



MINISTRY OF DEFENCE

Ministry of Defence

Strategic Trends Programme **Regional Survey - South Asia out to 2040**



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Background

Global Strategic Trends Programme is a comprehensive view of the future produced by a research team at the Development, Concepts and Doctrine Centre (DCDC). This regional survey, *South Asia out to 2040*, is part of the suite of publications within this programme.

Conditions of release

DCDC have produced the findings within this regional survey, *South Asia out to 2040*. It does not represent an official position of Her Majesty's Government or the Ministry of Defence information is, however, ©crown copyright, unless otherwise stated.

Departmental direction

Global Strategic Trends Programme examines the strategic context that faces defence as well as the challenges and opportunities it provides for the MOD. We have been directed by the MOD to stress the need for an integrated approach.

DCDC's Strategic Trends Programme aims to provide a detailed analysis of the future strategic context for defence out to 2040. This will be an essential input into policy and concept development. Major outputs include:

- trends-based analysis of the future strategic context
- analysing alternative futures, key risks and shocks, including an assessment of their probability, frequency and magnitude
- identifying how shocks might impact on the future strategic context
- identifying broad defence and security implications.



Foreword

The Development, Concepts and Doctrine Centre (DCDC) Global Strategic Trends Programme analyses the future strategic context. *Global Strategic Trends out to 2040*, published in 2010, highlighted defence and security trends that informed both the National Security Strategy and the Strategic Defence and Security Review. The pattern of publication will continue, aligned to the 5-year Defence review cycle. This particular publication is a regional study, which along with others, forms an ongoing body of evidence to inform the higher-level analysis.

A key deduction from the 2010 *Global Strategic Trends out to 2040* was that over the next 30 years Western dominance of international affairs is likely to reduce as economic and military power become more evenly distributed. The West's strategic relationship with South Asia will be important. Some argue that such aspects of globalisation are nothing new. They may be technically correct, but the character of it has changed. The reach of international trade and services, the sheer velocity of information, and the inescapable security implications of climate change, for example, are increasingly binding together the security of nations.

This *South Asia out to 2040* regional survey uses the Global Strategic Trends Programme methodology to identify key security drivers. It identifies two key themes. The first is the changing geopolitical balance and the most likely future international context, with China and India as key players. The second explores the challenges arising from the rise of South Asian powers. Having established where South Asia is going, and how it might get there, the study then considers what the potential implications might be for defence and security. We will develop these more fully in the next iteration of the *Changing Character of Conflict* study.

The definition of South Asia for this survey highlights the significance of two obvious poles of power: China and India. The research confirms that the critical path for the whole region is defined by their future development. All the South Asian economies will be affected, to some degree, by the performance of the Chinese and Indian economies and how they interact with India and China. This study notes that China and India will likely endure as significant economic, political, cultural and military actors.

One of the strengths of the Strategic Trends Programme is its independence enabling it more easily to remain distant from, but aware of, current policy. This helps it to be objective. Inevitably, the findings in *South Asia out to 2040* may challenge some perceptions, but I commend them to you. Only by thinking about the future can we be prepared for the future.



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October 2012



South Asia out to 2040

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Introduction

South Asia out to 2040 is the latest in a series of the Development, Concepts and Doctrine Centre (DCDC) regional surveys that have considered areas such as the Arctic, Europe and the South Atlantic. The Ministry of Defence (International Planning and Policy Section) commissioned this survey and it takes forward the research that underpins *Global Strategic Trends – out to 2040*. It also highlights the current trends and drivers identified by the continuous process of horizon scanning undertaken at DCDC. The survey informs decision makers about likely developments in the region, and focuses on the potential defence and security implications. The findings from this document will inform the next edition of *Global Strategic Trends (GST)* which is due for publication in 2014.

For the purposes of this survey, we have geographically defined South Asia to include: Pakistan, China, India, Nepal, Bhutan, Bangladesh, Myanmar, Sri Lanka and the Maldives. See Figure 1.

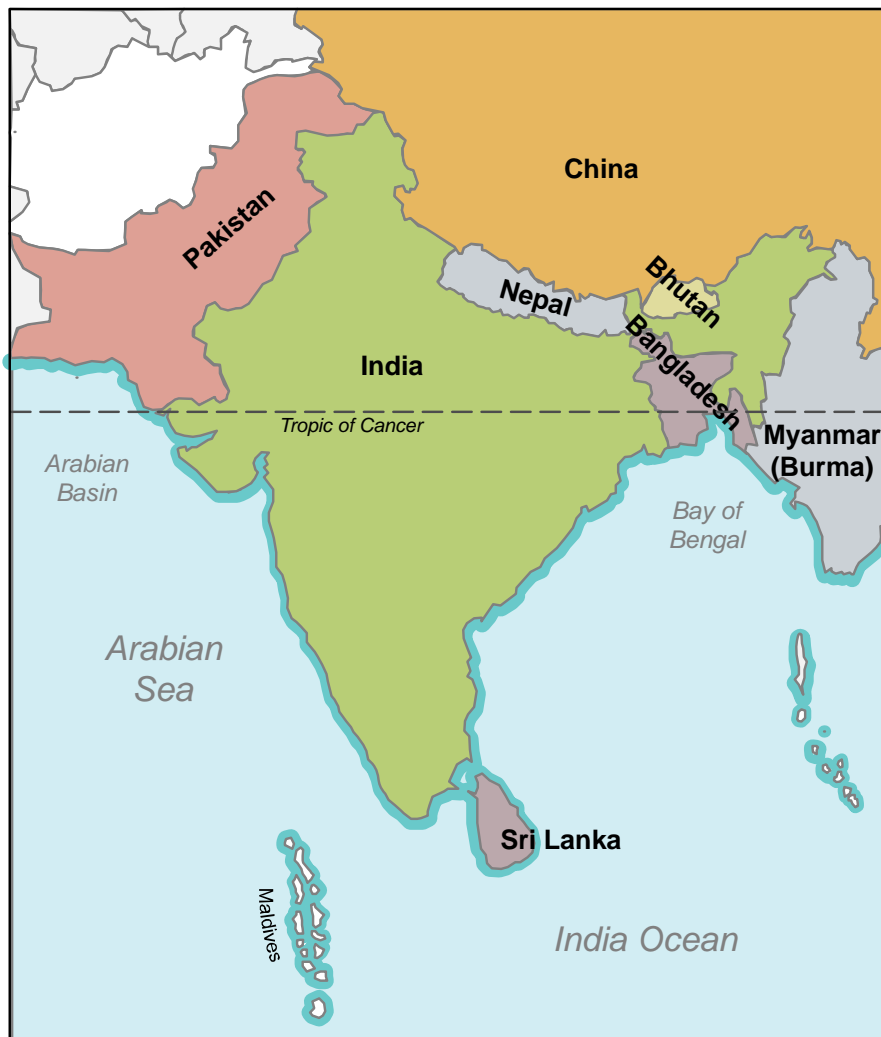


Figure 1 – Global Strategic Trends definition of South Asia



We have constructed the survey to take into account our readers' differing needs. The **key findings** section highlights the major themes for the region and identifies their relevance for defence and security. Further:

- Part 1 articulates the core arguments, identifies the key themes and explains the analytical base. It provides examples of how the Global Strategic Trends (GST) *ring road issues*¹ are relevant to the region. It then outlines the key themes faced by South Asia in two essays: *The Future International Context* and *The Challenge of Transformation*.
- Part 2 provides the source data from our horizon-scanning process and summarises the relevant trends and drivers.

We have also addressed **hot topics** and potential **strategic shocks**. Hot topics analyse in greater depth specific countries and issues of particular interest. Strategic shocks are high impact, but low probability, events that would have a significant impact on both global and UK's defence and security. They are, therefore, worthy of some consideration.

Expressing probability

We have assigned each finding with an 'assessment of likelihood'. This assessment represents the probability of the finding as viewed by the authors. Such probabilities are, by necessity, subjective. Their function provides a measure to guide those policy planners who need to make timely and informed decisions regarding complex global issues using a readily comparable scale for judgements.²

Using the terms listed below, we have written these assessments *in italics*. Due to the high number of variables, trends-based analysis can never offer precise predictive analysis. The terms below provide only a coarse indication of certainty, based on available evidence.

Assessment of probability	
Description	Associated probability range
<i>will</i>	greater than 90%
<i>likely/probably</i>	between 60% and 90%
<i>may/possibly</i>	between 10% and 60%
<i>unlikely/improbable</i>	less than 10%

¹ The *ring road issues* of globalisation, climate change, global inequality and innovation are discussed throughout this study. See *Global Strategic Trends - Out to 2040* for further information.

² 'In order to acknowledge the uncertainty of an event, the first task is to measure the intensity of your belief in the truth of that event; to attach to each event a number, which describes your attitude to the statement.' Lindley D.V, *Understanding Uncertainty*, 2006.



Definitions

Term	Definition
Trend	A discernable pattern of change.
Driver	A factor that directly influences or causes change.
Ring road issue	A driver that is so pervasive in its nature and influence that it will affect the life of everyone on the planet over the next 30 years.
Dimension	In depth research and analysis on trends and drivers, organised into four key areas: social; resource and environment; economic; and science and technology.
Strategic shock	A shock is a high impact event that results in a discontinuity or an abrupt alteration in the strategic context. The strategic shock can be expected or unexpected. The important point is that it dislocates the strategic context from the trends that have preceded it.

Outline methodology

Global Strategic Trends is based on analysing drivers and trends. The process identifies trends and drivers in the social, science and technology, economic, resource and environment, and geopolitical dimensions.³ Within each of these dimensions, key trends have been determined through detailed analysis with subject matter experts. A cross-dimensional analysis then considers how these trends are likely to develop and interact, in order to establish the key themes:

- the future international context
- the tension of transition
- evolving defence and security challenges.

Assessments are made to varying degrees of probability to reflect multiple alternative outcomes. The future outlined in Global Strategic Trends is realistic, based on the most probable outcomes. Alternative futures are also explored.

³ Note that, unlike *Global Strategic Trends - Out to 2040*, this publication does not contain a 'geopolitical dimension'. This is because we have incorporated all the substantive analysis into the *Key theme 1 – the international context*.



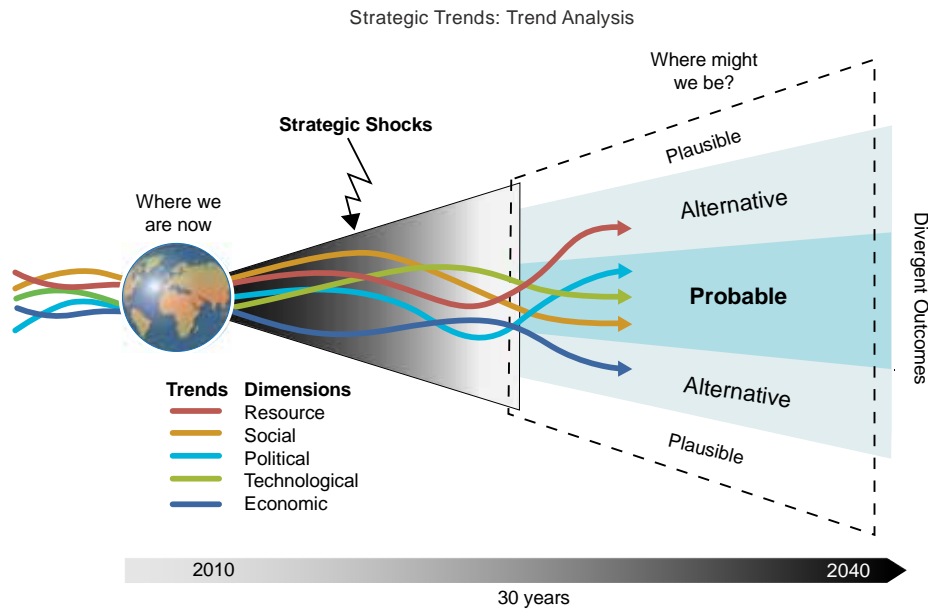


Figure 2 – Global Strategic Trends: Outcome assessment

These outcomes are discussed in three key themes:

- the human environment
- dynamics of global power
- evolving defence and security challenges.

