

Global Priority Market Analysis in the

# Higher Education Sector



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## INTRODUCTION AND BACKGROUND

Scottish Enterprise, through Scottish Development International (SDI), and British Council Scotland (BC) commissioned the consulting support of Galloway & Associates to help identify a shortlist of countries which will form the basis of a 'Team Scotland' education mission programme for the next 3 years. The purpose of the work was to evaluate the top global markets/countries for future sector based missions and to identify those countries with the greatest future potential for opportunities based on the collective strengths of the sector, taking into account the current activities of Scotland's Higher Education Institutions (HEIs) in the following areas of potential opportunity:<sup>1,2</sup>

- Transnational Education (TNE)
- Student Recruitment
- Research Collaboration and Knowledge Exchange

## APPROACH, METHODOLOGY AND SUMMARY OF FINDINGS

The work drew on existing desk research, reports and qualitative data to produce an informed summary and shortlist. The scope of the work did not include primary research, although it has been necessary in each of the above areas to engage both in interviews and additional data gathering to find the information required.

Following an initial briefing with SDI and Universities Scotland (US), we were sent the existing reports, data and information which SDI and British Council Scotland wished to be used as the basis of the analysis. We also conducted our own search to identify alternative sources of information where possible. (Appendix A contains a list of the main documents consulted). An early evaluation of these shared reports and documents revealed that they contained most information in the area of TNE, somewhat less on Student Recruitment, and very little indeed on attractive markets for Research

Collaboration. It was agreed therefore that an alternative source of information would need to be found for this third and important area of the work, and that requesting informed feedback from the existing Research Pools and Innovation Centres would allow us to do this. Details of this are included in the Research Collaboration section below.

According to the information available, for each of the three opportunity areas above we have detailed and prioritised the most attractive markets in their own right as follows:

**Transnational Education (TNE):** China, India, Indonesia, Nigeria, Bangladesh, Philippines, Vietnam, and Thailand

**Student Recruitment:** China, Philippines, India, Thailand, Nigeria, Indonesia, Bangladesh, Malaysia, and Vietnam

(Summary profiles of the lead market countries, taken from information in the reports provided, are included in Appendix B).

For **Research Collaboration and Knowledge Exchange**, China is the lead priority market noted most often by the Research Pools. However, the various market opportunities identified by them have specific features and requirements, and further work is required to evaluate and prioritise these in terms of; the nature of the market opportunities, Scotland's sector priorities, and most importantly, where Scotland's truly world class research strengths lie.

The draft findings were presented and discussed at a meeting on 25th November with SDI, British Council Scotland and US. At this meeting it was agreed by the partners that in order to evaluate and 'filter' these opportunities relative to the various market, sector and other priorities of Scotland's Higher Education Institutions (HEIs) collectively and of the support bodies, and to arrive at a final and agreed shortlist of lead potential opportunity markets, further discussion with the HEIs is required. We understand that this meeting is being held in December 2013.

1. 'Opportunities in Education Consultancy', 'Niche sector opportunities' and 'Continuing Professional Development (CPD) for the Corporate Sector' were dropped from this list due to insufficient information available in the documents provided by SDI and BC.

2. It is understood that as this work is looking at markets which Scotland's HEIs are less able to address themselves, and which offer future potential, the focus will therefore be (particularly for TNE and Student Recruitment) not on mature markets (such as Europe) but in the main part on emerging growth markets.

## RESEARCH FINDINGS – MARKET OPPORTUNITIES

We have separated the findings into two sections: 1. TNE and Student Recruitment, and 2. Research Collaboration & Knowledge Exchange

### 1. TNE and Student Recruitment

Many of the reports articulate a list of ‘priority’ or ‘key’ markets relevant for consideration of TNE,

student recruitment and international education opportunities in general. Because these approach the selection of markets from different angles, based on different assumptions and for different reasons it means there are both overlaps and inconsistencies among them, and makes the simple identification of a single best opportunity list challenging.

Priority markets from the key reports in the area of international education include:

Report	Description of the markets identified	Key Markets
Horizon Scanning	Emerging markets with highest demand for higher education qualifications by 2020, based on population of potential tertiary students.	China, India, Indonesia, Pakistan, Nigeria, Brazil, Bangladesh, Ethiopia, Philippines, Mexico, Egypt and Vietnam.
HM Government - International Education: Global Growth and Prosperity (An Accompanying Analytical Narrative)	Top ten countries of origin for internationally mobile students 2010	China, India, Germany, United States, Malaysia, France, Vietnam, South Korea, Canada, Turkey.
HM Government - International Education: Global Growth and Prosperity	Description: 8 countries and 1 region identified as target markets for international educational partnerships/ international education potential. Chosen on basis that they are deemed important for increased engagement by the UK “for a whole host of foreign policy reasons,” demographics and ambitions in prioritizing education.	China, India, Brazil, Saudi Arabia, Columbia, Turkey, Mexico, Indonesia, and the Gulf (comprising Bahrain, Kuwait, Oman, Qatar, and the United Arab Emirates).
BC - Partnership Access: Exploring Partnerships in Burgeoning Economies	Countries with highest tertiary enrolment growth 2002-2009	China, India, United States, Brazil, Iran, Indonesia, Russia, Turkey, Venezuela, Vietnam, Nigeria, Bangladesh, Pakistan, Ukraine, Columbia, Mexico, Romania, Egypt.
BC - Partnership Access: Exploring Partnerships in Burgeoning Economies	Countries with largest tertiary age population in 2020.	India, China, United States, Indonesia, Pakistan, Nigeria, Brazil, Bangladesh, Ethiopia, Philippines, Mexico, Egypt, Vietnam.

Key markets in the areas of TNE and Student Recruitment more specifically include:

Report	Description of the markets identified	Key Markets
BC - "The Shape of Things to Come": The evolution of transnational education: data, definitions, opportunities and impacts analysis (2013)	List of priority markets with favourable environments for TNE.	<b>Group 1:</b> HK, Malaysia, Singapore, United Arab Emirates. <b>Group 2:</b> Qatar, South Korea. <b>Group 3:</b> Botswana, Bahrain, China, India, Mauritius, Oman, Spain, Thailand, Vietnam. <b>Group 4:</b> Brazil, Indonesia, Mexico, Nigeria, Pakistan, Poland, Russia, Turkey. <b>Group 5:</b> Nepal, Sri Lanka.
HM Government - International Education: Global Growth and Prosperity (An Accompanying Analytical Narrative)	Most favourable environments for TNE (sourced from British Council report).	HK, Malaysia, Singapore, United Arab Emirates.
BC - Hot Topics: An Examination of Host Destinations from a Student Perspective	List of emerging challengers for international students.	United Arab Emirates, Malaysia, China.
Horizon Scanning/ "The Shape of Things to Come": higher education global trends and emerging opportunities to 2020	Countries with the largest number of outward mobile students by 2020.	China, India, South Korea, Germany, Turkey, Malaysia, Nigeria, Kazakhstan, and France.
Horizon Scanning	Countries with the biggest growth of outbound mobility by 2020.	India, Nigeria, Malaysia, Nepal, Pakistan, Saudi Arabia, and Turkey.
Universities UK - Futures for Higher Education	Top 20 non-EU countries with most students in UK higher education system.	China, India, Nigeria, United States, Malaysia, HK, Pakistan, Saudi Arabia, Canada, Thailand, Taiwan, South Korea, Bangladesh, Sri Lanka, Singapore, Japan, Norway, Russia, Iran, Turkey.
A Strategic Analysis of the Scottish Higher Education Sector's Distinctive Assets	List of countries with the most students studying in Scotland (non-EU students).	China, United States, India, Nigeria, Canada, Malaysia, Pakistan, Saudi Arabia, Norway, Taiwan, HK, Thailand.
A Strategic Analysis of the Scottish Higher Education Sector's Distinctive Assets	List of "opportunity" countries where Scottish institutions under-perform in terms of student recruitment.	Malaysia, Saudi Arabia, HK, Thailand, Sri Lanka, Bangladesh, Vietnam, Turkey.
BC - Hot Topics: An Examination of Host Destinations from a Student Perspective	Countries of origin for students choosing the US as a first choice destination.	China, Turkey, South Korea, India, Thailand, Pakistan, Taiwan, Russia, Bangladesh, Nigeria.
BC - Hot Topics: An Examination of Host Destinations from a Student Perspective	Countries of origin for students choosing the UK as a first choice destination.	China, Turkey, South Korea, India, Pakistan, Bangladesh, Russia, Mexico, Taiwan, Thailand.

Report	Description of the markets identified	Key Markets
BC - Hot Topics: An Examination of Host Destinations from a Student Perspective	Countries of origin for students choosing Australia as a first choice destination.	China, Bangladesh, Turkey, Pakistan, Thailand, India, Singapore, South Korea, Taiwan, Indonesia.
BC - Hot Topics: An Examination of Host Destinations from a Student Perspective	Countries of origin for students choosing Canada as a first choice destination.	Turkey, China, Pakistan, Bangladesh, India, Nigeria, Mexico, South Korea, Russia, Brazil.
BC - Hot Topics: An Examination of Host Destinations from a Student Perspective	Countries of origin for students choosing New Zealand as a first choice destination.	China, Thailand, India, Turkey, South Korea, Bangladesh, Pakistan, Malaysia, Philippines, Taiwan.
BC - Hot Topics: An Examination of Host Destinations from a Student Perspective	Countries of origin for students choosing the United Arab Emirates as a first choice destination.	Pakistan, Bangladesh, Turkey, India, United Arab Emirates, China, Mexico, Nigeria, Russia, South Korea.
BC - Hot Topics: An Examination of Host Destinations from a Student Perspective	Countries of origin for students choosing Malaysia as a first choice destination.	Pakistan, Bangladesh, Turkey, Nigeria, Malaysia, Russia, Thailand, India, South Korea, China.
BC - Hot Topics: An Examination of Host Destinations from a Student Perspective	Countries of origin for students choosing China as a first choice destination.	China, Thailand, Turkey, South Korea, Spain, Taiwan, Pakistan, Bangladesh, HK, Russia.

Looking in more detail at some of these, as an example, the British Council's priority shortlist of countries for TNE (in its highly cited 'benchmark' report, "The shape of Things to Come": The evolution of transnational education: data, definitions, opportunities and impacts analysis<sup>3</sup>) is selected using three weighted metrics, and then assigning the countries to five categories. This is called the TNE Opportunities Matrix:

Group 1 Well above average	Group 2 Above average	Group 3 Average	Group 4 Below average	Group 5 Well below average
Hong Kong	Qatar	Botswana	Brazil	Nepal
Malaysia	South Korea	Bahrain	Indonesia	Sri Lanka
Singapore		China	Mexico	
UAE		India	Nigeria	
		Mauritius	Pakistan	
		Oman	Poland	
		Spain	Russia	
		Thailand	Turkey	
		Vietnam		

3. Referred to in this report for clarity as 'The Shape of Things to Come'[2].

The Priority Countries from HM's Government's 'Global Growth & Prosperity' report, on the other hand, contains no raw data on how it prioritises countries in its list. The list is shorter, but contains none of the first choice Category 1 countries presented by the British Council. The Global Growth list:

Meanwhile, the 'Horizon Scanning' report jointly published by several agencies focuses on twelve emerging markets in its list of priority markets. There is some overlap with both lists above:

These inconsistencies (coupled with the British Council's acknowledgement that there are major issues with much of the data used in its assessments, and which it states is in many cases either inconsistent or non-existent) mean that it is not possible to simply identify from the reports consulted a definitive list of the international markets with the greatest opportunities in TNE or Student Recruitment. In addition, in the above three reports alone, the total number of 'priority' markets defined is close to thirty! For example, in the British Council's 'The Shape of Things to Come'<sup>(2)</sup> it notes, of the TNE data, that, 'robust data is generally lacking' and that, 'data availability in general is woefully inadequate'.

The report however offers the most comprehensive short-list of opportunity countries for TNE in its Opportunities Matrix. This is a benchmark report that other agencies cite. The raw data used in the categorization of countries as well as the weighting is well documented, allowing the reader to understand the criteria behind the rankings. Nearly fifty criteria are used in the study to assess each country. The final 'scores' are added up and the countries categorised by opportunity group. After carefully analyzing the raw data, however, we believe the British Council list has significant shortcomings for the purpose of this exercise.

The report describes the Opportunities Matrix as, 'an analytical framework developed to identify countries with the most favourable prospects as hosts of TNE programmes over the next two to three years.' In other words it is describing the situation now and in the near future. For universities looking to future market opportunity prospects (as is the case for 'Team Scotland') this picture is likely to be already out of date. Other shortcomings can be attributed to a number of factors to do with how the data is weighted:

First, the data overemphasizes the importance of a formal regulatory environment (40%). By heavily weighting the existence of an agency responsible for TNE and formal regulations to govern them, the report penalises emerging and developing markets. In our own recent interview with the Provost and CEO of Nottingham in Malaysia, Professor Christine Ennew, she stated that when they entered the Malaysian market twelve years ago as the first International Branch Campus (IBC), there was no regulation whatsoever (interview, 2013). Solutions to problems were solved as they arose and from that experience regulation was established.

#### Priority Countries

Brazil  
China  
Columbia\*  
India\*  
Indonesia  
Mexico  
Saudi Arabia  
Turkey  
Gulf region\*

#### Priority Countries

India  
China  
Pakistan  
Nigeria  
Indonesia  
Mexico  
Brazil  
Bangladesh\*  
Ethiopia\*  
Philippines\*  
Vietnam  
Egypt

Next, the British Council data relies too much upon macro-economic metrics such as current GDP for a given country. This means that emerging markets are penalized, as the wealth disparity between the poor and middle / upper class can be substantial in a market such as China.

The result of just these two factors lead to a Category 1 short-list including Singapore, Malaysia, HK, and the UAE. Yet the top tier of recommended countries does not match the story we find on the ground in these countries. For example, in 2013 alone Singapore has seen three IBCs exit the market: The Tisch School of the Arts, the University of Las Vegas, and Chicago-Booth. For many IBCs in Singapore, the high cost of business plus the lack of student enrolment (partly from the difficulty in attracting students from the region outside Singapore) led to the closures.

The point of highlighting these inconsistencies is to make an argument for using a less complex means of predicting which countries have the best opportunities for future TNE growth. Rather than using fifty criteria and a complex weighting system, we recommend a more simple and practical analysis.

We have therefore analysed the raw data ourselves and suggest our own target country lists for TNE and Student Recruitment. We propose that to do this the priority consideration should be the key drivers of higher education demand. As suggested in the British Council's "The Shape of Things to Come": higher education global trends and emerging opportunities to 2020 report<sup>4</sup>, the most important of these are **demographic** and **economic** drivers.

'There are demographic drivers (specifically the 18-22 age group population) and economic drivers (economic growth, economic wealth and household incomes)... 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

The most significant tertiary population growth is and will continue to be in emerging nations. India and China together will account for 44% of the world total of 18-22 year olds (or 210 million) by 2020, with ten other countries collectively constituting a further 29% (or 137 million): Indonesia, Pakistan, Nigeria, Brazil, Bangladesh, Ethiopia, the Philippines, Mexico, Egypt and Vietnam (Horizon Scanning, 2013). I.e. The total population of 18-22 year olds in these countries plus India and China, just 12 countries altogether, will comprise nearly 75% of the global demographic - 256 million people.

## ECONOMIC DRIVERS

'The Shape of Things to Come' (1) states,

'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. The relationship positive and statistically significant.... 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.'

