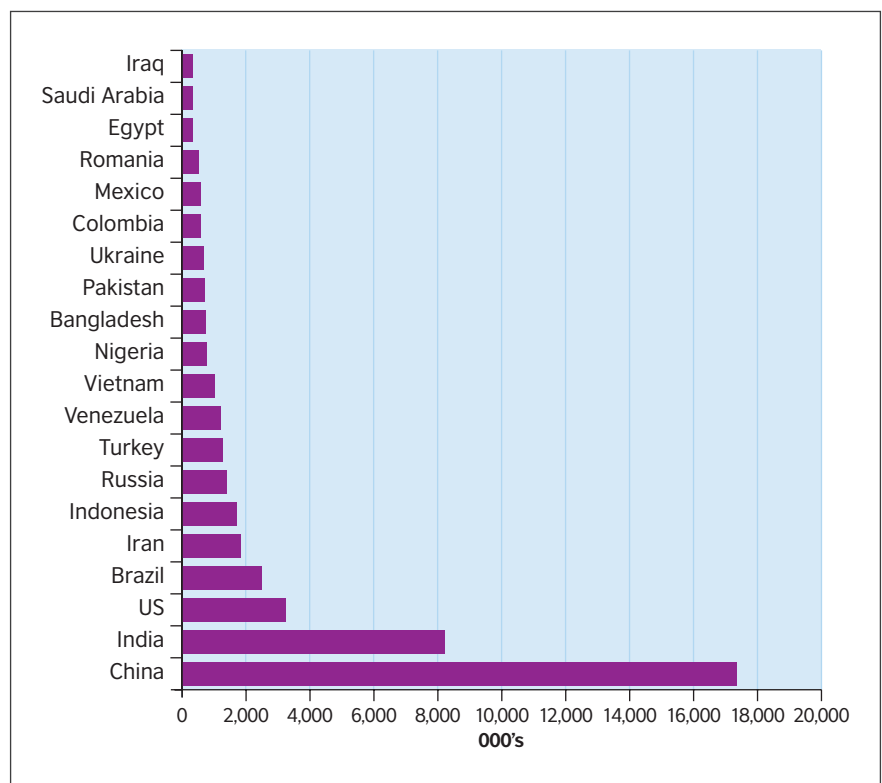
Tertiary enrolments

Based on the latest data available from UIS, total global tertiary enrolments were approximately 170 million in 2009.⁹ The 50+ shortlisted countries focused on for this study make up over 150 million or 90 per cent of this total. Just four countries – China, India, US and Russia – have a combined share of 45 per cent of total global tertiary enrolments. Other emerging economies with significant numbers of tertiary enrolments include: Brazil (6.2 million), Indonesia (4.9 million), Iran (3.4 million), South Korea (3.3 million) and Turkey (3.0 million).

Global tertiary enrolments were approximately 65 million in 1990, so have increased by 160 per cent in 20 years or on average by five per cent per annum. The world's 18–22 age population over the same period grew by one per cent per annum, implying a significant rise in the global gross tertiary enrolment ratio.

Between 2002 and 2009, China and India dominated global growth in tertiary enrolments, accounting for 26 million (44 per cent) of the overall increase of 55 million. In percentage terms, a number of other countries of significant critical mass registered exceptionally strong growth rates in tertiary enrolments over the same period: Brazil (+68 per cent), Turkey (+74 per cent), Indonesia (+53 per cent), Nigeria (+68 per cent), Pakistan (+179 per cent), Malaysia (+41 per cent), Vietnam (+127 per cent), Saudi Arabia (+70 per cent) and Bangladesh (+84 per cent).

Countries with negligible or even slightly negative growth in tertiary enrolments are also noteworthy: South Korea, Japan and Spain. This tends to reflect underlying demographic trends and gross tertiary enrolment rates stabilising at what might be considered maximum threshold levels. Although this does not automatically mean that tertiary sectors in these countries are 'static' as there may be rising demand for certain underlying elements of higher education.



Source: UNESCO, Oxford Economics

Fig 2.1: Tertiary enrolment growth (2002–2009, 000's)

⁹ This includes estimates for countries where data is missing in this year.

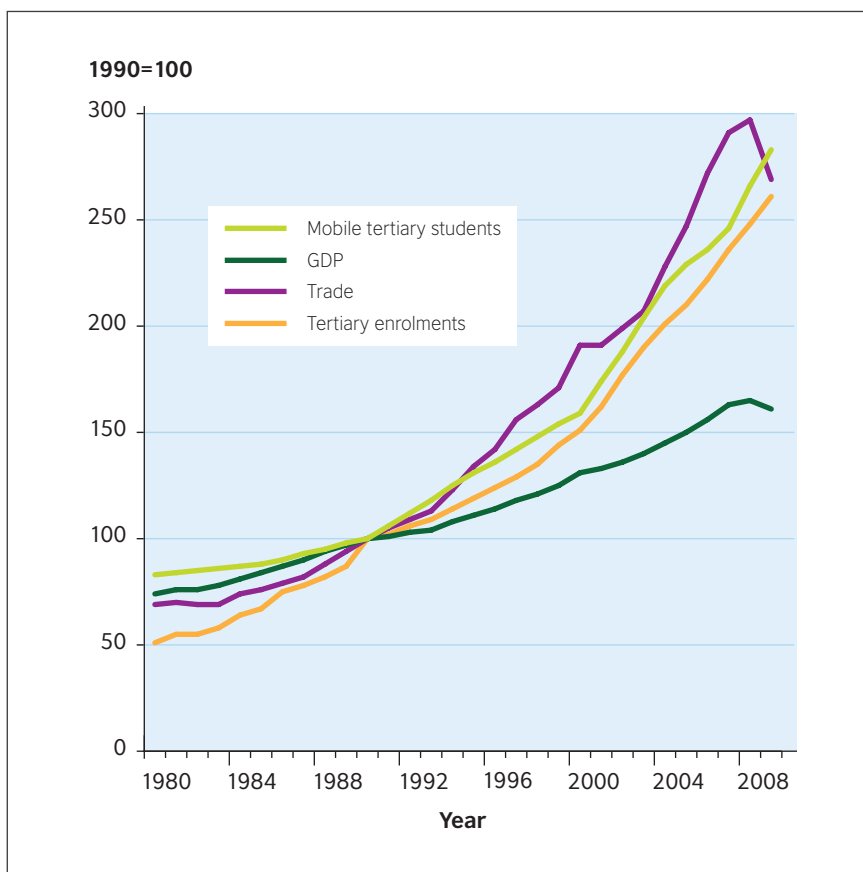
International student mobility

Another key feature of the global tertiary education sector has been the growth in international students. The number of international students in tertiary education has risen from 800,000 in the mid-1970s to over 3.5 million in 2009.

However, the outbound mobility ratio (mobile tertiary students divided by total tertiary enrolments) has remained remarkably stable from the early 1990s onwards at just over two per cent, reflecting a stable 'propensity' to study abroad. The 50+ shortlisted countries focused on for this study make up over 70 per cent of the global international students at tertiary level.

To set the growth of mobile tertiary students in context, its growth has been tracked against the growth in world gross domestic product (GDP) and world trade. Initially during the 1980s, growth in mobile students lagged behind both world GDP and world trade (and indeed global tertiary enrolments also). But from the early 1990s, mobile tertiary student growth (and tertiary enrolments overall) accelerated to outpace world GDP growth, and grow at a similar pace to world trade (see Fig 2.2).

It is difficult to determine the causality between mobile tertiary students and trade – and is beyond the scope of this research – but clearly there is a close association between the two, both in aggregate and at a bilateral country-to-country level (see Table 2.1 on page 20).



Source: UNESCO, OECD, Oxford Economics

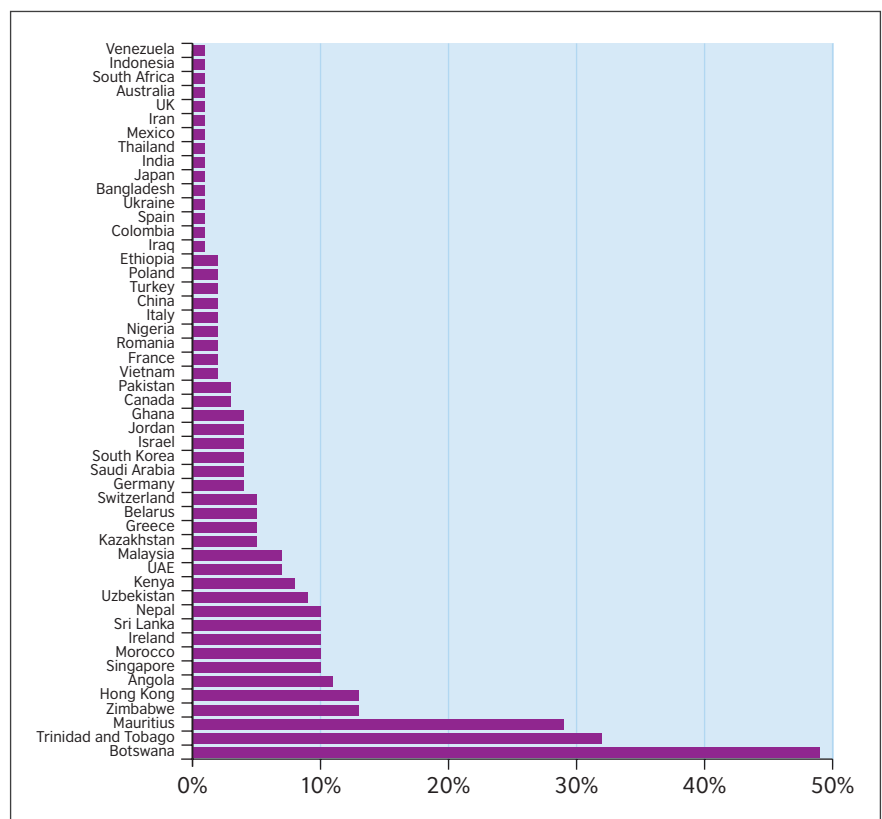
Fig 2.2: Global tertiary enrolments and mobile students and global GDP and trade (1980–2009)

Outbound mobility

The major origin markets for outbound mobile tertiary students include China, India, South Korea, Germany, Turkey and France, with the distribution of outbound mobile students more balanced than for tertiary enrolments. China and India contribute 29 per cent of total tertiary enrolments but only 21 per cent of total outbound mobile students. This is because they have lower outbound mobility ratios than the global average.

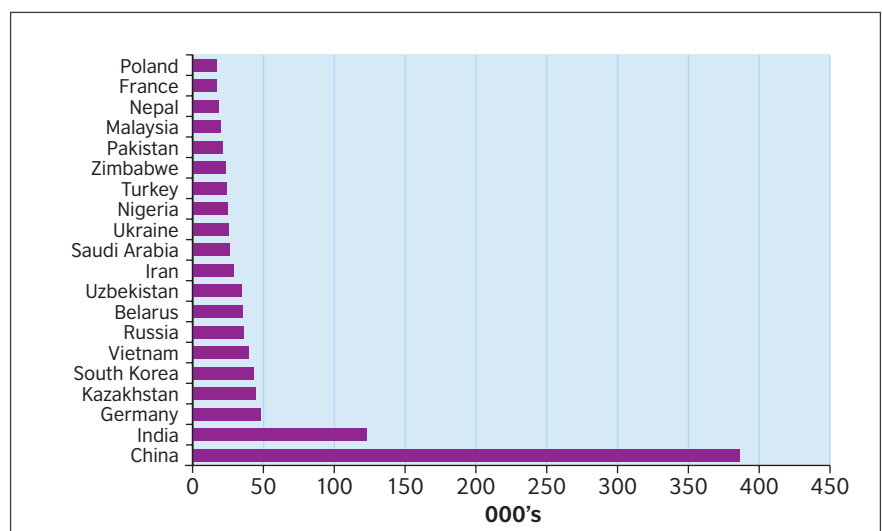
Outbound mobility ratios vary significantly across countries, ranging from above 25 per cent for Mauritius, Trinidad and Tobago and Botswana, to less than one per cent for the UK, US, Australia, Russia, Indonesia, Philippines, Egypt and Brazil. Markets such as Hong Kong, Singapore, Ireland, Nepal, UAE and South Korea have above global average outbound mobility ratios, as do many European countries due to high mobility across borders within Europe and growing provision in widely spoken English language postgraduate courses, (see Fig 2.3).

China has been the source of one-third of global growth in outbound mobile students between 2002 and 2009, followed by India (10 per cent), however, their outbound mobility ratio is significantly low. Other countries appearing in the top 20 for outbound mobile student growth (in absolute terms) are South Korea, Vietnam, Russia, Iran, Saudi Arabia, Nigeria, Turkey, Pakistan, Malaysia and Nepal (see Fig 2.4).



Source: UNESCO, OECD, Oxford Economics

Fig 2.3: Global tertiary outbound mobility ratio by origin market (2009)



Source: UNESCO, OECD, Oxford Economics

Fig 2.4: Global outbound mobile tertiary students by origin market growth (2002–09)

Inbound mobility

According to available data the distribution of destination markets for inbound mobile tertiary students is much less evenly distributed than for outbound students. The US, UK, Australia, France, Germany, Russia, Japan and Canada lead at global level, accounting for 60 per cent of total inbound mobile students.

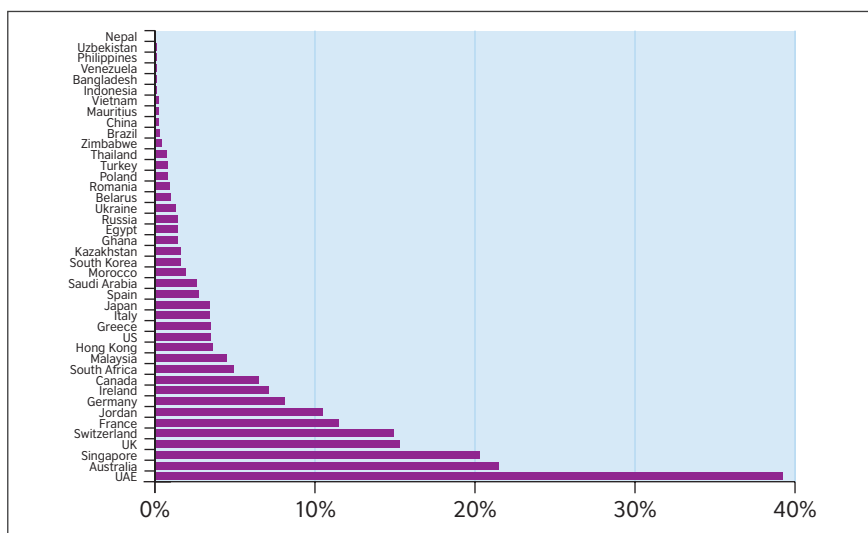
Other countries, however, do play an important destination role at a more regional level: South Africa (Sub-Saharan Africa); Malaysia and Singapore (South East Asia); and South Korea (North East Asia).

Inbound mobility ratios also vary significantly across countries, ranging from 39.2 per cent in the UAE and above 10 per cent in France, Switzerland, UK, Singapore and Australia (and also countries such as Qatar, Cyprus and Austria), to less than one per cent in Turkey, Poland, China, Brazil, Bangladesh, Indonesia and Nepal (see Fig 2.5).

Drawing on UIS (as opposed to OECD) data, part of this inbound flow in 2009 is accounted for by China (61,000), India (12,000 in 2006), Brazil (16,000), Indonesia (6,000) and Singapore (40,000). Even though some of these flows are significant in scale, they are all still lower than current inflows to Canada (93,000).

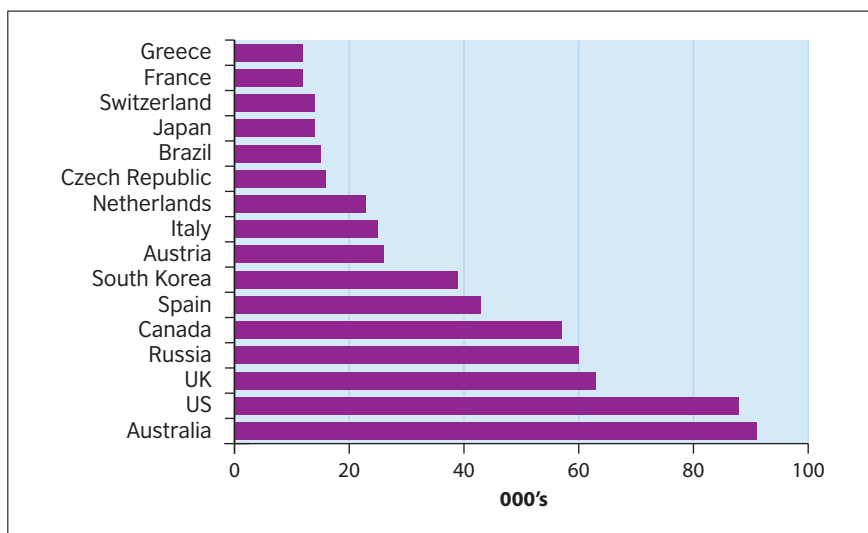
The figures for some of these countries are likely to be higher still than captured by both OECD and UIS. Given these agencies mainly capture degree students only, other agencies' data complement these statistics by providing data on student exchanges, TNE and various study abroad options. For example *Project ATLAS*¹⁰ reports an inbound tertiary student flow of 265,000 currently for China compared to the UIS figure of 72,000 in 2010. This matters because some of the non-reported or under-reported countries are investing heavily in higher education and have plans to develop further as education hubs. So their growing role as destinations for internationally mobile students should not be underestimated.

For growth in inbound mobile students, Australia's success is clearly evident, increasing its number of inbound students by more than the US and UK. This is despite



Source: UNESCO, Oxford Economics

Fig 2.5: Global tertiary inbound mobility ratio by destination market (2009)



Source: UNESCO, Oxford Economics

Fig 2.6: Global inbound mobile tertiary students by destination market growth (2004–09)

having a smaller tertiary education sector. Australia's growth in inbound students between 2004 and 2009 (+54 per cent) was more than double the rate of growth of both the US (+15 per cent) and UK (+21 per cent), Canada, Russia, South

Korea and Spain are also notable for their expansion of inbound mobile students between 2004 and 2009 (see Fig 2.6).

If additional and alternative inbound data were available and used, it is not impossible, especially given investments

¹⁰ www.iie.org/en-GB/Services/Project-Atlas/China/International-Students-In-China

in higher education, that countries such as China, Singapore, Malaysia and a Gulf state would account for a higher share of global inbound student mobility growth.

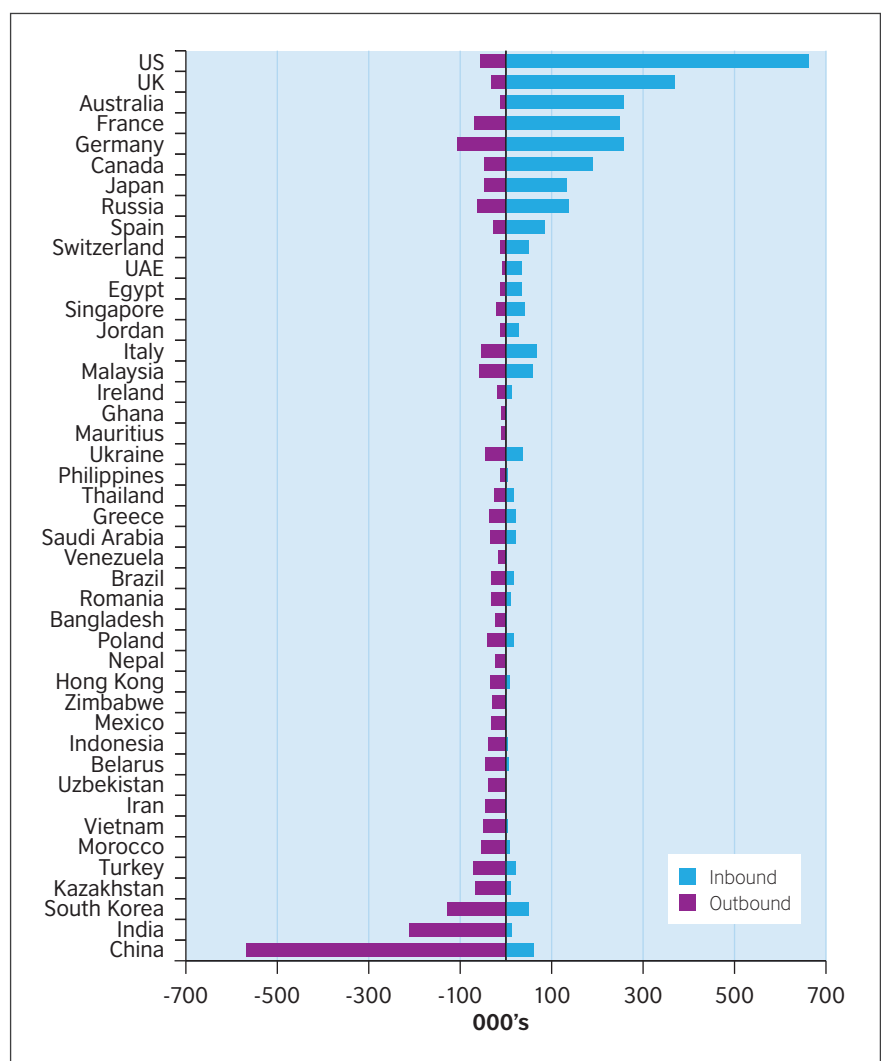
For example, China's inbound flow of tertiary mobile students doubled between 2006 and 2009, but this is based on the lower UIS figures. A doubling of growth in the larger Project ATLAS figure of 265,000 inbound students would dwarf historic growth in any other country, including the US, UK and Australia.

Net balance of inbound and outbound mobility

It is useful to present the net balance between the inbound and outbound student flows to and from countries. The major countries where inbound mobile students exceed outbound mobile students are the US, UK, Australia, France, Germany, Canada, Japan and Russia.

The major countries where outbound mobile students exceed inbound mobile students are China, India, South Korea, Kazakhstan, Turkey, Morocco and Vietnam.

Malaysia is an interesting case study where inbound (41,000)¹¹ and outbound (58,000) flows were similarly large in 2009. This compares to a large net mobility outflow in 1998 when inbound flows were only 3,000 and outbound flows were still high at 50,000–55,000. As such, the evolution of Malaysia's global tertiary education experience serves as a useful lesson for other countries with aspirations to follow a similar path (see Fig 2.7).



Source: UNESCO, Oxford Economics

Fig 2.7: Global inbound and outbound mobile tertiary students (2009)

¹¹Project ATLAS estimates tertiary inbound student inflows to Malaysia currently are much higher at around 87,000.

Bilateral tertiary mobile flows

The major bilateral flows of mobile tertiary students are as follows: China to US, India to US, China to Japan, South Korea to US, China to Australia, China to UK, China to South Korea, China to Canada, India to UK, Canada to US, Japan to US, Turkey to Germany, and Morocco to France. The importance of China as a major origin market and the US as a major destination market is very evident from these flows. There may be other significant bilateral flows (through TNE, student exchanges and short-term mobility) not listed here – for example inflows to China, Singapore, Malaysia and other countries. Over the last decade, Chinese student outflows to US, Australia, Japan, South Korea, Canada and UK have dominated the league table for fastest growing, in absolute terms, outbound bilateral flows.

There have also been some interesting falls in bilateral student flows: Japan to US, Greece to UK, Singapore to Australia, China to Malaysia, Indonesia to Malaysia and Indonesia to US.

As has previously been demonstrated, bilateral trade patterns are an important determinant of bilateral mobile tertiary student origin-destination patterns, both in history and in the forecast methodology used to make projections to 2020. Due to the lack of comprehensive bilateral services trade data, this global analysis is based solely on bilateral goods trade. Although at UK level, where bilateral services data are available, there does appear to be some correlation between bilateral services total trade and student countries of origin. This close association is particularly true for the following study destinations: Canada, Japan, China, South Korea, India and Switzerland. Some countries, however, conform less to this correlation, such as Malaysia, Nigeria, Hong Kong and Indonesia.

The UK typically has a share of total outbound mobile students from certain origin markets – India, Nigeria, Malaysia, Hong Kong, Sri Lanka, Ireland and UAE – which far exceed its share of bilateral trade with these countries. This illustrates the additional importance of historic and cultural ties and language in explaining bilateral mobile student flows.