These key themes identify outcomes from the trends and drivers. They help:

- understand interactions between the trends
- distinguish between long-term significant changes and short-term turbulence
- identify major challenges and opportunities in the future strategic context.

As well as establishing trend-based outcomes, Global Strategic Trends seeks to identify and interpret the likely pattern of change over the next 30 years. We assess that during this period human activity will be dominated by four pervasive issues, described here as *ring road issues*:

- climate change
- globalisation
- global inequality
- innovation.



Executive summary and implications for defence and security



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A Tibetan exile is detained by Indian security officers during a visit by the Chinese President Hu Jintao to New Dehli

This section highlights the emergent themes and assesses their relevance to defence and security



Executive summary

South Asia is a region that is fundamentally important to the world's development. If present trends continue, it is *likely* to make the largest contribution to global Gross Domestic Product (GDP) by 2040.⁴ It *will* also contain nearly 40% of the world's population by the same date.⁵ It follows then that any future trend or driver in the region is *likely* to have defence and security implications for the world and us. The dominance of China, possibly succeeded by India, will command particular attention. Over the next 10-20 years, we will need to consider carefully the continuing shift of global power from the West to the East if we and other western allies are to reconfigure our security policies and associated capabilities appropriately.

The economic rise of China and India

Projections suggest that South Asia is likely to be the greatest contributor to global GDP from 2030 onwards causing a tilt in the global economic power axis firmly towards Asia.⁶ Factors driving this economic shift include:

- continued urbanisation across South Asia and labour markets
- massive internal consumer markets
- demographic strengths of many South Asian states.⁷

The Renminbi (RMB) and the Rupee will be of greater global significance by 2040. Both are likely to be traded internationally as reserve currencies assuming that both countries can undertake the necessary economic reforms to make this possible. Given the strength of the Chinese economy in the near term it is likely that the Renminbi will be the most traded global currency, rivalled only by the US dollar out to 2030.^{8,9} Therefore, it is likely that the Chinese economy will show strong growth (assuming no internal or economic disruptions occur) out to at least 2020.¹⁰ From this point onwards, the internal welfare demands, and a reduction in levels of available capital, are likely to lead to a slow down in the Chinese economy, which may lead to India overtaking China by between 2030-2040.

⁴ See *Key theme 1 – the international context* for further details.

⁵ The countries in our definition of South Asia are projected to have a combined population of 3.57 billion people in 2040, accounting for 40% of the global population. Source – *UN Population Prospects*, 2010.

⁶ See page 27, data derived from Standard Chartered Projections that suggest that China, India and Asia (excluding Japan) combined will contribute 41% global gross domestic product (GDP) by 2030, as opposed to 26% from the EU and US.

⁷ China will continue to enjoy the benefits of a 'demographic dividend' until 2020, but is unlikely to benefit as much as India with its larger and younger population over the period. However, post-2020 China is also likely to face significant demographic challenges as its population ages and requires greater welfare support from the state.

⁸ There are indicators that China is already taking steps to internationalise the Renminbi – *China's Yuan Convertible by 2016 in Global Poll Marking Big Investor Shift*. <http://www.bloomberg.com/news/2011-05-12/china-s-yuan-convertible-by-2016-in-poll.html>

⁹ However, post-2030 India is more likely to have liberalised its economy, tackled internal corruption and shown better integration into the global knowledge-based economy.

¹⁰ DCDC analysis suggests that China is likely to continue growing economically out to 2040. However, for planning purposes, a 'strategic shock' concerning Chinese economic failure has been included alongside the 'five scenarios for China'. These can be found at pages 28 – 33.



The new international context

The rise of China and India will alter the dynamics of international relations, most significantly with regard to how the US engages with these emerging powers. Although, the US is likely to undergo a 'relative' decline in its contribution to global GDP, it is still likely to remain a significant economic, but most especially, military power in 2040. The dollar will retain a pivotal role in trading and its usage and strength will have a key role in the development of all other currencies over the period. Assuming it remains outward-looking, US operations are likely to continue in South Asia, especially in the South China Sea. However, these operations are likely to be increasingly contested. The growing strategic and economic significance of South Asia is likely to lead to a reorientation of US government and business interests, with the US becoming more 'Pacific' than 'Atlantic'-focused.¹¹

Despite short term fluctuations, the strength of the US, Chinese and Indian economies are likely to lead to the formation of an unofficial 'G3' grouping. Each of these three powers will engage with the others on a host of issues ranging from defence, through to climate change and, perhaps most significantly, continued national economic and industrial development. Within the 'G3', the US is likely to increasingly value its relationship with India. The emerging strength of the Indian economy, allied to the shared languages and culture of large numbers of the Indian diaspora contributing to US technological development, will drive this relationship.

The US is likely to remain the world's only superpower in 2040. However, China and India as 'great powers' will equip themselves with modern, capable and robust defence forces over the period. If China is able to maintain defence spending at its current levels as its economy continues to grow, the level of its defence spending *may* be three times as much as the US.¹² Situations where the 'old' West and the 'new' East meet are therefore likely to increase, especially in the domains where the East shows greatest interest, namely:

- cyberspace
- space
- Middle East resources
- the South China Sea
- the Indian Ocean.

Europe will remain a significant economic power. It is likely to be the fourth largest global economy. However, due to the lack of a credible EU military force, it is unlikely to be as significant as the 'G3' powers on the global stage. It is likely that the main influence of Europe will remain trade-based. The EU, therefore, will generally lack the key instruments of power necessary to project its will effectively on the global stage through conventional,

¹¹ Recent indications of this trend have been demonstrated in The US Congressional Bill 2410, *The Foreign Relations Authorisation Act for Fiscal Years 2010 and 2011 (H.R. 2410)* that articulates 'engagement in Asia must be a cornerstone of United States foreign policy in the 21st Century' and the bill backs up this assertion with billions of dollars of funding focused on the region.

¹² Present estimates suggest that both China and the US presently spend around 4% of GDP on defence. If both countries continue to accept a military burden at, or close to, this level, and if China's economy in 2040 is three-times bigger than the US economy, its defence spending would also be about three times larger.



'hard power'¹³ means. It is likely that the EU will continue to rely on the strength of its economy and other forms of 'soft power'¹⁴ to gain influence on the global stage. However, given the difficulty of the EU forming a substantive common position towards Asia, and if it suffers long-term economic disruption, it is *unlikely* to be as significant as the 'G3' powers on the global stage.

Future trends across South Asia

Across South Asia, interactions with China and India will determine the future of many of its states. Traditional affiliations, as well as ethnic and religious factors will remain significant in driving the formation of any such alliances. For example, Pakistan is *likely* to stay closely aligned with China in order to gain economic, technological and military support. Similarly, Myanmar's authoritarian government, in response to demands for democratic transformation from its internal populace, is likely to increasingly emulate the process of gradual economic liberalisation seen in China which it is *likely* to see as its major partner.^{15,16}

Nepal *will* sustain linkages with both China and India providing access to hydroelectricity, water and potentially mineral resources. The shared cultural, ethnic and historic ties with India *will* be significant as India provides support for governance, societal development and technology. However, China is *likely* to value Nepal as a buffer state between itself and India, and increasingly provide economic support and infrastructure development. Similarly Bhutan, but on a smaller scale, will also represent an increasingly 'contested' state between India and China, due to its geographic position and its hydropower generation facilities.

Sri Lanka is *likely* to continue strong economic growth for most of the period, with most external investment coming from China.¹⁷ As long as a peaceful economic climate dominates, the more *unlikely* it is that Liberation Tigers of Tamil Eelam (LTTE) activity will return to the levels experienced over the past 20 years. Bangladesh is *likely* to require support from its' South Asian neighbours in times of both humanitarian crises (as a consequence of increased flooding/drought or the large scale migration that results) and in order to mitigate against gradual alterations caused by progressive climate change. Similarly, the Maldives *will* also be increasingly threatened by sea level rises. By 2040, the success or failure of current mitigative policies will be apparent.

¹³ Hard power is *the threat or use of military or economic coercion that is used to influence the behaviour or interest of other States, groups or individuals to induce the, to adopt a particular course of action, which they would not otherwise chose themselves.* DCDC, Joint Doctrine Publication (JDP) 0-01.1, UK Supplement to the NATO Terminology Database, 8th Edition, dated September 2011.

¹⁴ *Ibid.* Soft power is *the ability of a political body, such as a state or combination of states, to attract and hence persuade, other political bodies through cultural and ideological means or by encouraging emulation.*

¹⁵ The Buddhist Sinha is the Buddhist Religious Community of Monks within Myanmar whose traditional role has included offering views on government policy and activity. The degree to which ordinary people revere them dictates that the Myanmar Government must 'tolerate' their public criticisms of the current regime.

¹⁶ This is likely to lead to the progressive democratisation and relaxation of current controls by the military Junta. Such a trend is already being observed in the recent success of Aung San Suu Kyi's pro-democracy party in a series of by-elections. Although very early in the process, it is a strong indicator that political reform in Myanmar is likely to occur over the next 30 years. *U.S. hails Myanmar election as step for democratic change* - <http://www.reuters.com/article/2012/04/02/us-myanmar-idUSBRE83109I20120402>.

¹⁷ However, the government is *likely* to balance Chinese investments with that derived from established relationship arrangements with the UK, India and Japan.



Similarly, other Islands in the region, including Diego Garcia, are also *likely* to be affected.¹⁸

Challenges to South Asia's rise

South Asian countries will have to undergo significant transformation to become the powers of tomorrow. China principally, but also to some degree India, *will* face increasing demands from its burgeoning population over the next 30 years. For example, rising domestic consumption, increased demands for social care, welfare provision, greater freedom of expression and the need to tackle the forces of inequality and corruption. For governments to react successfully to these demands, it is *likely* to require significant economic and political transformation.

Both China and India will require strong levels of sustained economic growth over the period to maintain internal stability. This will be their pressing national priority, taking precedence over all matters except national sovereignty and security. To this end, ensuring a stable external environment, which allows both countries to pursue domestic reforms and expand trading and investment opportunities with as many states as possible, *will be* an enduring aim for both countries.

Many South Asian states will experience demographic challenges, but also opportunities. China is *likely* to experience an increase in the average age of its population, from an average of 34 in 2011, to 44 in 2040. This could lead to China becoming one of the first countries to 'age before it gets wealthy'.¹⁹ South Asian countries with younger age profiles and larger family sizes such as India, Pakistan and Bangladesh, are *likely* to enjoy the economic benefits of young and productive workforces over the period. However, without the necessary social and educational policies in place to use such young populations and if inequality and corruption lead to large, young populations with limited economic opportunities but greater material aspirations, this 'demographic dividend' could become a 'demographic time bomb'.

The growth of South Asian economies will impact on most western nations, where the way of life for the majority of the populaces *may* be challenged by rising energy and resource prices, coupled with a relative decline in the value of their national economies. If the West continues to experience periods of sustained recession, increasingly we may need to adopt protectionist policies. Such a combination of recession and protectionism *may* limit export growth across South Asia while domestic demands for employment and expectations of higher living standards continue to rise.²⁰ This *may* occur before 2020 if western economies experience a long period of stagnation while China is still attempting to reconfigure to a service-based economy.