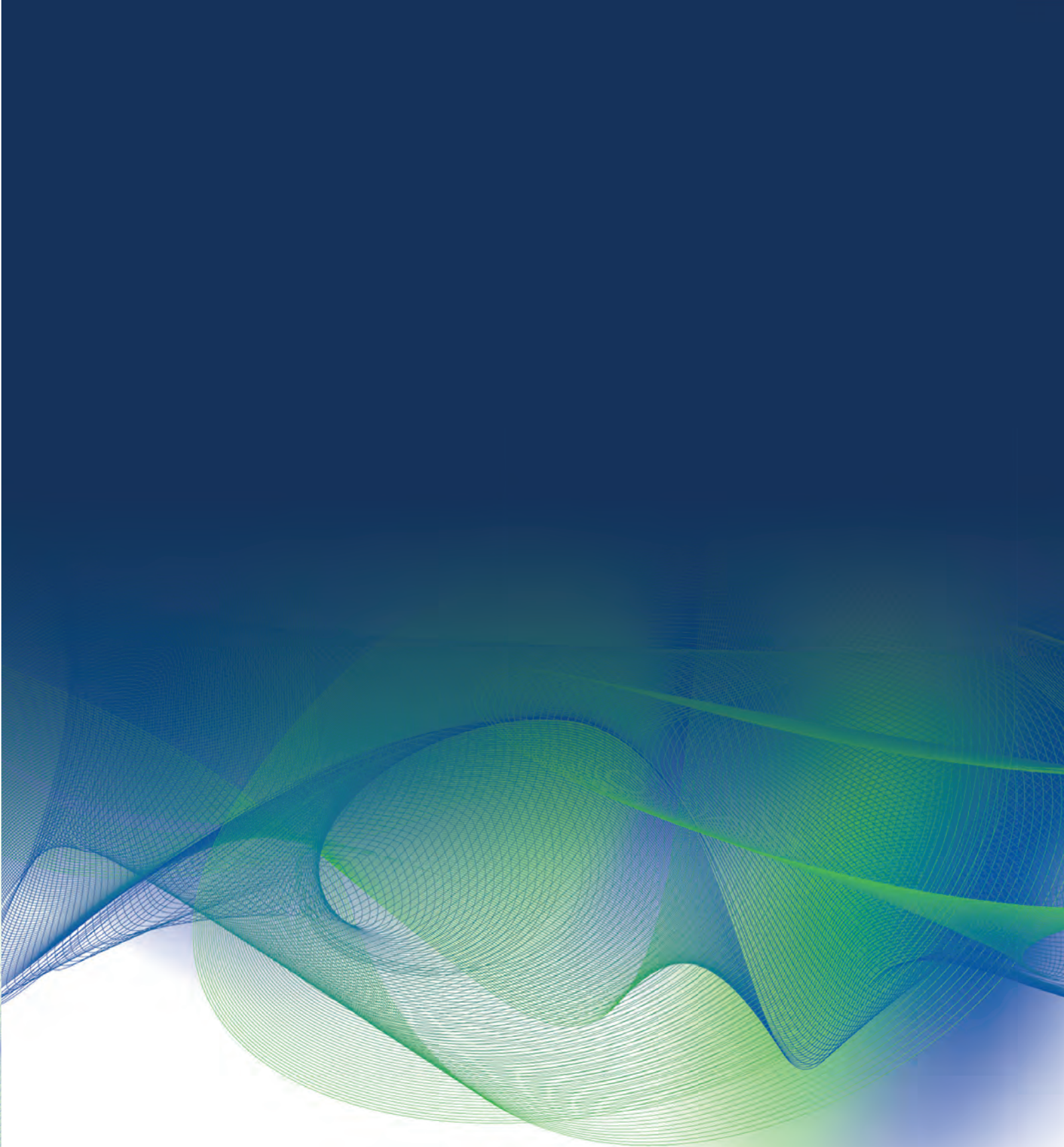
With regard to economic growth in general, Brookings Institute observes that the most substantial middle class growth between now and 2030 will be in Asia, Africa, and the Middle East.

With this in mind we offer the following market prioritisation processes for TNE and Student Recruitment:

4. Referred to in this report for clarity as 'The Shape of Things to Come (1)



# 1. Transnational Education (TNE)



Using the full list of 52 countries in the British Council's 'The Shape of Things to Come' (2), we can adjust for the weighting and redefine the parameters for a new shortlist<sup>5</sup>:

1. Listing in order of GDP growth (as the best indicator of future GDP growth): The British Council list was cut to include only those countries with GDP growth (2011-12) over 5%. The shortlist becomes 18 countries from 52, effectively narrowing the list down to emerging, growing markets. In the context of comparing countries by GDP growth rates, there is consistency over time. As an example, China's GDP growth is 7.8%. While it may fluctuate up or down, we would expect it to remain relative to the growth rates of other countries. At the other end of the scale, we would expect to see a far lower rate of growth in Greece or Spain relative to China in the short, medium, and most probably long term.
2. Next, the shortlist countries were put in order of population. Half of the world's tertiary aged students in the next five years will come from just India and China. If we accept the economic forecasts indicating middle class growth in the high GDP growth markets, then those with large populations will have the fastest growing number of tertiary students. In many developing countries demand will outstrip supply for tertiary provision. Therefore these countries have high potential for TNE.
3. Finally, like the British Council rankings, we have ranked countries in groups, which also show the number of tertiary students and GDP per capita (an indicator of standard of living) for consideration.

The following tables below show this prioritisation process:

	Country	Population (000)	Population of Tertiary Age: 15-24 yrs (000)	Tertiary students (000)	Outward bound students (000)	GDP per capita (PPP) US\$	GDP growth %
Group 1 Top 18 by GDP growth	Libya	6,002	1,024	557	4	12,300	104.5
	Iraq	31,858	6,215	1,017	9	7,200	8.4
	Uzbekistan	28,662	6,008	533	51	3,600	8.2
	China	1,349,586	211,750	54,949	934	9,300	7.8
	Ghana	25,200	4,937	599	n/a	3,400	7
	Saudi Arabia	26,940	4,582	1,685	69	31,800	6.8
	Philippines	105,721	20,912	6,041	n/a	4,500	6.6
	Qatar	2,042	261	26	5	103,900	6.6
	India	1,220,800	229,388	40,992	410	3,900	6.5
	Sri Lanka	21,676	3,249	502	35	6,200	6.4
	Thailand	67,448	9,949	4,745	47	10,300	6.4
	Nigeria	174,508	33,767	3,465	52	2,800	6.3
	Indonesia	251,160	43,702	10,104	71	5,100	6.2
	Bangladesh	163,655	32,698	3,463	42	2,100	6.1
	Malaysia	28,628	5,119	2,060	111	17,200	5.6
	Kazakhstan	17,737	2,916	1,190	67	14,100	5
	Oman	3,154	689	197	14	29,600	5
	Vietnam	92,478	17,303	3,857	96	3,600	5

5. All economic data is taken from the CIA World Factbook. Population of tertiary age, tertiary students, and outward-bound students is taken from the British Council's Opportunities Matrix. 'N/a' means the British Council does not provide this data in its report

	Country	Population (000)	Population of Tertiary Age: 15-24 yrs (000)	Tertiary students (000)	Outward bound students (000)	GDP per capita (PPP) US\$	GDP growth %
Group 2 Bottom 35 by GDP growth	Kenya	44,038	8,852	357	29	1,800	4.7
	Nepal	30,430	6,533	363	28	4,300	4.6
	Colombia	45,746	8,193	3,206	417	11,000	4
	Bahrain	1,281	167	42	6	29,200	3.9
	Mexico	1,116,221	200,362	56,161	562	15,600	3.9
	UAE	5,474	759	170	14	49,800	3.9
	Botswana	2,128	455	34	17	17,100	3.8
	Pakistan	193,239	40,773	2,185	57	2,900	3.7
	Australia	22,263	3,030	2,422	19	43,300	3.6
	Russia	142,500	17,670	13,410	67	18,000	3.4
	Mauritius	1,322	222	55	17	15,800	3.3
	Israel	7,707	1,134	709	28	32,800	3.1
	Morocco	32,649	6,141	812	82	5,400	3
	Jordan	6,482	1,368	516	21	6,100	2.8
	Turkey	80,694	13,960	6,397	102	15,200	2.6
	South Africa	48,601	9,506	1,427	n/a	11,600	2.5
	Egypt	85,294	16,027	5,188	67	6,700	2.2
	Japan	127,253	12,547	7,496	90	36,900	2
	Poland	38,384	4,986	3,517	53	20,900	2
	South Korea	48,955	6,535	6,739	256	32,300	2
	Canada	34,568	4,480	2,688	78	43,400	1.8
	HK	7,183	886	529	28	52,300	1.4
	Singapore	5,460	762	562	56	61,400	1.3
	Switzerland	7,996	925	507	24	46,200	1
	Brazil	201,010	33,850	8,676	43	12,100	0.9
	Germany	81,147	8,650	6,012	144	39,700	0.7
	Trinidad and Tobago	1,225	194	22	7	20,400	0.4
	Romania	21,790	2,637	1,551	34	13,000	0.3
	Ukraine	44,573	5,527	4,392	53	7,500	0.2
	Jamaica	2,910	551	159	15	9,300	0.1
	France	65,952	7,861	4,287	n/a	36,100	0
	Spain	47,371	4,666	3,417	41	31,100	-1.4
	Iran	79,854	15,092	6,455	65	13,300	-1.9
Greece	10,773	1,096	979	37	24,900	-6.4	

	Country	Population (000)	Population of Tertiary Age: 15-24 yrs (000)	Tertiary students (000)	Outward bound students (000)	GDP per capita (PPP) US\$	GDP growth %
Group 1 Strong growth and 50+ million population	China	1,349,586	211,750	54,949	934	9,300	7.8
	India	1,220,800	229,388	40,992	410	3,900	6.5
	Indonesia	251,160	43,702	10,104	71	5,100	6.2
	Nigeria	174,508	33,767	3,465	52	2,800	6.3
	Bangladesh	163,655	32,698	3,463	42	2,100	6.1
	Philippines	105,721	20,912	6,041	n/a	4,500	6.6
	Vietnam	92,478	17,303	3,857	96	3,600	5
	Thailand	67,448	9,949	4,745	47	10,300	6.4
Group 2 Strong growth and population less than 50 million	Iraq	31,858	6,215	1,017	9	7,200	8.4
	Uzbekistan	28,662	6,008	533	51	3,600	8.2
	Malaysia	28,628	5,119	2,060	111	17,200	5.6
	Saudi Arabia	26,940	4,582	1,685	69	31,800	6.8
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	Libya	6,002	1,024	557	4	12,300	104.5
	Oman	3,154	689	197	14	29,600	5

Priority market list for TNE, prioritised by both GDP growth and population size

Comparing this list with the Horizon Scanning report's list of emerging markets with highest demand for higher education qualifications by 2020, based on population of potential tertiary students; (China, India, Indonesia, Pakistan, Nigeria, Brazil, Bangladesh, Ethiopia, Philippines, Mexico, Egypt and Vietnam), the following do not feature in our list for the following reasons:

- Brazil (less than 1% GDP growth)
- Pakistan (3.7% growth)
- Ethiopia (not included in the British Council lists at all)
- Mexico (3.9% growth)
- Egypt (2% growth)

It also omits smaller countries such as Singapore which feature in the British Council Opportunities Matrix.

The top three opportunities are China, India and Indonesia. These choices make practical sense. China will have 500,000 foreign students by 2020, and as we have seen in the demographic data, half of the world's university age population will be from India and China. In Indonesia, there are 44 million 15-22 year olds and a GDP growth of over 6%. Furthermore, although Indonesia has no universities ranked globally, it has a fast growing middle class. Like India, the demand is there, but the supply will not be able to keep up with it. This has been found to be the best recipe for successful private universities entering the markets, including international players, as we have seen for example in Malaysia in the last fifteen years.

'The Shape of Things to Come' (1) states:

'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.'

While this is true, we should be careful not to equate TNE with branch campuses. There seems to be a tendency or implication in much of the literature/reports to assume that the two are the same. However, it must be remembered that there are several TNE models, some of which can be effective in high-risk countries. The franchising model employed by Oxford-Brookes has apparently yielded success in Pakistan, a country that can be considered dangerous and high risk for a branch campus. In some cases of course, the regulatory environment will have a significant impact upon which model can be employed. Likewise, India has not passed its foreign higher education partnership bill yet, and announced it would only consider institutions on the top 500 global institutions list to enter the market. However, demand is skyrocketing with the increase in population and rising middle class.

## ADDITIONAL NOTES ON TNE TRENDS

### Definitions of TNE Models vary among agencies.

There is no consistent list of models under the umbrella term 'TNE'. The British Council's much cited report 'The Shape of Things to Come' (2), for example, does not include distance learning in its definition of TNE. It states, 'While distance learning is considered to be TNE, it is not covered in this report.' Distance learning is, however, used as a model in HM Government's 'Global Growth and

Prosperity' report, thus the British Council and the Government have different understandings as to what comprises, and may be important in, TNE. Because the distance-learning model is one of fast-expected future growth via Massive Open Online Course platforms (MOOCs) for example, this inconsistency means that the growth potential of TNE overall is not consistently measured or considered.

Another consideration will be when new hybrid models begin to emerge, such as International Branch Campuses that have classes on a foreign campus plus a distance-learning component delivered online. This is the model planned for example at EduCity@Iskandar's Johan Cruyff Institute, Malaysia.

### Defining TNE Models

It is our belief that the models defining TNE must include distance learning and new technology-based solutions such as MOOCs. MOOCs will only increase as a TNE solution for distant places such as South or East Asia, and with technological advances every year, it only makes sense that at the very least MOOCs will be part of a blended learning strategy defining many future TNE arrangements. TNE models as defined in the 'Global Growth and Prosperity' report are perhaps the most appropriate:

- Distance Learning, including MOOCs (University of London model)
- UK Overseas Campus, or IBC (Nottingham Malaysia model)
- Twinning Program (University of Southampton in China model)
- Dual / Joint Award (Kingston University model)
- Franchising (Oxford-Brookes model)
- Validation and Articulation models

At present, 82% of all students in TNE programs are registered at overseas partner organisations, studying overseas for an award of the reporting institution. This is the Oxford-Brookes / ACCA model, which has 35,000 students in Pakistan alone. While Oxford-Brookes skews the figures, at present this is the most popular TNE model by volume of students. Conversely, less than 5,000 students total, or 4% of all TNE partnerships, are studying at branch campuses (British Council, 'Exploring Partnerships in Burgeoning Economies, 2013').

Next, new types of partnerships are now emerging, and so-called 'South-South' partnerships are increasing. In this model, the awarding institution is also in an emerging market. We see examples of Chinese academic programmes, for example, opening in Laos. 'North-South' partnerships are also beginning to emerge, where the emerging market is the awarding institution and the developed country is the where the programme takes place ('International Higher Education Collaboration in the South: Worldwide Developments, Dr Rosa Becker, 2012'). A recent example is Malaysia's Limkokwin University, which has opened a campus in London.

A recent trend among International Branch Campuses is the concept of the niche campus, i.e., a programme with a limited range of courses available. An example of this is Southampton University in EduCity@Iskandar, in Malaysia. This is their first year of instruction in Malaysia, and they are only offering undergraduate engineering courses. While the programme will eventually expand to include a greater course offering, they will all be within the discipline of engineering. This very focused approach allows new entrants in the IBC market to start conservatively with less risk than if they were offering a fully comprehensive set of subjects ('The Observatory, 2012').

With regard to growth, by 2020 the number of IBCs is expected to grow from 200 to 280 (Horizon Scanning, 2013).

## The global TNE market is large and it is growing in the short, medium, and long term.

In 2011/12, there were 570,000 higher education students studying for a UK higher education qualification at institutes abroad or via distance learning. This is greater than the number of foreign students actually studying at all programmes in the UK (HM Government, 'International Education, Global Growth & Prosperity Analytics, 2013'). In 2010/2011 there were 24,410 students studying on Scottish TNE programmes (British Council Scotland, 2013).

Since the proportion of TNE students is stable at 2% of global tertiary enrolments (British Council, 'Student Interest Hot Topics: Examination of Host Destinations from a Student Perspective, 2012'), the total size of the TNE market globally by 2020 is predicted to be just under 4 million students. This is based on present growth rates, which might be considered conservative in view of the potential for technological advances, such as new platforms such as MOOCs, to rapidly increase the reach of TNE globally. In short, TNE represents the most significant growth opportunity for UK higher education over the long term (Universities UK, 'Futures for Higher Education, 2012').

## More on Distance Learning and MOOCs

According to the Horizon Scanning report 2013, by 2020 MOOCs will be a major part of TNE provision. The experimental Stanford University case in 2012 reached 1 million distant students watching an advanced physics class online from around the world. In the future, this could be a threat to branch campuses. It may also mean that blended learning will be pervasive by 2020 ('Horizon Scanning, 2013').

The UK is behind the US in MOOC delivery platforms. While the UK government has launched FutureLearn, the first UK MOOC platform, the US now has three platforms, all privately funded by venture capital companies. Coursera, for example, is funded by venture capitalists, yet its advisory

board includes provosts from Princeton, Stanford, Duke, University of Pennsylvania, University of Michigan, and the University of Melbourne. It should be noted that Edinburgh launched six courses on the Coursera platform this year. 35,000 students completed the course, which is the same size as the university itself ('Horizon Scanning, 2013').

### **The market for TNE is shifting from the Middle East to Asia in the medium to long term.**

Demand for higher education is expected to continue to outstrip supply in Asia for another twenty years (The Observatory, 'International Branch Campuses, 2012'). OECD data state that Asian students presently represent 52% of foreign students enrolled worldwide. This percentage should drop due to increasing supply in Asia, as ASEAN is likely to want to stop brain drain and emphasise TNE as a means of keeping students within the region ('Horizon Scanning, 2013'). A significant driver of International Branch Campus growth in Asia is a drive by governments to establish education hubs ('International Branch Campuses, 2012').