Tertiary student origin by destination country-correlation with total goods trade (2009)		
	Correlation	R-squared
Canada	0.98	96%
Japan	0.92	85%
China	0.88	77%
South Korea	0.86	75%
India	0.85	72%
Switzerland	0.83	69%
Italy	0.81	66%
Ireland	0.78	61%
Spain	0.75	57%
Germany	0.68	46%
US	0.64	41%
Bangladesh	0.63	40%
Russia	0.63	39%
France	0.58	34%
Saudi Arabia	0.56	31%
UK	0.53	29%
Australia	0.51	26%
Indonesia	0.44	19%
Hong Kong	0.41	17%
Nigeria	0.39	15%
Angola	0.29	9%
Malaysia	0.27	7%

Source: OECD, Oxford Economics

Table 2.1: Correlation between bilateral trade and outbound mobile tertiary student destinations (2009)

Transnational education (TNE)

Definition of TNE

One definition of TNE is delivering education where, 'the learners are located in a country different from the one where the awarding institution is based'.¹²

The Global Alliance for TNE specifically defines TNE as an export product. There are a variety of ways in which education is conducted transnationally, including via: distance education (with or without local support), twinning programmes, articulation programmes, branch campuses, and franchising arrangements. See Annex D for some further definitional information on different forms of TNE.

TNE is attractive to students seeking to gain a foreign qualification without moving from their country of residence. It can also be attractive to employers and governments looking at options for human resource development, including multinational or global corporations with a geographically dispersed workforce. Education providers seeking ways to expand their export markets are also attracted to the possibilities opened up by transnational education. In other words, TNE can be a win-win for all stakeholders – students, tertiary providers and host governments and economies – if delivered effectively.

There are very different policy frameworks in place across countries to support and promote TNE, both in terms of outbound domestic students and inbound overseas students. These can be opaque, contradictory and sometimes a source of significant frustration. India, for example, has so far failed to provide a clear set of guidelines on what higher education developments and partnerships it will and will not allow.

In China, the government often requires overseas institutions to engage in partnerships with local providers, a policy geared towards protecting and improving quality standards in the domestic education market. In addition, other

countries, such as Brazil and Indonesia, have legislative frameworks that have not proved conducive to facilitating TNE initiatives from overseas providers.

Global TNE

A 2011 survey of international joint and double degree programmes (summarised in Annex B)¹³ shed light on their prevalence around the world. It revealed that globally, most joint or double degree programmes tend to be at the masters level (53 per cent), with the exception of Australia (where the majority are at doctoral level) and the US (where the majority are undergraduate courses).

The most popular subject areas were business, management and engineering. Institutions in France, Germany and Italy tended to have launched joint or double degree programmes in the 1990s, while the UK and Australia started more recently.

New data on international branch campuses (IBCs)¹⁴, collected in late 2011 (again summarised in Annex B) show that the campus approach is growing in popularity. Globally some 200 branch campuses now exist around the world, serving around 120,000 students, with 37 more set to open by 2013 (Source: Observatory on Borderless Higher Education). Overall, the UAE remains the most popular host country (with 37 campuses), and the US by far the most popular source (accounting for 78 campuses worldwide).

Reviews of global TNE show that Australia has one of the largest overseas presences of any country, and certainly the largest relative to the size of its domestic tertiary sector. Around a quarter of all Australian university campuses are located outside Australia. Its top partners for joint and double degrees are China, Singapore and Indonesia, which are its near neighbours.

UK TNE

The number of people studying entirely outside of the UK on a programme delivered at least in part by a UK institution was over

half a million in 2010–11 (Source: HESA, 2012). Singapore and Malaysia account for the largest share of these students (around 10 per cent each). The programmes include those delivered in full by a UK institution, for example through distance or online learning, or in person at an overseas branch campus, and those delivered in partnership with an overseas institution.

The number of students enrolled on programmes delivered at overseas branch campuses of UK institutions is around 12,300. This accounted for just 2.5 per cent of people studying on foreign-based courses involving a UK institution. Overseas branch campuses have tended to account for a very small proportion of the UK's overall TNE offer, particularly when compared to distance learning or courses delivered with partner institutions.

The University of Nottingham is among the global leaders on IBCs in terms of student numbers: its campuses in Ningbo (China), and Semenyih (Malaysia), both have more than 5,000 students and are among the five largest overseas operations in the world. A different approach was taken by University of Liverpool and Xi'an Jiaotong University, which in 2006 established the first independent Sino-Foreign University: Xi'an Jiaotong-Liverpool University (XJTLU). The new university has its own degree awarding powers and recruits around 5,000 students. Manchester Business School, University College London and Middlesex University are other notable UK players, with several smaller campuses each.

¹² Council of Europe (2002). 'Code of Good Practice in the Provision of Transnational Education' Directorate General IV. DGIV/EDU/HE (2002) 8

¹³ IIE (2011), *Joint and Double Degree Programmes in the Global Context* (www.iie.org/Research-and-Publications/Publications-and-Reports/IIE-Bookstore/Joint-Degree-Survey-Report-2011)

¹⁴ The Observatory on Borderless Higher Education (2012), *International branch campuses: data and developments* (www.obhe.ac.uk/documents/view_details?id=894)

Academic research collaboration

Volume of research outputs and propensity to collaborate

Scopus and Thomson Reuters data show that the total volume of global research articles produced is skewed heavily towards a small number of major nations: between 1996 and 2010 almost 25 per cent of articles were produced by the US, while just five countries accounted for more than half of the total (the US, China, UK, Japan and Germany), and 15 countries for more than three quarters of the total.

Rates of international research collaboration vary significantly from country to country, now averaging around 45 per cent in the UK, 30 per cent in the US, 15 per cent in China (where they have actually fallen since the 1990s), 45–50 per cent in Germany and the Netherlands, and up to 65 per cent in Switzerland. In 2010, the top countries for producing academic research articles through international collaboration were the US (143,000), UK (62,000), Germany (58,000), China (47,000), France (44,000), Canada (35,000) and Italy (30,000).

There is a strong correlation between international research collaboration rates and citations per document. While not a proof of causality, the association is positive (i.e. the direction expected) and significant (for 2010, 80 per cent of the variation in citations per document across countries is ‘explained’ by international research collaboration rates).

The UK is a strong and specialised player in international academic research. The UK accounts for around 6–7 per cent of global research articles (ahead of Germany and Japan), and generates output, citations and article re-usage more efficiently (both per researcher and per unit of research spend) than any of the other major research-producing nations. Between 1996 and 2010, the UK produced more research articles in total than any other country except the US and China. The UK’s research output is well internationalised: 63 per cent of researchers currently or previously affiliated to a UK institution have published at least one research article overseas¹⁵. Further, the total

Country	Total Research articles produced, 2010 (Scopus)	Total collaboratively produced articles, 2010 (Scopus)	Collaboration rate (%)	Citations per document (2010)	Citations per document (1996–2010)
US	502,804	143,048	28.5%	1.75	20.18
UK	139,683	62,061	44.4%	1.81	17.42
Germany	130,031	58,150	44.7%	1.76	15.79
China	320,800	47,093	14.7%	0.67	5.66
France	94,740	44,092	46.5%	1.57	15.09
Canada	77,694	34,675	44.6%	1.72	17.55
Italy	73,562	30,175	41.0%	1.60	14.45
Japan	113,246	26,828	23.7%	1.17	11.72
Australia	59,058	25,867	43.8%	1.60	16.00
Spain	64,985	25,845	39.8%	1.48	13.12
Netherlands	43,214	22,087	51.1%	2.22	20.05
Switzerland	30,866	19,208	62.2%	2.38	21.77
Sweden	26,842	14,758	55.0%	2.03	19.09
South Korea	55,546	14,359	25.9%	1.08	9.82
Belgium	23,716	13,573	57.2%	1.95	17.10
India	71,975	12,567	17.5%	0.76	7.27
Brazil	45,189	11,004	24.4%	0.79	9.57
Russia	36,053	10,589	29.4%	0.60	5.21

Source: Scopus (Elsevier) data, extracted January 2012

Table 2.2: Global share (by volume) of collaboratively produced research articles (2010)

share of articles produced by the UK collaboratively has risen to a higher level than seen in most of the other large research-producing nations. Internationalisation has been actively promoted from within by the UK’s tertiary sector. This has been in the wake of strong evidence that overseas collaboration enhances institutional reputation, corporate standing and research impact. In volume terms, the UK is currently in second position for research collaborations globally, behind the US. Relative to the total volume of all research output, China and Japan slip down the table by virtue of relatively low collaboration rates (though still remain important players in volume terms).

Research citation impacts

The highest citation impacts in research are made by tertiary institutions in the US, Europe (in particular northern Europe) and Australia.

At country level, within the top 30 research-producing nations between 1996 and 2010, the highest number of citations generated per document – a common proxy measure of quality – was achieved by Switzerland (22), followed by the Netherlands, Denmark and the US (20), and then Sweden, Canada, Belgium, the UK, Norway, Finland and Israel (17–19).

¹⁵ BIS (2011), ‘International Comparative Performance of the UK Research Base – 2011’ (www.bis.gov.uk/policies/science/science-innovation-analysis/uk-research-base)

Collaboration partners

The US is the top research collaboration partner in most countries around the world. This is partly driven by the large scope and depth of research activity in the US, and the volume of articles it produces. It may also be due in part to the fact that researchers previously studying there tend to maintain close links to former colleagues when they return to their home countries.

In many cases, research collaboration partner patterns reflect close geographical, cultural or migratory ties – for example, France accounts for 42 per cent of Algeria's collaboratively produced output, while Egypt was involved in around one third of Saudi Arabia's joint research articles, and vice versa.

Analysis of collaboration patterns in some of the largest emerging markets reveal important links to particular institutions. For example, over the decade to 2008, China partnered most frequently with researchers from the National University of Singapore, the University of Texas, the University of Tokyo, Harvard University and the University of Sydney.

In fact, two of the same universities, Texas and Harvard, were among the most frequent research partners in Brazil (alongside Paris in a clear top three), while Texas also made the top two in India (behind Tokyo). This likely indicates the extent to which research links have been driven by proactive institutional strategy and relationships between key individuals.

The top research collaboration partners for China over the decade to 2008 were the US, Japan, Germany, the UK, Canada, Australia, France, Singapore and South Korea (in descending order of importance).

In Brazil and India, the US was by far the largest co-author of joint research. The UK was the second most frequent collaboration partner for Brazil, but perhaps surprisingly, only the third most common partner for India, for which Germany achieved a higher share of joint papers.

The total share of UK articles published through international collaboration has risen around 15 percentage points (from 30 per cent to 45 per cent) over the decade to 2010. Both Scopus and Thomson Reuters data show the same

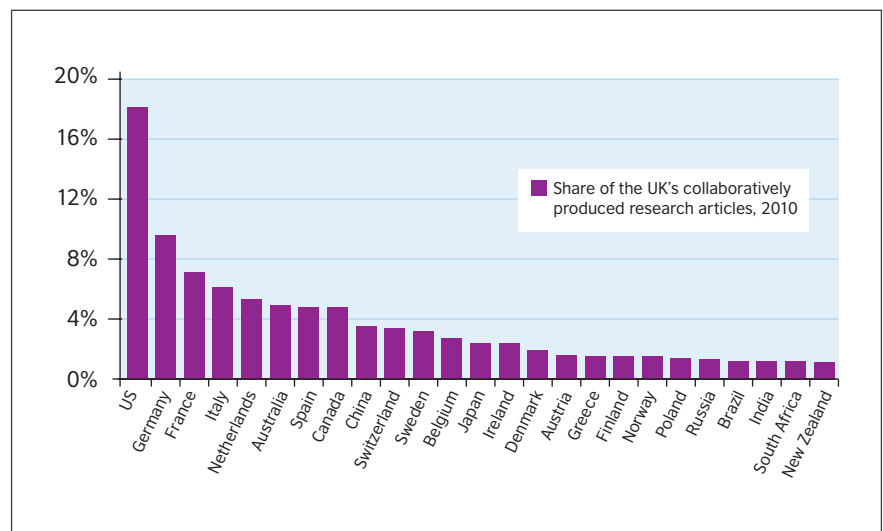
ranking of main partner countries for the UK: the US a clear leader, followed by Germany, France, Italy, the Netherlands and Australia. China now makes the top ten list of UK partners, having seen collaborations with the UK approximately double between 2005 and 2010 (see Fig 2.8).

In terms of global tertiary institutions undertaking the highest volumes of international collaborative research, four UK universities (Oxford, Cambridge, University College London [UCL] and Imperial College London) are among the global top six, largely by virtue of a higher average rate of joint-working than their US counterparts (many of whom generate more articles in total). In these four UK institutions, around half of all research is undertaken with international partners.

Toronto produced more articles through international collaboration than any UK institution, and was second on the global ranking behind Harvard (see Table 2.3).

Across the global top 400 tertiary institutions (as ranked by the total volume of collaborative research output), the US has 98 representatives, Germany 29 and the UK 24. China has 38 representatives on the list.

The UK has at least eight universities with an average research citation impact more than 80 per cent above the global average. In key subject areas such as medicine, the UK is the second largest producer of research behind the US, and often achieves a greater citation impact per document than its much larger competitor, indicating global leadership in these important scientific fields.



Source: Thomson Reuters Web of Knowledge data, extracted December 2011

Fig 2.8: Top UK collaborative research partners (2010)

Globally, Harvard is a clear leader in the volume of international collaborations it engages with, despite just a third of its total research output being produced through overseas partnership. Between 2005 and 2009, Harvard recorded a total number of collaborative articles some 50 per cent higher than Oxford or Cambridge.

Canadian universities also scored highly, including Toronto, British Columbia (Vancouver) and McGill (Montreal).

In China, only Peking University matched the global average for normalised citation impact over the four-year period 2005–09, though Fudan, Nanjing and the smaller Nankai performed well in terms of publications within the highest-ranked global journals.

Rank	Institution	Country	Total research articles, 2005-2009 (Scopus)	Intl. collab. rate (% of total)	Total collab. produced articles, 2005-2009 (Scopus)	Normalised citation impact (1 = global average)	Excellence rate (% within top decile in subject area)	Global inst. rank for total research output (all sectors)
1	Harvard University	US	69,995	34.4	24,078	2.4	35.7	4
2	University of Toronto	CAN	45,771	41.1	18,812	1.8	24.3	8
3	University of Oxford	UK	32,354	51.6	16,695	2.0	27.5	28
4	University of Cambridge	UK	32,900	49.8	16,384	1.9	26.7	27
5	University College London	UK	33,610	46.4	15,595	1.9	28.0	26
6	Imperial College London	UK	29,851	51.4	15,343	1.9	26.3	36
7	The University of BC	CAN	29,569	43.7	12,922	1.7	21.7	38
8	University of Tokyo	JPN	48,947	26.3	12,873	1.2	17.9	6
9	Johns Hopkins University	US	41,399	29.8	12,337	2.1	30.1	10
10	University of California, Berkeley	US	31,943	37.4	11,947	2.1	26.6	29
11	Swiss Federal Institute of Tech.	CH	20,291	58.3	11,830	1.9	24.7	79
12	Catholic University of Leuven	BEL	22,498	52.2	11,744	1.7	20.9	63
13	Stanford University	US	37,885	29.5	11,176	2.3	29.1	19
14	University of California, LA	US	37,994	29.3	11,132	2.1	28.9	17
15	National University of Singapore	SGP	25,188	44.0	11,083	1.5	17.0	51
16	U. Pierre et Marie Curie, Paris 6	FRA	20,786	51.4	10,684	1.5	23.5	74
17	The University of Manchester	UK	25,142	41.8	10,509	1.7	19.1	52
18	McGill University	CAN	23,113	45.0	10,401	1.6	23.1	58
19	University of Michigan, AA	US	41,059	25.3	10,388	2.0	25.6	12
20	University of Washington	US	39,428	26.2	10,330	2.1	28.6	15
21	University of California, San D.	US	31,165	32.6	10,160	2.1	29.3	31
22	Massachusetts Institute of Tech.	US	29,172	34.6	10,094	2.4	26.9	40
23	University of Sydney	AUS	24,709	40.5	10,007	1.5	18.7	53
24	University of Sao Paulo	BRA	40,196	24.8	9,969	0.8	9.9	13
25	Columbia University	US	33,902	29.0	9,832	2.1	27.9	25
26	University of Copenhagen	DNK	17,582	53.8	9,459	1.6	24.2	111
27	Utrecht University	NLD	22,630	41.3	9,346	1.8	26.0	61
28	University of Amsterdam	NLD	21,134	43.0	9,088	1.8	24.9	70
29	University of Melbourne	AUS	23,561	38.3	9,024	1.7	21.8	57
30	University of Alberta	CAN	22,752	39.5	8,987	1.4	18.2	59
31	The University of Edinburgh	UK	18,515	46.8	8,665	1.8	23.4	93
32	Cornell University	US	28,921	29.9	8,647	1.8	25.5	41
33	The University of Queensland	AUS	20,436	42.1	8,604	1.6	20.0	77
34	Karolinska Institute	SWE	15,693	54.3	8,521	1.8	32.1	138
35	University of California, Davis	US	28,015	30.3	8,489	1.7	23.5	44
36	Lund University	SWE	15,713	53.8	8,454	1.6	22.9	137
37	University of Wisconsin	US	31,789	26.3	8,361	1.8	24.2	30
38	Kyoto University	JPN	34,813	24.0	8,355	1.2	17.9	22
39	Universitat Heidelberg	GER	20,277	40.8	8,273	1.6	24.2	80
40	Ludwig-Maximilians, Munich	GER	20,863	39.6	8,262	1.7	25.0	72

Source: Adapted from SCImago Institutions Rankings (SIR), 2011, based on Scopus (Elsevier) data for 2005–09

Notes: Normalised citation impact is relative to the world average, so a rating of 1.3 means the institution is cited 30 per cent more than average. Excellence rate is the percentage of the institution's output included within the 10 per cent most cited papers in their respective scientific fields. Global institution rankings also include non-HE organisations, for example government, health or private research institutes.

Table 2.3: Top global institutions within HE sector for research produced through international collaboration (2005–09) (Scopus data)

Rank	Organisation	Sector	Country	Total research articles, 2005–2009 (Scopus)	Intl. collab. rate (% of total)	Total collab. Produced articles, 2005–2009 (Scopus)	Normalised citation impact (1 = global average)	Excellence rate (% within top decile in subject area)	Global inst. ranking for total research output (all sectors)
1	Centre National de la Recherche Scientifique	Gov't	FRA	130,977	49.0	64,179	1.4	18.7	2
2	Max Planck Gesellschaft	Gov't	GER	49,987	65.0	32,492	1.8	29.3	5
3	Russian Academy of Sciences	Gov't	RUS	88,907	35.0	31,117	0.5	5.9	3
4	Chinese Academy of Sciences	Gov't	CHN	144,269	21.5	31,018	0.9	11.3	1
5	Consejo Superior de Investigaciones Cientificas	Gov't	ESP	42,087	49.4	20,791	1.4	21.9	9
6	National Institutes of Health United States	Health	US	46,819	35.3	16,527	2.3	40.1	7
7	Consiglio Nazionale delle Ricerche	Gov't	ITA	37,928	42.5	16,119	1.3	17.7	18
8	Partners HealthCare System	Health	US	38,096	28.5	10,857	2.6	36.5	16
9	Commissariat a l'Energie Atomique	Gov't	FRA	19,935	51.1	10,187	1.5	19.6	83
10	Polish Academy of Sciences	Gov't	POL	20,274	48.9	9,914	0.9	11.1	81
11	Academy of Sciences of the Czech Republic	Gov't	CZE	18,163	52.9	9,608	1.1	14.1	101
12	Institut National de la Sante et de la Recherche	Health	FRA	22,679	39.8	9,026	1.8	35.4	60
13	Assistance Publique Hopitaux de Paris	Health	FRA	36,013	24.6	8,859	1.6	21.1	21
14	Istituto Nazionale di Fisica Nucleare	Gov't	ITA	13,437	59.3	7,968	1.3	12.9	188
15	National Academy of Sciences of Ukraine	Gov't	UKR	18,928	41.6	7,874	0.5	5.0	89
16	United States Department of Agriculture	Gov't	US	29,796	23.9	7,121	1.3	18.5	37
17	National Aeronautics and Space Administration	Gov't	US	20,634	31.3	6,458	1.6	16.9	76
18	Hungarian Academy of Sciences	Gov't	HUN	11,565	54.8	6,338	1.0	14.4	237
19	Lawrence Berkeley National Laboratory	Gov't	US	11,104	55.4	6,152	2.1	27.1	245
20	Veterans Affairs Medical Centers	Health	US	36,902	16.3	6,015	2.0	30.6	20

Source: Adapted from SCImago Institutions Rankings (SIR), 2011, based on Scopus (Elsevier) data for 2005–09

Table 2.4: Top global institutions outside the HE sector for research produced through international collaboration (2005–09) (Scopus data)

Extending the analysis beyond the tertiary sector, it becomes apparent that some of the largest volumes of internationally collaborative academic research involve government-sponsored research institutes in major countries.

Globally, for instance, Harvard ranks only fifth on the overall list of research collaborations by volume, behind the French Centre National de la Recherche Scientifique (CNRS), the German Max Planck Institutes, and the Russian and

Chinese Academies of Sciences. Between them, over the period 2005–09, these four state institutes produced more research articles through international collaboration than the top 13 US universities combined (see Table 2.4).

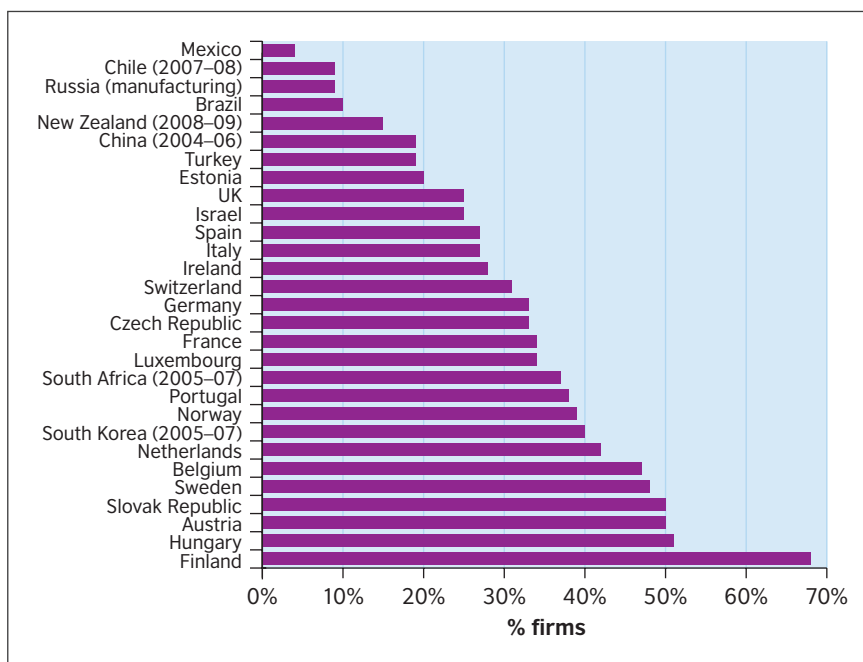
Business research collaboration

In a climate of fiscal austerity and with many universities facing significant operational pressures, there will be increasing pressure for institutions to consider opportunities to generate income from commercial relationships with the private sector and overseas nations. At their best, these relationships can represent best practice models of innovation, and provide valuable revenue to sustain and develop core teaching and research programmes.

Globally, the US and Japan are clear leaders in terms of the volume of patent applications filed in collaboration with other countries – but this is primarily driven by the very large volume of patents they generate rather than a particular tendency towards collaboration. The highest rates of overseas partnership in patenting activity (around 80 per cent) are found in countries including India, Brazil and Australia, with rates in the US and Japan fairly average by international standards (around 40 per cent), and indeed below those of the UK (around 60 per cent).

Significantly, rates of patent collaboration in China remain well below the world average, indicating – as with its falling collaboration rate in academic research – both a confidence in domestic technological leadership and a number of practical (e.g. language) and cultural barriers to overseas partnering. Looking at specific technologies within the Chinese market, the key drivers of patent growth since 2000 have been digital communications and telecoms engineering; there is also strong growth in areas potentially better suited to UK collaboration, such as biotechnology, pharmaceuticals, medical technologies and materials chemistry.