¹⁸ Current projections suggest a continued increase in sea level over the next 200 years. 'Sea levels around the world can be expected to rise by several metres in coming centuries, if global warming carries on. Even if global warming is limited to 2 degrees Celsius, global-mean sea level could continue to rise, reaching between 1.5 and 4 metres above present-day levels by the year 2300, with the best estimate being at 2.7 metres'. *Significant Sea-Level Rise in a Two-Degree Warmer World* -

<http://www.sciencedaily.com/releases/2012/06/120624134955.htm>

¹⁹ According to projections from Goldman Sachs, the Chinese 'demographic window' for boosting economic growth occurs between 1986-2027, this contrasts with the Indian projection which is likely to occur between 2012-2054. *Population Growth and Ageing in the BRICs* - Goldman Sachs Global Economics, Commodities and Strategy Research at <https://360.gs.com>

²⁰ Russell Ong, *China's Security Interests in the 21st Century*, (Routledge: London, 2007), p.18.



South Asian defence and security trends

Events and developments in South Asia will directly influence global defence and security out to 2040. The continued industrial rise of India and China will also boost military strength and capability across the region. The establishment of substantial military-industrial-capabilities in South Asia, the proportionally greater levels of defence spending by the 'G3' nations, and the significant mass of the Chinese and Indian Armed forces will combine to dwarf other national militaries.



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Indian Army trucks pass through the 3510 metre-high Zojila Pass, which lies on the lower depressions of the Himalayan range and connects Ladakh to the Kashmir Valley

Both India and China *will* seek to develop a mature blue water naval capability by 2040 to maintain a routine maritime presence both in the oceans surrounding South Asia and increasingly around the world. It is *likely* that India will maintain a continuous maritime presence in the Indian Ocean to address piracy. Similarly, China *will* continue to develop an extensive and technically proficient navy in order to project its power around the world and to counter US operations in the region's oceans. China will continue to justify this development as a counter to perceived US encirclement, citing America's continued involvement both militarily and politically with South East Asian states. Such a perception of 'encirclement' will be an enduring tension for the region. India will object to China's policy of continued investment and integration with Bhutan, Nepal, Sri Lanka, Pakistan and Myanmar. At the same time, China will view US engagement in the South China Sea and its alliances with South East Asian powers as a policy of 'containment'. The South China Sea and the Indian Ocean are likely to be a strategic flashpoint for relations between the 'G3' out to 2040. While it is *unlikely* that this will lead to large-scale conflict, it *may* result in isolated military engagements in the region from time to time.



The strategic context in South Asia, with the two new 'poles' in global power sharing one of the largest borders in the world, makes it *likely* that both countries will continue to develop weapons of mass effect. China, India and Pakistan will for example, continue to develop nuclear weapons and civil nuclear programmes for national prestige, defence and energy supply reasons. Out to 2040, this increases the likelihood of both fissile and radioactive material being used militarily, or becoming available to radicalised non-state actors.

Terrorism *will* remain an enduring factor in South Asia out to 2040 as many al-Qaeda inspired terrorist groups continue to plan attacks from, and across, the region.²¹ In addition, 'home-grown' terrorists such as the Taliban (Tehrik-e Taliban Pakistan (TTP)) in Pakistan, Kashmiri inspired terrorist groups, an increasingly active Maoist 'Naxalite' insurgency in India (there were 2000 terrorist related deaths in India in 2010)²² and Uighur separatists in China will ensure that the region is unlikely to be free from terrorism over the next 30 years. The capacity of many South Asian states to manage diverse ethno-religious groups will be a critical factor for maintaining internal and regional stability out to 2040. The success with which conflict between different groups is managed and resolved will depend upon the effectiveness of a states overall governance.

Emerging technology frontiers

The Asian technological landscape will be dynamic and continue to expand, with its researchers making significant high profile contributions to publications, research and development, as well as high technology manufacturing and exports. The growth of Asian intellectual centres, along with forming new financial centres and continued investment by trans-national corporations, will continue to attract significant high-tech investment, and create a 'hub' for research and development. Collaborative research and development between South Asian countries, the US and other Asia-Pacific partners will establish a regional innovation network by 2020. Such a network will enable the rapid exchange of technology and ideas, and accelerate the development of many South Asian countries such as India.

China and India will attain global leadership in select technical disciplines by 2020. South Asian defence and security markets will become significant and so allow other developing nations to take advantage of emerging defence technologies via the modification of civil sector based dual-use technologies for a relatively small investment. Technological parity with leading Western states *may* also be achieved by China and India before 2040, with parity being achieved in many niche areas by as soon as 2015.²³ Consequently, the protection of intellectual property (IP) *will* be an increasingly significant global issue, There will be continued demands for South Asian countries to develop resilient systems that safeguard research and technologies for multinational corporations with operations in South Asian countries.

²¹ CONTEST: The UK's Strategy for Countering Terrorism, July 2011, p.26.

²² South Asia Terrorism Portal Database (2011). India Assessment 2011, available at <http://www.satp.org/satporgtp/countries/india/index.html>

²³ China is likely to attain and sustain global leadership in a number of technical areas (such as computer science, space science, genetic engineering and nanotechnology), possibly eclipsing the UK's science and technology base in certain niche areas as early as 2015, and those of the US, by 2020.



Space *will* be an increasingly important ‘frontier’ over the period. Both China and India will use space power to increase their national power, prestige and influence - moving them towards ‘great power’ status. Access to low cost satellite technologies and the development of launch capabilities will be a priority for both India and China. Other South Asian countries including Pakistan, Bangladesh, Sri Lanka and Myanmar will secure access to such capabilities through the global market.

Exploiting cyberspace *will* provide an opportunity to a range of state and non-state actors to gain an advantage. Many South Asian countries will continue to have large, active communities of hackers and information security experts. Some of these groups are likely to be under direct, or indirect, state control while others operate independently. China, Pakistan and India are *likely* to mobilise these groups as part of coordinated national efforts during periods of conflict.

Climate change and energy

South Asia’s industrial rise, along with continued volatility in the Middle-East and the imminent passing of the point of peak ‘easy oil’, will mean that hydrocarbon-based energy prices will rise significantly out to 2040.²⁴ Rapid price rises are *likely* to increase the viability of alternative fuel sources, such as tar sands, shale gas, coal and renewable technologies as well as nuclear energy. India in particular has large thorium reserves.²⁵ China’s enormous demand for resources and energy means it will continue to expand its global links as it secures bilateral deals with other resource-rich nations around the globe.²⁶ As other nations witness this ‘scramble’ for commodities and resources, the reality is that their own resource requirements *may* go unfulfilled and that their previously sound relationships with China’s new resource providers suffers.

South Asia *will* be vulnerable to the increasing effects of climate change, with rising average global temperatures and greater incidence of extreme weather events. While some states in the region have significant disaster-relief capability (and experience), many do not. The need for ‘outside’ support therefore is *likely* to endure to 2040. The rapid loss of some arable land is *likely* to promote local, then national migration, with international migration *possible* for a small proportion of the affected people, (current estimates suggest around 1-2% of the population migrate internationally). The impact of sea-level rises on low-lying Island-based nations such as the Maldives however, *may* challenge this trend and lead to large numbers of international migrants.

The increasing regional demand for water is likely to heighten tensions over shared resources such as the Brahma-Putra Himalayan region.²⁷ Food production will also be a key issue for the region, with much of the population dependent on rice crops as a

²⁴ By 2020, production growth of easily accessible oil and gas is *unlikely* to match demand growth. See *Global Strategic Trends - Out to 2040* for further details on this trend.

²⁵ Thorium is a naturally occurring radioactive element that has the potential to produce nuclear energy. See *the environment dimension* for more detail.

²⁶ If China were to sustain its present rate of per capita growth, by 2030 it would consume the same level of oil produced by today’s entire oil industry – See Wilton Park Dialogue: *Dialogue with China: towards ‘harmonious society’ governance, participation and social cohesion*.

²⁷ The Himalayan range contains high altitude glaciers which supply water to many rivers in Asia, which in turn, supply water to more than half of the world’s population. These populations will be affected by accelerated glacial-melt adversely affecting the reliability of supply. In Nepal and Bhutan today, for example, melting glaciers are filling glacial lakes beyond their capacities and causing significant floods.



staple.²⁸ For example, China's arable land, which represents 10% of the total arable land in the world, supports over 20% of the world's population.²⁹

China and India will continue to implement long-term policies to incorporate some measures of sustainable development, but economic growth *will* remain the imperative throughout the period.³⁰ China is currently the world's largest producer of greenhouse gases, although later in the period, India is *likely* to rival it. China and India are likely to take confidence from their geographic sizes and the variability of resources and land available to them over the next 30 years. However, given the scale of the challenges they face, especially with regard to food and water, availability and the sensitivity of the monsoon cycle, may be challenge such confidence.³¹ The smaller South Asian states which do not have the benefit of covering such large geographic ranges are, however, likely to be weakened by incidences of climate stress such as flooding, sea level rises and drought.



Shutterstock 5972857

Climatic incidents such as the flooding seen in Shahdadkot, Pakistan in 2010 are likely to increase in frequency out to 2040

²⁸ Rice production is the largest consumer of water in the region further sensitising it to the consequences of a changing climate. In India alone, more than 85% of the water is used for irrigation purposes.

²⁹ 'About 75% of China's cultivated area is used for food crops. Rice is China's most important crop, raised on about 25% of the cultivated area. The majority of rice is grown south of the Huai River, in the Yangtze valley, the Zhu Jiang delta, and in Yunnan, Guizhou, and Sichuan provinces. Wheat is the second most-prevalent grain crop, grown in most parts of the country but especially on the North China Plain, the Wei and Fen River valleys on the Loess plateau, and in Jiangsu, Hubei, and Sichuan provinces. Corn and millet are grown in north and northeast China, and oat is important in Inner Mongolia and Tibet.'

http://en.wikipedia.org/wiki/Agriculture_in_China

³⁰ Given the scale and pace of Chinese and Indian economic development, both countries are, at present, able to cap economic growth in order to constrain emissions. This tactic is unlikely to be available as economic growth slows out to 2040.

³¹ For example, in India in 2010, irregularities in the monsoon season led to onion crop failures that resulted in a national shortage. This prompted internal riots and protests that were mitigated by purchasing the necessary supplies from Pakistan.



Global implications for defence and security

Our horizon scanning highlighted a number of strategic trends that have both global and UK implications. Future trends in South Asia will impact on:

- the global economy
- the geopolitical balance of power
- international law
- global security
- climate change.

The global economy

The global economy is likely to undergo a long-term reconfiguration. From now until 2030, the Chinese economy is *likely* to retain its significant influence on the global economy. However, post 2030, the Indian economy is *likely* to become just as influential, possibly assuming greater global significance beyond 2040. This will have long-term implications for UK diplomatic, economic, defence and scientific policies as the UK plans how to most effectively accommodate the changing dynamics of global power.

Global GDP levels are *likely* to 'equilibrate'. The increasing economic growth and prosperity of South Asia could lead to the stalling and subsequent decline of many western economies as global GDP per capita levels approach the same level. This may lead to long periods of recession and rising disaffection within the UK population. This could subsequently lead to increased incidents of internal unrest, a rise of nationalistic groups and a demand for protectionist economic and defence policies. The western way of life with cheap access to a wide variety of consumer choice and cheap energy will be increasingly challenged as lifestyles follow GDP levels and balance across the globe.

Chinese economic failure would have a significant impact upon the global economy. The US economy's association with China, and the importance of the Chinese economy to continued global growth, will increase its influence on the UK economy. Although unlikely, a destabilised China would severely disrupt the global economy and, with the City of London as a pivotal financial hub, the impact for the UK would be considerable.