### **The rate of growth of student mobility will begin to slow.**

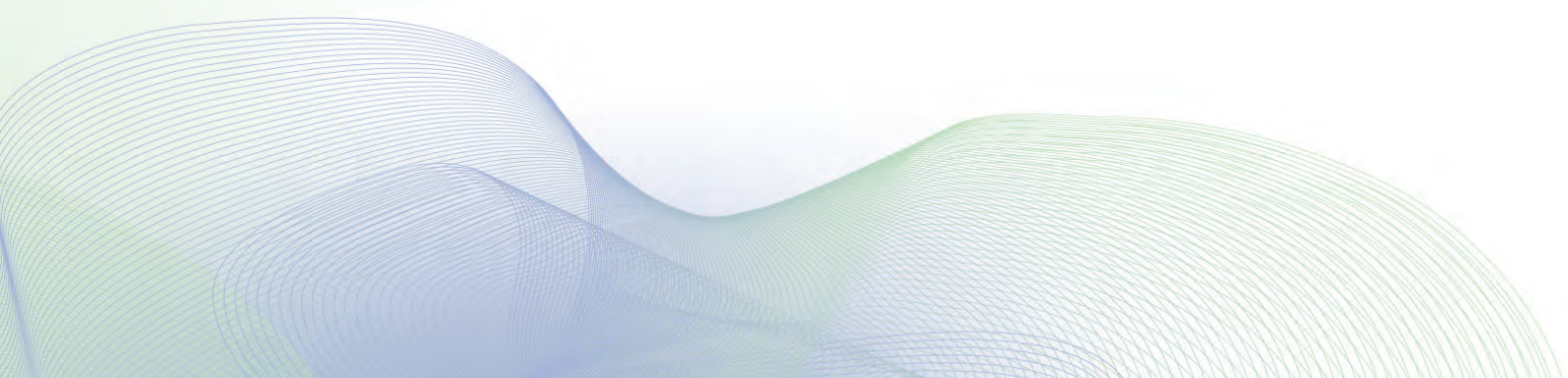
There will be a downward change in student mobility occurring globally, as countries that were once supplying students to host countries become host countries themselves. This includes China, Malaysia, Singapore, and the UAE ('British Council, 2012') As the rate of growth of student mobility slows, growth is expected in TNE to meet the demand, as learners will have options to study within their own countries ('Horizon Scanning, 2013'). While this suggests there could be fewer students studying in the UK, it also suggests an opportunity for UK TNE programmes.

### **Quality assurance is of growing importance to successful TNE outcomes.**

By 2020 the importance of quality assurance will go up ('Global Growth & Prosperity, 2013'). In autumn 2013 QAA and the UK Higher Education International Unit will report on what is needed to strengthen the quality assurance of TNE. This report will be of significant importance to the longevity of TNE programs. The importance of quality assurance is prevalent in nearly every source document of this study. Quality assurance is also seen consistently as a challenge (1994 Group, 'Strategies and Trends in the Internationalization of UK universities, 2011').

### **Recognition of award / diploma in the country of study is also significantly important.**

The British Council's report 'The Shape of Things to Come' (2) states, 'It is important that host country recognition bodies make efforts to publicly communicate their recognition and acceptance of TNE as a form of education.' In China, only one IBC has been recognized as a Chinese university: the University of Nottingham, Ningbo ('The Observatory, 2012').



## TNE Student Profiles

According to the British Council, the greatest potential student market for TNE is for those learners between the ages of 17-21 and those over 40 (British Council, 'Student Interest Hot Topics: Portrait of a Transnational Education Student, 2012'). The postgraduate age range is 20-26 and over 40. There is a potential market therefore for undergraduate and postgraduate programmes for mature students. Mature learners (those over 40) are likely to be in employment, and half of current postgraduate TNE students are also working. Flexibility in course delivery will therefore be important with these groups.

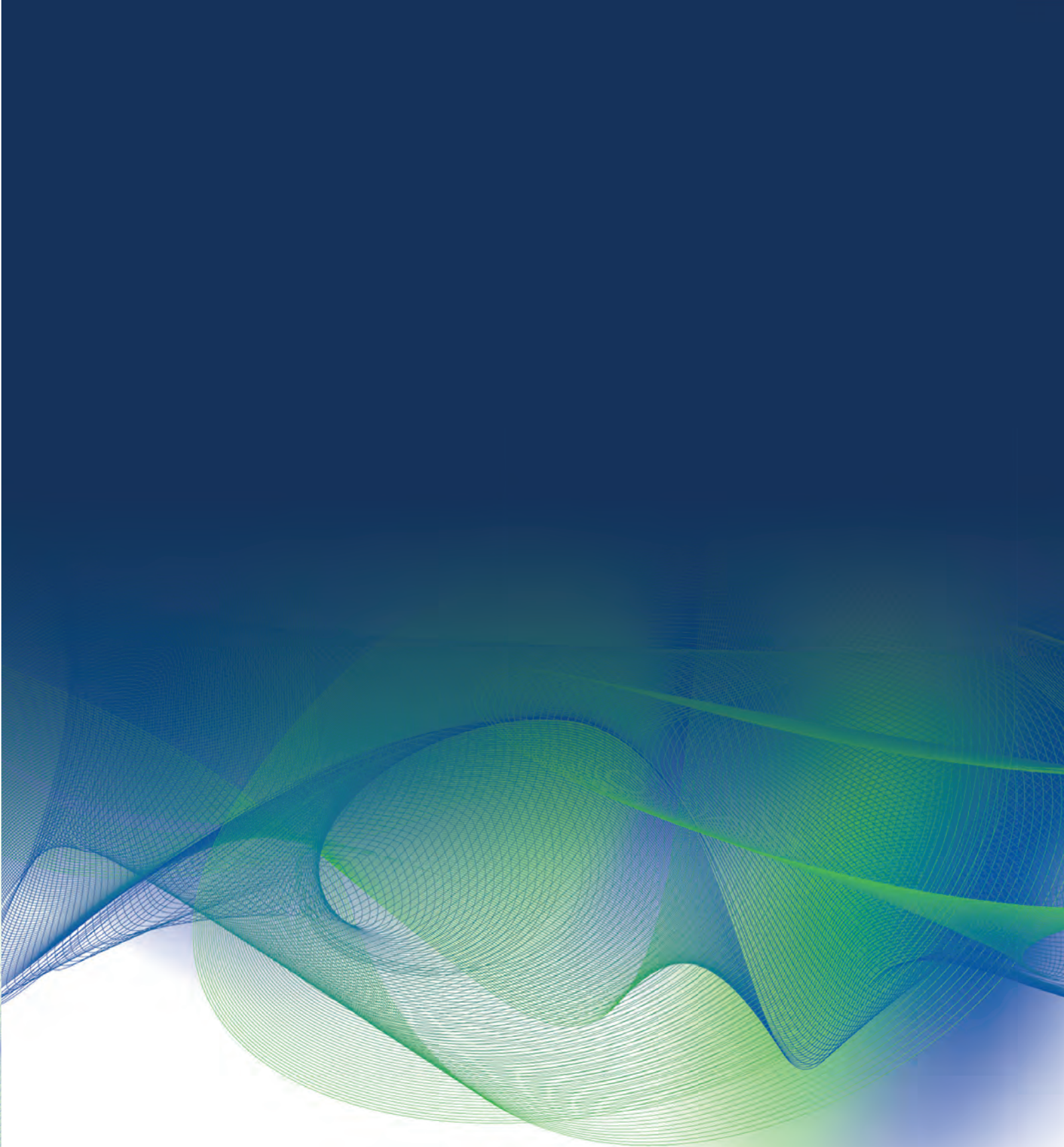
TNE students profiled in the British Council's 'Portrait of a TNE Student' study expressed interest in relevance and the impact of the specific qualification on their career more than the brand or reputation of a specific institution. Weight was also placed on recognisable qualifications, as well as course and country of the awarding institution.

**While universities in the UK have had individual successes with TNE, there has been little work as a collective group to seek international opportunities.**

'Global Growth & Prosperity' succinctly notes that UK institutions act autonomously and not cooperatively with regard to overseas opportunities.



## 2. Student Recruitment



Markets have been prioritised as follows, again using the full list of 52 countries in the British Council's 'The Shape of Things to Come' [2]:

1. We have taken as the lead factor the number of tertiary students, with the understanding that markets with the highest number offer the greatest potential as only a very small number of students proportionally travel abroad for study (generally agreed to be on average 2%)<sup>6</sup>. From the list of 52 countries, we applied a cut-off point of 2 million tertiary students, which results in a short-list of 26 countries.
2. The shortlist countries were then sorted in order of GDP growth, to show those countries with high numbers of tertiary students which also have a growing middle class and are therefore most likely to be able to send students overseas to study.
3. We have ranked countries in groups which also show the number of 15-22 year olds and GDP per capita.

The tables below show this prioritisation process:

	Country	Population (000)	Population of Tertiary Age: 15-24 yrs (000)	Tertiary students (000)	Outward bound students (000)	GDP per capita (PPP) US\$	GDP growth %
Group 1 Over 2 million tertiary students (26 countries)	Mexico	1,116,221	200,362	56,161	562	15,600	3.9
	China	1,349,586	211,750	54,949	934	9,300	7.8
	India	1,220,800	229,388	40,992	410	3,900	6.5
	Russia	142,500	17,670	13,410	67	18,000	3.4
	Indonesia	251,160	43,702	10,104	71	5,100	6.2
	Brazil	201,010	33,850	8,676	43	12,100	0.9
	Japan	127,253	12,547	7,496	90	36,900	2
	South Korea	48,955	6,535	6,739	256	32,300	2
	Iran	79,854	15,092	6,455	65	13,300	-1.9
	Turkey	80,694	13,960	6,397	102	15,200	2.6
	Philippines	105,721	20,912	6,041	n/a	4,500	6.6
	Germany	81,147	8,650	6,012	144	39,700	0.7
	Egypt	85,294	16,027	5,188	67	6,700	2.2
	Thailand	67,448	9,949	4,745	47	10,300	6.4
	Ukraine	44,573	5,527	4,392	53	7,500	0.2
	France	65,952	7,861	4,287	n/a	36,100	0
	Vietnam	92,478	17,303	3,857	96	3,600	5
	Poland	38,384	4,986	3,517	53	20,900	2
	Nigeria	174,508	33,767	3,465	52	2,800	6.3
	Bangladesh	163,655	32,698	3,463	42	2,100	6.1
	Spain	47,371	4,666	3,417	41	31,100	-1.4
	Colombia	45,746	8,193	3,206	417	11,000	4
	Canada	34,568	4,480	2,688	78	43,400	1.8
	Australia	22,263	3,030	2,422	19	43,300	3.6
	Pakistan	193,239	40,773	2,185	57	2,900	3.7
	Malaysia	28,628	5,119	2,060	111	17,200	5.6

6. "Global tertiary enrolment forecast by UNESCO to increase by 21 million between 2011 and 2020. Two percent of these students will travel abroad for study" (Shape of Things to Come [2])

“Any given country has the capacity to offer so many prospective students paces at HE institutions, and when demand at a national level outstrips supply, a proportion of students seek higher education opportunities elsewhere.” This proportion is stable at 2% of global tertiary enrolments. (BC Hot Topics Host Destinations)

	Country	Population (000)	Population of Tertiary Age: 15-24 yrs (000)	Tertiary students (000)	Outward bound students (000)	GDP per capita (PPP) US\$	GDP growth %
Group2 Fewer than 2 million tertiary students	Saudi Arabia	26,940	4,582	1,685	69	31,800	6.8
	Romania	21,790	2,637	1,551	34	13,000	0.3
	South Africa	48,601	9,506	1,427	n/a	11,600	2.5
	Kazakhstan	17,737	2,916	1,190	67	14,100	5
	Iraq	31,858	6,215	1,017	9	7,200	8.4
	Greece	10,773	1,096	979	37	24,900	-6.4
	Morocco	32,649	6,141	812	82	5,400	3
	Israel	7,707	1,134	709	28	32,800	3.1
	Ghana	25,200	4,937	599	n/a	3,400	7
	Singapore	5,460	762	562	56	61,400	1.3
	Libya	6,002	1,024	557	4	12,300	104.5
	Uzbekistan	28,662	6,008	533	51	3,600	8.2
	HK	7,183	886	529	28	52,300	1.4
	Jordan	6,482	1,368	516	21	6,100	2.8
	Switzerland	7,996	925	507	24	46,200	1
	Sri Lanka	21,676	3,249	502	35	6,200	6.4
	Nepal	30,430	6,533	363	28	4,300	4.6
	Kenya	44,038	8,852	357	29	1,800	4.7
	Oman	3,154	689	197	14	29,600	5
	UAE	5,474	759	170	14	49,800	3.9
	Jamaica	2,910	551	159	15	9,300	0.1
	Mauritius	1,322	222	55	17	15,800	3.3
	Bahrain	1,281	167	42	6	29,200	3.9
	Botswana	2,128	455	34	17	17,100	3.8
	Qatar	2,042	261	26	5	103,900	6.6
	Trinidad and Tobago	1,225	194	22	7	20,400	0.4

Priority market list for Student Recruitment, by number of tertiary students only

	Country	Population (000)	Population of Tertiary Age: 15-24 yrs (000)	Tertiary students (000)	Outward bound students (000)	GDP per capita (PPP) US\$	GDP growth %
Group 1 Large tertiary pop plus strong GDP growth over 5%	China	1,349,586	211,750	54,949	934	9,300	7.8
	Philippines	105,721	20,912	6,041	n/a	4,500	6.6
	India	1,220,800	229,388	40,992	410	3,900	6.5
	Thailand	67,448	9,949	4,745	47	10,300	6.4
	Nigeria	174,508	33,767	3,465	52	2,800	6.3
	Indonesia	251,160	43,702	10,104	71	5,100	6.2
	Bangladesh	163,655	32,698	3,463	42	2,100	6.1
	Malaysia	28,628	5,119	2,060	111	17,200	5.6
	Vietnam	92,478	17,303	3,857	96	3,600	5
Group 2 Large tertiary population and GDP growth less than 5%	Colombia	45,746	8,193	3,206	417	11,000	4
	Mexico	1,116,221	200,362	56,161	562	15,600	3.9
	Pakistan	193,239	40,773	2,185	57	2,900	3.7
	Australia	22,263	3,030	2,422	19	43,300	3.6
	Russia	142,500	17,670	13,410	67	18,000	3.4
	Turkey	80,694	13,960	6,397	102	15,200	2.6
	Egypt	85,294	16,027	5,188	67	6,700	2.2
	Japan	127,253	12,547	7,496	90	36,900	2
	South Korea	48,955	6,535	6,739	256	32,300	2
	Poland	38,384	4,986	3,517	53	20,900	2
	Canada	34,568	4,480	2,688	78	43,400	1.8
	Brazil	201,010	33,850	8,676	43	12,100	0.9

Priority market list for Student Recruitment, by number of tertiary students &amp; GDP growth

Comparing these priority markets with those in the other lists above:

The 'Horizon Scanning' and 'The Shape of Things to Come' (1) reports list the countries with the largest number of outward mobile students by 2020 as: China, India, South Korea, Germany, Turkey, Malaysia, Nigeria, Kazakhstan, and France.

- Kazakhstan misses out in our grouping due to having fewer than 2m tertiary students and a small overall population.

Of the 'Horizon Scanning' report's list of emerging markets with the highest demand for higher education qualifications by 2020, based on population of potential tertiary students; (China, India, Indonesia, Pakistan, Nigeria, Brazil, Bangladesh, Ethiopia, Philippines, Mexico, Egypt

and Vietnam), only Ethiopia is missing (as it is not included in the British Council's master list).

The British Council's 'Hot Topics, 2012' states that India, China, Thailand, Indonesia, and Bangladesh, all presently comprise an enormous market of outbound students studying in the US, UK, Australia and Canada.

The report 'A Strategic Analysis of the Scottish Higher Education Sector's Distinctive Assets' lists the 'opportunity' countries where Scottish institutions under-perform in terms of student recruitment as; Malaysia, Saudi Arabia, Hong Kong, Thailand, Sri Lanka, Bangladesh, Vietnam and Turkey. A number of these feature in our list and warrant possible attention.

'The Shape of Things to Come' (1) states, '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.'

The inclusion of the Philippines in the top two is interesting and worthy of further investigation.

## ADDITIONAL NOTES ON STUDENT RECRUITMENT TRENDS

### The market

There were 41,000 international students studying in Scotland in 2009/10 (British Council Scotland, 2013). The expected growth in emerging markets suggests the UK overall can increase international student numbers in the next five years by 15-20% ('Global Growth and Prosperity, 2013'). In the long term, however, the rapid increase of TNE programs in the Middle East and Asia will have a negative impact on the number of students going overseas. To what degree these TNE students will cannibalise the market of students going overseas to study cannot be determined. It is possible the growth of the middle class in emerging markets could offset any decreases meaning the overall pie will get bigger.