The UK has a mixed track record at linking its strong university and government R and D base to private innovation. The share of business-funded R and D in these sectors has halved since 1999 (to just five per cent), ranking it far below competitors as diverse as Germany, the Netherlands, Turkey, China, Australia, Finland, Spain, South Korea and Canada. This is despite 23 per cent of all



Source: OECD

Fig 2.9: Share of firms collaborating on innovation with higher education or government research institutions – large firms (2006–08)

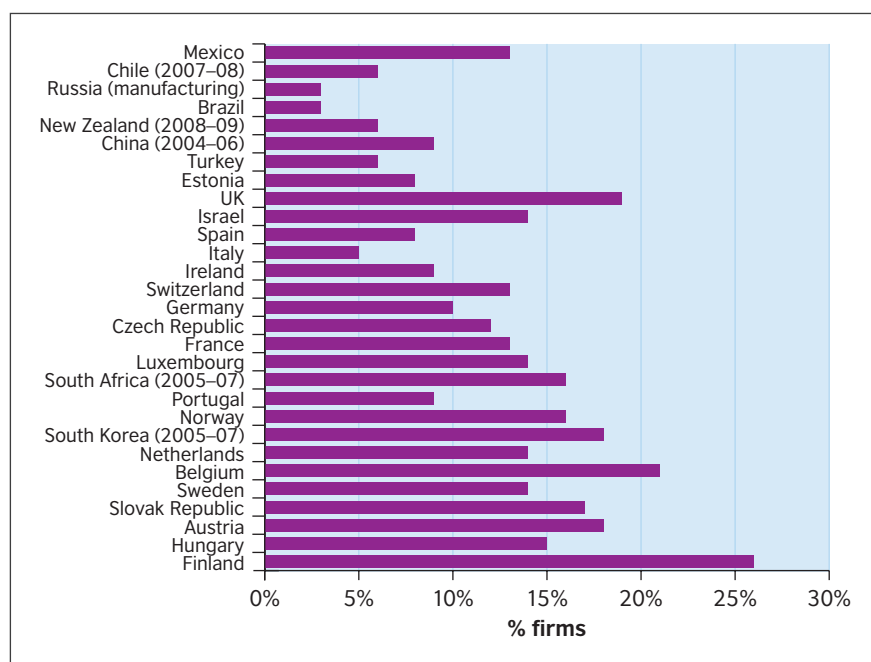
R and D activities in the UK being funded from overseas¹⁶ – the highest rate in the OECD area, highlighting the UK's strong reputation. In 2010, despite producing 14 per cent of the world's most highly-cited academic journal articles (second only to the US)¹⁷, the UK managed to record just 2.2 per cent of global patent applications. This is due in part to a smaller percentage of total research spending on business enterprise activity than many other nations. In other words, the UK's research tends to be more 'fundamental', considering basic scientific principles, than commercially applied. However, looking at overall rates of collaborative activity within business R and D, the UK is a leading international player. According to OECD data, UK firms are highly likely to collaborate on innovation with other organisations, both at home and overseas. The data also show that the UK's small and medium enterprises (SMEs) have

some of the highest rates of collaboration with university and government research institutions of any OECD nation (only behind Finland and Belgium between 2006 and 2008). But collaboration between larger firms and universities is much lower than overseas competitors: just 25 per cent between 2006 and 2008, compared with almost 70 per cent in Finland and 40–50 per cent in countries like Hungary, Sweden, Belgium and the Netherlands (see Fig 2.9 and Fig 2.10). These data imply a degree of resistance among some of the higher-rated UK research institutions towards commercial engagement, or at least barriers to this engagement, and the recent Wilson review of university-business collaboration (February 2012) suggested universities were 'an under-used resource' in attracting inward investment and generating research income from global companies.¹⁸

¹⁶ BIS (2011), 'Innovation and Research Strategy for Growth', (www.bis.gov.uk/assets/biscore/innovation/docs/i/11-1387-innovation-and-research-strategy-for-growth.pdf)

¹⁷ Royal Society (2011), 'Knowledge, Networks and Nations: Global scientific collaboration in the 21st century' (http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2011/4294976134.pdf)

¹⁸ Wilson, T (2012), 'A review of business – University collaboration: www.wilsonreview.co.uk/review



Source: OECD

Fig 2.10: Share of firms collaborating on innovation with higher education or government research institutions – SMEs (2006–08)

Joint technological development

- Some interesting lessons for research collaboration are available from analysis of participations in the European Research and Technical Development (RTD) Framework Programmes, which have become the continent's primary source of collaborative research funding. The seventh programme, FP7, which runs from 2007–2013, is worth more than €50 billion, and by March 2011 the UK had received more funding and been involved in more projects than any other country except Germany. To be approved for a research grant under these programmes, an application is normally required to involve multiple countries, and is encouraged to involve different organisational types (e.g. Higher Education Institutions (HEIs), research institutes or private companies).
- An evaluation of the UK's role in FP7 and FP6 (its predecessor, which ran from 2003–2008) was produced for

the Department for Business Innovation and Skills (BIS) in 2010. This document sheds light on both the most research-active countries and the UK's individual collaborations:

- Of all overseas organisations partnering with the UK (some 43,000 in total in FP6 and 16,000 in the early stages of FP7, from 120 countries around the world), around 40 per cent were HEIs, 20–25 per cent were private companies and 25–30 per cent were specialist research institutes (whether publicly or privately funded). The UK's top universities were at the forefront of the UK's funded research collaborations within the programme – the most frequent participants, in order, were London, Oxford, Cambridge, Imperial, Manchester, Edinburgh, Southampton, Nottingham and Newcastle.
- The most research-active countries, in terms of their EU27 share of FP6 and FP7 funding relative to their share of EU27 population, are Finland, Sweden, Denmark and the Netherlands (the ratio of the two

shares being more than double in all cases). Belgium, Austria, Ireland and Luxembourg also receive more funding than their population share would predict, but to a lesser extent.

- At a headline country level, the UK partnered most on FP6 and FP7 with institutions and organisations in Germany, France, Italy, Spain and the Netherlands, as would be expected from those countries' higher levels of absolute participation in the programme. But there are interesting patterns in the share of other EU countries' collaborations with the UK relative to their total overseas collaborations – a measure which effectively shows their propensity to choose the UK as opposed to other countries as project partners. In FP6, the biggest 'UK bias' was seen in Denmark, Ireland, the Netherlands and Sweden. In the early years of FP7, this switched to Lithuania, the Netherlands, Germany and Poland, although Denmark, Ireland and Sweden still showed notable levels of bias towards the UK.

- Looking at countries outside the EU who participated in programme projects,¹⁹ the highest rates of UK bias in FP6 (defined in the same way, by the share of UK collaborations being significantly higher than the share of all overseas collaborations) were seen in Norway, Iceland and South Africa. India, Australia and Switzerland also showed a bias towards the UK, to a lesser extent. In the early stages of FP7, Norway, India, South Africa and Iceland still all showed a strong bias towards the UK as a project partner. However, the highest rates of UK bias were shown by Australia, China and Brazil – where the over-representation of the UK as a partner was very high.

- Since HEIs accounted for the majority of UK involvement in both FP6 and FP7, at around 56 per cent of all participations in the former and 61 per cent in the latter (to November 2009), this information is very relevant to the future of international higher education collaboration.

¹⁹ Applicants from all countries are welcomed, although projects must clearly demonstrate their potential benefit to the European economy.

Top UK universities for collaborative research

- The UK universities producing the highest numbers of international research collaborations are Oxford, Cambridge, UCL and Imperial College London. These four institutions are some way clear

of the rest – in terms of both quantity and quality indicators. The remainder of the UK ranking table on international collaborations largely features the Russell Group, including (in order, from fifth position downwards), Manchester, Edinburgh, Bristol, Southampton, King's, Birmingham, Glasgow, Sheffield, Leeds,

Nottingham, Liverpool, Cardiff, Newcastle and Warwick. With the exception of Glasgow being a few places lower than expected, this ranking order reflects almost perfectly the normalised global citation impact of each institution's total research output.

UK rank	Institution	Total research articles, 2005–2009 (Scopus)	Intl. collab. rate (% of total)	Total collab. produced articles, 2005–2009 (Scopus)	Normalised citation impact (1= global average)	Excellence rate (% within top decile in subject area)	Global inst. ranking for total research output (all sectors)
1	University of Oxford	32,354	51.6	16,695	2.0	27.5	28
2	University of Cambridge	32,900	49.8	16,384	1.9	26.7	27
3	University College London	33,610	46.4	15,595	1.9	28.0	26
4	Imperial College London	29,851	51.4	15,343	1.9	26.3	36
5	The University of Manchester	25,142	41.8	10,509	1.7	19.1	52
6	The University of Edinburgh	18,515	46.8	8,665	1.8	23.4	93
7	University of Bristol	16,037	44.4	7,120	1.8	23.2	131
8	University of Southampton	15,159	43.8	6,640	1.6	19.2	149
9	King's College London	15,814	41.6	6,579	1.8	25.6	135
10	University of Birmingham	14,899	40.9	6,094	1.6	20.6	153
11	University of Glasgow	13,458	44.8	6,029	1.8	21.5	186
12	The University of Sheffield	15,336	38.3	5,874	1.6	20.4	144
13	University of Leeds	13,853	40.2	5,569	1.5	19.7	171
14	University of Nottingham	15,091	36.6	5,523	1.5	18.6	151
15	University of Liverpool	11,636	46.0	5,353	1.5	19.5	234
16	Cardiff University	12,175	39.3	4,785	1.5	21.0	214
17	Newcastle University	10,649	41.7	4,441	1.7	22.3	258
18	University of Warwick	9,025	43.2	3,899	1.4	16.3	319
19	Queen Mary, Univ. of London	8,478	45.5	3,857	1.8	23.6	344
20	University of Aberdeen	8,206	46.1	3,783	1.6	22.7	353
21	University of Durham	7,807	48.2	3,763	1.8	23.1	378
22	University of Leicester	7,870	45.3	3,565	1.7	22.5	372
23	Queen's University Belfast	8,021	43.3	3,473	1.4	17.7	365
24	University of York	8,099	40.0	3,240	1.6	20.2	360

Source: Adapted from SCImago Institutions Rankings (SIR), 2011, based on Scopus (Elsevier) data for 2005–09

Notes: Normalised citation impact is relative to the world average, so a rating of 1.3 means the institution is cited 30 per cent more than average. Excellence rate is the percentage of the institution's output included within the 10 per cent most cited papers in their respective scientific fields. Global institution rankings also include non-HE organisations, for example government, health or private research institutes.

Table 2.5: Top UK HE institutions for research produced through international collaboration (2005–09) (Scopus data)

Postgraduate researchers in UK

- We have obtained data on the total number of postgraduate research students at UK institutions during the 2010–11 academic year, from Higher Education Statistics Agency (HESA). This shows that the top sources of overseas research students for the UK are China, the US, Germany, Italy and Saudi Arabia (Table 2.6). Between them, these five countries account for just over 30 per cent of the overseas total, including 9.3 per cent from China.
- By comparing the share of overseas postgraduate researchers from each country with that country's share of overseas students (including undergraduates), we can build a picture of where the UK's academic research links are proportionately the strongest. By dividing one share by the other (as in Table 2.6), we have calculated the relative concentration of postgraduate researchers in the UK from each country. This analysis shows that the highest concentrations of researchers relative to students (we have highlighted those greater than two) are provided by Italy, Saudi Arabia, Iran, Libya, Mexico, Iraq, Egypt and Kuwait. By contrast, countries with a relatively low concentration of researchers relative to students include China, India, Ireland, Nigeria, France, Poland, Cyprus and Japan.

Country	Total postgraduate researchers in UK (2010–11)	Share of UK total	Share of overseas students in UK	Concentration of researchers vs students
China	3,955	9.3%	12.9%	0.7
US	2,840	6.6%	3.9%	1.7
Germany	2,480	5.8%	3.9%	1.5
Italy	1,810	4.2%	1.7%	2.5
Saudi Arabia	1,785	4.2%	1.4%	3.0
Greece	1,705	4.0%	3.3%	1.2
India	1,605	3.8%	9.4%	0.4
Malaysia	1,435	3.4%	3.5%	1.0
Ireland	1,235	2.9%	4.2%	0.7
Nigeria	1,145	2.7%	4.0%	0.7
Canada	1,085	2.5%	1.5%	1.7
Pakistan	1,020	2.4%	2.6%	0.9
Iran	960	2.2%	0.8%	2.8
France	920	2.2%	3.6%	0.6
Thailand	805	1.9%	1.3%	1.4
Libya	780	1.8%	0.6%	3.0
Poland	690	1.6%	2.5%	0.6
Spain	660	1.5%	1.6%	1.0
Mexico	615	1.4%	0.4%	3.6
Portugal	605	1.4%	0.8%	1.8
Cyprus	590	1.4%	2.9%	0.5
South Korea	550	1.3%	1.2%	1.1
Turkey	550	1.3%	0.7%	1.8
Iraq	475	1.1%	0.2%	5.6
Netherlands	470	1.1%	0.9%	1.2
Egypt	415	1.0%	0.4%	2.4
Kuwait	370	0.9%	0.4%	2.2
Australia	365	0.8%	0.5%	1.7
Jordan	325	0.8%	0.4%	1.9
Japan	325	0.8%	1.1%	0.7
United Arab Emirates	295	0.7%	0.7%	1.0

Source: HESA data, January 2012

Note: Taiwan and Hong Kong are excluded from the analysis because comparable student data is unavailable

Table 2.6: Country breakdown of overseas postgraduate researchers in the UK (2010–11)

3. Drivers of higher education demand

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3. Drivers of higher education demand

Box 3.1: Drivers of higher education demand – key facts

Demographics – by 2020, four countries (India, China, the US and Indonesia) will account for over 50 per cent of 18–22 year-olds globally; while China's 18–22 population is forecast to remain large at over 90 million in 2020, it is projected by the UN Population Division to fall by over 20 million over the next decade given the current number of 8–12 year-olds; Russia's 18–22 population is also projected to fall; the 18–22 populations in Nigeria, India, Ethiopia, Philippines and Pakistan are projected to grow by 3.9 million, 2.9 million, 1.9 million, 1.2 million and 0.9 million respectively over the next decade despite divergent projections across countries. Overall the global 18–22 age group population outlook is stable; but this will still mark a significant change from recent decades where the 18–22 age group expanded rapidly.

Economics – strong correlation between wealth (gross domestic product [GDP] per capita at purchasing power parity [PPP]) and tertiary enrolment, particularly up to US\$10,000 annual household income; many of the emerging economies which performed strongly in the 2000s are forecast to continue growing strongly; both China and India are forecast to continue to be at the top of global growth league tables; following closely behind are economies such as Angola, Vietnam, Bangladesh, Sri Lanka, Indonesia, Nigeria, Pakistan, Malaysia and Brazil; consequently several emerging economies will be significantly wealthier in a decade, i.e. have higher PPP GDP per capita, even when measured in constant prices; but despite strong economic growth, many of the shortlisted economies will still have PPP GDP per capita below US\$10,000 in 2020 – Nepal, Bangladesh, Pakistan, Nigeria, India, Morocco, Indonesia and Sri Lanka.

There are demographic drivers (specifically the 18–22 age group population) and economic drivers (economic growth, economic wealth and household incomes and other macroeconomic variables such as the exchange rate – the latter is more relevant for inbound student mobility) underpinning international student mobility. There are of course other key drivers, such as the legal framework in overseas markets governing transnational education (TNE) and political stances on outbound and inbound mobile student flows, but these are harder to quantify and therefore forecast.

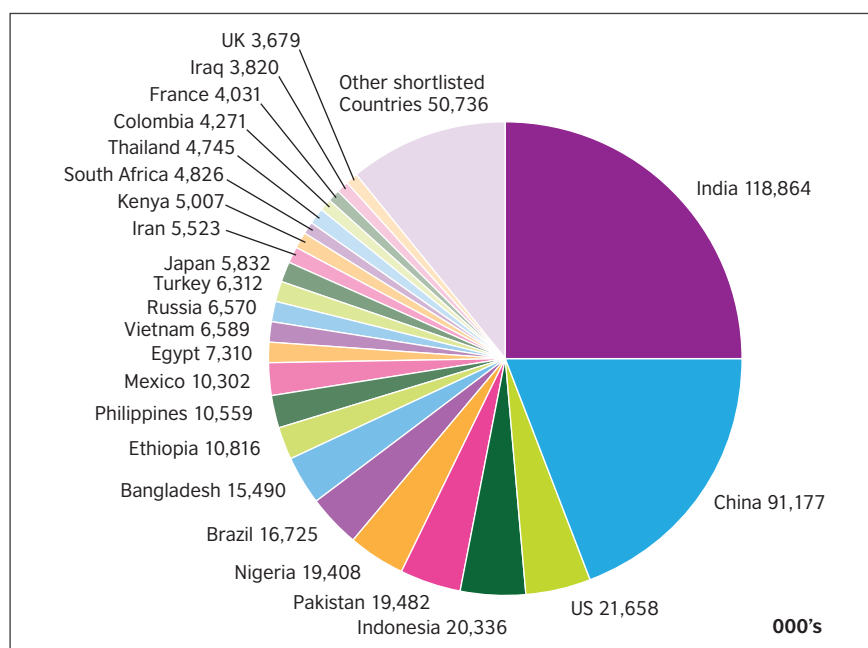
Demographic drivers

By 2020, just four countries – India, China, US and Indonesia – will account for over half of the world's 18–22 population. A further quarter of the world's 18–22 population in 2020 will come from Pakistan, Nigeria, Brazil, Bangladesh, Ethiopia, Philippines, Mexico, Egypt and Vietnam. The 50+ shortlisted countries considered in this study are projected to account for over 80 per cent of the world's 18–22 population in 2020 (see Fig 3.1).

While China's 18–22 population is forecast to remain large at over 90 million in 2020, it is projected by the UN Population Division to fall by over 20 million over the next decade given the current number of 8–12 year-olds. As demographic forecasts are based on current population levels of younger age groups, they tend to be accurate (see Fig 3.2).

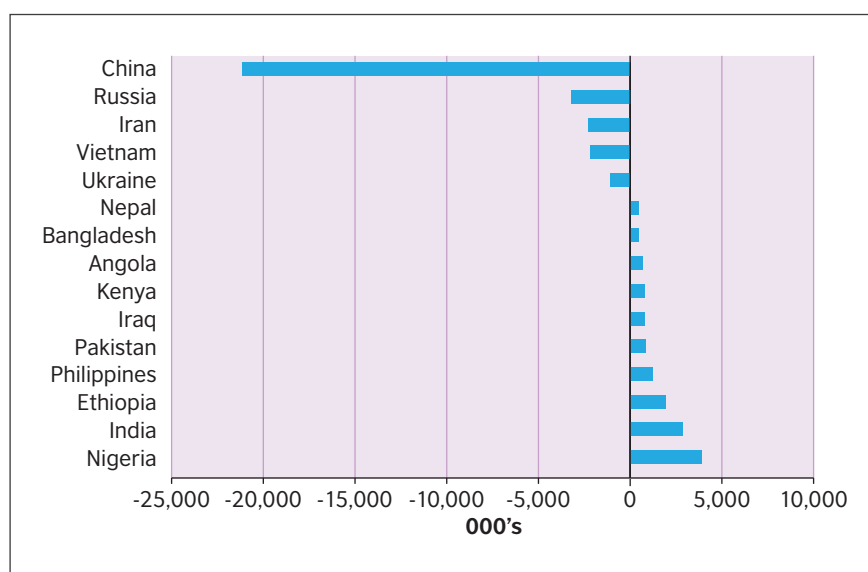
However, it is not only China that is projected to experience a fall in its tertiary age population. With birth rates having fallen for a sustained period in (i) many advanced economies (although there have been some recent reversals which are expected to be temporary), and (ii) the nations of the Commonwealth of Independent States, in many parts of the world it will be the norm to see declining population numbers of tertiary age. The projected fall in the 18–22 age group in Russia is stark, which remains blighted by adverse demographics. The US and Brazil, however, are noteworthy for their relatively stable demographic outlooks for 18–22 year-olds (see Fig 3.3).

The 18–22 age group populations in Nigeria, India, Ethiopia, Philippines and Pakistan are projected to grow by 3.9 million, 2.9 million, 1.9 million, 1.2 million and 0.9 million respectively over the next decade. Applying the current or higher tertiary enrolment ratio to this increase in 18–22 year-olds implies that these demographic projections will provide a strong boost to tertiary demand, both domestically and internationally.



Source: UN Population Division, Oxford Economics

Fig 3.1: Global tertiary age (18–22) population (2020)



Source: UN Population Division, Oxford Economics

Fig 3.2: Global tertiary age (18–22) population growth (2011–20)

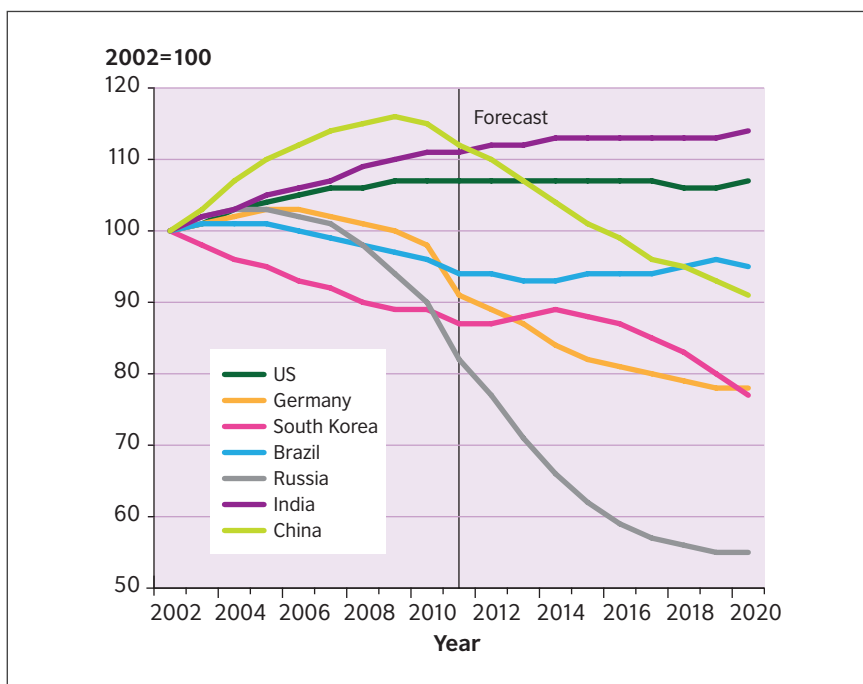
Despite divergent projections across countries, overall the global 18–22 age group population outlook is stable. Although this will still mark a significant change from recent decades where the 18–22 age group expanded rapidly.

Economic drivers

The importance of an economy's average economic wealth as a driver of future tertiary education demand is clearly illustrated by the correlation between PPP GDP per capita and gross tertiary enrolment ratios, as illustrated in Fig 3.4. Not only is the relationship positive and statistically significant, but more importantly, at low PPP GDP per capita levels, gross tertiary enrolment ratios tend to increase sharply for relatively small increases in GDP per capita (see Fig 3.4). In practice this is likely to reflect rising household incomes, growing middle classes, demand from parents to provide their children with a tertiary education, and a higher gradient of skills demand from structurally changing economies. It may also reflect an increased fiscal capacity of governments to fund and expand access to tertiary education.

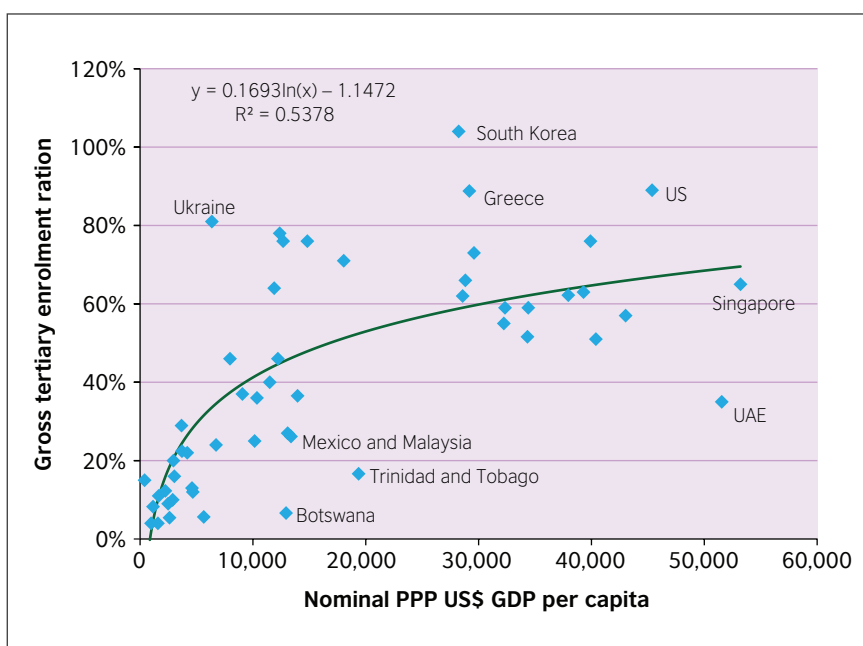
While not all countries fall on or close to the line of best fit, in many cases there are obvious explanations (e.g. commodity-dependent economies tend to fall below the line of best fit). As an economy's PPP GDP per capita rises above US\$10,000 (where on average a country's tertiary enrolment ratio is around 40 per cent), the increments in tertiary enrolment ratios become smaller.