The US Military Industrial Complex (MIC), and by association the UK MIC, will be much smaller³² compared to the Chinese MIC capability by 2040. The current scale and pace of Chinese industrial growth is leading to the creation of a MIC that is *likely* to exceed the productive capacity of the US by 2040. Although it is *unlikely* to surpass it in technological sophistication, with regard to robotics and advanced military technologies, it is *likely* to be a magnitude of scale larger than the US capacity. This will increase the UK's dependency on the US and may also increase the significance of the emerging Indian industrial base to UK defence capabilities.

³² Note: in terms of a direct comparison of size and budget.



Geopolitical balance of power

'Multipolarity' is likely to drive the formation of a new diplomatic context. The growth of the Chinese and Indian economies in South Asia coupled with the 'relative' decline of the West is *likely* to lead to a new power framework where alliances are constantly re-assessed and negotiated based upon 'transactional principles'.³³ In such cases, the UK cannot assume dominance and is *likely* to remain one option among many. It is however, likely to offer considerable insight and experience in foreign policy and influence, so is *likely* to remain an attractive potential ally.

Demographic opportunities and risks will occur across South Asia. Demographics will continue to drive national economic growth and policy formation. Demographic challenges and opportunities will vary across South Asia. China is likely to experience significant demographic challenges in ensuring that the workers who sustained its demographic dividend from 1990s to 2020 have their social security and welfare needs met. States with younger age profiles and larger populations, such as Pakistan, India and Bangladesh, are *likely* to enjoy the economic benefits of their own demographic dividends, taking advantage of productive, and relatively cheap, manpower. However, in all states, this dividend *will* require resilient social policies to ensure that large-scale inequality and poor education do not generate demographic 'time bombs'.³⁴

Internal tensions are likely to arise in the Chinese Communist Party (CCP). China will need to undergo economic and political liberalisation to sustain continued economic growth and internal stability. The speed and the depth of this transformation *will* have implications for both the intra-party democracy of the CCP and the international system. Tensions surrounding this liberalisation *may* lead to China exhibiting erratic behaviour on the international stage. It *may* also lead to it pursuing ethno-nationalistic policies to distract from internal issues.

Incidents of Chinese unrest are likely to increase. Due to the physical size of China, the diverse ethnicity of its people, rising inequality, the strict control placed upon freedom of speech by the CCP and the increased ease of access to global communications, China is *likely* to experience increased incidents internal of unrest. An increasingly aged population that is more greatly dependent on the state for welfare provision than previous generations is *likely* to drive such demands.

Crisis management will be increasingly tested over enduring issues. As Chinese and Indian militaries develop in size and capability, the chances of confrontation over areas of shared significance, such as the South China Sea and the Indian Ocean, are likely to increase. In cases where large, hierarchical structures such as the Peoples Liberation Army (PLA), where all decisions are subject to complex channels of political management, rapid and informed management of such encounters could be a challenge. Countries like the US, the UK and Russia, could have influence in strengthening the resilience of such systems to help prevent potential incidences of conflict.

³³ 'Transactional principles' describe relationships based predominantly on guaranteeing trade.

³⁴ A 'demographic time bomb' describes an increasingly common scenario in which the number of older people dependent on pensions and state support exceeds the number of people of working age.



International law

International organisations may decline in significance. The strategic reorientation of the US, and the potential rise of new regional authorities such as the Association of Southeast Asian Nations (ASEAN), could lead to the declining influence of existing international institutions such as NATO and the UN Security Council. The founding of new international organisations which reflect a new 'multipolar' world would radically impact on the UK's position in the world. The Five Powers Defence Agreement (FPDA) therefore is *likely* to be of increasing importance for the UK as the century progresses.³⁵

International law and conventions may become less relevant. On common issues, China and India *may* circumvent UN rules. For example, in confronting piracy both countries have, and are likely to continue, to develop their own rules of engagement to protect their national supply chains. Both China and India *may* increasingly work independently of internationally specified laws to address immediate threats to their sovereign interests. Similarly, with conventions such as United Nations Convention on the Law of the Sea (UNCLOS), China may choose to ignore such conventions and instead invoke 'ancestral' claims on areas of strategic importance such as the Spratly Islands. Such a development would have a significant impact on the current diplomatic context and how many countries administer overseas territories.



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A Chinese Navy Jiangwei II-Class Missile Frigate 548 Yiyang sails through the high seas between Okinawa and Miyako islands into the East China Sea

³⁵ The Five Powers Defence Agreement (FPDA) is a defence agreement between the UK, Australia, New Zealand, Singapore and Malaysia.



Global security

South Asia will continue to be a source of terrorist threats. South Asia will endure as a source of terrorist activity and non-state groups that have associations and impacts upon both their country of origin and the UK, through numerous South Asian diaspora groups. High levels of inequality based upon class, ethnicity and religion *will* endure as sources of tension across the region and *may* impact on the overall governance and stability of states such as Pakistan and Nepal. Turbulence, especially terrorist activity, in South Asia will continue to adversely affect the UK.

Nuclear weapons and weapons of mass effect will contribute to the regional balance of power. The threat of nuclear war and the development of nuclear weapons programmes *will* endure for the region. India, China and Pakistan will retain such capabilities and are *likely* to trade the technologies and nuclear material required for an increasing number of other states to develop this capability. New 'weapons of mass effect' *may* also arise. The UK will increasingly need to adopt wider security strategies to understand and detect cross-domain challenges and new strategic weapons. For example, increasing cyber incursions, attacks on space-based assets and strategic dependencies on virtual resources will all yield new strategic dependencies and vulnerabilities.

Continuing small arms proliferation and counterfeiting. China's continued engagement with fragile and corrupt regimes, especially in Africa, *will* provide channels for the proliferation of low-cost, low-tech military technologies that may have lasting implications for regional and, therefore, global security. Such relationships will also drive global criminality through the trading of counterfeit goods and technologies.

Climate change

Climate change will have a number of serious impacts on South Asia. Rising pollution levels and the declining availability of arable land and water will lead to tensions over shared resources, as will increased incidents of seasonal flooding and food shortages. Water *will* be one of the main defence and security issues for South Asia out to 2040. The potential for 'riparian conflict' is significant and some form of state on state confrontation over shared water resources may occur out to 2040.³⁶

Sudden sea level rise would impact on international migration and the use of Diego Garcia as a permanent operating base. If sea levels rise more quickly than current estimates, millions of people across South Asia (principally in Sri Lanka, Bangladesh and the Maldives) will be displaced, with no opportunity to return to their homes.³⁷

³⁶ 'Riparian conflict' describes conflicts and disagreements relating to control and access to rivers.

³⁷ Current projections suggest a continued increased in sea level over the next 200 years. 'Sea levels around the world can be expected to rise by several metres in coming centuries, if global warming carries on. Even if global warming is limited to 2 degrees Celsius, global-mean sea level could continue to rise, reaching between 1.5 and 4 metres above present-day levels by the year 2300, with the best estimate being at 2.7 metres'.

Significant Sea-Level Rise in a Two-Degree Warmer World.

[Http://www.sciencedaily.com/releases/2012/06/120624134955.htm](http://www.sciencedaily.com/releases/2012/06/120624134955.htm).



This *will* increase the number of international migrants, a proportion of which *may* come to the UK to seek support from UK diaspora communities. Similarly, faster than projected sea-level rises in the region, could result in the loss of Diego Garcia as an operating base. This would significantly constrain UK and US operations in the region at a time when its relevance is becoming increasingly important, with a corresponding loss of influence.³⁸

The demand for humanitarian support to climate change related crises in South Asia are likely to increase. As well as increases in average global temperature, climate change is likely to increase the frequency of extreme weather events.³⁹ These developments will increase the need for humanitarian support across the region. Specifically, support operations are likely to be required in Bangladesh and Pakistan who are unlikely to have the necessary mitigative and adaptive systems in place to cope with increasing climate change impacts. Uncontrolled waves of international mass migration are unlikely to be a significant issue, as we assess that displaced people are likely to move first locally, then nationally, with only a very small proportion attempting international migration.⁴⁰

Opportunities exist for the UK to support responses to climate change. The UK can help South Asian countries prepare for the effects of climate change through technology and training. Through its renewable energy industry the UK can encourage technology transfers and focused sustainable development. Such activities will benefit both South Asia and the UK economically, while working to reduce the global impacts of climate change. Similarly, through the training and exchange of humanitarian and disaster relief expertise the UK can provide support and education to many countries over the period.

³⁸ *National Security and the Threat of Climate Change*, 2007 highlighted Diego Garcia as an example of an area that would potentially be lost due to climate change, because of its low average elevation of 1.3 meters above sea level. Further details on Diego Garcia and its strategic significance to the region are available at *Diego Garcia and the United States' Emerging Indian Ocean Strategy* Andrew Erickson, Walter Ladwig III and Justin Mikolay - *Asian Security*, vol. 6, no. 3, 2010, pp. 214–23.
[Http://users.ox.ac.uk/~mert1769/Diego%20Garcia.pdf](http://users.ox.ac.uk/~mert1769/Diego%20Garcia.pdf).

³⁹ Further details on the impacts of climate change, see *Global Strategic Trends out to 2040*, page 104.

⁴⁰ Please see the *Foresight Report on Migration and Environmental Change* for further details on this trend, available at <http://www.bis.gov.uk/foresight/our-work/projects/current-projects/global-migration/reports-publications>.



UK implications for defence and security

Future trends in South Asia will have the following impacts for the UK:

- economic risks and benefits
- diplomatic challenges and opportunities
- domestic implications
- science and technology risks and opportunities.

Economic risks and benefits

The UK will operate in a new strategic context. The UK will be part of a world that expects China to engage on collective issues such as global financial crises and climate change. The UK will be pursuing its interests in an international context that is no longer shaped to the same degree by the interests of the West.

The UK's independence could be its strength. The UK's physical geography and close associations with the US and Europe enable significant economic, military and political ties with the established western powers. Its shared history with India and emerging trade linkages with both China and India could strengthen its position as a global financial hub.

The UK's financial sector is likely to adapt to the Eastern economic shift. While no means a given; the UK is *likely* to adapt to the Eastern shift in economic power and retain its position, assuming that any change is neither too rapid nor too deep. The City of London is likely to retain a number of advantages: English is likely to remain the first language of choice for business (especially within the 'G3' powers of the US, India and China); the UK's physical geography (its proximity to Europe and the US but in a different time zone to other global trade centres), will keep it as a significant player in western markets. In addition, the UK's strong cultural linkages to South Asia, due to shared history and the large UK based South Asian community are all *likely* to provide enduring opportunities for trade. However, the influence of the UK diaspora may decrease in relative terms due to the size of populations of the US, China and India who are likely to represent far greater diaspora communities.



Diplomatic challenges and opportunities

The UK as a 'junior partner'. As the political and economic ties between India, China and the US strengthen, there is a risk that UK influence will decline due to its relatively small size. This is especially so with defence, where a lack of engagement with rising South Asian powers, especially India, and declining investment in UK military technologies could reduce the UK's influence in the region.

UK influence in South Asia is likely to decline. While the UK's military influence in the region is likely to reduce, conflict or instability would impact on the UK's prosperity and security, and would therefore require some response. A routine lack of presence in the South Asia region by UK defence assets is *likely* to increasingly reduce Her Majesty's Government's influence in the region. How much influence the UK can have is debatable. But, continued military engagement in the region, for example through the Five Powers Defence Agreement, *may* be a possible means through which the UK can retain influence. The establishment and maintenance of strong regional bilateral relationships is *likely* to offer the UK long-term benefits that would far outweigh the likely cost.

The significance of new strategic partners in South Asia will increase to the UK.

The UK's historic links with many South Asian countries, especially India, may not offer any advantage over other nations if future associations are based purely on strategic and economic weight. However, over the next 10-20 years, as the UK reconfigures from current operations around Afghanistan/Pakistan the opportunities for re-engagement across the region will increase, especially with those states where some cultural/historical linkages endure, such as India, Nepal, Bangladesh as well as the enduring ties with Pakistan.