### Scotland vs. overall UK international student enrolments

Proportionally, the number of international students in Scotland is similar to the UK overall. Scotland Higher Education has done well in recruiting Chinese and Indian students, although immigration issues may have a negative impact on the latter. Where Chinese students study at several universities and study a wide range of subjects, Indian students are at fewer universities and tend to study vocational postgraduate subjects (British Council Scotland, 2013).

Where Scotland differs from the UK in recruitment is in its lack of ability to attract proportionally similar numbers of students from Malaysia, Saudi Arabia, HK, Thailand, Sri Lanka, Bangladesh, Vietnam, and Turkey (British Council Scotland, 2013). These countries are present in every opportunity list for TNE, as well as being present in the top lists for attendees of tertiary programs in the US and Australia (British Council, 'Student Insight Hot Topics: An Examination of Host Destinations from a Student Perspective, 2012'). There is an opportunity for Scottish universities here.

### Scottish universities have an excellent reputation, emphasize collaboration, and have high student satisfaction results.

While those responding to a British Council survey failed to identify what was unique about Scotland or the Scottish university experience (British Council Scotland, 'A Strategic Analysis of The Scottish Higher Education Sector's Distinct Assets, 2013'), the individual reputations of Scottish universities was high, as was student satisfaction.

### Top factors when selecting an institution in the UK

A student survey (British Council, 2012) reveals the top five factors prospective students listed when selecting an institution in the UK:

- Quality of the course
- Scholarships
- Career prospects
- International reputation
- World class academics

Selection factors for TNE students studying primarily in their own country are different to those going overseas to study (British Council, 'Student Insights Hot Topics: Portrait of a TNE Student, 2012'):

- Course availability
- Ease of admissions
- Program flexibility
- Quality of teaching
- Relevance of qualification
- Institutional reputation

## China and India

Because China and India play such an important role in the global composition of tertiary students, and will continue to do so in the medium and long term, additional notes on student recruitment from these markets have been included below:

### Recruitment notes on China

A Scottish Government priority has been to expand and deepen Scotland's education links with China. This includes increasing the number of Chinese and Hong Kong students studying in Scotland (The Scottish Government, 'A Five Year Strategy for Engagement Between Scotland and the PRC, 2013').

Chinese students from the mainland make up 17% of total of international students worldwide (British Council Country Brief: China, 2012). The importance Chinese students play globally can be seen in the 2013 China International Education Exhibition Tour in Beijing, which attracted 400 overseas institutions, all courting potential students.

The US is the most popular destination for Chinese students, with 194,000 studying in the US. This is followed by Australia, with 94,000 students, and then the UK, with 83,000 (British Council, 2013).

In the UK, this is a 16% increase over the prior academic year. Of these students, 53% are in postgraduate programs and 47% in undergraduate programs (British Council, 2013). Nearly 80% of these Chinese students are self-funded.

In terms of recruitment, 43% of Chinese undergraduates and graduates are from 3 cities: Beijing, Shanghai, and Guangzhou. Other cities accounted for less than 5% each (British Council, Student insight: China, 2012). This clearly has implications for recruitment and recruitment potential. Furthermore, 44% of Chinese students in a British Council survey said they did their own research when selecting an institution. Sources of information for all prospective students included websites (15%), search engines (12%), family or friend recommendations (10%), and agents (10%). It should be noted the most popular search engines are Google and Baidu, the latter being a local search engine.

### Recruitment notes on India

The profile of Indian student recruitment varies from that of China. 203,537 students from India studied overseas in 2011/12 (British Council, Country Brief: India, 2013). The US is the most popular destination, with 100,000 students, or 49% of all Indian students studying overseas. 31,000 students go to the UK, of whom 75% are graduate students. New immigration rules in the UK have made it difficult for Indian students to remain in the UK after graduation, and this has had a significant impact on student numbers, which have dropped 24%.

Like China, 80% of these students are self-funded. Graduate students and undergraduates from India have a different profile. Graduate students are mainly from just three cities: Delhi (22%), Mumbai (18%), and Kolkata (12%). Undergraduates are spread widely from over 17 areas (British Council, Student Insight: India, 2012).

Unlike Chinese students, the top three factors influencing students to study overseas are: employer (38%), parents (22%), media (12%). 48% of students did their own research. Also unlike China, the most important source of information for graduate students was the British Council (16%), followed by websites from the institutions (15%), and search engines (11%). Undergraduates had a wide dispersal of research sources. Facebook is the dominant site in India (28%), followed by Orkut (a local version of Google).

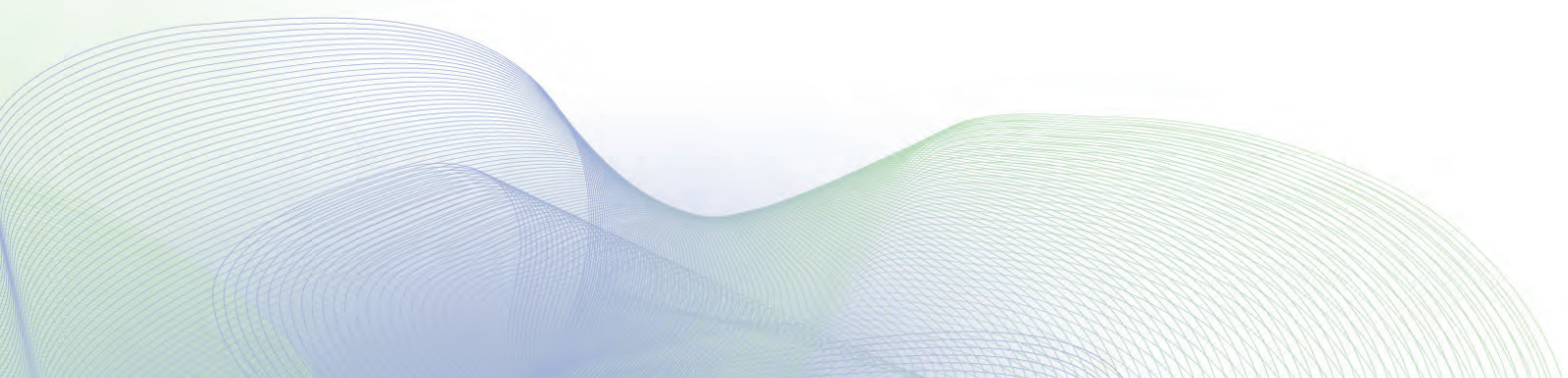
## Next Steps: TNE and Student Recruitment

Scottish Development International, British Council Scotland and Universities Scotland have decided that they wish to engage with Scotland's HEIs directly through the Universities Scotland International Committee to assess the above proposed priority markets relative to the HEIs' own activities, priorities and needs, with the intention of creating a short and agreed list of priority markets for future market missions. Given that this exercise is designed to identify possible markets for future engagement (5 years and beyond) we propose that whatever these chosen markets are they should at least satisfy the above key criteria of large tertiary student population size and significant economic growth.

The fact that India and China dominate in these lists requires careful consideration. While a number of Scotland's HEIs may already have arrangements with, and know these markets well, this may not be the case for all. In addition, consideration of where future TNE or Student Recruitment growth/opportunities might come from in China and India may warrant looking at these markets at a more segmented or regionalised level (rather than simply as the 'Chinese' or 'Indian' markets). Meanwhile, other markets such as Vietnam, Indonesia, Philippines and Thailand may be less well known.

The International Committee and the partners will then need to compare and evaluate the most important TNE and Student Recruitment opportunities relative to each other, and relative to those of Research Collaboration. With TNE we emphasise again the need to understand the potential and the implications of all models of TNE and caution against the assumption that consideration should be made primarily of, for example, branch campus model opportunities (which it is likely will be one of the least accessible models of TNE for many Scottish HEIs) or franchising (which some HEIs will be wary of for quality reasons).

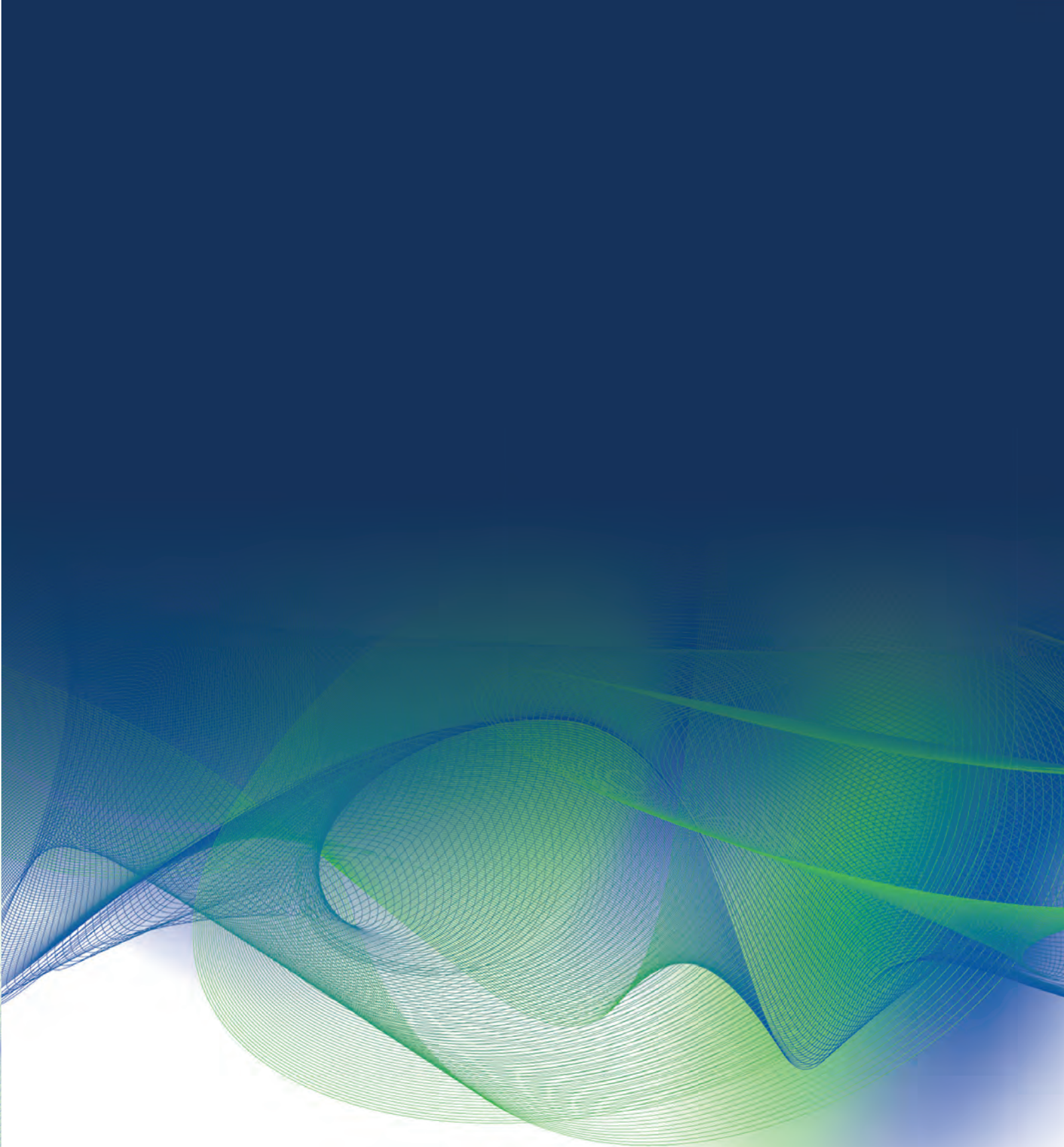
It should be noted that consistent and detailed information on these priority country markets in areas such as; government/industry strategy/funds for education development, details of specific skills gaps and training requirements, information on cross sector opportunities, and details of regulations concerning foreign education providers delivering in the country (as specified in the project brief) are not available in the reports provided. We recommend that for the agreed priority markets, this further level of research be conducted to provide a detailed and comprehensive market profile of each market which covers these important areas and which could inform discussions regarding potential future market missions.







## 3. Research Collaboration and Knowledge Exchange



Detailed information in the reports on international markets from the perspective of opportunities for Research Collaboration for Scottish HEIs is limited. The British Council's 'Shape of Things to Come (1)' states:

'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.

It summarises the current and future opportunities as shown opposite:



International Higher Education Opportunity	Current Opportunities	Future Opportunities
<p><b>Academic International Research Collaboration</b></p>	<p>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).</p>	<p><b>Largest growth in research output:</b> volume growth to be driven by collaborations involving US and Chinese institutions.</p> <p><b>Highest collaboration rates:</b> 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.</p> <p><b>Highest average citation impacts:</b> Switzerland, Netherlands, Denmark and US – collaborating with these countries in theory should help to maintain and increase research average citation impacts.</p> <p><b>Three core opportunity groups:</b> 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 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.</p>
	<p><b>Potential barriers</b></p>	
	<p>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</p>	
<p><b>Business international research collaboration</b></p>	<p><b>Large companies:</b> 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).</p> <p><b>Smaller companies:</b> 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).</p> <p><b>Leading countries in internationally filed patent application:</b> Japan, US, South Korea and in volume terms, China and India.</p> <p><b>Innovation:</b> Ongoing promotion of open innovation models, with fluid collaboration between business and the HE sector.</p>	
	<p><b>Potential barriers</b></p>	
	<p>Tertiary sector often focused on pure research, not commercial applications Large existing internal R&amp;D spend by global companies Institutional funding constraints can prohibit new commercial initiatives</p>	

(The report 'International Comparative Performance of the UK Research Base' lists the UK's most frequent collaboration partners in research currently as: United States, Germany, France, Italy, Netherlands, Australia, Canada, Spain, China, and Switzerland.)

'The Shape of Things to Come' (1) goes on to say:

"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.

### 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.

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.

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.

### International Research Collaboration

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

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.

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. China has the fastest-growing research output in the world and will play a key role in re-shaping the global research landscape to 2020.

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.'

This top level assessment of future research collaboration opportunities does not offer sufficient detail on the opportunities for specific sectors or areas of specialism that are of greatest interest to Scottish HEIs, either individually or collectively.

In addition, a number of reports make the observation that the greatest and most effective research collaborations stem from the networks and relationships of individual researchers than are created from 'top down' initiatives. 'The Shape of Things to Come' (1) states:

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

The report 'International research collaboration: opportunities for the UK higher education sector (Universities UK, 2008)' notes:

'Universities point to an important distinction between two classes of international research collaboration, with most distinguishing the much smaller number of institution-level strategic research partnerships from the much more extensive international collaboration between individual researchers. Senior management takes a more formative role in the former and a more facilitative role in the latter.

For most, this bottom-up approach increasingly coexists with a more strategic, institutional perspective. It seems that many UK universities already have a small number of strategic research partnerships, institution-to-institution, with overseas universities or research groups, motivated by the desire to sustain or improve the institution's research capability and international standing or reputation. It is also clear that most of these institution-level relationships began with educational programmes, ranging from double masters degrees to international summer schools and major recruitment campaigns.'

The report 'Knowledge, networks and nations: Global scientific collaboration in the 21st century. Royal Society 2011' states:

'One of the fundamental tensions at the heart of today's science is between the motives of national governments and the choices of

individual researchers. National governments often fund scientific research to boost national prestige, to stimulate economic growth and to gain competitive advantage over other nations. Academic researchers rarely have nationalist motivations for their work, instead being driven by curiosity and competition. These individuals often move and collaborate to access funds, resources and data, and to ally with the most talented researchers.'

It concludes:

'Science is becoming increasingly global, with more scientific activity taking place in more countries, cities and institutions than ever before. At the same time, growing global collaboration is making this activity increasingly interconnected. Continued growth in worldwide research spending and the development of easier and faster ways to collaborate means that this trend looks set to continue.

The league tables of science, so long dominated by the 'scientific superpowers' such as the USA, Western Europe and Japan, are in flux. In the coming years, China, Brazil, India and South Korea are set to assert themselves even further, along with newly emergent scientific nations in the Middle East, South-east Asia, North and South Africa, and middle-ranking industrial countries such as Canada and Australia as well as some of the smaller nations of Europe. The recognition of the role that science can play in driving economic development, and in addressing local and global sustainability has led to increased research activity and the application of science within less developed countries.

International collaboration fundamentally enhances and transforms scientific research; it is driven by three main factors:

**Quality:** the added value gained by bringing together different skills, knowledge and perspectives (manifested in the increased citations of papers with international collaborators). Scientists search out suitable collaborators in their field wherever they are located to progress their research, bringing together a range of relevant and complementary skills and resources.

**Efficiency and effectiveness:** the drive to combine intellectual, financial and infrastructural resources, to achieve more than one nation could manage

alone, best exemplified by multinational projects such as the LHC and the Human Genome Project.