Amongst this study's shortlist of 50+ countries, approximately half currently have PPP GDP per capita levels below US\$10,000. Thus, provided these economies grow strongly over the next decade, there is significant scope for their tertiary enrolment ratios to increase. While GDP per capita clearly matters for tertiary enrolment ratios, which in turn drives household incomes along with income distribution patterns, it is useful to consider briefly how short-term turbulence in economic growth affects the global tertiary education sector. The recent global recession is an ideal period to test hypotheses, marking an abrupt reversal from a previous long, largely unbroken period of growth in the world economy and world trade.



Source: UN Population Division, Oxford Economics

Fig 3.3: Global tertiary age (18–22) population



Source: UN Population Division, Oxford Economics

Fig 3.4: Cross-country relationship between PPP GDP per capita and gross tertiary enrolment ratios

With complete tertiary education data only available up to 2009, this may be too soon to observe the full impact from the global recession. Indeed the impact may have a long lag. One dimension where this is already highly evident is on public finances and consequently public funding of the tertiary sector.

At global level, the recession pushed world GDP growth into negative territory in 2009, with world trade falling even further by close to 10 per cent. Half of the shortlisted 50+ countries also went into recession during 2009, although importantly some of the major origin markets for mobile outbound tertiary students – China, India, Bangladesh, Pakistan, Nigeria etc – still posted positive, and in many cases, strong rates of GDP growth in 2009. Despite the severity of the world recession, the number of global mobile tertiary students increased in 2009, and across all but a small number of the shortlisted countries, including those that suffered significant sharp drops in output. This suggests that at least in the short term, the world recession has not significantly impacted international tertiary flows (see Fig 3.5). This may be linked to the fact that certain demographic groups were more negatively affected by the recession, including low income households who are less likely to fund their children to study overseas. But, like many aspects of the world recession, the fallout could be long-lived and impacts could yet be felt on the global tertiary education sector in years to come.

Returning to the long-term economic growth outlooks for the shortlisted countries, the key message is the continued strong growth forecast for many of the emerging economies, which also performed strongly in the 2000s.

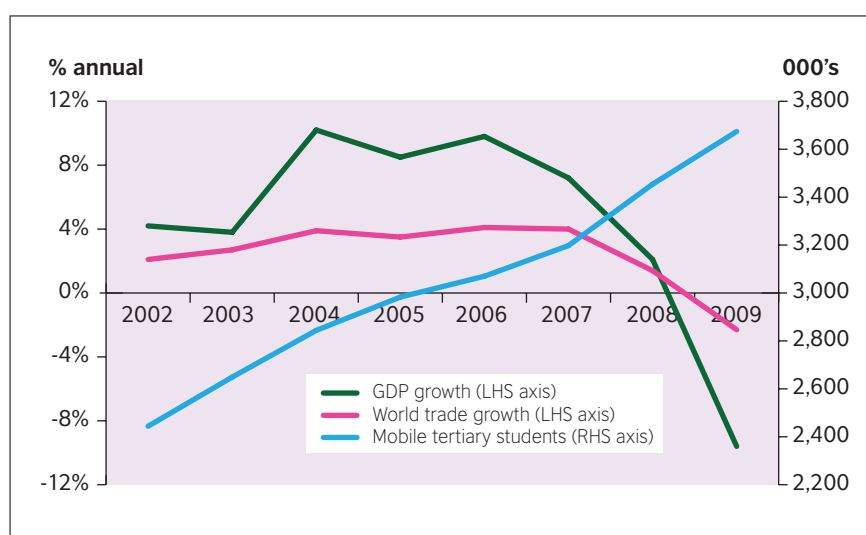
Despite important downside risks – notably a ‘hard landing’ in China stemming from financial sector imbalances and an over-inflated property sector, which would have significant knock-on effects throughout the region – both China and India are forecast to continue to be at the top of global growth league tables.

Following closely behind are economies such as Angola, Vietnam, Bangladesh, Sri Lanka, Indonesia, Nigeria, Pakistan, Malaysia and Brazil. Each has forecast

annual average GDP growth above four per cent, twice the rate of growth forecast for most European economies over the next decade (see Fig 3.6).

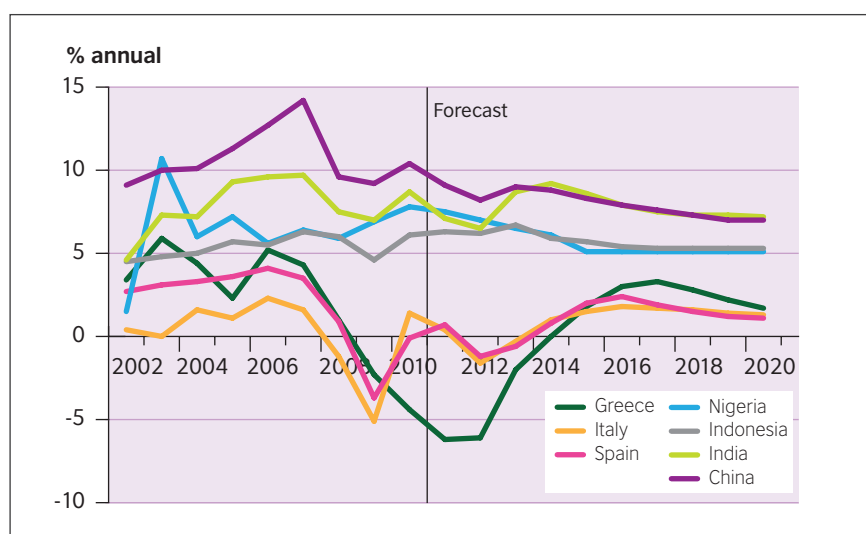
Eurozone economies in particular will be hampered by sluggish economic performance in the medium term. Despite Europe being a key export market for many emerging economies, their growth

performance should not be significantly affected unless there is an escalation of the Eurozone crisis, for example if countries are forced to exit the single currency. It is hard to envisage how a Eurozone break-up scenario, given the extent of negative impact predicted, would not have a very noticeable effect on the global higher education sector.



Source: OECD, Oxford Economics

Fig 3.5: Global mobile tertiary students and global GDP and trade (2002–09)



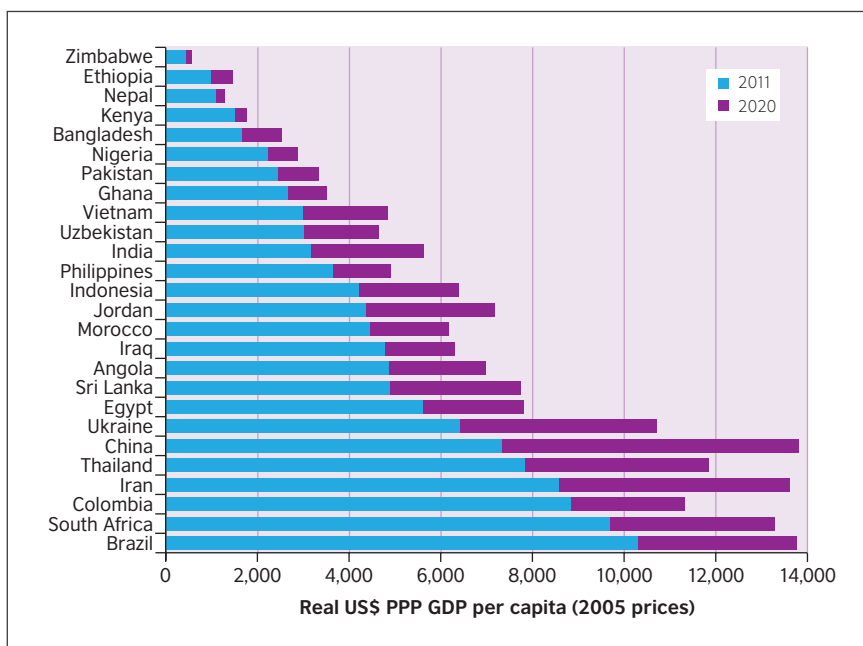
Source: Haver Analytics, Oxford Economics

Fig 3.6: Selected country GDP growth

Translating economic growth forecasts into PPP GDP per capita levels in 2020, it is evident how several emerging economies will be significantly wealthier in a decade, i.e. have higher PPP GDP per capita, even when measured in constant prices (see Fig 3.7 and Fig 3.8).

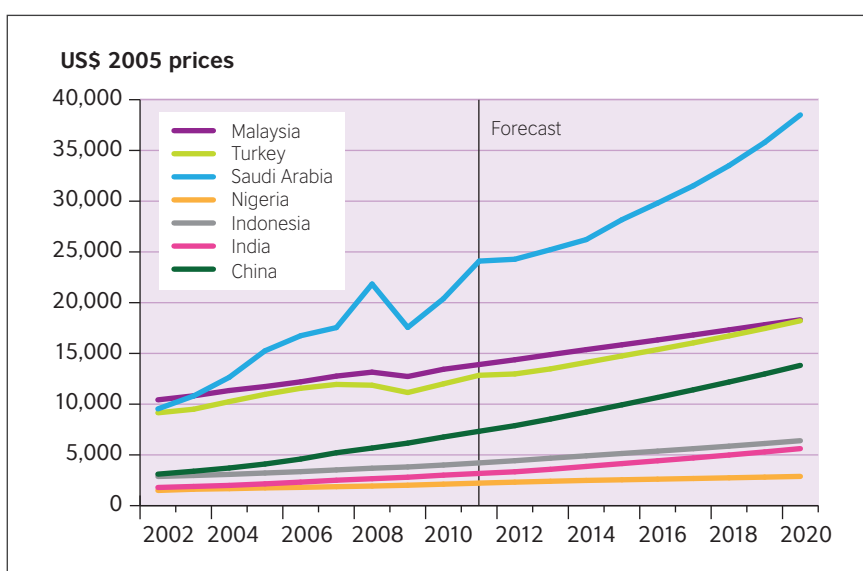
Based on the correlation relationship described above, countries such as China, Colombia and Brazil, with their rising wealth, should start to close the gap in tertiary enrolment rates on advanced economies, provided there are no capacity bottlenecks.

Despite strong economic growth, many of the shortlisted economies will still have PPP GDP per capita below US\$10,000 in 2020 – Nepal, Bangladesh, Pakistan, Nigeria, India, Morocco, Indonesia and Sri Lanka. This is likely to constrain how soon these countries close the gap in tertiary enrolment rates on advanced economies. But it does also mean the decade beyond 2020 should see continued rises in enrolment ratios and strong growth in tertiary education demand, subject to demographics.



Source: Oxford Economics

Fig 3.7: Global PPP GDP per capita (2011 and 2020)



Source: Haver Analytics, Oxford Economics

Fig 3.8: Selected country PPP GDP per capita

4. The global higher education sector to 2020

Box 4.1: Global higher education sector to 2020 – key facts

Tertiary enrolments – forecast to rise across most countries to 2020, but at a slower rate than previous decades (1.4 per cent per annum compared to 5–6 per cent per annum); 21 million additional tertiary enrolments by 2020; Chinese growth significantly down but still second largest absolute increase behind India; other emerging economies with significant forecast growth in tertiary enrolments over the next decade include: Brazil (+2.6 million), Indonesia (+2.3 million), Nigeria (+1.4 million), Philippines (+0.7 million), Bangladesh (+0.7 million), Turkey (+0.7 million) and Ethiopia (+0.6 million).

International student mobility – largest numbers of mobile students in 2020 expected to be from China (585,000), India (296,000), South Korea (134,000), Germany (100,000), Turkey (84,000), Malaysia (82,000) and Nigeria (67,000); largest increase from India (+71,000 from 2011), followed by Nigeria, Malaysia, Nepal, Pakistan, Saudi Arabia and Turkey.

TNE – Asia and Middle East to continue to offer strongest growth opportunities; legal, political and institutional frameworks in host countries a key driver, alongside tertiary enrolment demand.

Academic international research collaboration – largest recent growth in collaborative articles in the US (+78,000 since 2000) and China (+40,000); growth to 2020 expected to be driven by high volume markets, with China matching the US by the end of the decade.

Business international research collaboration – likely to see significant revenue growth from global 'open innovation' partnerships between multinational companies, SMEs and universities. Opportunities in countries with high and unexploited innovative collaborations with the tertiary sectors, and countries with high and growing internationally-filed patents.

Note: Forecasts in this chapter should be considered as 'policy neutral' – i.e. not reflecting any specific country policy aims, which are fundamentally different from the past, or specific country targets.

Forecasts are driven by UN Population Division demographic projections, Oxford Economics' latest economic outlooks and past trends. Uniform data sources and a uniform method across all countries are used for consistency.

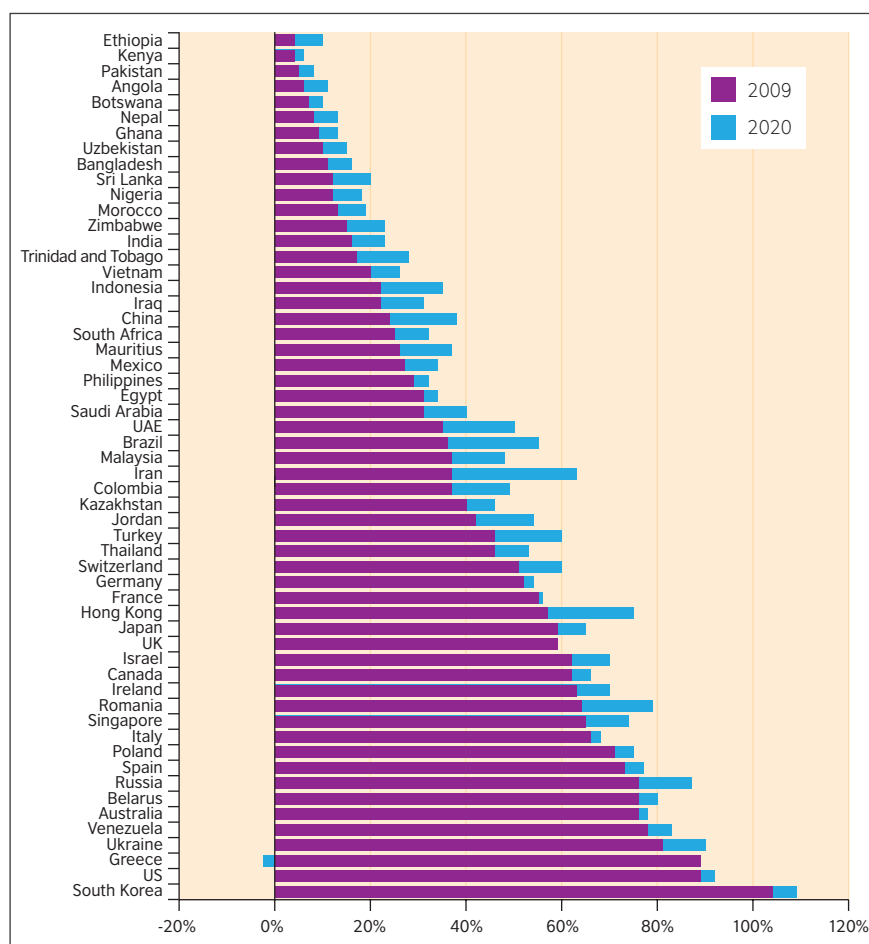
The forecasts are the 'most likely' outcome, constrained by sustainable growth in the overall global higher education sector. This effectively captures the global competition there will be for the same 'pool' of mobile students. Countries may have more ambitious targets for domestic tertiary enrolments and specific targets for inbound and outbound mobile students. Such simulations are better handled as scenarios around a central case forecast.

Tertiary enrolments

Driven by both economic (PPP GDP per capita) and trend forecasts, gross tertiary enrolment ratios are forecast to rise across all shortlisted countries (see Fig 4.1).²⁰ The scope for tertiary enrolment ratio growth is more limited among countries with already high enrolment ratios. Instead the greatest potential for tertiary enrolment ratio growth is with countries with low- to mid-current enrolment ratios and strong economic growth outlooks.

The forecasts for tertiary enrolment ratios for some countries might be considered conservative as the ranking of countries remains largely unchanged and large gaps are still expected to exist between tertiary enrolment ratios in advanced economies and emerging and developing economies. For example, China's gross tertiary enrolment ratio is forecast to rise to 38 per cent from 24 per cent and India's from 16 per cent to 23 per cent. That said, the improvements in tertiary enrolment ratios are non-trivial and look plausible on the basis of past trends, and are predicated on the assumption of no major shift in education policy.

In addition, if it was believed that tertiary enrolment ratio forecasts should be stronger, a key question is whether the future skill needs of economies would justify the need for such a strong uplift in tertiary graduates. Tertiary enrolment level forecasts are the product of forecasts for tertiary enrolment ratios and the 18–22 age group population. The twin effect of both helps to explain future growth in tertiary enrolments. For all shortlisted countries combined, total tertiary enrolments are forecast to grow by 21 million between 2011 and 2020, or 1.4 per cent per annum on average. This compares to global tertiary enrolment growth of five per cent per annum in the previous two decades (and almost six per cent for the shortlisted countries between 2002 and 2009). Thus a significant slowdown in growth rates of tertiary enrolments is predicted across the shortlisted countries. This in some ways should be expected with the sector maturing or slowing in some markets,



Source: UNESCO, Oxford Economics

Fig 4.1: Global gross tertiary enrolment ratio (2009 and 2020)

and demographic trends no longer as favourable, e.g. in China and Russia.

China and India dominated global growth in tertiary enrolments between 2002 and 2009, accounting for 26 million of the overall increase of 55 million. Their combined forecast growth for the period 2011–20 is down to 12 million, with growth in tertiary enrolments in China falling from 17 million to five million. India's tertiary enrolment growth in absolute terms is forecast to outpace China's growth between now and 2020. However, it should be noted that forecasts are highly sensitive to

underlying assumptions – a one per cent increase in China's tertiary enrolment ratio would result in an extra one million tertiary enrolments per year.

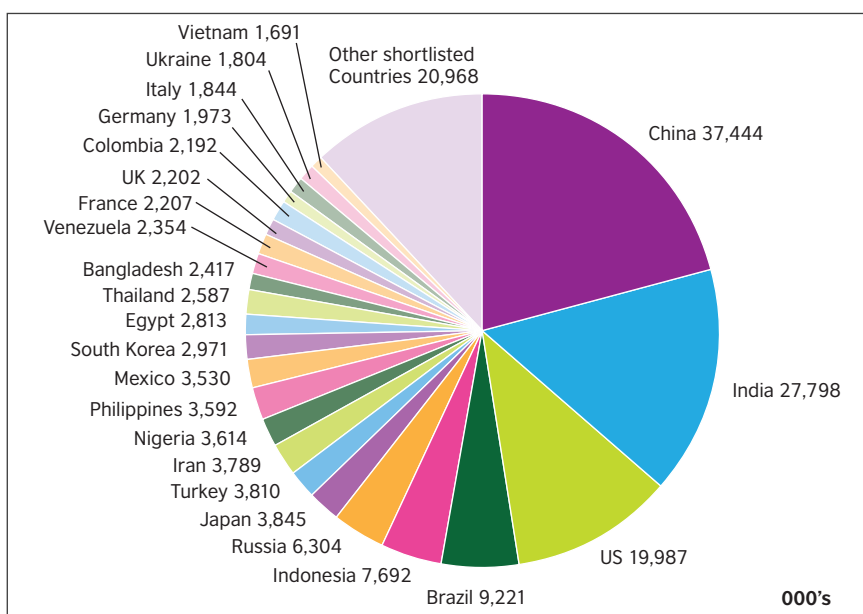
Following China and India, other emerging economies with significant forecast growth in tertiary enrolments over the next decade include: Brazil (+2.6 million), Indonesia (+2.3 million), Nigeria (+1.4 million), Philippines (+0.7 million), Bangladesh (+0.7 million), Turkey (+0.7 million) and Ethiopia (+0.6 million) (see Fig 4.3).

²⁰ Except for Greece which already had a high enrolment ratio in 2009, and has on average the weakest economic growth outlook across the shortlisted countries.

The Gulf countries have a rising prominence in many aspects of economic and cultural life, and view high quality education as a natural complement to their internationalisation process. Education investment per capita in these countries is likely to exceed anywhere else in the world. TNE opportunities for the UK, may, though remain more limited compared with other regions simply due to critical mass. The Gulf countries included in the shortlist for this study – Saudi Arabia and UAE – had fewer than one million tertiary enrolments in 2009, and this figure is forecast to grow to only 1.2 million by 2020, compared to 28 million in India by 2020. That said, there is a large number of overseas students who travel to education hubs in Gulf States to enrol on TNE programmes, but often the scale of these inflows is not recorded.

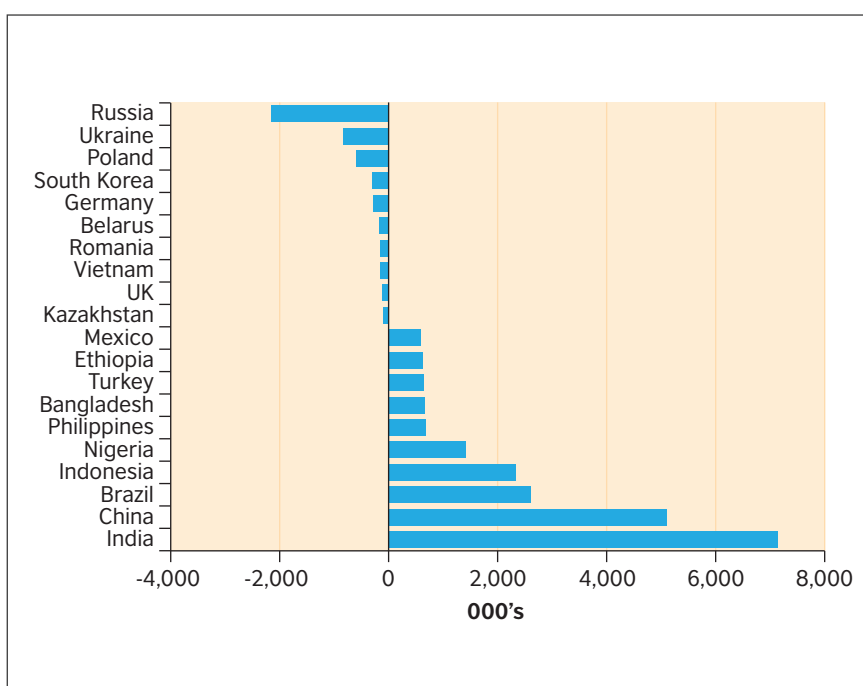
Legal frameworks for TNE are also likely to be more supportive in Gulf States than in India and China. The key point is that TNE in Gulf States can be sustainable by attracting third country nationals from within the region, similar to the role Malaysia is playing meeting regional demand (e.g. for students from Indonesia).

Tertiary enrolment levels are forecast to fall in Russia and Ukraine for demographic reasons outlined earlier, and noteworthy also, in both Germany and South Korea by approximately 0.3 million by 2020. By 2020, four countries – China, India, US and Brazil (replacing Russia) – are forecast to account for more than half of total shortlisted country tertiary enrolments. In addition to Brazil, Indonesia, Turkey and Nigeria will become increasingly important players in the global tertiary education sector, while Russia, Japan and South Korea's market shares are forecast to fall (see Fig 4.2).



Source: UNESCO, Oxford Economics

Fig 4.2: Global tertiary enrolments (2020)



Source: Oxford Economics

Fig 4.3: Global tertiary enrolment growth (2011-2020)

International student mobility

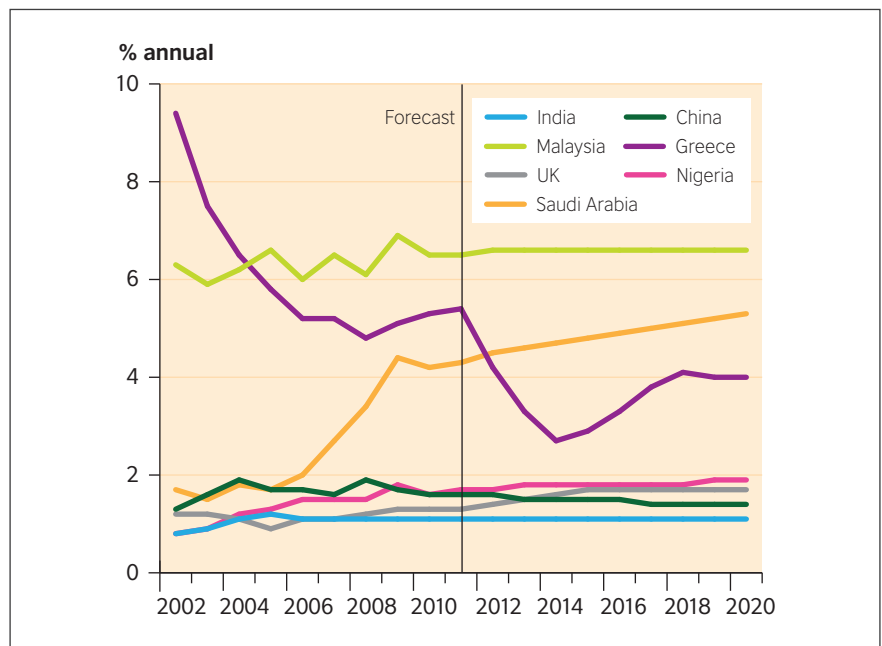
Outbound mobility

Outbound mobility ratios are forecast using a combination of the following variables: household incomes, trend factors, exchange rate, and domestic tertiary sector capacity. As outbound mobility ratios tend historically to be relatively stable or at least the trend is relatively stable, there are no major deviations forecast for the path of outbound mobility ratios, except in special circumstances. These deviations include a rise in the outbound mobility ratio for the UK in response to the hike in tuition fees, and a fall in the outbound mobility ratio for southern European economies as a result of weak economic outlooks and knock-on effect to household incomes.