Prince Andrew, The Duke of York with the Indian Army's Lieutenant General SS Jog at the Officers Training Academy in Chennai, India

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Domestic implications

Challenges to the Western 'way of life'. The western 'way of life' is often associated with ready access to a wide variety of consumer choice and relatively cheap energy. This is likely to be increasingly challenged as lifestyles follow GDP levels and 'normalise' across the globe. This trend will have significant impact within the US and the UK, where the way of life for the bulk of their populations *may* be challenged by rising energy and resource prices, and the declining availability of finance to sustain discretionary spending. In such a context, this could lead to periods of sustained recession in the West, causing increasingly protectionist policies to be adopted.

The economic and industrial rise of China and India will increase the cost and reduce the availability of UK energy supplies. As a resource-importing nation, and with relatively modest fossil fuel reserves, the UK *will* be affected by increased resource and commodity costs. The UK will increasingly need to compete with China and India in order to secure enduring access to energy.

Overseas diaspora in the UK will continue to have close associations with South Asia. Projections suggest that by 2051, the UK is likely to have 2.8 million citizens of Indian origin, 2.3 million of Pakistani, 0.76 million from Bangladesh and 1.1 million from China.⁴¹ Events in the home nations of these communities could have local impacts in the UK, especially during times of conflict or instability. For example, the *possible* resurgence of conflict between Pakistan and India would have a direct impact upon the UK. Due to projected levels of economic migration to the region, there would be a significant number of UK citizens at risk both in the region and at home. Conflict between India and Pakistan could be mirrored by tensions between their sizeable UK communities.

The UK will be required to support humanitarian crises across South Asia. Due to the UK's cultural associations with many South Asian countries, especially those likely to be affected by climate change, the UK *will* have an enduring requirement to supply economic and humanitarian aid in time of crisis, especially if a regional response proves inadequate.

Sustained globalisation and the economic rise of South Asia will increase global migration. The number of UK citizens travelling to South Asia for employment and recreation will increase. This will mean that in times of crisis, whether societal, military or environmental, the UK is likely to mobilise, and respond to, the evacuation of greater numbers of its citizens from an increasingly diverse range of locations.

⁴¹ Research undertaken by the University of Leeds, based on 2008-based National Population Projections (NPP TREND-EF) suggest that the UK population could grow to 77.7 million by 2051 with the following South Asian ethnic minorities showing growth: Indian (2011 - 2.26% of total population, 2051 - 3.68%) Pakistani (2011 - 1.64%, 2051 - 2.98%), Chinese (2011 - 0.67%, 2051 - 1.39%) and Bangladeshi (2011 - 0.59%, 2051 - 0.97%).
http://www.geog.leeds.ac.uk/fileadmin/downloads/school/research/projects/migrants/WP_ETH_POP_PROJECTIONS.pdf.



Science and technology risks and opportunities

The UK science and technology base may be eclipsed by 2015 in certain niche areas.

The scale and pace of the innovative and industrial capacity of countries like China and India will outpace many Western countries in a matter of years. China is *likely* to attain and sustain global leadership in a number of technical areas (such as computer science, space science, genetic engineering and nanotechnology). It could possibly eclipse the UK's science and technology base by as soon as 2015, and those of the US, in a number of areas, by 2020.⁴² However, the UK will retain valuable niche capabilities. For example, the 'small space' industry is likely to endure. It will be able to trade with India and China, who may seek to exploit niche capabilities for military purposes.⁴³

Espionage and the protection of national assets and industrial interests will be an increasing concern for UK security out to 2040. By 2040, the contribution to the global knowledge-based economy will be of key importance to the UK economy. Increased access to globalised communications and the advance of 3d-printing technology will increase the value of ideas.⁴⁴ Blue prints, patents and formulas *will* be increasingly seen as the foundations of wealth generation and such assets *will* be greatly prized and protected. The line between government, and private industry protection of intellectual property of key technologies for security and wealth creation, *may* become increasingly blurred.

The UK is likely to prize long-term educational policies that develop technologies for national security and long term prosperity. Across the West, it is possible that enrolment on science, technology, engineering and mathematics educational courses will remain low relative to South Asia over the period.⁴⁵ Graduates from India and China, will become more visible and lead trans-national companies, particularly in technical and engineering fields. The implementation of long-term strategies to educate the UK population and revive these technical disciplines *may* be of increasing importance to maintain an innovation base and a competitive national economy. Key-skilled workers, scientists and researchers who develop the complex technologies which underpin cyber security, space, nuclear, stealth and bio-medical technologies will be increasingly prized.

The UK will interact with many South Asian countries for continued access to space. China and India will field their own indigenous capabilities for space and emerging defence capabilities. China *will* maintain global, real-time monitoring through its satellite capability. India, although *likely* to primarily pursue a regional capability, is likely to gain a global capability through its connections with other space powers such as the US and Russia. In such a context, China and India will have a greater awareness of operational activity.

⁴² Citation data is best considered as an indicator of influence rather than quality. Peer review remains the gold standard of quality and can sometimes use metrics such as number of papers in areas of interest from countries or the measure of esteem, such as major prizes.

⁴³ The 'small space' industry describes a burgeoning technology sector producing smaller, lightweight satellites that use advances in microelectronics to considerably reduce launch costs associated with larger, traditional satellites.

⁴⁴ *A third industrial revolution* - <http://www.economist.com/node/21552901>.

⁴⁵ For further details, see the science and technology dimension.



The increasing number of South Asian states with space industries is *likely* to reduce the cost and increase access to space technologies and launch capabilities. Conversely, threats such as space debris collision or congestion in useful orbits are likely to increase.

Increasing cyber threat from South Asian countries. Many South Asian states will undertake state-sponsored cyber programmes facilitated by low barriers of entry to cyberspace, the availability of large pools of skilled manpower and extensive IT infrastructures. China, India and Pakistan *will* be the most sophisticated players in the region out to 2040. Other South Asian countries will develop their cyberspace activities to project power and influence which would otherwise be limited using only conventional instruments of national power. UK government and UK interests (such as the financial and industrial sectors) will increasingly be at risk from cyber incursions from a range of actors, many of whom will originate in South Asia. In order to mitigate emerging threats the UK could consider early collaboration on issues relating to cyber security.⁴⁶

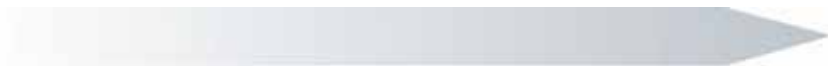


India's Polar Satellite Launch Vehicle (PSLV) takes off from the space centre in Sriharikota, India. It is used to help spot fishing zones in the sea by monitoring ocean temperatures

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⁴⁶ For example, information assurance technologies, including the export of protection aids, and operating processes and tools for handling cyber incident responses could be potential areas for collaboration.





Part 1 Analysis

Key theme 1 – The international context: South Asia in 2040



Organisations that reflect the interests of South Asian countries will be increasingly significant both regionally and on the global stage

This section details what the international context could look like for South Asia in 2040. It also details five scenarios for how China could develop over the next 30 years



The international context: South Asia in 2040

Scope

As articulated in the *Five scenarios for China in 2040* below, the most likely scenario over the next 30 years is for global power to shift east. Strong Chinese economic and technological growth over the next 20 years and the increasing strength of the Indian economy post 2030 will underwrite this shift. The growth of these two major global powers will convey significant economic advantages to other South Asian states, while creating a new international context fostering greater competition for resources and access to markets. Assuming South Asia sustains its rise, this key theme considers what the international context could look like in 2040.

Key Theme 1: The international context: South Asia in 2040 analyses:

- The 'G3' (China, India and US), the EU, and the possibility of the 'G4'
- Other South Asian states: Pakistan, Myanmar, Bangladesh, Nepal, Sri Lanka, Maldives and Bhutan
- Other players:
 - South East Asia
 - Russia
 - Latin America
 - Middle East
 - Africa
- The global commons.

The hot topic is: **Cyberspace**.

Five scenarios for China's status in 2040

In conducting research for this regional survey, we have produced a number of scenarios to summarise the potential future development of China. During this timeframe, we do not think China could rise sufficiently quickly to overtake the US (even given some relative US decline) to such a degree that it is able to assume the mantle of a lone global superpower. Also, while India will play an increasingly important role in South Asia, China is likely to remain the prominent South Asian state actor on the global stage, at least for the next 20 years. We concluded that the most '*likely*'⁴⁶ evolution for China is a combination of scenarios 2 and 3 (Figure 3). We see a complex relationship emerging between China and the US which is largely harmonious, while remaining prone to periods of stress. These two scenarios represent the most likely drivers of global trends out to 2040 and this is reflected throughout.

⁴⁶ The judgement of *likely* equates to an associated probability range of 60-90%.



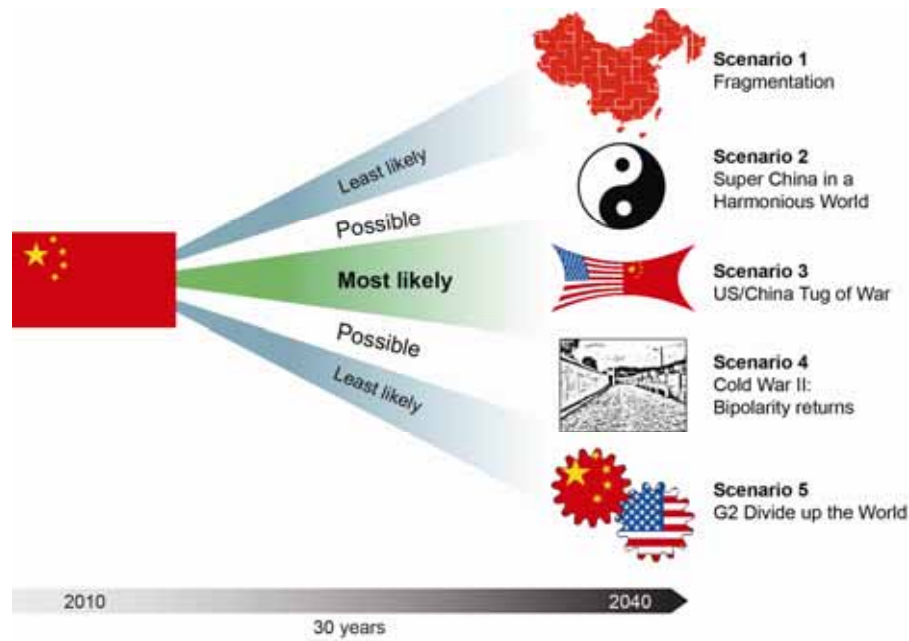


Figure 3 – Illustrating five potential outcomes for China’s development which could occur out to 2040

Scenario 1 – Fragmentation

We consider this scenario where China undergoes state fragmentation to be a high impact/low probability event. Within this scenario, internal unrest, resultant from a combination of frustrated economic ambition and a perceived lack of political and ethnic representation, becomes widely reported via greater access to communication technology amongst numerous non-state groups. Violent protests spread across the state, too widely and on too large a scale for the Chinese government’s existing security infrastructure to quell quickly and quietly. ‘Outer states’ such as Inner Mongolia, Xinjiang and Tibet attempt secession. Such fragmentation leads to a multi-faceted, geographically dispersed civil war, with the state finding itself forced to act evermore aggressively in a number of areas to maintain the integrity of the Peoples Republic of China. Increased repression and the persecution of minorities occurs, and international protests in response threaten China’s membership of both the G20 and the UNSC. The increased need to direct industrial resources to supply China’s internal security requirements also forces a swift return to greater state control of the economy and manufacturing, thus minimising opportunities for China’s entrepreneurs. The UN finds itself increasingly unable to intervene in any other capacity than in disaster relief operations to ease the famines that follow conflict. The security of China’s nuclear capability, both civil and military is also called into question and the risk of accidental release or the proliferation of fissile material



increases. In order to attempt to win the 'battle of the narrative', each side becomes increasingly aggressive in the cyber domain and global cyber collateral damage from attacks originating in China increases significantly. As launch facilities in the 'outer states' are lost to state control, the risk of significant damage to space infrastructure also increases, with 'rebels' attempting to remove the surveillance advantages that space based technologies give the Chinese state. The result of a number of years of instability is an economy that both shrinks in size and stays reliant on manufacturing, rather than moving into the service sector. Globalisation slows, with many economies feeling the adverse affects of China's troubles. Some states do however, seek to exploit Chinese instability to improve their own economic and political prospects, especially in and around the South China Sea. The US, secure as the only global superpower, seeks primarily to contain the effects of the conflict and limit the risk of a global recession. Washington uses the UN as the primary means by which to express its neutrality to Beijing, as well as its concerns over humanitarian issues. Chinese economic progress is put back 20 years.