**Necessity:** to address high-level global challenges such as climate change and pandemics which do not recognise national boundaries, and which require large-scale co-operation and the mobilisation of resources to tackle them, as well as the application of global knowledge to local manifestations of these problems.'

As stated in the Introduction and Background, it was therefore agreed that in order to provide this relevant and collective input, specific to Scotland's HEIs' research strengths and ambitions, the Research Pools and Innovation Centres would be asked to contribute their considered preferences regarding the most attractive potential markets and where SDI and British Council Scotland might offer support in terms of market visits or missions.

With introductions from Paul Hagan at the SFC, each of the Research Pools and the three new Innovation Centres was contacted and asked to consult its members to feed back an informed answer to the following question:

- For which international locations is there a benefit to presenting the research strengths in your Research Pool collectively (e.g. in the form of a mission to the location) with the support of SDI and British Council Scotland?

Each was asked to list up to 3 top locations, along with a rationale and details, for each of the following category of opportunity:

- Exchange with locations that already have a renowned capacity in research (international research excellence)
- Exchange with locations that have emerging research strengths (emerging research excellence)
- Exchange with locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs

8 out of the 10 Research Pools and 1 of the 3 Innovation Centres input to varying levels of detail. ScotCHEM declined to take part and neither SRPE (Scottish Research Engineering Partnership) nor ETP replied to our request. We are therefore currently missing input from the Engineering and Chemicals sectors. A summary of the priorities of those who responded is included below. (The comments in full are contained in the accompanying Appendix C: Collected Research Collaboration Market Opportunities).

## Research Pools/Innovation Centres: Priority Markets

Pool	Priority Markets		Top category markets
SULSA (Life Sciences)	China, Singapore	Renowned capacity Emerging research strengths Strong industrial base for KE	1. Japan 2. South Korea/Singapore 3. Nordic Countries (NOR, SWE, DEN, FIN, ICE) 1. China 2. Brazil 3. India 1. Canada 2. Japan 3. Singapore
SUPA (Physics)	USA (esp. Silicon Valley)	Renowned capacity Emerging research strengths Strong industrial base for KE	1. USA 2. Germany 3. Korea 1. Singapore/China 2. Russia/India/Brazil 1. USA/Germany 2. France
SOILLSE (Gaelic)	None Specified	Renowned capacity Emerging research strengths Strong industrial base for KE	1. Ireland 2. Wales 3. Spain 1. Canada 2. US 3. NZ None Specified
SIRE (Economics)	India or Latin America	Renowned capacity Emerging research strengths Strong industrial base for KE	1. USA 2. Western Europe 3. Canada 1. China 2. India 3. Eastern Europe 1. Latin America 2. East Asia e.g. Singapore, Korea, Vietnam
SINAPSE (Imaging)	China	Renowned capacity Emerging research strengths Strong industrial base for KE	1. Netherlands 2. USA 3. Canada 1. China 2. S Korea 3. India 1. USA 2. Germany 3. Belgium
SAGES (Geoscience/ Env/Society)	China	Renowned capacity Emerging research strengths Strong industrial base for KE	1. China 2. US 3. Singapore 1. Brazil 2. Indonesia 3. Chile 1. USA 2. Norway 3. China
SMS (IC) (Stratified Medicine)	Singapore/SE Asia	Renowned capacity Emerging research strengths Strong industrial base for KE	1. Boston MA 1. Singapore/SE Asia 1. Boston MA 2. West Coast USA 3. Singapore/SE Asia
SICSA (Informatics & Computer Science)	None Specified	Renowned capacity Emerging research strengths Strong industrial base for KE	China, Russia, India, Singapore (no priority) Brazil, China, South Africa (no priority) China, India, South Korea (no priority)

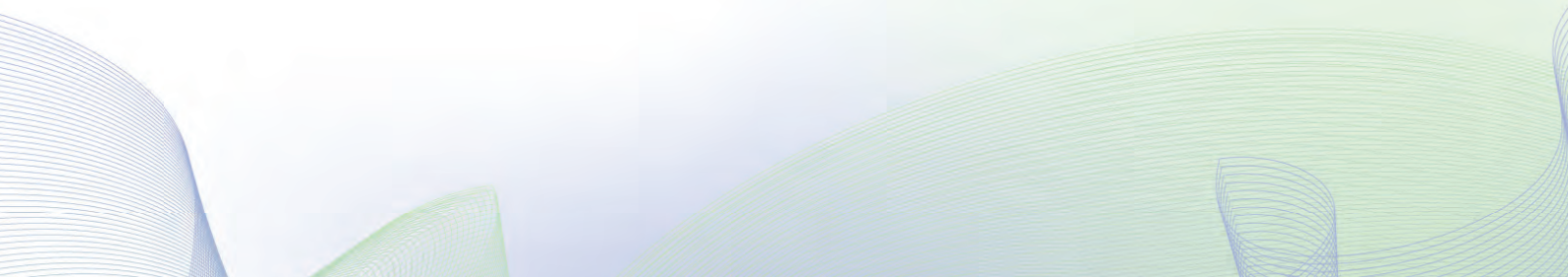
MASTS (Marine) (replied with 5 different areas/forums separately)

MASTS (Deep Sea Forum)	Southern African Region	Renowned capacity Emerging research strengths Strong industrial base for KE	1. USA 2. Europe 3. Australasia 1. Japan 2. South America 3. Southern African Region None Specified
MASTS (Fisheries Science Forum)	Hobart, Tasmania, Australia	Renowned capacity Emerging research strengths Strong industrial base for KE	1. Seattle USA 2. Vancouver Canada 3. Hobart, Tasmania, Australia 1. China 2. Chile/Peru 3. S Africa/Namibia 1. Iceland 2. NZ 3. Norway
MASTS (Marine Energy Forum)	Not clearly specified (Canada, S Korea and France?)	Renowned capacity Emerging research strengths Strong industrial base for KE	1. USA/Canada 2. Europe (Denmark/Germany) 3. Japan 1. Japan 2. USA/Canada 3. Europe (France/Spain) 1. Chile 2. France 3. Japan/S Korea
MASTS (Sustainable Aquaculture Forum)	Brazil	Renowned capacity Emerging research strengths Strong industrial base for KE	1. Norway 2. Canada 3. Europe 1. South America (Brazil/Chile) 2. Mexico 3. Japan & China 1. Norway 2. Chile 3. Brazil
MASTS (Dynamics and Properties of Marine Systems Theme)	China	Renowned capacity Emerging research strengths Strong industrial base for KE	1. USA 2. Europe 3. Australia/NZ 1. China 2. India 3. S. America 1. China 2. USA

## NEXT STEPS: RESEARCH COLLABORATION AND KNOWLEDGE EXCHANGE

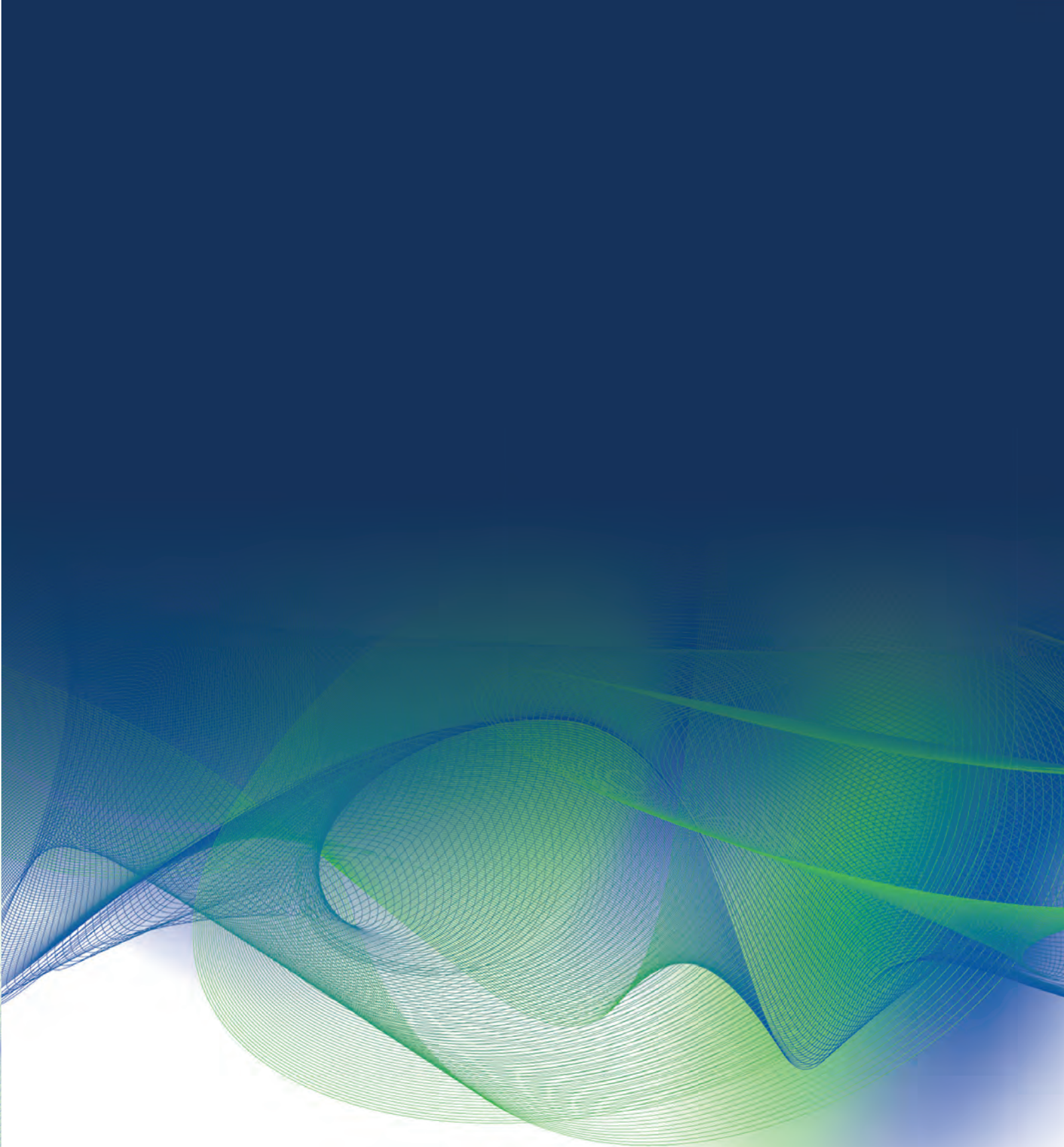
Although China emerges as the lead market opportunity overall, many of the opportunities outlined have very specific features and requirements, and further work is required to evaluate and prioritise these, in terms of; the nature of the market opportunities, Scotland's sector priorities and most importantly, where Scotland's

truly world class research strengths lie. Scottish Development International, British Council Scotland and Universities Scotland have decided that they now wish to engage with each of the Research Pools and Innovation Centres directly, based on the details offered by them and communicated in this report, in order to fully understand and evaluate these Research Collaboration & Knowledge Exchange opportunities from a collective and mission-based perspective.





# Appendices



## APPENDIX A: LIST OF MAIN INFORMATION SOURCES USED FOR THE REPORT

### Reports provided by SDI and British Council Scotland

- British Council Scotland: A Strategic Analysis of The Scottish Higher Education Sector's Distinctive Assets
- British Council Country Briefs
- British Council: Student Insight Reports
- British Council Partnership Access: Exploring Partnerships in Burgeoning Economies
- British Council Student Insight Hot Topics: Portrait of a Transnational Educational Education Student
- British Council Student Interest Hot Topics: Examination of Host Destination from a Student Perspective
- British Council 'The Shape of Things to Come' - Higher Education Global Trends and Emerging Opportunities to 2020 (2012)
- British Council 'The Shape of Things to Come': The Shape of Things to Come - The evolution of transnational education: data, definitions, opportunities and impacts analysis (2013)
- British Council: TNE Opportunities Matrix
- British Council 'The Shape of Things to Come' FAQ Sheet
- SDI Sector Strategy Summary 2013/2014
- SDI KPIs for Team Scotland Indonesia Mission
- Universities Scotland International committee - Assessment Criteria for University Mission Programmes 2013-2015

### Reports sourced independently by Galloway & Associates

- UK Higher Education International Unit: Horizon Scanning: what will higher education look like in 2020? (September 2013)
- OBHE: International Branch Campuses Data And Developments, (January 2012)
- "Universities UK: Driving Economic Growth: Higher education – a core strategic asset to the UK"
- Universities UK. Futures For Higher Education, Analysing trends. Higher Education: meeting the challenges of the 21st century. (January 2012)
- British Council Scotland: Going Mobile - Internationalisation, mobility and the European Higher Education Area
- 1994 Group: Strategies and trends in the internationalisation of UK universities. (November 2011)
- UK Govt: International Comparative Performance of the UK Research Base (Elsevier, 2011)
- UK Govt: International Education: Global Growth and Prosperity (July 2013)
- UK Govt: International Education – Global Growth and Prosperity: An Accompanying Analytical Narrative
- Knowledge, networks and nations: Global scientific collaboration in the 21st century, The Royal Society (2011)

- Scottish Government: Working with China - A Five Year Strategy for Engagement between Scotland and the People's Republic of China
- The Scottish Government India Plan 2010
- The Scottish Government's Plan For Engagement In Canada
- SDI: Capability Statement. Scotland's Partnerships in Education
- SDI: Scotland's Education Sector
- UK HE International Unit: Quarterly Reports 2012-13
- UK HE International Unit: Global Opportunities for UK Higher Education UK: Higher Education International Unit Annual Report 2011 – 2012
- UK Higher Education International Unit: A guide to UK higher education and partnerships for overseas universities. July 2013
- UK Higher Education International Unit: International Higher Education in Facts and Figures (Autumn 2013)
- UK Govt Department for Innovation, Universities and Skills: International Research Collaboration in UK Higher Education Institutions (2008)
- British Council: Research Collaboration in Selected ASEAN Countries (2012)
- European Commission: Drivers of International collaboration in research (2009)
- Going Global 2012 Conference. Selected presentations
- Universities UK: The funding environment for universities: an assessment. (May 2013)

(In addition a wide range of other internet-based information sources were consulted).



## APPENDIX B: SUMMARY PROFILES OF LEAD OPPORTUNITY COUNTRY MARKETS

The following country analyses are for those countries with the most TNE and Student Recruitment potential, based on our recalculation. Many of the countries are on both lists, as one would expect, since TNE and Student Recruitment are both targeting the overall potential of a country's tertiary market. The summaries are based almost entirely on the British Council's Country Reports and Student Insights Reports (British Council, 2010-2013). We have tried to structure the content under each country to broadly reflect information relevant to either TNE or Student Recruitment. It should be noted however that consistent and detailed information on each country in areas such as; government/industry strategy/funds for education development, details of specific skills gaps and training requirements, information on cross sector opportunities, and details of regulations concerning foreign education providers delivering in the country (as specified in the project brief) are not available in the reports provided. We recommend that for the agreed priority markets, this further level of research be conducted to provide a detailed and comprehensive market profile covering these important areas which could inform discussions regarding potential future market missions.

### China

China ranks top for both our TNE and Student Recruitment opportunity rankings. The main challenges in China include censorship issues that do impact education, as well as a very closely regulated education sector that does not allow independent market entry without a partner for educational institutions or programmes.

### TNE

There are 31.13 million higher education students in China in 2011, including 293,000 foreign students. This figure will reach 500,000 by 2020. Most tertiary students in China are from a small handful of major cities including Beijing, Guangzhou, and Shanghai. China's 2010 National Outline for Education Reform and Development prioritizes China being a top destination in Asia for International students. China will only be able to meet 40% of the demand for higher education places by 2020. In 2011 there were

17 branch campuses in China, all in partnership with local institutions. These include New York University's Shanghai campus, in partnership with the East China Normal University, and Guangdong University of Foreign Studies' new Guangzhou-based Guanwai-Lancaster University, in partnership with Lancaster University in the UK. There are many partnership examples including the prestigious Beijing International MBA (BiMBA), a partnership between Peking University and Belgium's Vlerick Leuven Gent Management School.

China's interest is mainly in high-quality, high-value partnerships, and bureaucratic obstacles exist for overseas education providers. This meant that of the applications for partnerships made in 2011, approximately 70 percent were refused on grounds of non-compliance with state or municipal regulations.

Also, in 2010, China launched a partnership with the US to sponsor 100,000 American students studying in China between 2010-2013. European student numbers in China are up by 30% between 2011-12.

China is keen to internationalise and become a top education provider in Asia. The first state-backed Chinese branch campus (of Xiamen University – a top-20 institution in China) is set to open in Malaysia in September 2015. In 2013–2014, a common credit transfer scheme is set to be launched between Asian countries, including Vietnam, Cambodia, Laos, Myanmar, Thailand and China, which should increase student mobility within the region. Credit transfer remains a core concern for international students interested in studying in China.