India's tertiary outbound mobility ratio is forecast to stay stable at 1.0 per cent; China's is set to fall moderately to 1.4 per cent; Malaysia's ratio is projected to fall to 6.6 per cent from 6.9 per cent in 2009; and Singapore's is forecast to fall most to 5.4 per cent, following sharp falls in the 2000s. Moderate rises in outbound mobility ratios are forecast for Nigeria, Pakistan, Vietnam, Saudi Arabia, UAE and Philippines.

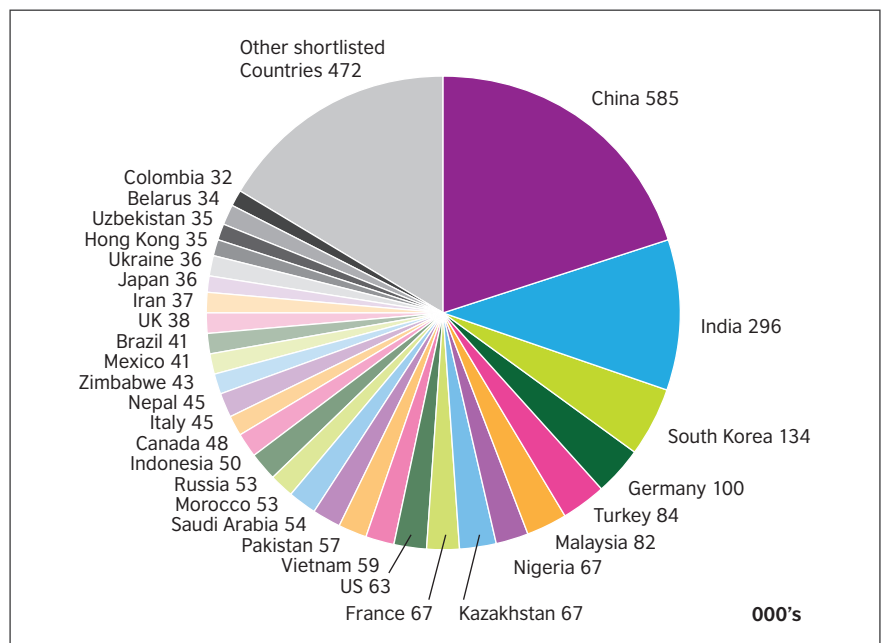
The forecast on outbound mobile students is the product of forecasts for tertiary enrolment and outbound mobility ratios. In absolute level terms, China, India and South Korea are still forecast to be the largest outbound tertiary student markets. Turkey, Malaysia and Nigeria also feature in the 2020 'top ten' outbound markets (see Fig 4.5).

Whereas between 2002 and 2009 China was the source of one-third of global growth in outbound mobile students, its contribution to future growth is forecast to be much more limited. This is partly to do with its slower tertiary enrolment growth and partly down to a fall in its outbound mobility ratio. India, however, is forecast to be the main source of future growth in outbound tertiary students (+71,000 between 2011 and 2020), followed by Nigeria, Malaysia, Nepal, Pakistan, Saudi Arabia and Turkey (see Fig 4.6).



Source: UNESCO, OECD, Oxford Economics

Fig 4.4: Selected country tertiary outbound mobility ratio



Source: Oxford Economics

Fig 4.5: Global outbound mobile tertiary students by origin market (2020)

With the growth in outbound students from Sri Lanka forecast to be similar to Brazil, the inbound student mobility opportunity offered by South Asia is very clear, and mirrors the opportunity that has existed in the past from South East Asia.

Inbound mobility

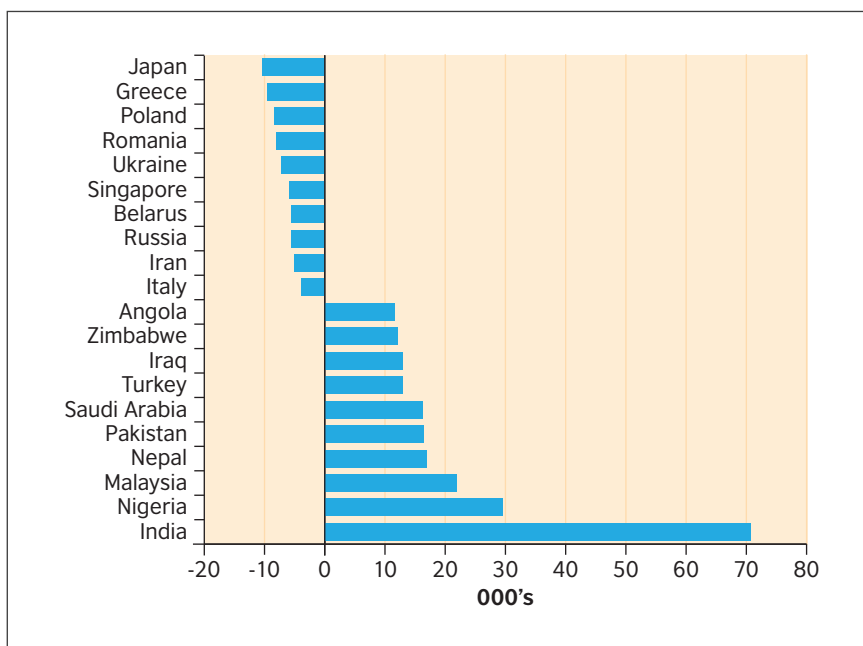
Forecasting the study destinations (i.e. inbound mobile tertiary students across all shortlisted markets) for international students is limited by data availability and the range of shortlisted countries. Whereas outbound mobile student forecasts are based on tertiary enrolments within a single country and its outbound mobility ratio, inbound mobile student forecasts essentially require the summation of outbound mobile student flows from all origin markets to the particular destination market in question. For some of the shortlisted countries, information on inbound mobile tertiary student flows is not well recorded (for example India).

It has nonetheless been possible to produce inbound tertiary student forecasts for the major advanced economies and a limited number of emerging economies. While the flows include shortlisted countries only, in many cases this covers a sufficiently high share of origin markets to be representative of future flows.

By 2020, the distribution of destination markets for inbound mobile tertiary students is forecast to continue to be led by a similar set of countries – US, UK, Australia, Canada, Germany, France and Japan. Canada's jump up the rankings ahead of Germany and France is noteworthy. However, in terms of absolute tertiary student inbound growth between 2011 and 2020, Australia is forecast to lead the way with growth of just over 50,000 inbound mobile students from the shortlisted countries, followed by the UK, US and Canada (see Fig 4.8).

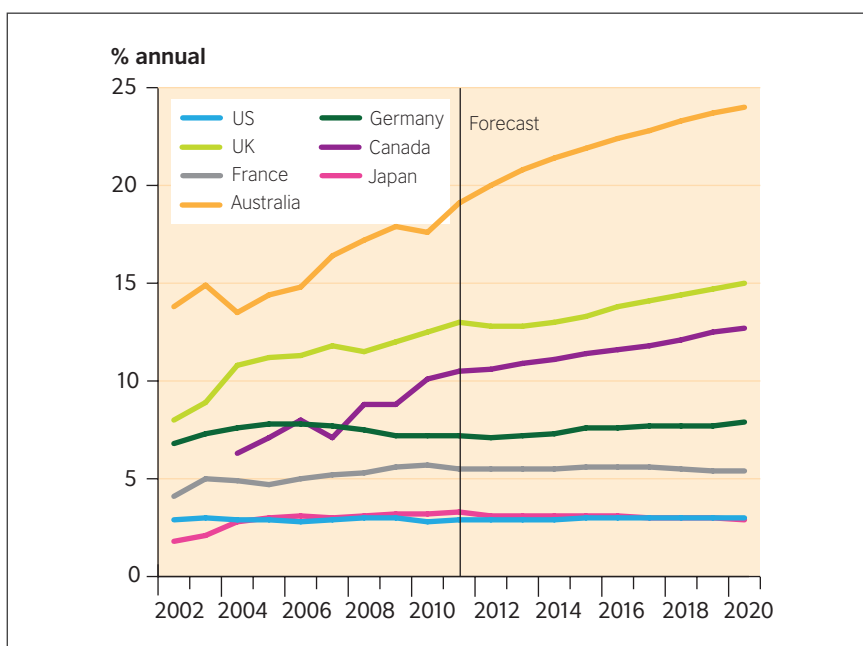
While this evidence suggests a continued dominance of Anglo-Saxon economies by 2020 in the inbound market, there is a growing body of hard, factual and anecdotal in-country evidence suggesting a shift in the balance from the English-speaking countries to the East.

If more complete data were available, it could be seen that countries such as China, Singapore, Malaysia and an Arab



Source: Oxford Economics

Fig 4.6: Global outbound mobile tertiary students by origin market growth (2011–20)



Source: OECD, Oxford Economics

Fig 4.7: Selected country tertiary inbound mobility ratio

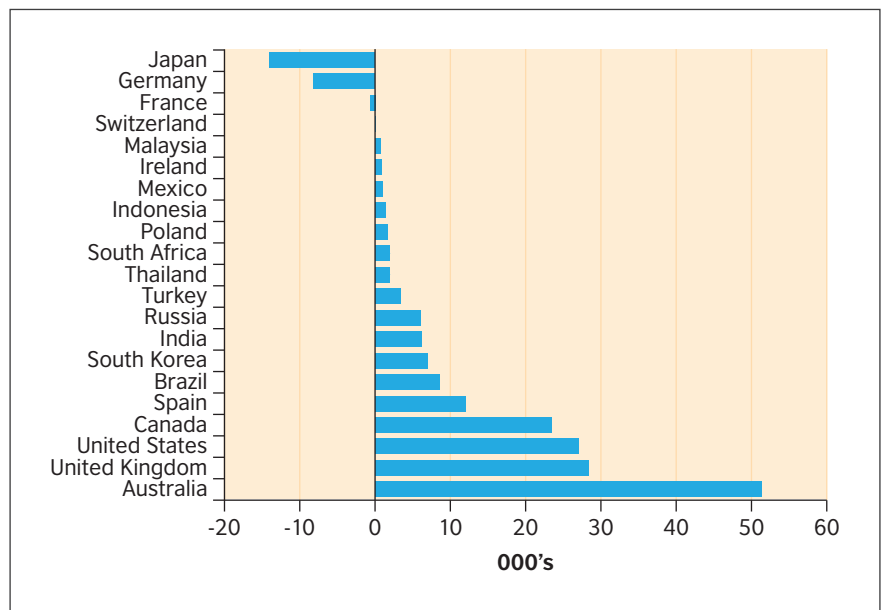
state were the fastest growing markets for international students. This would reflect their investments in higher education, their education hub ambitions and international student targets that are national responses to a combination of excess higher education capacity and less favourable demographics.

It is difficult to say precisely the extent to which this inbound growth would displace future tertiary student flows to traditional destinations such as the UK, US, Australia and Canada. This is because there is a lack of information on origin markets of inbound flows to many emerging economies. So it is difficult to assess whether China, for example, is competing with the UK, Australia and the US among others for the same markets. The most likely answer is that there would be some displacement; in which case the forecasts in this report are potentially over-optimistic on inbound student inflows to traditional markets and do not fully capture the shifting inbound pull from west to east.

Japan and Germany are forecast to have fewer inbound students in 2020 compared to today. This reflects forecast outbound growth in their key origin markets and their change in market shares of these countries. For example, Japan is forecast to attract fewer Chinese students compared to today, despite total Chinese outbound students growing. Germany is vulnerable to declining demographic trends in countries such as Poland and the Ukraine.

However, in the case of Germany, plus other European countries such as Switzerland and the Netherlands, inbound forecasts may be underestimated since they do not fully account for the emerging trend towards postgraduate course provision in English. Combined with changing fee environments in key tertiary markets such as the UK, this may serve to increase intra-European student mobility over the next decade. This could possibly widen the attractiveness of these markets to fast-growing English-speaking emerging markets such as India and Nigeria.

Inbound mobility ratios for the US, Japan, Germany and France are forecast to be relatively flat over the next decade, but rise for Australia, UK and Canada. The change in inbound mobile student flows for destination markets is driven by the volume



Source: Oxford Economics

*includes shortlisted country origin markets only

Fig 4.8: Global inbound mobile tertiary students by destination market growth (2011–20)

of outbound mobile students from key origin markets and the destination patterns of students from these origin markets.

Origin market destinations are forecast on the basis of current patterns and trends, plus forecast trends in bilateral trade. For European origin markets to the UK, there is also a specific adjustment to account for the effect of the increase in tuition fees. This is not expected to impact significantly on non-European origin markets where overseas students are already charged much higher fees in the UK than domestic students.

While the forecast growth in inbound tertiary students to the UK may be surprising given the impact of tuition fees on inbound students from Europe, it is largely driven by the UK's high and expected growing market share of forecast fast-growing origin markets in 2009: India (16 per cent), Nigeria (42 per cent), Malaysia (22 per cent), Pakistan (26 per cent), Saudi Arabia (15 per cent) and Sri Lanka (18 per cent). The UK's 28,000 growth in inbound students between 2011 and 2020 is expected to come from: India (20,000), Nigeria (14,100), Pakistan (5,200), Malaysia (2,700), UAE (1,700) and Bangladesh (1,500), more than offsetting a decline of 7,300

from China and a decline of approximately 15,000 from European countries. Of course the key challenge with regard to the UK inbound tertiary student outlook is student visa reform which could/will provide a barrier against realising this inbound student mobility opportunity, leading to an overspill of demand to rival markets such as Australia and Canada, and potentially also to China, Malaysia and Singapore.

Australia's growth in inbound tertiary students of 51,000 is largely forecast to come from China, India, Malaysia, Nepal and Saudi Arabia, with only students from Singapore forecast to fall to any significant degree. Unlike the UK, Australia is much less exposed to any drop-off in mainland European outbound students.

For this study we consulted with a small number of senior officials from highly internationalised UK universities. These individuals identified Canada and Australia as key rivals to the UK for inbound student mobility – a fact evident from the strong inbound forecast for these two markets. Both of these countries are said to offer liberal post-study employment regulations that the UK cannot currently match.

They also highlighted how existing cultural and geopolitical relationships restrict the UK's prospects in key growth markets: Brazilians, for example, will naturally look towards the US, while Australia is thought to be more strongly positioned in the Asian market. Given these factors, plus the student visa restriction factor, the inbound mobile student forecasts for the UK could, perhaps fairly, be considered over-optimistic.

Bilateral tertiary mobile flows

In terms of future major bilateral flows, these are presented in Fig E6 (in Annex E). A number of developments stand out:

- Outbound mobile student flows from: China to the US, Japan and the UK; Japan to the US and Greece to the UK, are forecast to fall most sharply in absolute terms. Markets with rising tuition fees are also likely to see declines in inbound student flows.
- In contrast outbound flows from: India to the UK; China to Australia; Nigeria to the UK; India to Australia and India to the US are forecast to be the largest absolute rises in bilateral flows.
- In terms of levels of flows in 2020, India to the US is forecast to overtake China to the US as the largest bilateral tertiary student flow. Although China to the US will only fall to second place. China to Australia and Japan; South Korea to the US and India to the UK are forecast to occupy the remaining top six bilateral flows.
- There may of course be other significant flows not recorded in the data, such as inflows to China, Malaysia, Singapore and Gulf States, which would feature very highly.
- Bilateral student flows within Europe may also shift in response to widening tuition fee differentials, especially given the economic climate. While overall this is unlikely to affect aggregate flows as it may simply shift bilateral patterns rather than increase overall outbound mobility ratios, there is likely to be a shift from high to low tuition fee countries. That said, increasing postgraduate provision taught in English may provide additional stimulus for greater mobility to non-English speaking European countries.

Transnational education (TNE)

Drivers and barriers

To identify future opportunities for TNE, whether through joint or independent initiatives, a number of key drivers need to be considered. These include the total number (and growth rate) of tertiary enrolments, student mobility rates and a variety of practical barriers, from language issues to the legal and political framework in the potential host country. The stage of development in existing markets also needs to be considered – a country like Malaysia, for example, is a more mature TNE market than one such as Indonesia.

In total volume terms, the leading countries for recent growth in tertiary enrolments (defined here as growth over the decade 1999 to 2009, since this is the most recent year for which data are available consistently), are largely the familiar players: China – growth of a remarkable 23.2 million students over the decade, from 6.5 million to 29.7 million; India – growth of around 10 million students, to 19.1 million; the US (growth of 5.4 million), Brazil (four million) and Russia (3.6 million), also based in part on large total populations; and other emerging economies such as Iran (2.1 million), Indonesia (two million), Turkey (1.5 million), Ukraine (1.1 million), Malaysia, Pakistan and Nigeria (one million each), Vietnam (980,000) and Mexico and Bangladesh (880,000 each).

However, identification of TNE opportunities should include consideration of a range of quality issues and practical barriers. For example, there is a significant TNE opportunity in countries such as Pakistan, Nigeria, Indonesia and Vietnam (and also a significant inbound student mobility opportunity), but a combination of security issues, legislative barriers and the mixed quality of written and statistical proficiency among local students serve to limit these at present. Security issues also provide a barrier to investment in countries such as Nigeria and Pakistan, while corruption is a concern in Vietnam.

A good case study of additional social and institutional barriers to TNE is provided by Pakistan. With a low but rapidly rising tertiary enrolment base (from around 100,000 students per year in 2000 to more than one million today), a large volume of unmet student demand and close social and historical links with the UK, the country might be considered to offer significant opportunity for UK-delivered TNE. But low levels of proficiency in written English mean that many prospective Pakistani students would struggle, in practice, with a degree course as delivered in the UK. Furthermore, rising domestic tertiary demand in Pakistan is being absorbed in part by fast growth in licensed private sector universities, whose quality and regulation is the subject of some concern.²¹ This means that UK higher education institution entrants may risk engaging in a 'race to the bottom' by reducing quality standards and costs to compete in the local market.

Programme types

TNE covers a range of programme types. Recent survey evidence from the Institute of International Education (IIE)²² suggests that a majority of global institutions have plans to expand their offering of joint and/or double degree courses; the US, China, India, France and Germany were among the most desirable partner countries for survey respondents, and there is some evidence that activity is rising in smaller, less developed countries.

To date, franchising and validations have been most popular in markets such as Malaysia, Singapore and Hong Kong. In future, it is known from our consultations that institutions are looking at volume markets such as Indonesia and Vietnam, and attempting to overcome legal and institutional barriers in the largest emerging markets of China and India.

Three obvious global growth trends are evident from the new data on international branch campuses:²³ a shift in host country emphasis from the Middle East to the Far East, particularly China and Singapore,

where many new projects are ongoing; a steady but increasingly significant rise in 'South-South' projects, both originating in and hosted by an emerging nation; and a trend towards niche specialism and single-discipline course provision, almost certainly driven by a desire to minimise financial and reputational risk.

Strategic decisions

Future trends will in part reflect national and institutional strategies. A number of emerging market destinations have actively sought to attract inward investment in the tertiary sector by branding themselves as education hubs or similar. The primary purpose behind these initiatives is usually to stimulate economic development and business growth, with universities rightly seen as key drivers of skills and technological progress.

In Malaysia, a development known as 'Iskandar EduCity' has recently attracted Newcastle University's medical school, to be joined by an engineering campus from the University of Southampton in 2012. The UAE has established a number of separate projects, such as Dubai's Health Care City and Media City. Across the Gulf, Qatar Education City is another major project actively seeking higher education investment from overseas, but to date it has focused on attracting high quality US universities.

At an institutional level, New York University (NYU) has one of the most ambitious internationalisation strategies of any university in the world. These have already delivered 'study-abroad sites' across six continents, among which are Accra, Buenos Aires, London and Prague. Some 60 per cent of the institution's students spend a semester abroad. In September 2010, NYU opened a facility in Abu Dhabi. Future TNE provision will be driven to a significant extent by individual and organisational decisions to invest or commit to another country – one of several factors that cannot easily be predicted.

²¹ Information from online article by Murtaza Haider (PhD), Associate Dean of research and graduate programs, Rogers School of Management, Toronto. Article can be viewed at: www.dawn.com/2012/02/01/the-dos-and-donts-of-higher-education-abroad.html

²² IIE (2011), *Joint and Double Degree Programs in the Global Context* (www.iie.org/Research-and-Publications/Publications-and-Reports/IIE-Bookstore/Joint-Degree-Survey-Report-2011)

²³ The Observatory on Borderless Higher Education (2012), *International branch campuses: data and developments* (www.obhe.ac.uk/documents/view_details?id=894)

International research collaboration

Academic research

Opportunities for academic research collaboration depend on a number of interlinked factors and not simply rates of growth in the overall higher education system, which may come from a very low base and be associated with a mixed quality offering.

Recent research has confirmed that informal networks of acquaintance between academics are often responsible for initiating joint research projects.²⁴ This places a premium on cultural and physical links between people, cities and countries.

In terms of recent growth in collaboratively produced research, the US increase – 78,000 more collaborative articles in 2010 than 2000 – is the largest by volume of any country. The rapid growth of research output in China means that even with a relatively low and declining collaboration rate, it still makes second place on the ranking, with almost 40,000 more jointly-produced articles in 2010 than in 2000 (see Table 4.1).

The next fastest growth, in absolute terms, was seen in the UK, Germany, France, Canada, Italy, Australia, Spain, the Netherlands, Japan and Switzerland. The large absolute number of collaborative articles these countries produce means they are likely to continue to generate the greatest number of new global collaboration opportunities to 2020.

In percentage terms, it is notable that most major research-producing nations were engaged in more than double the international collaborations in 2010 than they were ten years previously – but in China, the figure is five times greater.

If these trends continued to 2020, then China would match the US for the total number of international collaborations it engaged with, despite a much lower average rate of joint-working. As China has the fastest-growing research output in the world and will play a key role in re-shaping the global research

Country	Total Research articles produced, 2010 (Scopus)	Total collaboratively produced articles, 2010 (Scopus)	Growth in total collaboratively produced articles, 2000–2010 (Scopus)
US	502,804	143,048	78,000
China	320,800	47,093	39,547
UK	139,683	62,061	36,340
Germany	130,031	58,150	31,940
France	94,740	44,092	24,597
Canada	77,694	34,675	21,721
Italy	73,562	30,175	18,519
Australia	59,058	25,867	18,220
Spain	64,985	25,845	17,899
Netherlands	43,214	22,087	13,607
Japan	113,246	26,828	11,603
Switzerland	30,866	19,208	11,294
South Korea	55,546	14,359	10,710
India	71,975	12,567	9,002
Belgium	23,716	13,573	8,558
Sweden	26,842	14,758	7,877
Brazil	45,189	11,004	6,680
Russia	36,053	10,589	2,093

Source: Scopus (Elsevier) data, extracted January 2012

Table 4.1: Global growth (by volume) of collaboratively produced research articles (2000–10)

landscape to 2020, the top Chinese institutions for collaboratively produced research are presented in Table 4.2.

Though less developed as collaboration opportunities at present, there are some notable growth trends in total research output among smaller, emerging nations.

Looking at the period 2006–10, compound annual growth rates in total articles produced were the highest, in descending order, in Malaysia (35.4%), Luxembourg, Iran, Bosnia, Romania, Saudi Arabia, Serbia, Qatar

and Cyprus (20.9%). Of these countries, Malaysia (13,000 articles in 2010), Iran (25,000) and Romania (10,000) have by far the largest volumes of output, and therefore the most significant critical mass likely to support an increasing number of collaboration opportunities in the future.