Scenario 2 – Super China in a 'harmonious' world

We consider this scenario to be the most plausible assuming China continues to conduct socio-political reforms and becomes increasingly democratic. Over this period, social programmes reduce inequality between different classes and ethnicities and China achieves greater integration of the minority groups, such as the Uyghur's and Tibetans, into the national mainstream. In parallel with its internal development,(which remains the top priority of the Chinese government) the Chinese economy becomes more balanced as the Chinese Communist Party (CCP) feels sufficiently secure to loosen its grip on China's economic levers enough to allow entrepreneurship to increasingly drive Chinese commerce. As a result, a modern service sector develops quickly alongside Chinese manufacturing. The resultant 'new prosperity' also sees a significant increase in Chinese internal consumption, further driving economic growth. Similarly, as a result of widespread South Asian economic growth, political tensions over issues such as Taiwan and Tibet recede, with China in particular developing a more subtle and conciliatory approach towards the management of crises. Wealth inequality, and with it much socio-political tension, is reduced as development spreads across China's hinterland, allowing its economy to become the largest in the world by 2016. To affirm its commitment to its 'harmonious' rise policy, Beijing does not look to supplant existing global structures. As such, the G20 endures as the world's key economic forum. UN introduces changes, reflecting the new world order, and the UN Security Council expands the number of permanent members. Nations significantly reduce their nuclear arsenals over the period with an ultimate goal of nuclear disarmament agreed in principle. Economic activity takes centre-stage across the globe, and the danger of large-scale future conflict recedes. Within this new, more open, global environment, China becomes the driving force of the global economy, with the US acquiescing to its economic rise.



Scenario 3 – US/China tug-of-war

We consider this scenario is as plausible as scenario two and is one of the more likely scenarios for China's future development. In this scenario, the US decides that China's persistent encroachment into US areas of interest, rapid military expansion and economic power pose a serious risk to US national interests; therefore, it must be constrained. Within a more competitive and protectionist economic environment, China finds it more difficult to satisfy the needs of its diverse population and the CCP feels it necessary to halt further political reforms to safeguard 'national unity'. Relatively modest economic progress does reduce financial inequality somewhat, but is insufficient to compensate for the ongoing political frustrations within the country. Significant internal tensions within areas such as Tibet, Inner Mongolia and Xinjiang Province endure, as do tensions with other states over access to, and control of, areas of the South China Sea. The Chinese government becomes more 'hard-line' regarding both internal dissent and perceived external interference or incursion. Integrating ethnic minorities within China stalls and further polarises Chinese society. Economically however, China is still able to diversify into the service sector somewhat and internal consumption, on the back of more modest economic growth, does increase, providing both a more balanced economy and a more lucrative internal market. Some countries such as India, Japan and South Korea benefit from the Chinese slowdown. On the back of a less open global economy, the G20 becomes more factional, with a number of economic blocs each seeking policies that secure advantage over the others. The UN and its Security Council endure in their present form, but are seen as increasingly irrelevant in solving real issues, especially amongst the G20 community. Direct confrontation, especially between China and the US is avoided. However, the lack of trust among key state actors precludes any meaningful progress on nuclear arms limitation. Competition in space increases as the US seeks to maintain its lead and secure the resultant prestige. 'Attacks' in cyberspace between countries in competing economic blocs increase with collateral damage resulting in widespread, if short-term disruption to numerous state and economic systems. By 2040, the US and China have broad economic parity.



Scenario 4 – Cold War II: bipolarity returns

We consider this scenario to be a lower probability than scenarios 2 and 3. Here, China's ruling elites are able to harness Chinese nationalism to deliver broad unity, without needing to instigate wide-ranging reforms or give up the authoritarian one-party state apparatus. As the result of a well designed and centrally controlled economic plan, by 2020 China's economy has diversified into the service sector to a sufficient degree to enable it to emerge as an economic super power, on par with the US. Internal economic inequality reduces, and internal consumption



increases. However, repressive measures are still required to contain internal unrest. Many ethnic minorities become more marginalised. Nevertheless, buoyed by its economic success, China becomes more assertive on the international stage and confrontations with the US increase as hardliners in the government gain political ascendancy. As tensions increase, nations align with either the US or China according to their own best interests and informal political and economic blocs form. Taiwan, Tibet and military operations in the South China Sea endure as sources of volatility and localised confrontations increase. The UN increasingly becomes little more than a tool for political posturing and a general lack of cross-bloc cooperation dictates that Security Council reforms prove impossible. Nuclear arsenals are maintained, but not increased. Within the G20, conflicting economic blocs with a pervasive 'zero sum' mentality across its members now bound states which stifles any attempts to deal even with issues such as climate change and world poverty. International commerce reduces, particularly inter-bloc commerce and globalisation slows. Aggressive acts within cyberspace, though often not attributable, become ever more prevalent and damaging to the global economy. Progress within a new 'space-race' is seen as an indicator of relative national capability and prestige. China and the US continue to compete as economic equals within a highly antagonistic international atmosphere.

Scenario 5 – G2 divide up the world

As with scenario 1, we consider this to be a high impact/low probability scenario. Here, the US view China's rise as an opportunity as much as a threat, and view attempts at containing it as likely to be both prohibitively expensive and destined to fail. As a result the US puts pragmatic self interest ahead of ideology and increasingly recognises a Chinese sphere of influence, asserting that internal matters within China and authority over the South China Sea are matters primarily for Beijing and not Washington. The Chinese authorities, now less constrained by 'international opinion', stop any moves towards greater political representation, suppress secessionist movements in the outer states and increasingly contain, rather than integrate ethnic minorities. A new confidence within Beijing regarding 'internal' matters allows central control to be reduced in terms of the economy and progress towards a sizeable service sector is slow but steady, bringing with it some reduction in internal economic inequality and a larger internal consumer market. By 2020, China and the US have broad economic parity. As the two largest powers, China and the US, bypass global regulatory bodies and increasingly decide issues between themselves, often to the detriment of much of the rest of the world. The UN and G20 become tools by which Chinese and US interests are pursued or justified and as such UNSC reform is deemed unnecessary. Some progress on issues such as climate change and poverty is made, with each of the 'G2' implementing any agreed measures as they see fit. Significant reductions in nuclear weapons holdings are also realised. The US and China still look to engage with 'legacy' partners and neighbouring states but, due to an evermore synergistic relationship between the two powers, 'G2' cooperation increasingly drives global events as well as the



pace and character of globalisation. The space domain becomes increasingly regulated by US/Chinese led initiatives and as such the threat of damage to space infrastructure is reduced. In line with the physical space, cyberspace increasingly becomes compartmentalised, with the US and China overseeing their own 'areas' of the internet while largely respecting the 'sovereignty' of the others. Each superpower takes responsibility for containing localised conflicts within their own sphere of influence in order to safeguard the global economy, primarily for the benefit of Washington and Beijing.

Strategic Shock – Chinese Economic Collapse

Although unlikely, Chinese economic collapse would represent a significant strategic shock out to 2040. The Chinese economy is at greater risk than many more liberal, established economies due to the high level of central control that Beijing maintains, and is likely to maintain, over the next 30 years.

As a communist country configuring to a capitalist model, China will have to manage many challenges. It is unlikely that any single issue will lead to economic failure. However, a combination of any of the following drivers could cause significant challenges to the economy:

- significant devaluation of the Renminbi
- high levels of endemic corruption
- failure to meet the increasingly diverse social, political and religious choices of a large and ageing population.

These drivers, combined with the difficulty of retaining state control due to increasing public access to uncensored information, are likely to present a significant challenge the Chinese Communist Party maintaining control. Should a 'perfect storm' occur, with a range of such issues happening at the same time, Chinese governance and fledgling market controls may be insufficiently resilient to prevent economic collapse. If this collapse were to occur, it would have significant implications for both the global economy and internal Chinese stability. In *extremis*, China could face widespread intercommunal violence and even civil war.



The 'G3' (China, India and the US)

As described in *Global Strategic Trends out to 2040*, the next 30 years *will* see South Asia begin to dominate the global economy and, to a lesser but significant extent, the global geopolitical arena. The distribution of global power *will* therefore continue to shift to the East from the West, underpinned by the continued growth of both the Chinese and Indian economies.⁴⁷ Globalisation will continue to drive this trend and lead to the formation of three key global currencies; the US Dollar, the Chinese Renminbi, and the Indian Rupee.⁴⁸

The strengths of the US, Chinese and Indian economies, despite short-term fluctuations, are *likely* to lead to the formation of an unofficial 'G3' grouping. Each of the three powers will engage with the others on a host of issues ranging from defence, through to climate change and, perhaps most significantly, continuing national economic and industrial development. The US will remain significant in such moves and, despite China holding nearly two thirds of its \$2.8 trillion currency reserves in US Dollars, the US is *likely* to remain a significant economic power over the next 30 years. This includes playing a key role in facilitating the growth of other currencies.⁴⁹ A notable example of this is the growing strength of the Indian/US relationship. This, along with economic ties with other partner nations, *will* underpin India's economic growth over the period.

The US is *likely* to assume the role of a responsible steward, guaranteeing its continued economic growth and standards of living for its populace through engagement with the rising South Asian powers. Assuming that societal conditions across South Asia remain relatively stable, and that Chinese and Indian economic growth is not constrained by limited access to energy or water (see Key theme 2), some of the strongest rates of global economic growth are *likely* to be seen in South Asia. Access to large populations (especially for India and China), a growing number of educated workers and a large proportion of cheap labour are *likely* to drive this growth.

The emerging economies of China, India, and other developing nations in South and South East Asia are predicted to achieve significant growth, tilting the global economic power axis firmly towards Asia.⁵⁰ The combined strength of the Renminbi and the Rupee, coupled with the internal markets that have enhanced their growth, are *likely* to make South Asia the greatest contributor to global GDP from 2030 onwards. This likely trend is illustrated in Figures 4 and 5 which show the declining relative contribution of the US and European economies to global GDP from 2010 to 2030.⁵¹

⁴⁷ From 2000 to 2009, US GDP grew from US\$10 trillion to US\$14.4 trillion, a 44% increase. During the same period, China's GDP rose from US\$1 trillion to US\$5 trillion, a 400% increase or about 20% per year from 2005-2008.

⁴⁸ The Euro could be a fourth global currency, see hot topic: the Renminbi in 2040, for further detail.

⁴⁹ April 2011 data taken from <http://www.imf.org/external/np/sta/ir/IRProcessWeb/data/hkg/eng/curhkg.htm#4>.

⁵⁰ See the economic dimension for further evidence of this shift.