### Student recruitment

Chinese students are most influenced to study abroad by a perceived better quality of education and the desire to experience living overseas. The influences on deciding which country to study in include the reputation of the university, the quality of education, recognition of the award, and career prospects. Chinese students overwhelmingly do their own research on the institutions, and the role of the institution website is the most important source of information.

In 2011, 564,435 Chinese students went overseas to study. This made up 17% of the 3.7 million international students worldwide in that year. Students are keen to experience living and studying abroad. In 2013 over 400 institutions gathered for the 2013 China International Education Exhibition Tour, highlighting the importance of China in student recruitment globally. America is the largest market for Chinese students, with over 200,000 students expected in the US in 2013. Chinese students in the UK have increased to over 80,000 students a year in 2012, indicating growth over the previous year of 16%. More than half of these students are in graduate programs. Chinese student numbers in Australia have dropped by 10% to 95,000.

At the undergraduate level, the ten most popular subjects for Chinese students are: Business Studies, Finance, Accounting, English Studies, Management Studies, Economics, E&E Engineering, Mathematics, Design Studies, and Computer Science. At the graduate level, the most popular subjects are: Finance, Business Studies, Management Studies, Economics, E&E Engineering, Marketing, Accounting, HR Management, Hospitality / Tourism, and Design Studies. 79% of Chinese students have no award or financial backing.

## India

India ranks highly in both our TNE and Student Recruitment opportunity rankings. While behind China in the number of successful IBCs due to its slow passing of regulations allowing IBCs to enter the market, the rapid rise of the middle class and staggering tertiary population will create continued high demand for tertiary education providers.

## TNE

While postgraduate students from India are largely from a handful of major cities, undergraduates are from an extremely wide range of locations. There were 20.47 million tertiary students in India in 2010. The number of foreign students, however, is much lower as a percentage than in China, with only 12,347 international students in 2006 (the last year for which UNESCO data is available). Fierce competition and high entry standards make it difficult for foreign students to get into Indian institutions. India has not passed its foreign higher education partnership bill yet, and announced it would only consider institutions on the top 500 global institutions list to enter the market. However, demand is skyrocketing

with the increase in population and rising middle class.

The UK already operate joint ventures within India, including a management degree programme with Leeds Metropolitan University in Bhopal and Lancaster University courses at the GD Goenka World Institute near Delhi. The BC states that as the international education community faces its own budgetary pressures, getting institutions to open in India without financial incentives and with major bureaucratic obstacles is likely to be a challenge.

## Student recruitment

Indian students are most influenced to study overseas by the desire to experience the culture, to improve their career prospects, and by the perception of a better quality of education. When choosing a country in which to study, university reputation, quality of education, recognition of qualification internationally, and career prospects all factor highly, just as in China. Unlike China, the influences on selecting a university are much less clear, although quality of course and career prospects factor highly. Self-research once again is the chief means of selecting an institution, although an equal number went to institution websites and the British Council for information.

Given a lack of domestic provision, many Indian students study abroad. In 2011-12, over 200,000 Indian students studied overseas. America is the largest study destination, with half of the Indian students going there to study. The US is considering issuing green cards for any student completing a degree in science, technology, engineering or mathematics, which will have a significant impact on increasing student numbers. The UK saw a 23.5% drop of Indian students from 2011-2012, from just over 40,000 to 32,000 in one year. This was due to UK immigration concerns. Students at the postgraduate level were most affected with a nearly 30% drop. Because nearly 75% of all Indian students in the UK are studying at the postgraduate level, this is a major concern. Numbers in Australia also dropped after a series of attacks on Indian students, as well as the strength of the Australian dollar. Concurrently, the number of Indian students in New Zealand increased to 12,500.

Scholarships for Indian students are offered by a large number of overseas institutions, governments, non-profit organisations and companies. In addition,

a wide range of scholarships is available within India from private trusts, non-profit organisations, learning institutions and the government. The high competition for domestic places means that many students unable to secure a place at a top Indian institution have nonetheless excellent academic scores and capabilities, making them prime scholarship candidates.

The most popular fields of study at the undergraduate level are: Nursing, Business Studies, Management Studies, Hospitality / Tourism, Mechanical Engineering, Computer Science, Aerospace Engineering, E&E Engineering, Economics, and Design Studies. At the postgraduate level the most popular areas of study are: Business Studies, Management Studies, Computer Science, E&E Engineering, Finance, Information Systems, Mechanical Engineering, Pharma, Marketing, and General Engineering.

## Indonesia

Indonesia has a reputation for corruption and the quality of Indonesian universities has been mixed. However, the large young population, fast growth of the middle class, and capacity of current tertiary spaces will result in growth in both TNE and student recruitment.

## TNE

Nearly all tertiary students in Indonesia are from Jakarta or Bandung. In 2010 there were over 5 million tertiary students in Indonesia. Less than 40% of these students attended public institutions due to a lack of places, thus nearly 60% entered the private sector. In 2012 the passing of the Higher Education Bill gave universities more autonomy and fee hikes are expected. There are a number of international partnerships in Indonesia, following the 2012 Higher Education Bill. The UK signed an agreement for eight new university partnerships, involving top universities including Oxford, Southampton, the Open University, Newcastle, and others. The University of Queensland and Monash are also establishing joint projects in Indonesia.

In 2010, there were just 6,437 international students studying in Indonesia, a third of whom came from Malaysia, and another third from East Timor. High tuition fees in the private sector have been a barrier to growth. The government is keen to increase student numbers to bring Indonesia in line with

Singapore and Malaysia. In 2012 they held their first International Student Summit. Furthermore, the Ministry of Education and culture offers scholarships for postgraduate students from developing countries.

## Student recruitment

There are several influences on why Indonesian students want to go abroad to study, including the perception of a better quality of education, and improved career prospects. We also see scholarships as being an important factor. When deciding which country to study in, the dominant factor is quality of education. In regard to influences on selecting an institution, quality of course and scholarship availability far outweigh career prospects or any other factors. For information sources, like China and India, Indonesian students do their own research via websites, at the British Council, and at education exhibitions.

In 2010, 34,067 students from Indonesia were studying overseas. These students are self-funded, and the figures are returning to the peak years of 2002-2. Foreign qualifications are respected in the Indonesian job market, and many of the country's leaders went overseas for university.

Australia is the top choice for Indonesian students, with 9,027 attending in 2012 but the figure is dropping year on year. The US is close behind with 7,131, representing an increase year on year, followed by Malaysia. The UK has 1,500 Indonesian students, although the "visa crackdown" in the UK will affect future enrolments. Of these students, 36% are studying at the postgraduate level. Indonesian students are also studying in Germany and Japan.

Top subjects for undergraduates are: Design studies, Business Studies, Management Studies, Economics, Accounting, Finance, English Studies, Mechanical Engineering, Computer Science, and Clinical Medicine. At the postgraduate level the top areas are: Business Studies, Management Studies, Finance, Politics, Marketing, Civil Engineering, E&E Engineering, Academic Studies in Education, Law, and Mechanical Engineering.

## Nigeria

Although there are no Nigerian universities ranked in the 500 globally, Nigeria has a large and expanding young population and rapid GDP per capita growth (PPP). It is an important market in an area with many emerging markets.

## TNE

According to the last statistics available from UNESCO, there were 1.39 million Nigerian students enrolled in tertiary programs in 2005. Some partnerships exist between Nigerian and international universities, including Lancaster, Oxford Brookes, Limkokwing (from Malaysia) and the University College of Cork. There are also some distance-learning programmes, such as the University of London. Nigeria is not a prime destination for those studying overseas, and the majority of those students are from regional English speaking areas, such as Cameroon.

The British Council notes that although Nigeria's GDP growth masks the economic and social realities, it recognises that 'although proportionally small, Nigeria's consumer class still represents many millions of people and the increasing wealth of this segment should see private education spending rise. With youth unemployment at an all-time high and graduate numbers increasing, Nigeria is bound to see ongoing brain drain in the future, with those who can afford it seeking education, and particularly tertiary education, overseas.'

## Student recruitment

While TNE is in its infancy, student recruitment is a well-developed sector of the education market. In 2010, 38,851 Nigerians studied overseas at the tertiary level. Overseas education remains accessible only to a small fraction of the market, but the demand is enormous; in 2012 over 1.5 million made UTME applications. This may suggest a future demand for TNE provision, as well as a potential for growth of student recruitment as the economy continues to grow. Nigerian employers highly value foreign university qualifications.

The UK is the most popular destination for Nigerian tertiary students, with 18,420 studying there in 2012. The figure continues to climb. Similarities between the UK and Nigerian education systems make this a natural fit. Most of these students are at the

postgraduate level, which comprises nearly 65% of Nigerian students in the UK. The same year, 7,028 studied in the US, a figure that dropped due to a strong US dollar.

The most popular areas of study for undergraduate students are: Business Studies, Computer Science, Law, E&E Engineering, Management Studies, Economics, Mechanical Engineering, Chemical Engineering and Information Systems. The most popular areas for graduate students are: Business Studies, Management Studies, HR Management, E&E Engineering, Computer Science, Law, Information Systems, Civil Engineering, Finance, and Medicine.

## Vietnam

Like other developing nations in this study, Vietnam has a large population, a growing demographic population of tertiary students, and a rapidly growing economy. Add to this a historic emphasis on literacy and education and you have an excellent potential market for education. Internationalisation is a key concern for the Vietnamese government and the number of courses being taught in English has increased.

## TNE

In 2011, 2.23 million Vietnamese students were enrolled in tertiary education, an enrolment ratio of 22%. By 2020, it is estimated that 40% of tertiary enrolments will be in private institutions, compared with 13% in 2010. Student subsidies in the public sector have failed to keep pace with the rapid growth in student numbers, thus students from low income backgrounds are experiencing financial pressure. In a bid to improve quality, the government announced in 2013 that quotas would be introduced by 2020. Some institutions will be closed or merge, creating an even greater market in the private sector.

TNE programs have been operating in Vietnam since the mid 90s and over 500 partnerships exist, including the Royal Melbourne Institute of Technology, the University of Hawaii, Griggs University, and the Vatel International Hotel Management School. The government put in place measures to rein in TNE providers in 2012, and several institutions, including Raffles Vietnam, were heavily fined. The main obstacles in Vietnam are bureaucracy and quality control. Decree No. 73, passed in 2012, requires foreign institutions to invest

a minimum of \$15 million when establishing an institution in Vietnam. Other TNE models exist and could potentially thrive however.

In 2010 there were 3,260 international students in Vietnam, most of whom came from East Asia and specifically Cambodia, China and Laos. Vietnam is able to promote itself as a cheaper alternative to Thailand, Singapore, or Malaysia. In 2015 when the ASEAN Economic Community comes into force international study in Vietnam will become easier.

## Student recruitment

In 2010, close to 48,000 Vietnamese students studied abroad at the tertiary level. Studies suggest this figure could already be as high as 100,000 as international study has become desirable for Vietnam's middle class. The US is the most popular destination, with 15,572 Vietnamese students studying there in 2012. Australia is also popular, with 11,070 students, although this began to decline in 2011 after a series of racially motivated attacks involving international students. Vietnamese student numbers in the UK have increased although they remain quite low, at less than 4,000 in 2012. Of these students, 49% were in postgraduate programs.

The most popular subjects for undergraduates are: Business Studies, Economics, Finance, Accounting, Management Studies, Computer Science, Mathematics, Marketing, Humanities, and Design Studies. Popular postgraduate subjects are: Finance, Business Studies, Management Studies, Economics, Marketing, Computer Science, Accounting, Academic Studies in Education, Building, and E&E Engineering.

## Thailand

If English were the first language in Thailand, it would most probably be an education hub for IBCs in Southeast Asia. With a large and increasingly urban population, and a fairly stable economy, Thailand continues to grow and prosper. Education should be an important part of future growth.

## TNE

Most students at the graduate and postgraduate level in Thailand are from Bangkok. There were 2.5 million tertiary students in Thailand in 2011, representing an enrolment ratio of 48%. Overall, 64% of students attended public higher education

institutions in that year. Public institutions have some autonomy and can set their own fees, thus higher education is expensive for many Thais. Like Vietnam, Thailand is set to open its doors as part of the ASEAN Economic Community in 2015. There could be an influx of migrant graduates from across the region hoping to get qualifications in Thailand and eventually work.

Thailand has numerous partnerships with international institutions, and there are several branch campuses in country. This includes a long-standing medical partnership between Oxford and Mahidol University, Stamford International University. The Asian Institute of Technology, and the Kellogg School of Management and the Wharton School in partnership with Chulalongkorn University.

In 2010, there were 19,052 international students in Thailand, most of whom came from Southeast Asia, including Laos, Cambodia, and Myanmar. Thailand aspires to be a regional education hub and may succeed due to its low tuition fees and living costs. Thailand competes directly with Malaysia, Singapore, and Indonesia in the higher education sector. The powerful Council of University Presidents in Thailand continued to push for changes in the visa process to attract world class teaching talent and high achieving students to come to Thailand. Furthermore, Thailand's academic calendar is now aligned to the ASEAN and US calendar, further increasing the ease of international study.

## Student recruitment

Thai students are influenced to study overseas by several factors. These include the cultural experience of studying overseas, a desire to improve English, improved career prospects, and better quality of education. On deciding which country to study in, students indicated university reputation, quality of education, international recognition and career prospects as being the main drivers. Influences on selecting an institution were much more varied, and included social life, course quality, low tuition fees & scholarship availability, world-class academics, institutional reputation, institutional ranking, and career prospects. Students did their own research but used extremely diverse information sources, including institutional websites, staff member lectures, recommendations from friends and family, education exhibitions, the British Council and agents.



In 2010, 26,233 Thai students headed overseas to study at the tertiary level. The US and UK are the most popular destinations. There were 7,626 Thai students in the US in 2012, and 6,800 in the UK. Changes to visa requirements in the UK will have a negative impact on the number of students moving forward as has already happened in Australia. Close to 80% of all Thai students in the UK are in postgraduate programmes. Thai students also went to Australia, New Zealand, Germany, and Japan.

The most popular subjects for Thai undergraduates studying in the UK were: English Studies, Design Studies, Business Studies, Management Studies, Economics, Mechanical Engineering, Pre-clinical Medicine, Chemical Engineering, E&E engineering, Production and Manufacturing Engineering. For postgraduate students, the list includes: Business Studies, Management Studies, Marketing, Finance, Law Hospitality/Tourism, Design Studies, Economics, and Computer Science.

## Malaysia

Malaysia aspires to be a regional education hub, and has succeeded with long standing branch campuses such as Nottingham University and Monash University. China's first branch campus, Xiamen University, is set to open in September 2015 with places for 10,000 students.

## TNE

Over 1 million students were enrolled in tertiary programs in Malaysia in 2010, a rapid increase from 26% enrolment in 2000 to 42% in 2010. Several Malaysian universities were ranked globally, and universities in the public sector will continue to improve due to the government's relaxing control, allowing them to be autonomous. The invitation to overseas higher education providers to establish a presence in Malaysia had an enormous impact and many branch campuses entered the market. EduCity@Iskandar is the latest university hub, and has attracted several important UK universities such as Southampton, Newcastle, and Reading. Other branch campus projects include the 5000 student Heriot-Watt campus in Putrajaya, and Limkokwin University. Although the government announced a two-year moratorium on all new private higher education institutions, international universities with a good name are still able to enter the market.

## Student recruitment

In 2011, 55,503 Malaysians studied overseas. This is an outbound mobility rate of 5%, down from 12% in 1998's pre-Asia Economic Crisis statistic. The shift also represents the natural impact of the TNEs on outward student mobility. The most popular destinations for Malaysian students are the UK and Australia. Australia recruited 16,308 Malaysian students in 2012. The UK had 15,625 students enrolled, but the UK immigration crackdown will most certainly reduce this figure. There are 6,743 students studying in the US; the strong US dollar had an impact on student figures, and there are historic ties between Malaysia and the UK. Only 27% of Malaysian students are at the postgraduate level in the UK.

Popular undergraduate subjects are: Pharma, Clinical Medicine, Business Studies, Mechanical Engineering, Finance, Law, Accounting, E&E Engineering, Chemical Engineering, and Pre-clinical Medicine. Popular postgraduate programs included: E&E Engineering, Business Studies, Management Studies, Finance, Law, Clinical medicine, Civil Engineering, Computer Science, Mechanical Engineering, and General Engineering.