²⁴ Royal Society (2011), 'Knowledge, Networks and Nations: Global scientific collaboration in the 21st century' (http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2011/4294976134.pdf)

China rank	Organisation	Sector	Total research articles, 2005–2009 (Scopus)	Intl. collab. rate (% of total)	Total collab. produced articles, 2005–2009 (Scopus)	Normalised citation impact (1 = global average)	Excellence rate (% within top decile in subject area)	Global inst. ranking for total research output (all sectors)
1	Chinese Academy of Sciences	Government	144,269	21.5	31,018	0.9	11.3	1
2	Tsinghua University	HE	41,197	18.6	7,663	0.8	6.6	11
3	Peking University	HE	28,119	24.3	6,833	1.0	12.5	43
4	Zhejiang University	HE	40,140	15.7	6,302	0.7	7.4	14
5	Shanghai Jiao Tong University	HE	34,484	14.5	5,000	0.7	6.5	23
6	Fudan University	HE	18,341	24.0	4,402	0.9	11.4	98
7	Sun Yat-Sen University	HE	14,470	22.4	3,241	0.8	9.9	162
8	Nanjing University	HE	15,247	20.3	3,095	0.9	11.3	147
9	Huazhong U. of Science and Tech.	HE	26,035	11.5	2,994	0.5	3.7	50
10	Harbin Institute of Technology	HE	27,509	10.4	2,861	0.6	3.1	45
11	Shandong University	HE	15,520	16.9	2,623	0.7	6.4	143
12	Xi'an Jiaotong University	HE	18,537	12.5	2,317	0.6	4.0	92
13	Wuhan University	HE	18,284	12.3	2,249	0.6	6.2	99
14	Dalian University of Technology	HE	15,919	12.8	2,038	0.7	4.9	133
15	Tongji University	HE	16,263	12.4	2,017	0.6	3.6	126
16	Ministry of Education of PRC	Government	15,254	13.2	2,014	0.8	5.3	146
17	Beijing Normal University	HE	8,086	24.9	2,013	0.7	7.3	362
18	Jilin University	HE	17,342	11.3	1,960	0.6	6.6	113
19	Southeast University, Nanjing	HE	14,593	13.2	1,926	0.7	4.1	157
20	Sichuan University	HE	17,730	10.4	1,844	0.6	5.3	108
21	Central South University	HE	15,718	11.2	1,760	0.6	4.0	136
22	Nankai University	HE	9,490	18.5	1,756	0.9	11.5	296
23	Tianjin University	HE	16,666	9.9	1,650	0.5	4.0	121
24	South China University of Technology	HE	13,385	11.9	1,593	0.6	3.8	190
25	BeiHang University	HE	14,682	8.4	1,233	0.5	1.9	155
26	Northeastern University, China	HE	12,340	9.9	1,222	0.5	1.9	210
27	U. of Electronic Science and Tech.	HE	10,950	11.0	1,205	0.6	2.5	248
28	Shanghai University	HE	8,653	13.7	1,185	0.7	5.3	334
29	Chongqing University	HE	8,787	11.9	1,046	0.5	2.7	328
30	Beijing Jiaotong University	HE	8,480	11.8	1,001	0.5	1.8	343
31	Hunan University	HE	8,510	11.7	996	0.7	6.9	341
32	Beijing Institute of Technology	HE	12,051	7.7	928	0.4	2.2	218
33	Northwestern Polytechnical University	HE	12,780	6.8	869	0.4	1.7	200
34	U. of Science and Technology Beijing	HE	9,556	9.0	860	0.5	2.2	294
35	Beijing U. of Posts and Telecoms	HE	8,814	9.1	802	0.4	1.3	326
36	Nanjing U. of Aero/Astronautics	HE	9,215	6.9	636	0.6	2.3	308
37	Xidian University	HE	9,036	6.8	614	0.5	2.1	317
38	Wuhan University of Technology	HE	8,105	7.2	584	0.4	2.8	358
39	China University of Petroleum	HE	7,469	6.3	471	0.4	1.9	399
40	National U. of Defense Technology	HE	9,762	4.8	469	0.4	1.2	282

Source: Adapted from SCImago Institutions Rankings (SIR), 2011, based on Scopus (Elsevier) data for 2005–2009

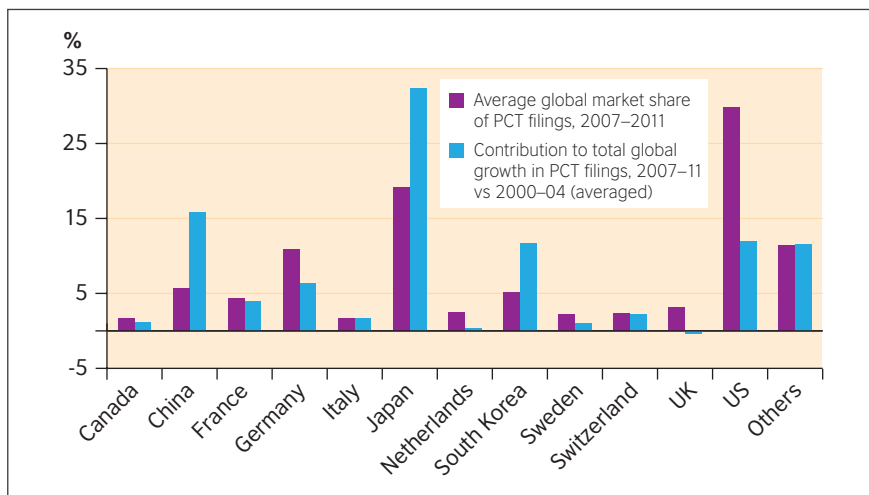
Table 4.2: Top Chinese research institutions (HE and government) for international collaboration (2005–09) (Scopus data)

Business research

Opportunities for commercial engagement will continue to grow, and are likely to be greatest in technology and research-intensive nations adept at international working.

A core group of smaller, advanced economies consistently feature at the top of most population-adjusted global technology rankings, including on key measures such as research and development (R and D) spending as a proportion of gross domestic product (GDP). This group typically includes the Nordic countries, Switzerland, Singapore, the Netherlands and Israel. For example, on INSEAD's Global Innovation Index 2011 – a comprehensive review of national innovation performance – the top ranked countries in 2011 were Switzerland, Sweden and Singapore, with the US in seventh place and the UK tenth. China currently ranks only 29th globally – though it is the best performing lower income country and its position has risen from 37th in the same index in 2008.

Looking at international patent filings (under the Patent Cooperation Treaty [PCT] system), a useful proxy for the internationalisation of technological development in a particular country, it is evident that global growth between the first and second halves of the decade 2000–10 was driven by just a few countries, including Japan, China, the US and South Korea²⁵ (see Fig 4.9).



Source: World Intellectual Property Organisation, Statistics Database, extracted January 2012

Fig 4.9: Global market share and growth in average PCT (international) patent filings (2007–11 versus 2000–04)

Besides confirming Japan as a central player in technological development aimed at overseas commercial application, this analysis also reveals that China, despite starting from a long way behind its more developed rivals, is quickly growing its expertise.

Finally, countries with the highest rate of 'technology flows' (defined as the average of technological payments and receipts) as a percentage of overall GDP, again include Ireland, the Netherlands, Finland, Switzerland, Sweden and Israel.

These are a useful proxy for the cross-border flows of technology and innovation, since they reflect technologies ready for production, not merely R and D spending. Ireland's top ranking is driven in part by the high share of foreign affiliates within its business base, but this group of economically successful countries is clearly adept at managing innovation internationally – in part necessitated by their relatively small size.

²⁵ To calculate this measure, we averaged total PCT filings in each country between 2000–04 and 2007–11, to adjust for annual volatility. We then calculated each country's individual contribution to the total global growth between the two averaged periods – which was around 48,000 applications, or 43 per cent.

5. Summary of future higher education opportunities for global engagement

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5. Summary of future higher education opportunities for global engagement

Summary

This study explores the growing internationalisation of higher education globally. The areas explored are (i) at national level (as opposed to institutional level) and (ii) those lending themselves to measurement. This study does not evaluate the internationalisation of universities' curricula and/or their internationalisation strategies.

The shape of things to come studies past and future trends that are expected to continue to shape the higher education landscape. It details the drivers of higher education demand, international student mobility, TNE provision and the role of international collaborations in academic research.

One of the key findings of this research is that at a global level, demographic and economic slow down will affect the growth of the tertiary education sector – it is expected to grow one per cent per annum on average, down from five per cent per annum in the previous decades. In absolute terms the most significant growth will come from India (7.1 million), China (5.1 million), Brazil (2.6 million), Indonesia (2.3 million) and Nigeria (1.4 million). The growth in international student mobility will follow these patterns – as such a significant slow down is expected. China, India, South Korea, Germany and Turkey will remain the top countries of origin for international students. However, the highest growth in absolute terms in international students will come from India, Nigeria and Malaysia.

TNE is expected to see continued growth especially in East Asia and further expansion of flexible modes of delivery mainly through online learning. TNE developments worldwide require further investigation and an update of definitions which will allow more comprehensive data capture.

About one third of all the academic research produced globally is carried out through international collaborations. *The shape of things to come* finds that

80 per cent of countries' research impact is explained through their collaboration rate, i.e. the higher the international research collaboration rate, the higher the impact of the research output. In order to maximise opportunities in research collaboration, these are the core opportunity groups which should be considered:

- high volume research leaders such as the US, China, the UK, Germany, France, Italy, Canada and Australia
- high average citation impact leaders which, in addition to the US and UK, also include Switzerland, Netherlands and Denmark; there is a distinct niche sub-group which provides opportunities in smaller, technology-intensive countries such as the Nordic countries, Switzerland and Israel
- producers of high research output growth in key emerging markets, most notably China and Brazil, but also Malaysia, Iran, Saudi Arabia, India and Qatar.

This research study also examines applications of academic research in commercial activities which are an under-used resource for generating income. The main opportunities are collaborations with multinationals in the US, Europe, China, India and Latin America. Countries with highest involvement with multinationals are Finland and Sweden. Increasingly, more opportunities will be in niche research and technology-intensive countries, e.g. Israel and Switzerland. Countries with higher involvement of their tertiary sector in small and medium enterprise (SME) innovation collaborations include Finland, Belgium and the UK. Another country group allowing closer involvement of academic research is the one with high internationally-filed patent applications such as Japan, US, South Korea and, in volume terms, China and India.

Future research

In conclusion, the empirical evidence shows that international student flows over the past decades were mainly to the advanced economies, suggesting that

internationalisation of higher education in these recipient countries has been very much driven by student recruitment. Data on credit mobility suggests a shift in the balance from West to East. While international students at degree level in Malaysia were 58,000²⁶, the total international student population (degree and credit mobility) accounted for 87,000 students. Similarly with China: the international students at degree level were only 71,700 in 2010, however, the total student population (including short-term mobility students) was 265,000.²⁷ In addition, there is increased international mobility within the region (Chien 2012).²⁸ The highest rates are in East Asia where 42 per cent of the international students opt to study in another country in the region.

However, the next decade is forecast to witness a significant slow down in the international student mobility growth. At the same time, there will be a substantial growth in international research and teaching collaborations. This indicates that internationalisation of higher education appears to be moving into a new stage, where international students will continue to play an important role, but research and joint delivery of education independently or with overseas partners will have growing prominence. International students enrolled on UK degrees abroad outnumber the international students onshore. The global international research collaboration rate increased from 25 per cent 15 years ago to over 35 per cent in 2010. While it is difficult to give an accurate estimate of international collaborations in teaching and research in 2020, the trend is positive.

Given the rising economic power of emerging economies – with China, India, Brazil and Russia now in the top 10 largest economies (GDP measured by PPP) – they are playing more proactive roles in the higher education community. De Wit argued at the British Council Going Global Conference (2012)²⁹ that the emerging economies and the higher education communities in other parts of the world are

²⁶ Ministry of Higher Education, Malaysia, see Project Atlas: www.iie.org/Services/Project-Atlas/Malaysia

²⁷ China Scholarship Council, see Project Atlas: www.iie.org/Services/Project-Atlas/China

²⁸ Chien, Chiao-Ling (2012), Opportunities for global engagement and the role of UNESCO-UIS, British Council Going Global Conference, London.

²⁹ <http://ihe.britishcouncil.org/going-global>

altering the landscape of internationalisation and that there is a shift from the 'western concept' of internationalisation. The concept of internationalisation is certainly becoming wider, however, there is also a shift in the debate from preoccupation with student recruitment to broader collaborations in teaching and research. The latter also became a focal point in the debate at Going Global 2012 on 're-thinking internationalisation', initiated by the International Association of Universities, where ethical considerations of the consequences of internationalisation were discussed.³⁰

The concept of equality between international partners is also noted by establishment of the first Sino-Foreign University, which was set up in 2006 by the University of Liverpool and Xi'an Jiaotong University. A similar model was used with the setting up of the New York University Shanghai – an independent institution set up by the New York University and the East China Normal University.

Given the projected growth in off-shore operations, the regulatory environments can be complex and restrictive. The largest tertiary education countries in the world – China, India and Brazil – have perhaps the most restrictive regulatory frameworks for foreign providers. While some countries are still cautious how much freedom foreign education providers should be granted, the only way into a country is often in partnership with a local institution, as is the case in Indonesia. Gore (2012)³¹ argues that 'a foreign partner is often crucial to bridge this learning gap.'

Further research is needed to establish whether there is a paradigm shift taking place in the Western concept of internationalisation of education in the context of rapid evolutionary development in the higher education sector globally. Jones and De Wit³² (2012) in their paper on

globalisation of internationalisation identify eight priorities, the first of which is the 'need to learn from other non-western national and cultural contexts – to understand the full extent of internationalisation as a phenomenon and what we can learn from each other in order to benefit students, employers and nations.'

Drawing on the discussion above, these are some of the areas that need a further exploration:

- 1 The growing variety of TNE provision globally needs further research in order to arrive at rigorous analysis and forecasts. The current definitions used to describe TNE no longer capture fully TNE activities of higher education institutions. Incomplete definitions lead to incomplete data sets on TNE. In addition, this is aggravated by lack of both nationally and globally available data on TNE. Different countries' national statistics, such as the UK, Australia and Ireland, collect these data whilst other big players in TNE, such as the US, do not. Given the growth expected in TNE, systematic data collection at national and pan-national level is required. UNESCO and OECD will be ideally placed to carry out this role.
- 2 The Royal Society study on Global Knowledge Networks laid excellent foundations of what research into international research collaborations should look into. Further bibliometric analysis is needed to establish the rate of countries' participation in bilateral, trilateral and multilateral research collaboration and their respective growth rates. The Royal Society suggests that the higher the number of countries collaborating on a particular research, the higher the respective citation impact. As such, there can be a speculative assumption that multilateral research collaborations will increase significantly in future. However, what is not clear is how much the current research funding

schemes, most of which are at national level, will support this development.

The British Council supports the recommendation from the Royal Society³³ that national funding schemes should accommodate international research collaboration and, where appropriate, supranational funding bodies (in addition to EU funding schemes) may be needed to support research addressing global problems (similar to the Belmont forum)³⁴. In addition, systematic data on trends and patterns in international academic research collaborations are needed in order to remove barriers and create supporting environments.

- 3 Drawing on the increasing inter-connectedness and interactions among education systems globally, further research is needed to better understand the real impact of internationalisation on students (those studying home, abroad and those undertaking TNE programmes either at home or in another country), faculty staff, higher education institutions and at country/region level.

Implications

Higher education leadership has not been studied in this research and as such it is difficult to judge whether existing models will accommodate the increasing exposure of universities' business to internationalisation in terms of research and teaching. Many western institutions already have a high proportion of international students and staff. However, increasing education provision outside the national borders and the growing internationalisation of research output may require adjustments in the institutions' leadership in order to better respond to changes the next decade presents and to allow greater flexibility when engaging with student and academic faculties from a wider range of countries. Some universities, including those that already have highly international student and academic bodies and a high rate of international research

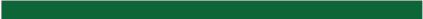
³⁰ International Association of Universities (2012), 'Affirming Academic Values in Internationalization of Higher Education: A Call for Action', www.iau-aiu.net/sites/all/files/Affirming_Academic_Values_in_Internationalization_of_Higher_Education.pdf

³¹ Gore, Tim (2012), Higher Education Across Borders: models of engagement and lessons from corporate strategy, The Observatory on Borderless Higher Education Report, April. www.obhe.ac.uk/documents/view_details?id=895

³² Jones, E. and H. de Wit (2012), Globalization of internationalization: thematic and regional reflections on a traditional concept, mimeo.

³³ Royal Society (2011), 'Knowledge, Networks and Nations: Global scientific collaboration in the 21st century' (http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2011/4294976134.pdf) page 9.

³⁴ <http://igfagr.org/index.php/about-us>



and teaching collaboration, already have appropriate structures. Others may require more supportive environments.

The slow-down in international student mobility will have implications for student recruitment departments. This deceleration will vary across countries depending on their demographic and economic outlook for the next decade. Some established countries of origins for international students such as China and South Korea will see a decline in their outward mobility (mainly affecting the US recruitment market); whereas others such as India, Malaysia and Pakistan are set to grow (mainly affecting student flows to Australia and UK). Institutions' recruitment strategies will have to take into account these changes.

It is difficult to judge the impact of tuition fees changes across countries. Increased postgraduate provision in English across many European countries may affect the market share of established English speaking destinations such as the UK and US. Increasing intra-regional mobility (such as in East Asia) may affect traditional host countries attracting students from the respective regions.

Increasingly through TNE activities, higher education establishments may want to tap into increasing mobility within certain regions (e.g. East Asia, as discussed earlier). It is difficult to establish the direction of causal relationships, i.e. whether TNE has contributed to this trend or vice versa. With improving access to tertiary education in many countries, the quality assurance requirements of both home and host countries for TNE providers are becoming much stricter. High quality education, the student experience, as well as meeting demand in niche subject areas, will be deciding success factors.

Increased interconnectedness of the academic community and open access to data and research will foster greater research collaborations among academics globally. Funding schemes for collaborative research at all levels: institutional, national and supranational level will have to accommodate and support this trend. Increasingly, there will be multilateral co-operation bringing strengths from more than two to three countries - formats that have the highest impact.³⁵

Applying research excellence in industry will require increased flexibility, entrepreneurship and presumably different governance structures amongst the academic community.

Most of the implications in this section were based primarily on conclusions drawn from empirical evidence on changing international student mobility flows, TNE provision trends, international research collaboration patterns and commercial activities as an additional source of income. As such, most of the observations are at national level and their applicability will vary from institution to institution.

The decade to 2020 is a decade of changes and opportunities. Maintaining domestic and international relevance through teaching and research will be a key preoccupation for the tertiary sector in most countries.

A summary of findings, current and future opportunities for international engagement as well as barriers and risks are presented in tables 5.1–5.3 on pages 53–57.

³⁵ Royal Society (2011), 'Knowledge, Networks and Nations: Global scientific collaboration in the 21st century' (http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2011/4294976134.pdf)

International higher education opportunity	Current opportunities	Future opportunities
International student mobility	• Largest outbound mobile student flows by origin (2009): China (568k), India (211k), South Korea (127k), Germany (105k), Turkey (72k), France (68k), Kazakhstan (67k), Russia (62k), Malaysia (58k). • Fastest growing (absolute) outbound mobile student flows (2002–09): China (386k) and India (123k). Also Germany (48k), South Korea (44k), Vietnam (43k), Saudi Arabia (40k), Russia (36k), Nigeria (25k), Turkey (24k). • Highest outbound student mobility ratios (2009): Botswana (49%), Trinidad & Tobago (32%), Mauritius (29%), Zimbabwe (13%), Hong Kong (13%), Angola (11%), Singapore (10%), Ireland (10%), Morocco (10%), Sri Lanka (10%), UAE (7%) (though several of these are low-volume countries). • Largest inbound mobile student flows by destination (2009): US (661k), UK (369k), Australia (258k), Germany (257k), France (249k), Canada (190k), Russia (136k) and Japan (132k). UNESCO figure for inbound mobile student flows to China in 2010 is 72k but estimate from Project ATLAS is much higher at 265k (main student origin countries are South Korea, Japan, US, Thailand and Vietnam). UNESCO figure for inbound mobile student flows to Malaysia in 2009 is 58k but estimate from Project ATLAS is again higher at 87k. The variations are mainly because of non-degree students in Project Atlas data. • Fastest growing (absolute) inbound mobile student flows (2004–09): Australia (91k), US (88k), UK (63k), Russia (60k), and Canada (57k). Also strong growth in inbound mobile student flows to China, Malaysia and possibly other countries where data are not well reported, e.g. in Gulf States. • Highest inbound student mobility ratios (2009): UAE (39%), New Zealand (26%), Australia (22%), Singapore (20%), UK (15%), Switzerland (15%), France (12%). • Major bilateral mobile student flows (2009): China to US (124k), India to US (102k), China to Japan (79k), South Korea to US (74k), China to Australia (70k), and China to UK (47k). Inbound flows to China would also likely feature in this list. • Fastest growing (absolute) bilateral mobile student flows (2002–09): China to US (61k), China to Australia (53k), China to Japan (38k), China to South Korea (37k), India to US (35k), China to Canada (34k), China to UK (30k), India to UK (28k), South Korea to UK (25k). Inbound flows to China would also likely feature in this list.	• Largest outbound mobile student flows by origin (2020): China (585k), India (296k), South Korea (134k), Germany (100k), Turkey (84k), Malaysia (82k), Nigeria (67k). • Fastest growing (absolute) outbound mobile student flows (next decade): India (71k), Nigeria (30k), Malaysia (22k), Nepal (17k), Pakistan (17k), Saudi Arabia (16k), Turkey (13k). • Largest inbound mobile student flows by destination (2020): US (582k), UK (331k), Australia (277k), Canada (176k), Germany (155k) – China, Malaysia are also likely to feature here. • Fastest growing (absolute) inbound mobile student flows (next decade): Australia (51k), UK (28k), US (27k), Canada (23k) – again China will surely feature here. • Major bilateral mobile student flows (2020): India to US (118k), China to US (101k), China to Australia (93k), South Korea to US (81k), China to Japan (64k), India to UK (59k) – flows to China and possibly India also. • Fastest growing (absolute) bilateral mobile student flows (next decade): India to UK (20k), India to US (19k), China to Australia (17k), Nigeria to UK (14k), India to Australia (11k) – flows to China also, and possibly India also. • Fastest declining (absolute) bilateral mobile student flows (next decade): China to Japan (-14k), Japan to US (-8k), China to US (-8k), China to UK (-7k), Kazakhstan to Russia (-5k), Greece to UK (-4k) – the impact of China's aggressive pursuit of international students could well lead to some well-established bilateral flows declining.

Table 5.1: Current and future opportunities

International higher education opportunity	Current opportunities	Future opportunities
International student mobility (continued)	• Fastest declining (absolute) bilateral mobile student flows (2002–09): Japan to US (-18k), Greece to UK (-13k), US to Australia (-6k), Singapore to Australia (-6k), Indonesia to Malaysia (-5k).	
Size and growth of domestic tertiary education systems	• Largest tertiary enrolment levels: China (29.6m), US (19.4m), India (19.1m), Russia (9.4m), Brazil (6.1m), Indonesia (4.9m), Japan (3.9m), Iran (3.4m), South Korea (3.3m), Turkey (3.0m). • Fastest growing (absolute) tertiary enrolment growth (last decade): China (17.3m) and India (8.2m). Also US (3.2m), Brazil (2.5m), Iran (1.8m), Indonesia (1.7m), Russia (1.4m), Turkey (1.3m), Vietnam (1.0m), Nigeria (0.8m), Bangladesh (0.7m), Pakistan (0.7m).	• Largest tertiary enrolment levels (2020): China (37.4m), India (27.8m), US (20.0m), Brazil (9.2m), Indonesia (7.7m), Russia (6.3m), Japan (3.8m), Turkey (3.8m), Iran (3.8m), Nigeria (3.6m). • Fastest growing (absolute) tertiary enrolment growth (next decade): India (7.1m), China (5.1m), Brazil (2.6m), Indonesia (2.3m), Nigeria (1.4m), Philippines (0.7m), Bangladesh (0.7m), Turkey (0.7m), Ethiopia (0.6m) – growth in certain markets could be larger still if ambitious international student recruitment targets are met. • Largest falls in outbound mobile students (next decade): Japan (-10k), Greece (-10k), Poland (-8k), Singapore (-6k), Russia (-6k), Germany (-2k) – China is one to watch here given its demographic outlook and ambitious domestic tertiary sector expansion plans.
TNE	• China, South Asia, Middle East, South East Asia, Latin America, Turkey, Nigeria.	• Dual and joint degrees: China, US, France, India, Germany. • Franchising and validation: Asia, Latin America, possibly Africa (Nigeria). • Branch campuses: Far East, possibly Middle East • Online: Gulf countries, Asia, possibly Scandinavia.
Academic international research collaboration	• Elite research and government-sponsored institutions. • Specifically for UK, Russell Group driving research volume. Opportunities for newer institutions in niche areas of specialism. Main opportunities in major research-producing nations, as well as smaller, research-intensive nations (e.g. Nordic countries, Switzerland, Israel).	• Largest growth in research output: volume growth to be driven by collaborations involving US and Chinese institutions. • Highest collaboration rates: research collaboration rates are higher in many smaller countries, such as Switzerland and Belgium (50–70%); they are low and declining in China (around 15%). Overall opportunity for collaboration depends on both the volume of research and propensity to collaborate. • Highest average citation impacts: Switzerland, Netherlands, Denmark and US – collaborating with these countries in theory should help to maintain and increase research average citation impacts.