⁵¹ Standard Chartered Bank Global Research - http://www.standardchartered.com/id/_documents/press-releases/en/The%20Super-cycle%20Report-12112010-final.pdf.



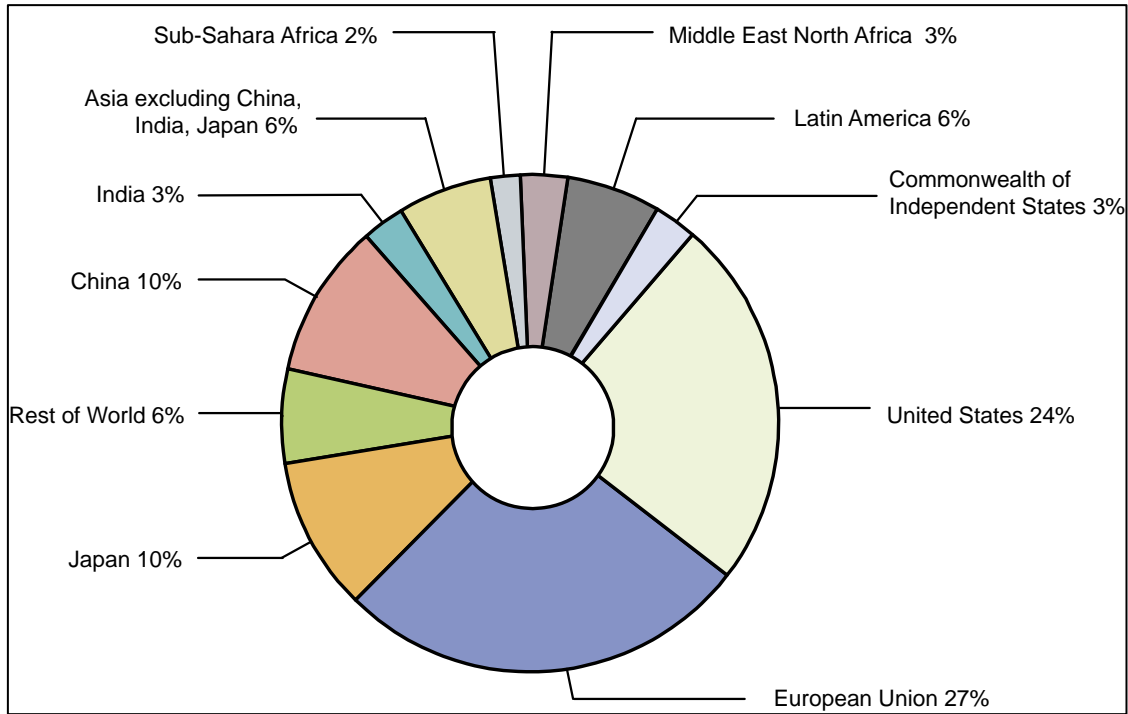


Figure 4 – The relative proportion of the major economies of global GDP in 2010⁵²

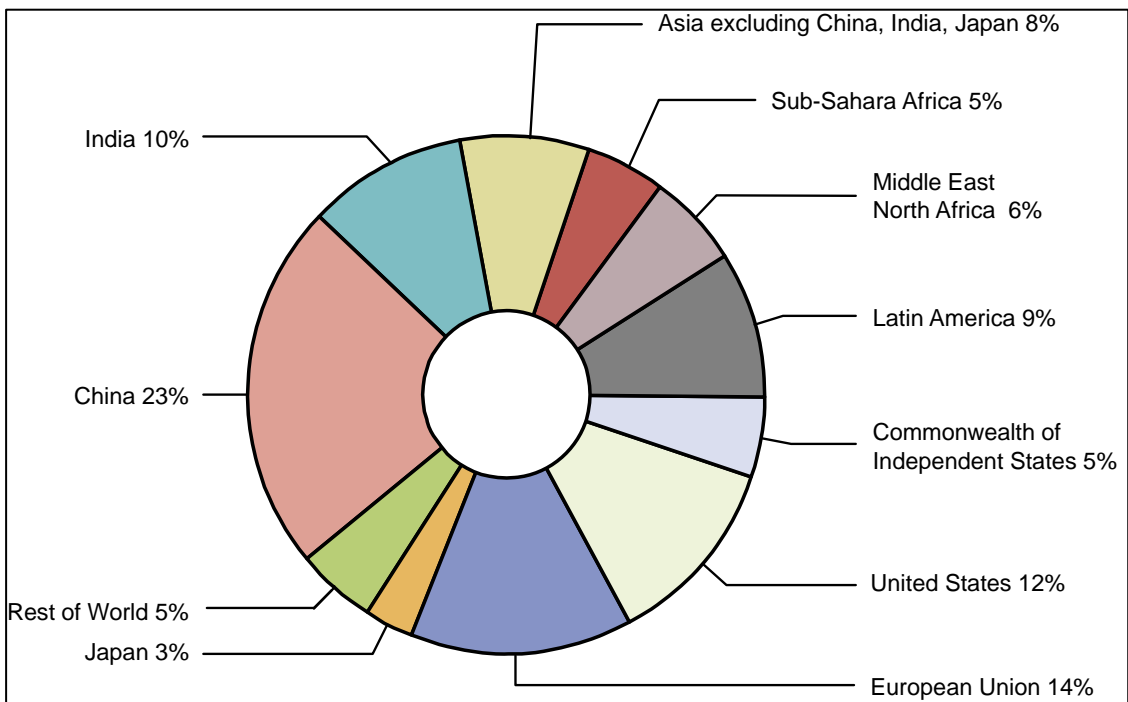


Figure 5 – The predicted relative proportion of the major economies of global GDP in 2030⁵³

⁵² *Ibid.*

⁵³ *Ibid.*



The growth of the Chinese economy, especially out to 2030, will underwrite this large-scale shift in economic power. It is this growth, the strong linkages with the US due to Chinese investment in the dollar as a reserve currency, and the continued investment in US industries that are *likely* to underpin enduring connections between the two countries.

China

Estimates from 2011 suggest that China has overtaken Germany and Japan to become the second biggest economy in the world.⁵⁴ If it maintains its present growth rate, International Monetary Fund projections suggest it could overtake the US by 2016.⁵⁵ The recent global economic crisis has accelerated the increase in size and significance of China to the global economy, with China continuing to show high growth rates despite the crisis. Geo-strategically, China has emerged as the dominant player in Asia and the Western Pacific.⁵⁶ A weakened Russia, a stalled Japanese economy, and an internally focused India have all contributed to this development. Consequently, for the period out to 2030, China is *likely* to dominate the region as the most significant economic and political power. Current Chinese investment in defence spending illustrates this trend and, although it is still second to the US, it is approximately 30% greater than the UK (according to official statistics) and three times that of India.⁵⁷ However, if China were able to maintain defence spending at comparable levels to the US today (around 4% of national GDP), the level of its defence spending *may* be three times as much as the US.⁵⁸

It is *likely* that the current growth of the Chinese economy and the gradual liberalisation of the Chinese economic system over the next 30 years will strengthen the use of Renminbi as a means of currency convertibility and a store of value. As China evolves economically, it will increasingly need new sources of economic growth and will be unable to rely on the demographic strength of its population. The financial benefits secured by having the Renminbi as a global reserve currency would be significant, especially as Chinese economic growth becomes increasingly dependant on the global economy. Although speculation is increasing regarding the use of the Renminbi as a global reserve currency in the next five years,⁵⁹ such an outcome is *unlikely*, before 2020, as China will need to address a number of fundamental issues within its economy before it is in a position to trade the Renminbi internationally.

By 2040, the Chinese economy is *likely* to have 'peaked'. From now until 2020, it is likely to enjoy its strongest phase of economic growth and will need to translate this period of strong growth into long-term social resilience. To do this it will need to address issues of inequality, between urban and rural populations and between different ethnic groups. It will also need to address the burden of an ageing population. Post 2020, the population

⁵⁴ 2011 estimates suggest that the US had the largest GDP (in terms of purchasing power parity) at \$14 trillion dollars, China was second at \$10 trillion, Japan third at \$4.3 trillion and India fourth at \$4 trillion. The UK ranked 8th at \$2 trillion. Estimates taken from *CIA World Factbook*.

⁵⁵ International Monetary Fund World Economic Outlook – April 2011.

⁵⁶ *Ibid.*

⁵⁷ *Military balance: the US and other key countries*. BBC analysis based on International Institute of Security Studies (IISS) data. <http://www.bbc.co.uk/news/world-us-canada-16428133>.

⁵⁸ Present estimate suggest that both China and the US presently spend around 4% of GDP on defence. If both countries continue to accept a military burden at or close to this level, and if China's economy in 2040 is three-times bigger than the US economy, its defence spending would also be about three times larger.

⁵⁹ 'US panel says Yuan is a threat to dollar's dominance'. <http://www.bbc.co.uk/news/business-15768867>, 17 November 2011.



that yielded such strong economic growth from 1980 to 2010 will age and require welfare support. Although, it will also need to sustain extensive supplies of the consumables needed to sustain its continued growth, especially oil and water. The biggest challenge *will* remain the pressure for social reform and the provision of welfare.

China *will* continue to seek a peaceful external environment in which it can pursue domestic reforms and expand trading and investment opportunities with as many states as possible. For the future security of the country, cultivation of close relations with Northeast Asia, and indeed Asia as a whole, *will* be required. Outside South Asia, China *will* continue to exert its economic strength and its soft power to influence places like Africa, Latin America and the Central Asian republics. Often this will be in pursuit of bilateral trade and resource agreements to sustain its future industrial and economic growth. It is *likely* to further exploit its political strength (such as the UN Security Council veto power) to increase its influence and leverage with authoritarian regimes, such as Myanmar, Venezuela, Iran and Zimbabwe, to arrange continued access to consumables.

Geopolitically, China is *likely* to act as a strategic observer rather than a global actor. It is *likely* to pursue an international policy of non-interventionism to present itself as following a 'wise and moral' philosophy based upon a long history and long established traditional culture that provides a strong focus on internal stability over foreign policy.⁶⁰ However, the balance between wanting to be, and acting as, a responsible global stakeholder, while ignoring the responsibilities of being the global leader that its economic power bestows, will test China's capacity to respond to crises both within its borders and internationally.

Strategic shock – Failure in Chinese crisis management

Beijing will remain central to all aspects of Chinese power, using extensive centralised bureaucratic organisations to disperse its power across the region. In cases of crisis, where events happen rapidly, and CCP guidance is required swiftly, decisions may not be made quickly enough to prevent an incident. This is most likely in cases of border control, sea-based engagement and responses to difficult areas of foreign policy such as human rights and social change. In such instances, speed of escalation and internal rivalries, both within the CCP and the PLA, may lead to an unpredictable and inappropriate response that threatens global stability.

In the world of 2040, where China is central to the global economy and increasingly interconnected with the US and Indian economies, it is *likely* to retain a stance of deliberate strategic ambiguity, as often seen today.⁶¹ It is *likely* to take a belligerent stance on a number of geopolitical issues and *will* project its power to suit its needs. A form of authoritarian Chinese governance is *likely* to endure out to 2040, although it is *likely* that a progressive process of liberal transformation will occur leading it to present

⁶⁰ At times, ethnonationalism *may* be invoked to suggest a form of higher rational management of the Chinese state in the face of barbaric, 'Gwaleo' hostilities. Joseph Nye, Jr. *Soft Power: The Means to Success in World Politics*.

⁶¹ Strategic ambiguity is 'the art of making a claim using language that avoids specifics' or 'one side being deliberately vague on a policy so as to preserve their options. Also known as having it both ways.'