## Bangladesh

Many of Bangladesh's higher education institutions are young and the quality is reported to be poor. The Higher Education Quality Enhancement Project with support of the World Bank is the Government's attempt to address this. As a result, no Bangladeshi universities factor in global or regional rankings. The number of international students in Bangladesh is very low, at 1,589. Social unrest and difficulty in entering the country are factors. However, there is a low cost of living and low tuition fees, which may appeal to students in the region from Nepal and Myanmar. The British Council states that 'weak infrastructure, including electricity and IT, and the lack of a clear internationalisation strategy make Bangladesh a comparatively unattractive country for education providers at the present time, despite the strong potential in this market owing to the large size of the country's young population.' It also states that Bangladesh's growth 'has allowed the country to invest in its education sector and increase development indicators significantly over the past decade, particularly in terms of literacy and enrolment.'

## TNE

Nearly all the tertiary students in Bangladesh are from Dhaka or Chittagong. In 2010, 1,582,000 students were enrolled in tertiary education. Like other emerging markets, demand continues to outstrip supply; the number of students enrolled in public universities increased 150% between 1997 and 2006. Fees of private universities are high and quality is substandard.

### Student recruitment

Bangladeshi students considered improved career prospects and a perceived better quality of education as the main drivers in deciding to study overseas. When deciding which country to study in, as well as which institution to attend, the same drivers were dominant—career prospects and quality of education. Suggestions on institution selection came from several sources, including self-research, friends, and family members. The best way to reach these students is predominantly through the British Council, as the internet and institution websites factor much less than in other countries.

In 2010 there were nearly 21,000 Bangladeshi students studying abroad. A Gallup survey revealed that 35% of Bangladeshis aged 15-24 aspired to move abroad permanently, which can be achieved with an international qualification. The most popular destination for Bangladeshi students is the UK. Not only are the education systems compatible, there is an established Bangladeshi Diaspora in the UK numbering over a half million. Changes to immigration rules in 2012 may affect the UK's

popularity. In the UK, 53% of Bangladeshi students are in postgraduate programmes. Students also go to Australia, with numbers increasing every year to the present 3,406. A similar number go to America to study.

Bangladeshi students are able to apply for a wide range of scholarships because they come from a developing country, including Fulbright Scholarships, Australia Award Scholarships, Commonwealth Scholarships for the UK and New Zealand, Nippon Foundation of Japan's merit-based scholarships to students from low-income backgrounds to study in Japan, and scholarships available for students to study in China. Bangladeshi government scholarships may also be available for high-achieving students through the Economic Relations Division of the Finance Ministry.

The most popular areas of study for undergraduates are: Business Studies, Management Studies, Law, E&E Engineering, Computer Science, Accounting, Aerospace Engineering, Economics, and Mechanical Engineering. The most popular areas for postgraduates are: Business Studies, Management Studies, Law, E&E Engineering, Economics, Computer Science, HR Management, Information Systems, and Marketing.

### The Philippines

This country does not appear in the British Council reports. It is recommended that a profile of this market be included in future TNE and Student recruitment research.

## APPENDIX C: COLLECTED RESEARCH COLLABORATION MARKET OPPORTUNITIES

**Question:** For which international locations is there a benefit to presenting the research strengths in your Research Pool collectively (e.g. in the form of a mission to the location) with the support of SDI and British Council Scotland?

In the table please list up to 3 top locations (this could be countries, regions or cities) in descending order for each category of opportunity:

- Exchange with locations that already have a renowned capacity in research (international research excellence)
- Exchange with locations that have emerging research strengths (emerging research excellence)
- Exchange with locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs

For each chosen opportunity, please indicate the rationale for choosing it, and the details of why this is an opportunity. Please also indicate any current blocks to engagement with the market, or any mechanisms that would need to be put in place to take advantage of the opportunity.

Of all the opportunities described, please also choose the one in the list that would benefit the most from a collective approach (i.e. an organised mission to the location).

The responses from each of the Research Pools and Innovation Centres who replied to the questionnaire are included in full overleaf.



### SULSA (Scottish Universities Life Sciences Alliance)

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1. Japan	Extensive research base in well funded university sector, particularly in basic biological research (cell & molecular biology, biochemistry).	Many Japanese students/researchers currently look to the US for experience in English-speaking research environments. Scotland already has good brand recognition in Japan (through whisky, golf, tourism) but no opportunities exist for direct Scotland-Japan partnerships (for example, PhD studentships, collaborative networks, etc.)
	2. South Korea, Singapore	Both countries have made large investment in research.	A number of researchers already with long standing associations.
	3. Nordic Countries (NOR, SWE, DEN, FIN, ICE)	Extensive research base in academia and industry.	Our near neighbors already interact well with each other (see <a href="http://www.nordforsk.org/en">http://www.nordforsk.org/en</a> for example). Giving their proximity to Scotland, the ease of travel to and from Scandinavia, and lack of a language barrier, it is perhaps surprising that no mechanism exists for research collaboration (such as a SULSA-Nordforsk tie-up)
	4. China	Likely world leader of the near future	Continued growth of their economy and research creates the greatest opportunity for all countries.
Locations that have emerging research strengths (emerging research excellence)	2. Brazil	The country is tapping into its immense oil wealth and has invested in research e.g. Science without Borders programme.	Distance is perhaps greatest problem but a number of exchange schemes exist including BBSRC with FAPESP.
	3. India	With economic growth there is a focus on research.	Grant funding in India is reaching 40% success rates. As labs in India try to catch up in use of technology many groups have a high interest in overseas collaboration.
Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs opportunities exist	1. Canada	Is in the top ten countries worldwide for research spending.	Also somewhat inward looking and so requires contacts.
	2. Japan	Also very high on the list of research investment.	Perhaps the hardest of the top countries for collaboration because of its insularity.
	3. Singapore	Emerging strength in biomedical research	Not dissimilar to Hong Kong (or Scotland) in population size. Investing heavily in education and research. As with examples above, no direct, funded research links with Scotland. No language barrier.

**Top Location overall** China and Singapore

## SUPA (Physics)

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1 USA	Particularly "Silicon Valley" but other locations highlighted – also east coast, Texas, Maryland	Limited detailed knowledge, networks and resource to pursue
	2 Germany	Particularly Max Planck links	
	3 Korea	Noted strategic national government investment in research and teaching institutions	
Locations that have emerging research strengths (emerging research excellence)	1 Singapore/China	The country is tapping into its immense oil wealth and has invested in research e.g. Science without Borders programme.	Limited detailed knowledge, networks and resource to pursue
	2. Russia/India/Brazil	Highlighted for quantum photonics, photonics and physics/life science interface	
Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs	1 USA/ Germany	Silicon Valley/Oil areas highlighted.	Limited detailed knowledge, networks and resource to pursue
	2. France	"Cosmetic Valley" highlighted	

**Top Location overall** USA (particularly Silicon Valley)



**SOILLSE (Gaelic)**

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1 Ireland	Established expertise in language policy and planning in a minority language context.	
	2 Wales	Established expertise in language policy and planning in a minority language context.	
	3 Spain	Established expertise in language policy and planning in several different minority language contexts.	
Locations that have emerging research strengths (emerging research excellence)	1 Canada	Established expertise in language policy and planning in the context of a formally bilingual state and increasingly multilingual society.	Outside the EU and thus ineligible for many funding programmes.
	2 United States	Expertise in language policy several different minority language contexts, including indigenous (Native American) languages.	Outside the EU and thus ineligible for many funding programmes.
	3 New Zealand	Established expertise in language policy and planning in a minority language context.	Outside the EU and thus ineligible for many funding programmes.
Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs	1.		
	2.		
	3.		

**Top Location overall** It would be more beneficial if a number of experts from several locations could be brought together to agree a research and funding strategy. Minority language development and research is a specialized area and it is relatively difficult to form partnerships within the prevailing funding arrangements.

## SIRE (Scottish Institute for Research in Economics)

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a re-nowned capacity in research	1. USA	In terms of international research excellence the top US universities dominate many sub-fields of economics (see e.g. the ESRC/RES International Benchmarking Review at <a href="http://www.esrc.ac.uk/_images/Int_benchmarking_economics_tcm8-4552.pdf">http://www.esrc.ac.uk/_images/Int_benchmarking_economics_tcm8-4552.pdf</a> ). The US is also the base for a number of major international, as well as national, policy-oriented institutions with close ties to high quality research (notably the IMF, World Bank and Fed). Across SIRE there are already fairly extensive linkages with leading academic and policy institutions in the US (reflected e.g. in joint authorship, seminar presentations, conference participation and other visits) but such links are largely informal, serendipitous, and ad hominem. Widening and deepening these links and in some cases perhaps formalizing them (e.g. through staff or PhD student visits/exchanges) has a potentially high pay off. It would enhance dissemination of SIRE research, help to ensure that research in SIRE does not lag behind the cutting edge, and improve recruitment of high quality academic staff and PhD students.	<p>(a) There is strong competition at the top. Some other leading UK and European research institutions (notably the LSE) have better established links and brands (e.g. for PhD exchange). Linking with the top institutions matters – going below roughly the top 20 or so US universities (for economics) reduces the value-added from any linkage and can even damage rather than enhance reputation.</p> <p>(b) Funding (e.g. to cover travel and accommodation) can limit the scope, scale and nature of linkages. This problem will become more severe when the current SIRE funding for such activities is exhausted in July 2015.</p> <p>(c) There can be tension and competition between the individual universities/ departments encompassed by SIRE which can, at times, conflict with cooperation. Much of the international outreach by the Scottish HE sector is funded and organized by ‘international offices’ (or equivalent) of individual universities. Research pools, and other cross-sector interests (including the Scottish Graduate Programme in Economics – SGPE), tend to lose out in this framework. A related issue is that the much longer established brands of individual universities can tend to dominate and make it hard to establish a relatively new brand, such as SIRE.</p> <p>(d) A discipline-focused (i.e. economics in the case of SIRE) mission seems needed in order to hit the appropriate target (e.g. a SIRE exhibit/function at the annual ASSA/ AEA meeting). A more generic (whole sector) approach seems unlikely to succeed.</p> <p>(e) UKBA regulations are a barrier to international collaboration and recruitment, which can weaken our ability to compete at the top.</p>
	2. W. Europe (Germany, Spain, Italy, BeNeLux, Scandinavia, France)	A number of strong research centres, linked to flourishing graduate programmes, have emerged in W. Europe over the last 25 years or so. For example (not exhaustively): Pompeu Fabra (Barcelona); Carlos III and CEMFI (Madrid); Milan Bocconi; Toulouse; Paris; Universite Catholique de Louvain; Stockholm School of Economics). In addition there are key policy-related institutions e.g. EU Commission, ECB, OECD, BIS) located in W. Europe. The opportunities for widening and deepening links are similar to those for US institutions.	Issues (a) through (d) cited above also apply to this market.
	3. Canada	Canada has a number of strong research centres, roughly on a par with those in Europe (e.g. UBC, Toronto, McGill and Queens).	Issues (a) through (e) cited above also apply to this market.

Locations that have emerging research strengths (emerging research excellence)	1. China	<p>Fee income from Chinese students at UG, PGT and PGR levels has been a major source of income across the HE sector in recent years. There is strong global competition for this market, which is already beginning to tighten as the Chinese HE sector develops. There is also the potential, not fully tapped, for extensive KE/CPD, as well as broader economy-wide benefits from building closer links with such a large and rapidly growing market. Our existing links with China are primarily via UG, PGT and PGR (current students and alumni). Building on these links, to develop closer KE/CPD (e.g. with government officials at central, provincial and city levels) and research collaborations (including PGR) – as economic policy and economic research in China develops – will help us to maintain a significant presence in this major market and underpin UG, PGT and PGR activities.</p>	<p>(i) There is strong and tightening global (and internal Chinese) competition for the Chinese market. The branding issues noted above (under (a) and (c)) are an impediment to competing effectively.</p> <p>(ii) There is a scarcity of China-specific expertise among economic researchers currently working in Scotland. This largely reflects the fact that ‘international research excellence’ in economics tends not to be country-specific in nature and, as such, is not a major relative weakness of Scotland.</p> <p>(iii) There are cultural and language barriers.</p> <p>(iv) For sustainability, it is important to focus on high-end links, which tie in better with our research interests (limiting the impact of point (ii) above) and are less likely to be displaced by developments within China as its internal research capacity grows. Identifying and building such high-end links is a key challenge.</p> <p>(v) An important way of building such high-end links for the longer term is through recruiting high quality UG, PGT and PGR students and maintaining good alumni links. (This can also help with points (ii) and (iii) above).</p> <p>(vi) Points (b), (c) and (e) above also apply to China.</p>
	2. India	<p>The rationale for India is similar in many respects to that of China (though compared to China, India has been a less significant source of student-fee income and the market is, in some respects less of a focus for global competition).</p>	<p>All the points raised above, in the context of China, also apply to India, though cultural and language barriers are somewhat less pronounced in the case of India. India also has some more established centres of good quality economics research e.g. the Indian Statistical Institute and the Delhi School of Economics.</p>
	3. E. Europe	<p>For historic reasons mainstream economics research is less well developed in E. Europe than in the West. There are, however, some rapidly developing centres of high quality research, for example Cerge-EI in Prague. E. Europe has also become a good source of high quality students at UG and PGT/R levels (partly because their maths background and work ethic tends to be strong). We have some, though fairly limited and largely ad hominem, existing links. Strengthening these links, in anticipation of further strengthening of economics research in E. Europe, could well be strategically advantageous.</p>	<p>Many of the points raised above also apply to E. Europe, though cultural and language barriers tend to be less pronounced, particularly with younger researchers from E. Europe. There is also more immediate potential for direct research collaboration, e.g. at PGR level, with emerging research centres such as Cerge-EI.</p>



Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs	1. Latin America	For historic, political and language reason, research links with Latin America tend to be dominated by Spain and the US. The scale of the market, however, suggests that there is scope for greater engagement. University-based research in economics in Latin America is patchy and our existing research networks/linkages are limited (more with policy institutions e.g. central banks)	Since we would be starting from a limited base, focusing on links to attract PGT and PGR students (possibly tied to KE) seems likely to be the best initial approach.
	2. E. Asia e.g. Singapore, Korea, Vietnam)	There are some isolated centres of high quality economics research, e.g. National University of Singapore, with whom there is the potential for closer collaboration. Otherwise the main potential in this market is for KE and CPD activities as well as a source of UG, PGT and PGR students.	The points raised above in the context of China are relevant more broadly in E. Asia.

**Top Location overall** India or Latin America

Brief rationale: While the USA, China, W. and E. Europe are more established and likely to remain more important markets for us, maintenance and development of these markets arguably requires a more narrowly focused discipline or sub-discipline-based approach, building on existing linkages. A broader mission-based approach seems more likely to have a higher pay off in markets where there is good potential but we currently have limited existing connections.



### SINAPSE (Scottish imaging Network – A Platform for Scientific Excellence)

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1. Netherlands	Our field is medical imaging and our membership includes both University and NHS employees. One of the main challenges in medical research is around statistical power and the way forward is 'population imaging' - studies with large cohorts. We have expertise in both image acquisition and, importantly, image analysis. Holland is probably the country that has committed most to population imaging in Europe - see <a href="http://www.populationimaging.eu/about/">http://www.populationimaging.eu/about/</a>	No particular blocks.
	2. USA	In SINAPSE we have had several academic exchange visits, many to Centres in the USA. These exchanges have arisen through contacts made at international scientific conferences. That is perhaps the best forum for such developments.	There are no blocks but a 'mission' is unlikely to make a difference.
	3. Canada	In particular Vancouver. This is focused on radioisotope production.	The above comment applies.
Locations that have emerging research-strengths (emerging research excellence)	1. China	We have limited experience of exchange with China but have a few Chinese students. We have taken part in a few fruitless visits by delegates from China, but we are aware of the huge potential, in particular for collaboration on MRI where we have a lot to bring to the table. We have particular expertise in imaging based clinical trials. Increasingly China is being explored in this context and it could be a good strategy to get a foothold there sooner rather than later. Trial design and imaging analysis would be key themes.	The block to collaboration is around trust. Our limited experience suggests that partners in China are keen to learn from us but are less keen to set up partnerships that would be of mutual benefit. Hopefully this can be overcome.
	2. South Korea	We took part in the recent Universities Scotland event in Edinburgh and it was clear that the Koreans are keen to develop partnerships. No collaborations in medical imaging were identified, but this was just one University and the event demonstrated that there are many Universities that would be open to discussion. Medical imaging analysis might a good theme to explore.	I think the Koreans would welcome us.
	3. India	India is an obvious setting for clinical trials but has made itself much more hostile recently and will remain problematic until they sort out regulatory issues and related legislation.	The blocks are around the regulatory issues. If there was a hint that there could be light at the end of the tunnel then India would be well worth exploring, but I don't think there is
Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs	1. USA	Most of our collaborations are with large multinationals but we have strong links with one smaller US company, Molecular Neuroimaging Inc.	Don't think a mission would help.
	2. Germany	We have links with German groups working on MRI and they have industrial collaborators.	It's not clear how a mission would help.
	3. Belgium	We have links with the University of Liege and they have associated companies that could help to take our PET tracer synthesis work to market.	Again it's not clear how a mission would help. This is very focused and we have the links.