Table 5.1: Current and future opportunities (continued)

International higher education opportunity	Current opportunities	Future opportunities
Academic international research collaboration (continued)		• Three core opportunity groups: specifically for UK, future growth in collaborations likely to be with US and other established high volume research leaders (Germany, France, Italy, Canada, Australia) and high average citation impact leaders (also Switzerland, the Netherlands, Denmark); niche opportunities in smaller, technology-intensive countries such as the Nordic countries, Switzerland and Israel; plus a chance to tap into rapid research output growth in key emerging markets, most notably China but also Malaysia, Iran, Saudi Arabia, India and Qatar.
Business international research collaboration	• Large companies: growth in collaboration opportunities with multinationals; large US, European, Chinese, Indian and Latin American companies; niche opportunities in research and technology-intensive countries e.g. Israel, Switzerland, learn from approach in Nordic countries and the Netherlands. Opportunities in countries with high tertiary sector-large firm innovation collaboration rates (e.g. Finland, Sweden) and unexploited opportunities in countries with low tertiary sector-large firm innovation collaboration rates (e.g. Brazil, UK, Spain, Italy). • Smaller companies: further growth opportunities in SME collaboration rates for R and D, focused on niche, high-value technology areas and/or links into multinational supply chains. Opportunities in countries with high tertiary sector-SME innovation collaboration rates (e.g. Finland, Belgium, UK) and unexploited opportunities in countries with low tertiary sector-SME innovation collaboration rates (e.g. Brazil, Italy). • Leading countries in internationally-filed patent application: Japan, US, South Korea and in volume terms, China and India. • Innovation: Ongoing promotion of open innovation models, with fluid collaboration between business and the higher education sector.	

Table 5.1: Current and future opportunities (continued)

International higher education opportunity	Potential barriers
International student mobility	• Student visa restrictions/migration laws • Post-graduation employment restrictions on mobile students in host countries • Political relations • Social and cultural norms (e.g. female students in some countries less likely to travel) – this factor works the opposite way for TNE
TNE	• Host country legal education framework • Political relations • Corruption • Security issues • Social and cultural norms (e.g. role of women) • Student quality concerns (impact on institutional reputation) • Language issues • Compatibility of pre-tertiary education systems across countries, and entry requirements to tertiary education
Academic international research collaboration	• Compatibility of research subject specialisms vs. demand, and compatibility of research methodological frameworks • Language • Researcher visa restrictions/migration laws • Lack of established relationships at individual researcher-to-researcher level • Political relations • Economic and fiscal climate, e.g. public funding of research
Business international research collaboration	• Tertiary sector often focused on pure research, not commercial applications • Large existing internal R and D spend by global companies (vertical integration) • Institutional funding constraints can prohibit new commercial initiatives

Table 5.2: Potential barriers to maximising opportunities

International higher education opportunity	Upside risks (↑)	Downside risks (↓)
International student mobility	• Significant catch-up potential in tertiary enrolment rates even beyond 2020 – tertiary enrolment rates could rise faster than forecast. • Continued strong economic growth and rising household incomes forecast for many emergers. • Continued globalisation and trade which is linked to student mobility, particularly as economies rebalance. • Rising gradient of skill demand across economies – economies will need more tertiary level graduates. • Gap in teaching standards and disparities in institutional quality and reputations between main origin and destination countries are still large. • English still the key language for global business (important for current dominant inbound markets) and increasing postgraduate provision taught in English in Europe (this would be a threat for the UK). • South Asia the new South East Asia.	• Rapid expansion of tertiary education capacity in traditional outbound markets (contributing to falling outbound mobility ratios). • Ambitious plans in traditional origin markets to attract inbound students (and reduce 'net' outflows) – threat to traditional inbound markets. • Future excess tertiary capacity in certain countries, e.g. Japan, Germany, may shift greater attention to attracting inbound students. • Gap in teaching standards and institutional quality falling (partly linked to emergers attracting overseas teaching staff) – countries such as Malaysia evolving to a new phase away from international student mobility to TNE. • Challenging economic environment in certain markets (particularly Europe), affecting household incomes. • China economy refocusing growth from exports to domestic demand. • Rising tuition fees in some markets – e.g. UK – linked to fiscal austerity (although this could be an opportunity for other markets).
TNE	• Significant catch-up potential in tertiary enrolment rates even beyond 2020 – tertiary enrolment rates could rise faster than forecast. • Rapid expansion of tertiary education 'volume' capacity in traditional outbound markets (contributing to falling outbound mobility ratios) – opposite direction of risk to downside risk for international student mobility. • Ambitious plans in traditional origin markets to attract inbound students (and reduce 'net' outflows) – threat to traditional inbound markets, but opportunity for TNE. • Countries such as Malaysia evolving to a new phase away from international student mobility to TNE. • Rising gradient of skill demand across economies – economies will need more tertiary level graduates. • Technology advancements and rising internet penetration (support distance learning). • Continued globalisation and cross-cultural awareness. • Gap in teaching standards and disparities in institutional quality and reputations between main origin and destination countries are still large – TNE can help to address quality issues.	• Reversal in demographics – stabilisation of global 18–22 population following historic rise. • Improvement in quality of domestic tertiary education capacity. • High levels of competition e.g. between US, UK, Australia and Canada, and increasingly China, Malaysia, Singapore and the Gulf States.

Table 5.3: Upside and downside risks to future opportunities

International higher education opportunity	Upside risks (↑)	Downside risks (↓)
Academic international research collaboration	- Continued globalisation and trade. - Economies moving up the value chain – need to undertake more R and D. - Growth in formal institutional partnerships. - Some markets still leaders in collaborative research specialism areas so will be in high demand.	- Equalisation of research capacity and specialisms across nations, e.g. China increasingly confident in its R and D capacity. - Reduction on public research funding linked to fiscal austerity. - High levels of competition – e.g. between US, UK, Germany, China, India.
Business international research collaboration	- Continued globalisation and trade. - Economies moving up the value chain – need to undertake more R and D. - Growth in financial incentives for tertiary-business collaboration. - Growth in global popularity of open innovation models.	Tertiary sector incentivised to focus on pure research and routine citation impacts.

Table 5.3: Upside and downside risks to future opportunities (*continued*)

Annexes

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Annex A: International student mobility ratio forecasts

International student mobility ratio forecasts

	Tertiary outbound mobility ratio %			Tertiary inbound mobility ratio %*		
	2009	2020	pp change	2009	2020	pp change
Angola	10.8%	7.8%	-3.1	-	-	-
Australia	0.8%	0.9%	0.1	17.9%	24.0%	6.2
Bangladesh	1.2%	1.0%	-0.1	-	-	-
Belarus	4.8%	6.1%	1.2	-	-	-
Botswana	48.6%	45.5%	-3.0	-	-	-
Brazil	0.4%	0.4%	-0.1	0.1%	0.2%	0.1
Canada	3.4%	3.6%	0.2	8.8%	12.7%	3.9
China	1.7%	1.4%	-0.3	-	-	-
Colombia	1.3%	1.1%	-0.2	-	-	-
Egypt	0.4%	0.6%	0.2	-	-	-
Ethiopia	1.5%	0.6%	-0.9	-	-	-
France	2.3%	2.3%	0.0	5.6%	5.4%	-0.2
Germany	4.3%	5.1%	0.8	7.2%	7.9%	0.7
Ghana	3.7%	2.7%	-1.0	-	-	-
Greece	5.1%	4.2%	-0.9	-	-	-
Hong Kong	12.9%	11.7%	-1.1	-	-	-
India	1.0%	1.0%	0.0	-	-	-
Indonesia	0.7%	0.5%	-0.1	-	-	-
Iran	0.9%	0.7%	-0.2	-	-	-
Iraq	1.3%	1.6%	0.3	-	-	-
Ireland	9.8%	9.3%	-0.5	6.2%	6.8%	0.7
Israel	3.8%	3.7%	-0.1	-	-	-
Italy	2.0%	1.8%	-0.2	1.6%	1.9%	0.2
Japan	1.2%	0.9%	-0.3	3.2%	2.9%	-0.3
Jordan	3.8%	3.0%	-0.8	-	-	-
Kazakhstan	5.4%	6.6%	1.1	-	-	-
Kenya	7.9%	4.5%	-3.5	-	-	-
Malaysia	6.9%	6.6%	-0.3	-	-	-
Mauritius	28.6%	27.6%	-1.0	-	-	-
Mexico	1.0%	1.0%	0.0	-	-	-

	Tertiary outbound mobility ratio %			Tertiary inbound mobility ratio %*		
	2009	2020	pp change	2009	2020	pp change
Morocco	9.9%	7.1%	-2.7	-	-	-
Nepal	9.5%	9.3%	-0.2	-	-	-
Nigeria	2.0%	2.1%	0.1	-	-	-
Pakistan	2.8%	2.9%	0.1	-	-	-
Philippines	0.4%	0.5%	0.2	-	-	-
Poland	1.5%	1.8%	0.2	0.5%	0.9%	0.4
Romania	2.2%	1.9%	-0.3	-	-	-
Russia	0.5%	0.6%	0.1	-	-	-
Saudi Arabia	3.9%	4.7%	0.8	-	-	-
Singapore	9.9%	5.4%	-4.4	-	-	-
South Africa	0.7%	0.8%	0.1	-	-	-
South Korea	3.9%	4.5%	0.6	-	-	-
Spain	1.2%	1.1%	-0.1	2.7%	3.6%	1.0
Sri Lanka	9.7%	9.4%	-0.3	-	-	-
Switzerland	4.6%	4.0%	-0.6	14.6%	13.2%	-1.4
Thailand	1.0%	1.0%	0.0	-	-	-
Trinidad and Tobago	32.4%	32.9%	0.5	-	-	-
Turkey	1.6%	1.4%	-0.1	-	-	-
UAE	7.4%	8.2%	0.8	-	-	-
UK	0.9%	1.2%	0.3	12.0%	15.0%	3.0
Ukraine	1.2%	1.5%	0.3	-	-	-
US	0.3%	0.3%	0.0	3.0%	2.9%	-0.1
Uzbekistan	9.4%	6.3%	-3.0	-	-	-
Venezuela	0.6%	0.5%	-0.1	-	-	-
Vietnam	2.4%	3.0%	0.6	-	-	-
Zimbabwe	13.3%	12.3%	-1.1	-	-	-

Source: OECD, UNESCO, Oxford Economics

Note: *includes shortlisted countries only

Table A1: Tertiary outbound and inbound mobility ratios by origin and destination market (2009 and 2020)

Annex B: Additional evidence on transnational education (TNE)

Joint and double degree programmes

- A 2011 survey of joint and double degree programmes³⁶ in 245 Higher Education Institutes (HEIs) across 28 countries, administered by the Institute of International Education (IIE), sheds light on the prevalence of such initiatives around the world. (It does not, however, claim to be exactly representative of the full global picture.) The survey revealed that:
 - 1 Globally, most joint or double degree programmes tend to be at the master's level (53 per cent), with the exception of Australia (where the majority are at doctoral level) and the US (where the majority are undergraduate courses). The most popular subject areas were business, management and engineering.
 - 2 The top five existing partner countries for global HEIs responding to the survey were France, China, Spain, Germany and the US, with the UK in seventh place behind Italy. Other countries mentioned as existing partners, though to a lesser extent, included Poland, Sweden, Russia, Mexico, South Korea, Belgium, India, Portugal and Turkey.
 - 3 Institutions in France, Germany and Italy tended to have launched joint or double degree programmes in the 1990s, while the UK and Australia had started more recently. For UK institutions, the top reasons for selecting partner institutions were strategic decisions (91 per cent), existing contacts among faculty (64 per cent) and existing links for exchange programmes (61 per cent).
 - 4 Almost all institutions reported plans to develop more joint or double degree programmes in the future. The top five desired partner countries for future collaboration were China, the US, France, India and Germany, with China being the primary target of the UK, US and Australia, and the US being the main focus of Germany, France and Italy.³⁷
- The survey hints at a potential future challenge for the UK in the form of an enthusiasm to develop more joint and double degree programmes with

Global desirability rank	Country	Keenest prospective partners (from top six survey responding countries)	Rank of desirability for UK HEIs
1	China	Australia, UK, US (all 1st)	1
2	US	France, Germany, Italy (all 1st)	4
3	France	Germany, Italy (both 2nd)	
4	India	UK, US (both 2nd)	2
5	Germany	Australia (2nd), UK (3rd)	3
6	Spain	Italy (3rd)	
7	UK	Germany (4th)	
8	Brazil	US (4th)	
9	Canada		
10	Australia	UK, Germany (5th)	5
11	Russia		
12	Italy		
13	Turkey	US (3rd)	
14	Japan		
15	Mexico		
16	Chile		
17	South Korea	US (5th)	
18	Netherlands		
19	Argentina	Italy (5th)	
20	Singapore		

Source: Survey of 245 institutions in 18 countries by the Institute for International Education, January–April 2011

Table B1: Most desirable countries for future joint and double degree programme partnerships (2011)

overseas partners (it was in fact the second keenest country to pursue this objective) that is perhaps not quite matched by other countries' enthusiasm to partner with it. Only Germany, in fact, of the top six countries responding to the

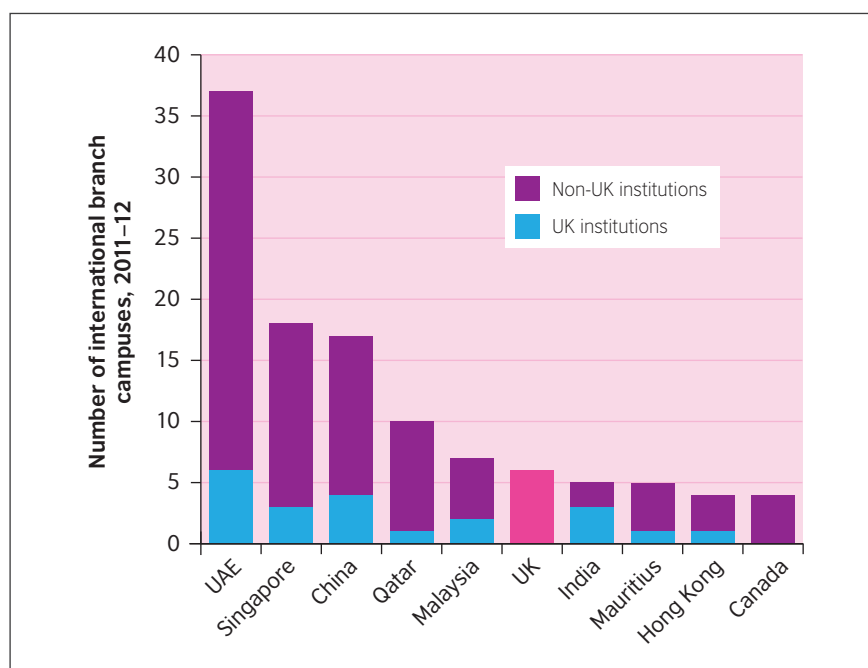
survey, rated the UK in the top five most desirable programme partners. (A key question not answered by the research is of course the future partnership preferences of large emerging education markets such as China, Brazil and India).

³⁶ Defined as programmes involving a jointly developed curriculum and physical study at two (or more) partner HEIs in different countries, the only difference being the issue of a single degree certificate (joint degree) or separate certificates for each institution (dual/double degree) upon graduation.

³⁷ Institute for International Education, *Joint and Double Degree Programs in the Global Context: Report on an International Survey*, September 2011.

International branch campuses

- Data on international branch campuses (IBCs), collected in late 2011 by the Observatory on Borderless Higher Education – and tightly defined to exclude partnership arrangements that do not involve physical infrastructure used by the source institution – show that the campus approach is growing in popularity. Globally, some 200 now exist around the world, serving around 120,000 students, with 37 more set to open by 2013. The UK is a leading source country, with 25 campuses operational in late 2011 (a figure which has doubled in two years), and at least eight more in the pipeline. Overall, the UAE remains the most popular host country (with 37 campuses), and the US by far the most popular source (responsible for 78 campuses worldwide).
- Three obvious global growth trends are evident from the new data:
 - 1 A shift in host country emphasis from the Middle East to the Far East, particularly China and Singapore, where many new projects are still ongoing.
 - 2 A steady but increasingly significant rise in 'South-South' projects, both originating in and hosted by an emerging nation.
 - 3 A trend towards niche specialisms and single-discipline course provision, almost certainly driven by a desire to minimise financial and reputational risk.
- Despite these emerging trends, and evidence of growing activity in a relatively large and diverse range of new countries, in volume terms the spread of IBCs is still very lopsided. Globally, a remarkable 80% of overseas campuses originate from institutions in just five countries (the US, France, the UK, India and Australia). Currently, China has only one (sited in Ghana). In terms of hosting, the UK is sixth on the global ranking, behind Singapore, China, Qatar and Malaysia as well as the clear leader, the UAE. Of the six IBCs currently hosted in the UK, four involve institutions from the US, while Malaysia and Iran provide the others.



Source: Observatory on Borderless higher Education, January 2012

Fig B1: Top host countries for international branch campuses (2011-12)

- The University of Nottingham is the UK leader on IBCs in terms of student numbers: its campuses in Ningbo, China, and Semenyih, Malaysia, both have well over 3,000 students and are among the five largest overseas operations in the world. Manchester Business School, University College London (UCL) and Middlesex University are other notable players, with several smaller campuses each. Overall, the UK's existing and currently planned IBCs are concentrated quite heavily in the UAE, China, India and Singapore, though single campuses have been established in less well-known locations such as Kazakhstan (UCL) and Uzbekistan (Westminster). By subject, business and management dominates the offering, but more specialised scientific provision is also evident, for example in engineering and medicine.

Case studies of UK-delivered TNE programmes

Box B1: Going global – UK tertiary institutions investing overseas

- **Nottingham:** Nottingham University's senior management is pleased with the growth of its Malaysian branch campus. In the past five years, it has grown from 950 to 4,000 students, and the plan is to increase numbers by between 300 and 400 each year. Nottingham aims to do this largely by introducing new subjects: almost half of current students are studying engineering, pharmacy or business. Overall, some 40 per cent of Nottingham's students in Malaysia are from outside the country. The market for students from India has always been strong, with large numbers also applying from Pakistan, Sri Lanka, and Bangladesh. There is also potential in the Middle East, and applications from China and Vietnam remain strong. Nottingham's Malaysian campus has the benefit that it can apply for funding from more than one region – it is seen as both a UK and Asian institution. UK branch campuses rely almost entirely on tuition fees, and Nottingham's Malaysian campus is 98 per cent funded in this way.

Source: 'British universities overseas: it's about more than just a piece of paper', The Guardian, 1 August 2011

- **Manchester:** Manchester Business School (MBS) has become the first UK institution to open a campus in the US, aiming to tap into increasing demand for global education from American executives. Launched in Miami in late 2010, MBS is the first British institution accredited to teach business in the US. The MBA programme, which initially took 30 students and aims to serve 600 by 2013, is delivered in person by existing MBS faculty, and also incorporates a centre previously opened in Jamaica in 2000. Strong links are being built with emerging markets in Latin America, but the aim of the Miami campus is primarily to fill a gap in the US market for global MBA education, with no highly-rated business schools operating in Florida, and many top US schools further afield charging \$100,000 or more in course fees (compared to \$30–60,000 at MBS). The school's international expansion, which now covers eight centres from Shanghai to Sao Paulo, was a key factor in turning a significant financial deficit into a £4 million annual surplus by 2010.

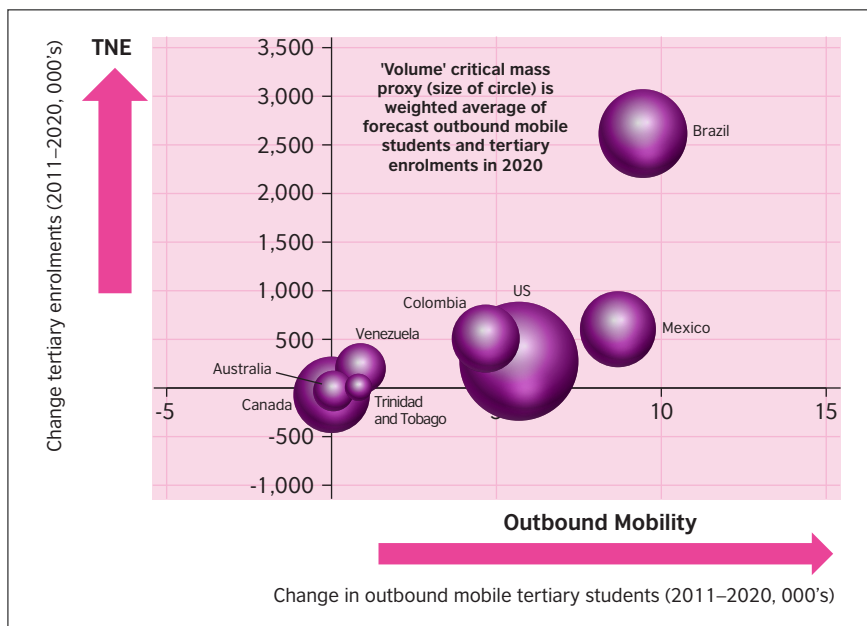
Source: Partly adapted from 'Manchester hopes to make waves in Miami', Financial Times, 6 September 2010

- **Liverpool:** University of Liverpool has demonstrated another successful model of TNE in China. In 2006, University of Liverpool and Xi'an Jiaotong University established the first independent Sino-Foreign University: Xi'an Jiaotong-Liverpool University (XJTLU). The new university, which has its own degree awarding powers, recruits around 5,000 students.