**Top Location overall** The top location that would be of interest to SINAPSE is China.

South Korea and the Netherlands might also be worth considering.

If other Scottish groups were focusing on any of these countries we could discuss common areas of interest with them.

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1. China	Particular SAGES opportunities in forest science; biochar and carbon; meteorology; and land-use (including panda habitat). The opportunity is to develop collaborative research opportunities and funding streams within top Universities and agencies in China, as well as to improve the attractiveness of Scotland to top Chinese researchers (students and academics)	Each of our members has productive engagements with several Chinese institutions. Developing some co-ordinated approaches with groups of Chinese partners (maybe regionally-based) may be a productive way to manage this interaction.
	2. United States of America	To enhance Scotland's global standing in geoscience and environment research we need to partner more effectively with the leading World institutions/groups. Many of these have developed or are developing 'centres' or other structures that span similar areas to SAGES (e.g., University of Washington's College of the Environment). Strategic links could include academic and researcher exchange. Several SAGES groups collaborate with leading US institutions (eg N Atlantic Oceanography: RAPID programme and sub-polar Gyre)	Linking with established centres is required – pooling as a concept is partly understood, but a co-ordinated approach may improve this and enable faster progress to be made.
	3. Singapore	Very strong research base, although concentrated in two universities. Opportunity to work with these institutions to develop regional research activities in SE Asia (Opportunities for SAGES in areas around water security and flooding; climate change; land use; ocean acidification impacts).	
Locations that have emerging research strengths (emerging research excellence)	1. Brazil	Particular opportunity for SAGES in the areas of forest science; biochar and carbon; water security; climate science. Some existing collaborations (decades of history). The opportunity is to develop collaborative research opportunities and funding streams within top Universities and agencies in Brazil, as well as to improve the attractiveness of Scotland to top Brazilian researchers (students and academics).	Another country with a huge number of institutions – coordinating an approach in specific areas of science with groups of Brazilian universities may be effective
	2. Indonesia	A rapidly emerging HE sector in which environmental science plays a significant role.	New area for engagement, so relationships with funders and main universities are still being established.
	3. Chile	Scotland has a track record of research excellence in environmental change at home and in Chile and Argentina. Comparable glaciated terrain and westerly atmospheric circulation provides opportunities for the emerging S. Am. research centers in Earth Sciences to greatly benefit from knowledge exchange	Long distance travel and developing university infrastructure limits the identification and access to S. American research groups.
Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs	1. United States of America	Funding available for KE and exchange with policy bodies.	See comment above regarding interaction with the US.

	1. Norway	Has observed a strong KE tradition at international conference presentations and during collaborative research projects. Has a strong science base and complementarity with SAGES activities.	
	2. China	Opportunities around biochar and carbon, and forestry, hazard detection, remote sensing, earthquake science.	Not easy to see how KE will operate with China, but there are examples of engagement with Chinese companies that we can learn from.

**Top Location overall** China

**SMS (Stratified Medicine Scotland: Innovation Centre)**

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1. Boston MA	Possible collaboration with some academic groups if it were to leverage engagement with Pharma /Biotech prospects in the area	
Locations that have emerging research strengths (emerging research excellence)	1. Singapore/SE Asia	Possible collaboration with some academic groups if it were to leverage engagement with Pharma /Biotech prospects in the area	
Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs	1. Boston MA	High install base of Pharma/biotech companies with a need to engage on the Stratified Medicine front. US patient population is not well served by e-health records → Inward investment to SMS-IC around focused clinical trials	An appropriate platform which would be well attended by Pharma/Biotech seniors – possibly around a large conference event
	2. West Coast USA	As above in CA although more predominantly biotech → Inward investment to SMS-IC around focused clinical trials	As above
	3. Singapore/SE Asia	Significant and expanding sector with Pharma investment ongoing → Inward investment to SMS-IC around focused clinical trials	Local intelligence as to how to break in here

**Top Location overall** Singapore/SE Asia

– predominantly as we know the ground/players in the US and could manage the East/West Coast prospecting by ourselves.



## SICSA (Scottish Informatics and Computer Science Alliance)

I enclose more or less verbatim the 4 responses I received (from 14 Heads of School polled), to support my brief summary.

### Summary

1.  
China: inc. Tsinghua, U Hong Kong, Peking  
Russia: inc. Gubkin RSU  
India: companies  
Singapore: inc. NUS
2.  
Brazil: inc. Sao Paolo, FU Rio  
China: inc. Chinese U Hong Kong, Hong Kong Baptist  
South Africa
3.  
China: inc. State Key Labs  
India: inc. IIT Bangalore  
South Korea

## Comments

### Internationalisation Questions

Responses from:  
UHI, Edinburgh, Strathclyde, Robert Gordon

— UHI:

No links or plans in this area.

— Edinburgh:

My reaction is that it is really difficult to think of an international organisation that we could only collaborate with if we had SDI help. UoE and Informatics has a pretty good international network and a large, complex set of priorities for engagement. I think SDI should focus on top institutions in BRICs (or similar) where there's some engagement already but where we could strengthen it. I think this might be one where the motivations of different universities will differ across SICSA (some may just want better engagement wherever it comes, which is fine but not what we need at Edinburgh). Anyway, here are a few thoughts:

### 1. Areas with existing research strength;

- China: Tsinghua or University of Hong Kong if we want to go for strength; Peking is strong overall but not so strong in CS so perhaps also a good target.

- India: Don't go for universities; go for multinational companies (same goes for countries like Korea, although KAIST is an option there).

- Singapore: National University of Singapore; has comparable research agenda but not huge connectivity currently.

## 2. Areas with emerging research strength

- China: Hong Kong area (Chinese University of Hong Kong, Hong Kong Baptist) provides strong universities that are comparable to us but not as strong as Tsinghua, Beihang, etc.

- Brazil: University of Sao Paulo.

## 3. Areas with potential for collaboration around knowledge exchange.

- Perhaps go for application areas - e.g. in China we could target appropriate State Key Labs (such as the State Key Lab for Chinese Medicine in Macau where we already connect).

— Strathclyde

It's a tricky one because most universities have links with all sorts of places so there's probably no part of the world we don't touch (except Antarctica perhaps). So I have mostly focussed on where CS could do with help

1. Russia. Although it is close to Europe I think we could do a lot more here.
2. South Africa.
3. South Korea are investing a lot of money especially in biotech. Seems ripe for exploiting on other tech areas.

I don't have anything more concrete than this (and have suggested two BRIC countries which is not helpful) except I suspect that there are government institutions in each country which will provide internal leverage and expertise.

— Robert Gordon

## 1. Areas with existing research strength;

Gubkin Russian State University of Oil and Gas, Moscow

All Gubkin's departments are focused on Oil & Gas, and they have good research links with global Oil & Gas majors.

## 2. Areas with emerging research strength;

Universities in Brazil with links to Petrobras; e.g. Federal University of Rio de Janeiro  
RGU has a strong interest in widening its Oil & Gas related research to Brazil.

## 3. Areas with potential for collaboration around knowledge exchange.

IIT Bangalore

RGU has strong links with IIT Madras and better links with IIT Bangalore would widen these opportunities.

Of these, opportunities in Brazil would be the most interesting to follow-up.

## MASTS (Marine Alliance for Science and Technology for Scotland)

(A number of our research themes and forums have sent information back regarding your recent request for input (please see attached document). I have also included the main contacts for the individual areas if there is anything you want to follow up on. The tables have been completed to varying degrees of completeness.

I have cc'd in Prof Hamish Mair who leads the MASTS International Collaboration and Networking group. Grateful if you can keep him informed of any progress and developments following the information gathering exercise. Prof Mair has strong links and contacts in Mexico and Colombia (as well as Ecuador, Panama) and can speak Spanish fluently.)

**MASTS Deep Sea Forum** – contact Dr Bhavani Narayanaswamy (Bhavani.Narayanaswamy@sams.ac.uk)

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1. USA	Very strong in deep-water research. Advances being made in technology. Often good opportunities for collaboration	Not that I know of. Just expense of undertaking DS research
	2. Europe	Very strong in deep-water research. Often good opportunities for collaboration	As above
	3. Australasia	Very advanced in their understanding of fragile environments and mining in deep-sea habitats	As above
Locations that have emerging research strengths (emerging research excellence)	1. Japan	Strong technological advances being made here. Some collaboration already	
	2. South America	Increasing exploration of their deep-water environment in terms of oil & gas, minerals etc. Will be useful to try and collaborate in the future with them	
	3. Southern African region	Fragile habitats with some, having high levels of biodiversity. Very little known about the area	
Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs	1.		
	2.		
	3.		

**Top Location overall** Southern African region

**MASTS Fisheries Science Forum** – contact Dr Paul Fernandes fernandespg@abdn.ac.uk



Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1. Seattle, USA (University of Washington, School of Aquatic and Fishery Sciences)	Hosts several of the most prominent academic researchers in the field	
	2. Vancouver, Canada (University British Columbia, Fisheries Centre)	Hosts several high profile academic researchers	
	3. Hobart, Tasmania, Australia (UTAS & CSIRO)	Hosts high profile academic researchers in broad range of activity	
Locations that have emerging research strengths (emerging research excellence)	1. China ?	Rapidly expanding fishing fleet	No obvious centre (possibly Zhejiang Ocean University)
	2. Chile (Valparaiso) / Peru (IMARPE, Lima)	Next to biggest fishery in the world (upwelling area / El nino)	
	3. S. Africa / Namibia	Next to major upwelling fishery	
Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs	1. Iceland (Institute of Marine Research)	Strong research programme and unique management	
	2. New Zealand (NIWA)	Small but successfully managed fisheries	
	3. Norway (Institute of Marine Research)	Many recovered fish stocks, unique management	

**Top Location overall** Hobart, Tasmania, Australia (UTAS & CSIRO) due to combination of techniques closest to MASTS fisheries interests: ecosystem modeling (Beth Fulton, CSIRO); fisheries assessment and management (Keith Sainsbury, UTAS); advanced technology (Rudy Kloser, CSIRO).

**MASTS Marine Energy Forum** – contact Dr Ben Wilson Ben.Wilson@sams.ac.uk

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1. USA/Canada		
	2. Europe (Denmark and Germany)		
	3. Japan		
Locations that have emerging research strengths (emerging research excellence)	1. Japan		
	2. USA/Canada		
	3. Europe (France and Spain)		

There is already various initiatives for the “opportunity” countries (point 3) (Centres of excellence/TSB discussions etc). Most of these represent opportunities to export Scottish expertise abroad rather than to bring in expertise in to help Scotland develop its own industry. Canada, S. Korea and France represent the most beneficial to the Scottish marine renewables community at the moment given the current pace of developments.



**MASTS Sustainable Aquaculture Forum** – contact Prof Brendan McAndrew [b.j.mcandrew@stir.ac.uk](mailto:b.j.mcandrew@stir.ac.uk)

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1.Norway	Major world aquaculture producer for cold water fish	More bilateral agreement with University sector
	2.Canada	Strong research base in fish genomics on species of interest to UK	ditto
	3. Europe	France (e.g. work done at IFREMER) already have a renowned capacity in research'. Spain also does a lot of aquaculture research (e.g. CSIC research facilities such as IATS (Instituto de Acuicultura de Torre de la Sal), and University of Tenerife and the University of Las Palmas de Gran Canaria).	
Locations that have emerging research strengths (emerging research excellence)	1.South America – Brazil and Chile	Brazil - Strong background in agricultural research but planning to expand aquaculture production and science base.  Chile - Will be the second largest aquaculture producer for species of interest to UK growing academic and science base many similar issues related to disease and genetic improvement	Brazil - Science without borders is in place but difficult to get a high enough profile to attract enough students.  Chile - More arrangements for bilateral research
	2.Mexico	Strong academic background aquaculture is an emerging priority good connections with several Mexican Universities	More arrangements for bilateral research
	3.Japan and China	Giants for global aquaculture research	ditto
Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs	1.Norway	As above	
	2.Chile	As above	
	3.Brazil	As above	

**Top Location overall** Brazil has the greatest overall potential

## MASTS Dynamics and Properties of Marine Systems Theme

– contact Dr David McKee david.mckee@strath.ac.uk

Collaboration	Priority Market	Rationale/Detail of the opportunity	Details of any current blocks or of mechanisms required
Locations that already have a renowned capacity in research	1. USA	Leading research institutes e.g. WHOI, Scripps. Excellent facilities and cross-fertilisation of ideas.	Transatlantic Research Alliance, launched by the Galway Statement on Atlantic Ocean Cooperation in May 2013 ( <a href="http://www.eu2013.ie/news/news-items/20130524atlantic-asharedresource/">http://www.eu2013.ie/news/news-items/20130524atlantic-asharedresource/</a> ). "The European Union, The United States and Canada today agreed to join forces on Atlantic Ocean Research. The goal is to better understand the Atlantic Ocean and promote the sustainable management of its resources. The Agreement aims to connect the ocean observation efforts of the three partners. The work will also study the interplay of the Atlantic Ocean with the Arctic Ocean, particularly in relation to climate change. The EU and its Member States alone invest nearly two billion euro on marine and maritime research each year. The 'Galway Statement on Atlantic Ocean Cooperation' was signed today at a high level conference at the Irish Marine Institute in Galway. - See more at: <a href="http://www.eu2013.ie/news/news-items/20130524atlantic-asharedresource/#sthash.0CKtVdo1.dpuf">http://www.eu2013.ie/news/news-items/20130524atlantic-asharedresource/#sthash.0CKtVdo1.dpuf</a> "  There is an urgent requirement to translate this high level agenda into practical cooperative funding mechanisms so that there can be leverage for example between EU H2020 programmes, NERC programmes and US programmes funded by NSF, NOAA and ONR.
	2. Europe	Need to better exploit opportunities presented by Horizons 2020 – establish MASTS as preferred partner.	Promote MASTS researchers as potential partners for research consortia
	3. Australia / NZ	Strong cultural ties e.g. Commonwealth. Chance to explore common concerns e.g. environmental impact of energy production technologies.	Identify funding mechanisms, and establish areas of mutual benefit.
Locations that have emerging research strengths (emerging research excellence)	1. China	Rapidly expanding university and research centres oceanography e.g. Qingdao	Funding mechanisms, esp. funding for studentships, scholarships and travel for joint field work.
	2. India	Emerging research capacity, including remote sensing	Funding mechanisms, esp. funding for studentships, scholarships and travel for joint field work.
	3. South America	Argentina, Brazil. Cuba emerging with space programs, and growing research capacity	Funding mechanisms, esp. funding for studentships, scholarships and travel for joint field work.
Locations that have a strong industrial base where knowledge exchange opportunities exist for university research outputs	1. China	Environmental impact assessment, esp. modeling capabilities available in MASTS	Funding, and IP protection.
	2. USA	Exploitation of technology developed in MASTS institutions	Funding, and IP protection

Top Location overall China

## ScotCHEM (Scottish Chemistry)

ScotCHEM via Peter Tasker declined to respond to the questionnaire as follows:

'I have had feedback from most of the ScotCHEM management team. Unfortunately there is not much enthusiasm for participation in the SDI/BC scheme.

The perception is that for most researchers in our community there is a much higher probability of setting up fruitful international collaborations via a "bottom-up" approach. This usually works by the wearers of white coats meeting at international scientific conferences, finding that they have complementary research expertise, and then applying for funding to set up collaborative projects and to exchange personnel. Increasing the funding for the latter should have a higher priority than committing substantial resource to run major "top down" events of the type which appear to be the aim of the proposed SDI/BC scheme.

It is not particularly difficult for a committed researcher to obtain funding, e.g. via the Royal Society, to attend appropriate international conferences. Also, the Royal Society of Chemistry has recently set up schemes to provide bursaries for its members (usually from the UK) to contribute to join meetings with overseas chemical societies.

You may find the attached report commissioned by Scottish Enterprise of interest (International Comparative Performance of the Scottish Research Base in Chemical Sciences: A Report prepared by Elsevier for Scottish Enterprise, May 2013). The main concern expressed when this report was published was that there is evidence that international collaborations involving ScotCHEM researchers are growing, whilst those involving collaboration between ScotCHEM institutions may be decreasing. It is probable that this is driven by the need to establish the international relevance of research output for REF exercise.

On the basis of all the above we do not think it will be very helpful to complete the survey. I am sorry that I cannot be more positive – please do not hesitate to contact me if you need any other input.'







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**Scottish Enterprise**

Atrium Court  
50 Waterloo Street  
Glasgow G2 6HQ

[www.scottish-enterprise.com](http://www.scottish-enterprise.com)

**British Council Scotland**

Waverley Gate (Fourth Floor)  
2-4 Waterloo Place  
Edinburgh EH1 3EG

[www.britishcouncil.org/scotland](http://www.britishcouncil.org/scotland)