Source: University of Liverpool

Annex C: Future higher education opportunities for global engagement – world region analysis

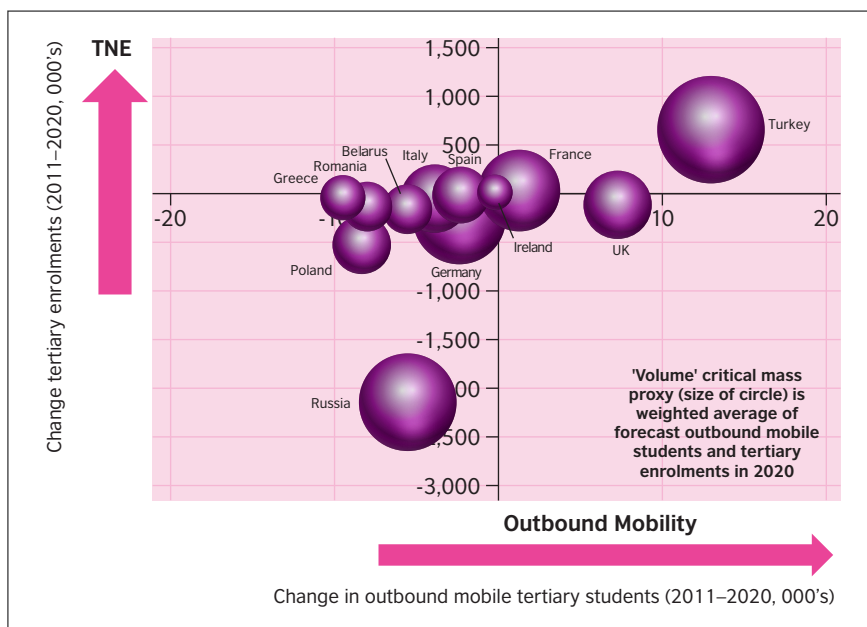
Americas and Oceania



Source: Oxford Economics

International Education Opportunities – Outbound Mobile Students and TNE

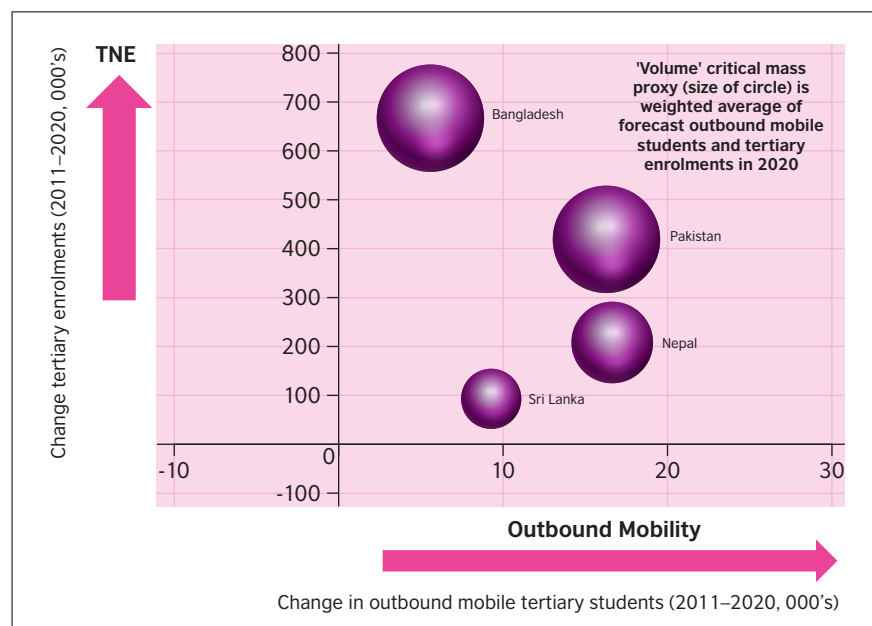
Europe



Source: Oxford Economics

International Education Opportunities – Outbound Mobile Students and TNE

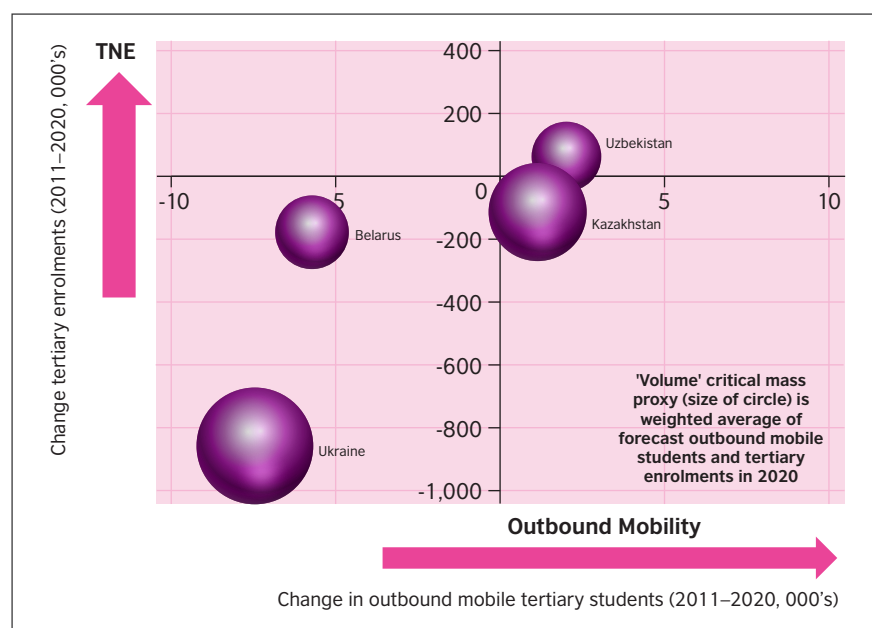
South Asia (excluding India)



Source: Oxford Economics

International Education Opportunities – Outbound Mobile Students and TNE

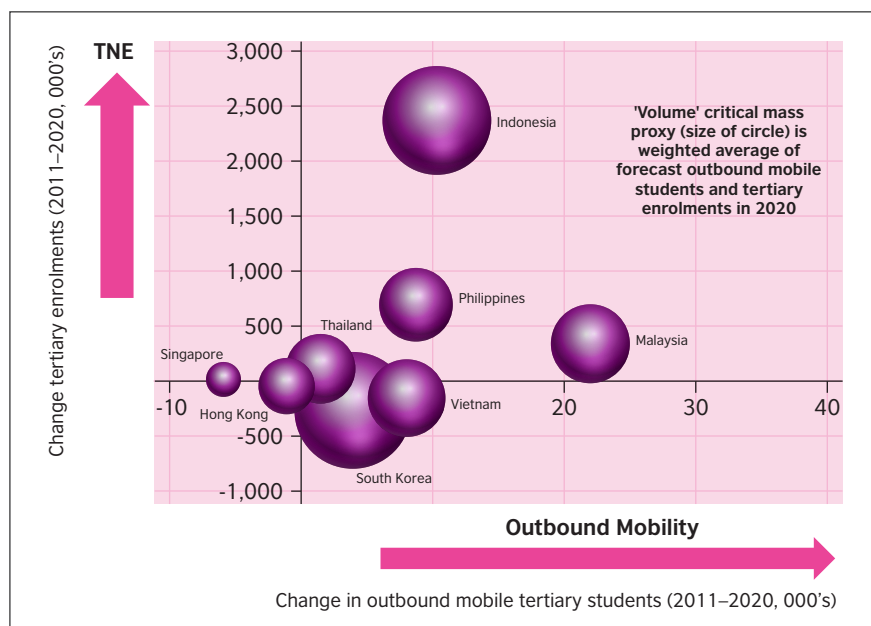
Commonwealth of Independent States (CIS) (excluding Russia)



Source: Oxford Economics

International Education Opportunities – Outbound Mobile Students and TNE

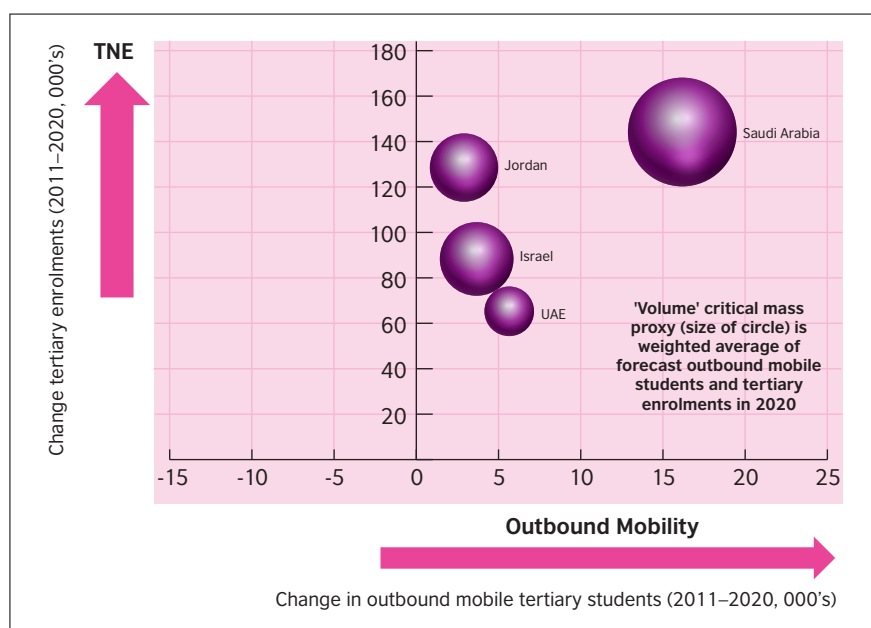
East and South East Asia (excluding China)



Source: Oxford Economics

International Education Opportunities – Outbound Mobile Students and TNE

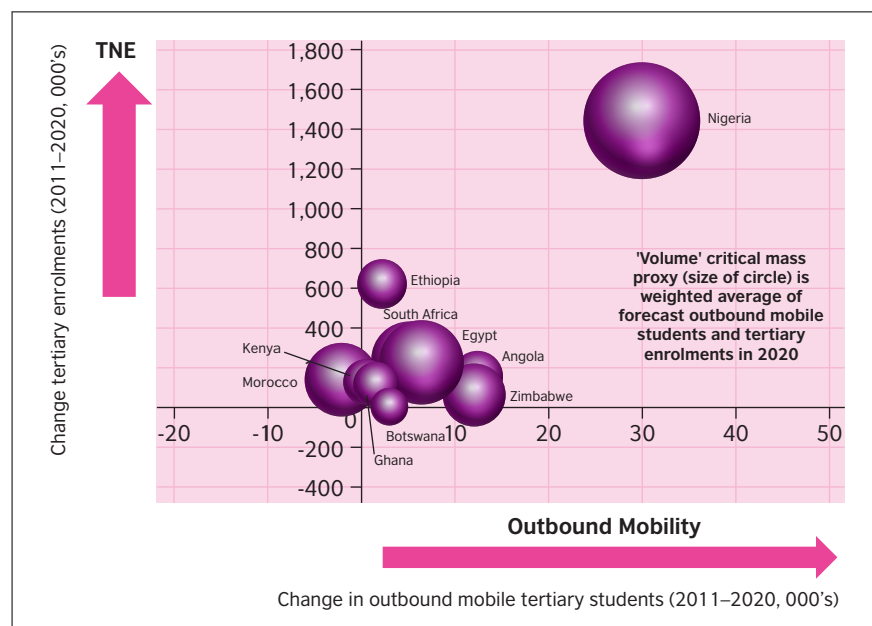
Middle East



Source: Oxford Economics

International Education Opportunities – Outbound Mobile Students and TNE

Africa



Source: Oxford Economics

International Education Opportunities – Outbound Mobile Students and TNE

Annex D: International higher education definitions

Distance learning

- The term distance learning is used differently depending on the context in which it is used.
- Traditionally distance learning is used to describe a learning experience which has little or no face-to-face contact. Students are able to study at their own pace and have limited interaction with other students or tutors on their course.
- In recent years, many distance learning programmes have developed to incorporate face-to-face teaching support. These programmes are often described as 'supported distance learning'. International students often see these programmes as 'part-time study' rather than distance learning. The teaching may be delivered by UK academics travelling overseas to teach part of the course; or through local tutors/academics; or a mix of the two.

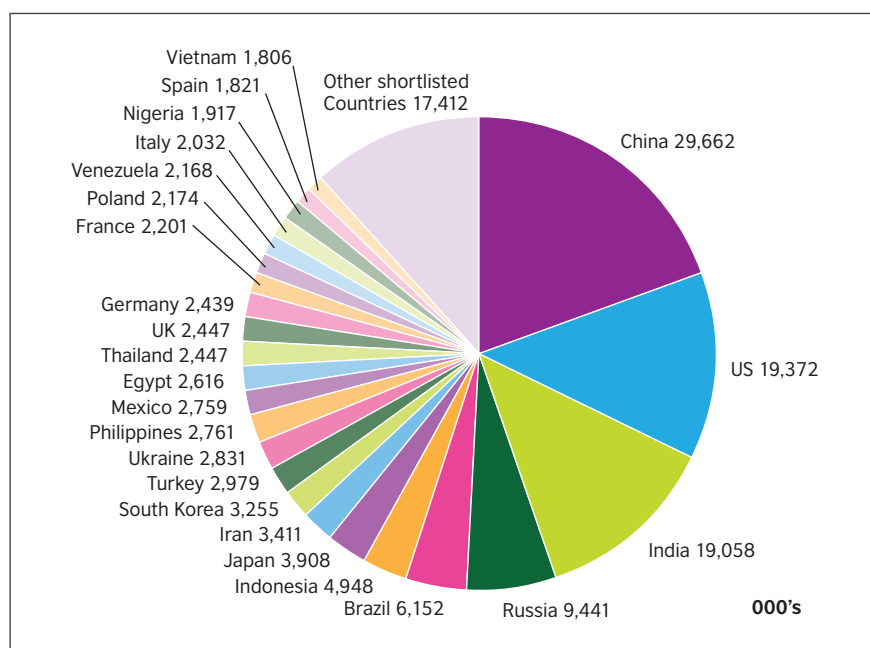
In-country delivery/ collaborative provision/ partnerships

- In-country delivery is used to describe programmes where the delivery mode is predominantly face-to-face (for the whole of a course or part of it).
- Teaching is usually delivered through a local partner institution or through a branch campus. Most of the teaching will be delivered through locally based tutors. The level of input into the programme and delivery from origin institutions can vary.

Models of in-country delivery include:

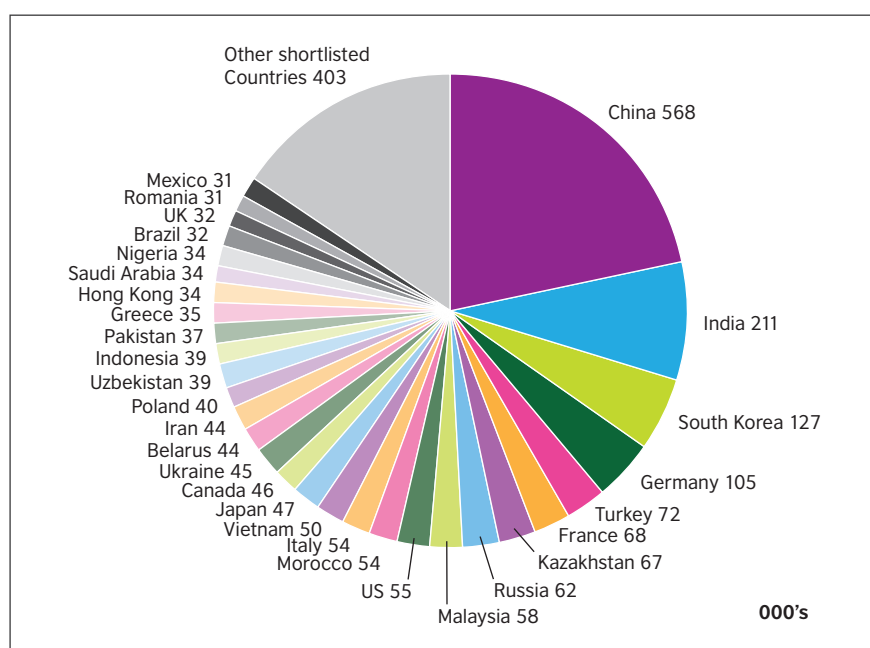
- **Branch campus:** The origin institution creates a campus on another site. Staff may be recruited locally or brought from the origin institution, but they are staff of the provider. The origin institution is solely responsible for course delivery and all academic matters. The costs involved in the development and management of branch campuses is prohibitive to the majority of institutions.
- **Twinning programme:** This is where the origin institution has a local partner. The local partner teaches part of the origin institution's course, using their own staff. Students transfer to the origin institution's own campus to complete the course. Typical combinations are:
 - 1+2 – the first year of the degree programme is delivered overseas followed by two years in the origin institution.
 - 2+2 – foundation and first year-degree is delivered overseas and the final two years of the programme in the origin institution.
 - 3+0 – are delivered entirely by the partner institution and do not involve any period of study in the origin country.
 - The origin institution will provide the course material to the local partner, or agree to accept the partner's own course as an alternative. The local partner is responsible for course delivery. The origin institution is responsible for monitoring academic standards.
- **Dual/joint award:** The origin institution and local partner provide programmes leading to separate awards of both or all of them (dual award) or to a single award made jointly by both (joint award).
- **Franchising:** The origin institution licences a local institution to teach some or its entire course, so that students can receive the award of the origin institution without attending the origin campus. The local institution is responsible for delivery of the course. The origin institution makes the final award and has overall responsibility for content, delivery, assessment and quality assurance.
- **Validation:** The course is developed and delivered by the local institution. The origin institution judges whether it is of appropriate quality to lead to its award. The origin institution determines the extent to which it exerts direct control over quality assurance aspects.
- A related term (not specific to in-country delivery) is articulation.
- **Articulation:** A transfer arrangement between an origin and local institution. The origin institution agrees to recognise and grant specific credit and advanced standing to applicants from a named programme of study pursued in the local institution.

Annex E: Supplementary charts and graphs



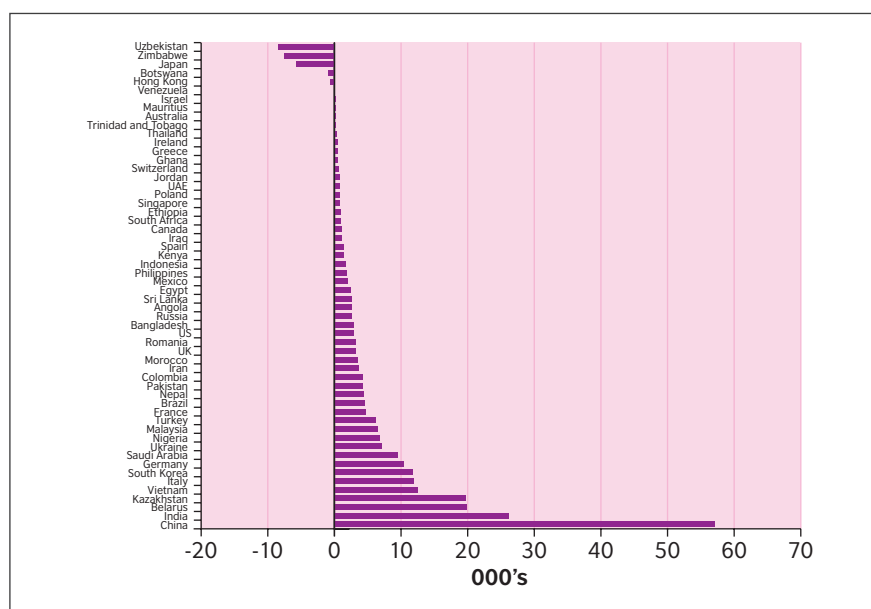
Source: UNESCO, Oxford Economics

Fig E1: Global tertiary enrolments (2009)



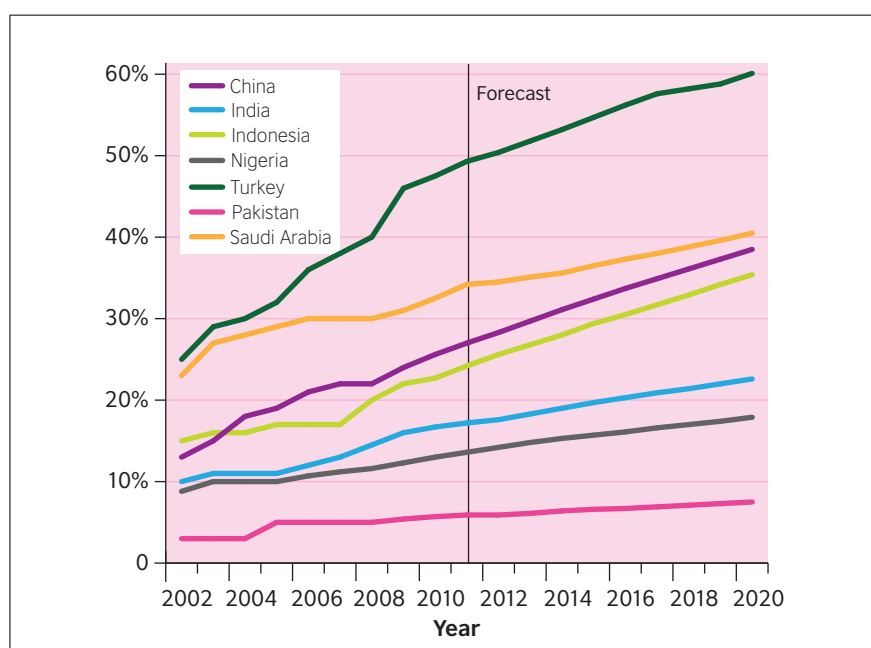
Source: UNESCO, OECD, Oxford Economics

Fig E2: Global outbound mobile tertiary students by origin market (2009)



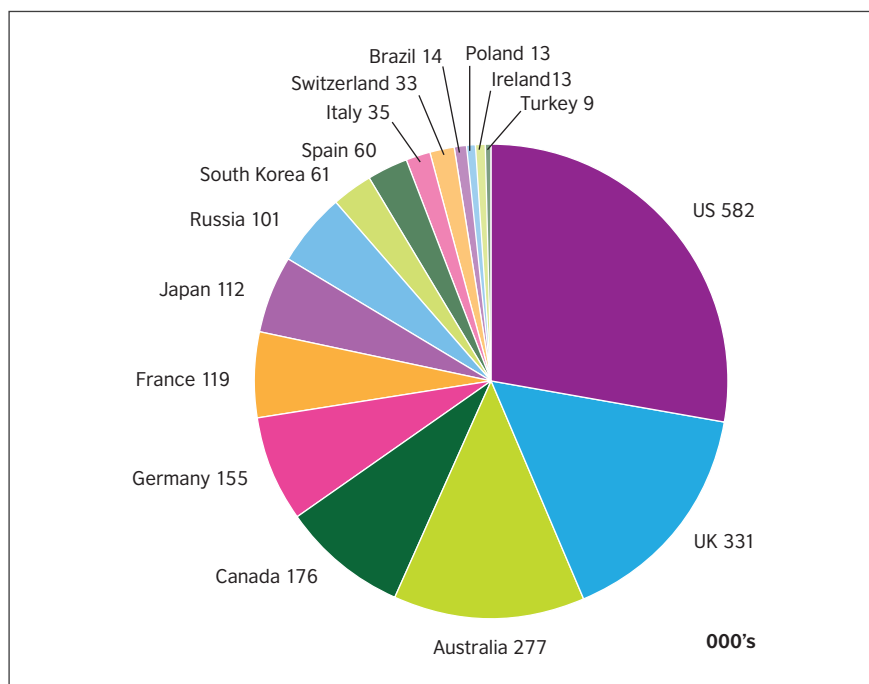
Source: UNESCO, OECD, Oxford Economics

Fig E3: Global outbound mobile tertiary students by origin market growth (2008–09)



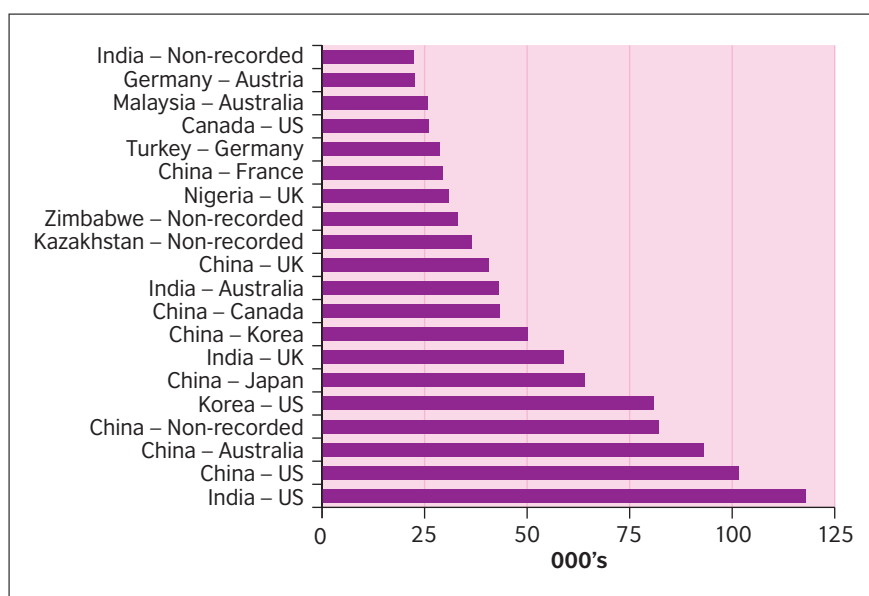
Source: UNESCO, Oxford Economics

Fig E4: Selected country gross tertiary enrolment ratio



Source: Oxford Economics

Fig E5: Global inbound mobile tertiary students by destination market (2020)



Source: UNESCO, OECD, Oxford Economics

Fig E6: Top 20 global tertiary mobile student flows by origin and destination market (2020)

EDUCATION INTELLIGENCE



EDUCATION INTELLIGENCE provides reliable and accurate research, forecasting, analysis and data to higher education institutions. Market intelligence is essential in order to locate effective partnerships, create solid collaborations and make strategic decisions regarding marketing and student recruitment. This service supports clients in forming individual international strategies by offering appropriate and timely information on student mobility flows, student decision-making and current national policies regarding higher education. Our extensive network of resources allows us to produce robust and cutting-edge trends analysis that can help shape the global debate in the education sector.

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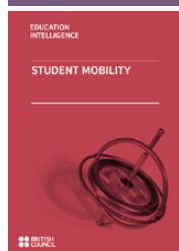
STUDENT INSIGHT: why students decide to study overseas

- informs marketing strategies aimed at international students
- focuses recruitment efforts
- allows better understanding of international student bodies



COUNTRY BRIEFS: concise country profiles

- provides broad economic country-specific profile
- highlights major education trends
- creates better understanding of potential geographic focus



STUDENTS IN MOTION: where students go globally to study

- helps anticipate student mobility flows
- provides information on education-influencing economic factors
- analyses mobility trends



PARTNERSHIP ACCESS: where to locate fruitful collaborations

- provides “needs and wants” analysis as to where opportunities lie
- offers higher education profile of a given country
- outlines limitations of what domestic and overseas institutions can do



GLOBAL GAUGE: a comparison of international education activity

- delivers big picture analysis of global “openness”
- offers context when measuring a given country’s education profile
- provides empirical evidence of international trends regarding education



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