[Http://www.sourcewatch.org/index.php?title=Strategic_ambiguity](http://www.sourcewatch.org/index.php?title=Strategic_ambiguity) or

<http://www.jargondatabase.com/Category/Political/General-Politics-Jargon/Strategic-Ambiguity>.



itself as more liberal and open on selected issues. However, certain issues will remain as key priorities that will not alter – such as the centrality of the CCP in governance and the importance of Taiwan, Tibet and the South China Sea.

Notwithstanding occasional and deliberate ambiguity, the Chinese leadership will continue to promote China as a responsible stakeholder in the international system. To do this, China *will* increasingly need to give reassurance and move away from being perceived as a threat. It *will* need to contain nationalist impulses and learn how best to approach sensitive diplomatic issues such as human rights, Taiwan and the South China Sea.⁶² Preserving regional stability will remain a critical issue for China, allowing it to focus on immediate and domestic challenges. In the international context, this will represent a balancing act for Beijing as it seeks to maintain constructive US relations whilst at all times considering the US as both a financial partner and a potential military threat. Consequently, China's status as a global power *will* depend on how it manages this relationship, as well as relations in the region.



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Chinese Police on patrol in Tiananmen Square in March 2012

⁶² 'Hu Jintao tells China navy: prepare for warfare' 7 December 2011. <http://www.bbc.co.uk/news/world-asia-china-16063607>.



India

It is likely that the Indian economy will rival that of China and the US by 2040, making it the final player in the 'G3' grouping. Economically, India will benefit from the increasing strength of its internal markets and its youthful, and economically productive, population. At present, India has the second largest population in the world (1.2 billion) which will *probably* rise to 1.5 billion by 2040 while maintaining ethnic diversity.^{63,64} Strong Indo/US ties will endure and their dominance in many global industrial sectors will grow. As the Chinese economy is likely to peak between 2020 and 2030, the Indian economy is also *likely* to show a high rate of growth. So, it will increasingly represent a significant area for global investment. Figure 6 uses normalised data from Figure 5 to illustrate likely Indian economic growth in 2030.

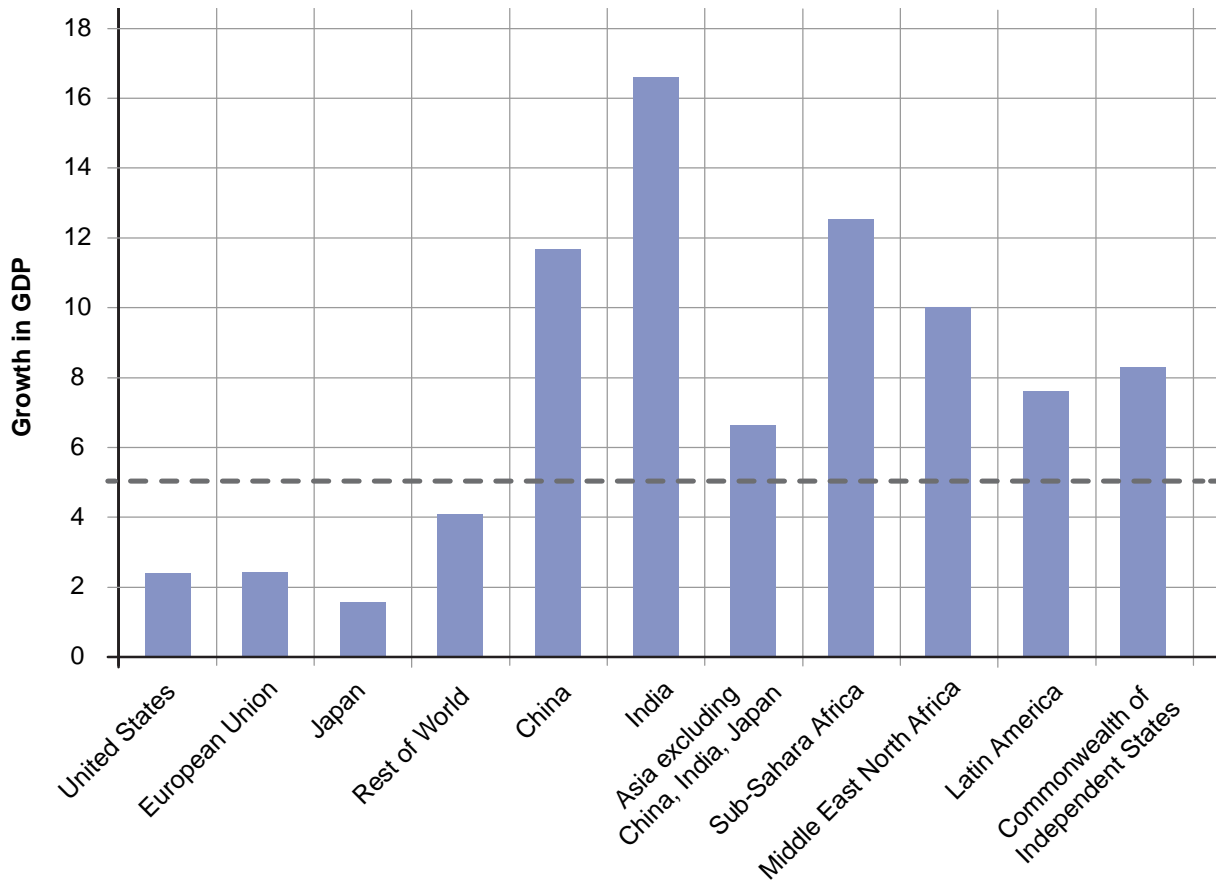


Figure 6 – Predicted Indian economic growth in 2030⁶⁵

If India can achieve the necessary internal transformations required to sustain this growth (see Key theme 2: Hot topic – *The tension of transformation* for a more detailed explanation) it is *likely* that the Rupee will challenge the Renminbi as the strongest global currency post 2040. To pursue such growth, it is likely that India will value ‘transactional

⁶³ The age profile of India means it will enjoy a relatively youthful and productive populace out to 2040 conveying significant advantages to the Indian economy. See the social dimension for further details.

⁶⁴ India - ethnic composition (2001 Census): 80.5% Hindu, 13.4% Muslims (>100 million), 2.3% Christians (>20m), 1.9 % Sikhs (18m) and others including Buddhists (6m), Jains, Parsis (Zoroastrians), Jews, and Bahais, less than 2%.

⁶⁵ Based on normalised data from standard chartered research as outlined in footnote 51.



relationships'⁶⁶ over transnational alliances. Its relationship with the US, and other international 'stakeholders', illustrate this point.⁶⁷

Unlike China, which has configured itself to be an export-based manufacturing economy, Indian economic growth has mostly been based on domestic consumption and the generation of new internal market-based opportunities.⁶⁸ Such characteristics will increase the economic significance of India in the 'G3' grouping by 2040 and will make it close to the EU and the US in relative contribution to global GDP from 2030 onwards, as illustrated in Figure 5.

Assuming that India can overcome the challenges of population growth, political and economic development and the threat of cross-border terrorism, it is *likely* to be a very significant contributor to the global economy in 2040. India has a number of cultural, economic and demographic strengths that are likely to contribute to this emergence. First, it is likely to sustain both a young and growing population.⁶⁹ See *the social dimension* for a comparison of age profiles in China and India. However, for this trend to occur, India must undergo the internal economic reforms necessary to ensure it gainfully employs the bulk of its population. If it does not address issues of inequality and corruption, India's young population could represent more of a demographic 'time bomb' than a dividend.⁷⁰ Second, the high proportion of English speakers in India, and the rapid growth and development of the service-sector, favours the Indian contribution to the global knowledge-based economy.⁷¹ Although China is making significant strides in its language training, the translation burden of the Chinese alphabet and the significant educational challenge of educating its vast population makes it *unlikely* that China will integrate as easily, or as quickly, into the global knowledge-based economy. Over the next 30 years however, the rise of machine translation, *may* have considerable impact on this trend. Finally, the Indian market-based economy will not experience the same 'transformative' challenges as the Chinese planned economy as it is already configured around the principles of a liberal democracy. Improved connectivity and growing economic, political and technological linkages, primarily with the US, will further reinforce its economic strength. However, the Indian economy will need to address issues such as corruption and cronyism.

In 2040, it is *likely* that India will have greater global influence, especially in terms of its contribution to international organisations such as the IMF, UN and the G8. As a result, India, due to its economic size and military capabilities, is *likely* to have gained a permanent seat on the UN Security Council, assuming probable US support. Such an outcome *may* occur after the easing of tensions with Pakistan, *possibly* through the development of a mutually beneficial trading relationship between the two countries. An

⁶⁶ Transactional relationships are relationships defined by commerce and trade.

⁶⁷ The 'G3' would include the three largest global economies, which, by 2040, are likely to be China, the US and India.

⁶⁸ For further details on the future of the Indian economy, see the economics dimension.

⁶⁹ Fertility rates for India and China: India 2010 = 2.54 children per woman, 2040 = 1.98. China 2010 = 1.56, China 2040 = 1.68. UN Population Prospects 2010 revision.

⁷⁰ *India's Population Time Bomb*, the Diplomat. <http://the-diplomat.com/2010/11/23/india%E2%80%99s-population-time-bomb>.

⁷¹ 'Prefer 'hinglish' words over pure Hindi translation'. This newspaper headline outlines how, in a bid to overcome problems posed by difficult Hindi words, the Indian government has asked employees to use their 'hinglish' replacements for easy understanding and better promotion of the language, http://articles.timesofindia.indiatimes.com/2011-12-05/india/30477363_1_hindi-words-pure-hindi-rajbhasha.



alternative outcome that *may* radically alter this development is the creation of a new, Pacific-focused authority, with a greater strategic orientation toward the US, China and India.

The same economic forces that have driven the economic integration of the Chinese and US economies *will* be felt within the other major global economies, increasing not only the integration of the US economy with China and India, but also directly between China and India. The strategic relationship between China and India *will* be driven by trade, with more movement *probably* originating in India due to market-based capital initiatives. This economic integration *may* act as a strategic stabiliser within areas of potential tension between the two countries, such as the Indian Ocean and the Brahmaputra region of the Himalayas.

US

In 2040, the US is *likely* to remain the political global leader even though its economic power *will* decline in relative terms. It is likely to retain the 'innovative edge' across a broad sphere of industrial and military areas due to the long term resilience of its markets and the structure of its society which encourages and rewards innovation. Demographically, the US is likely to sustain a relatively young population (for a western country) due to sustained international migration and relatively large family sizes.

Economic cooperation within the globalised system *will* increase, acting as a significant counter-balance to conflict; the relationship between the US and China being an exemplar. For example, it is estimated that China currently holds more than half of the \$2 trillion in currency reserves in US treasury bonds.⁷² Until it can develop the Renminbi to be a viable alternative to the dollar, China is *likely* to have few other places to store the foreign currency value it has accumulated.⁷³ While tensions are *likely* to arise in the region (for example, over Pakistan, the South China Sea, Taiwan and Tibet), it is *unlikely* to lead to conflict, due to the complex inter-dependencies between China and the US. China's route to global power status therefore *will* depend on how it manages its relationship with both the US, as well as on how it manages the region.

The US will also remain significant on the global stage as China is unlikely to seek the reform of the international system before 2030. At present, China lacks political influence because of its limited ability to project military power and its comparative inexperience in foreign policy. By 2040, it is *unlikely* that China would assume the risk or the responsibility of global leadership unless it is a stage where economic necessity dictates the Renminbi must become the principle reserve currency. For present growth to continue, it is likely therefore that China's development will be underwritten by its relationship with the US. Thus, it will not be in China's interest to allow the US to decline too rapidly. Chinese attempts at revision and renegotiation of the international system are *likely* to be opposed by the US, the EU and India. Assuming Chinese foreign policy

⁷² <http://www.imf.org/external/np/sta/ir/IRProcessWeb/data/hkg/eng/curhkg.htm#4>

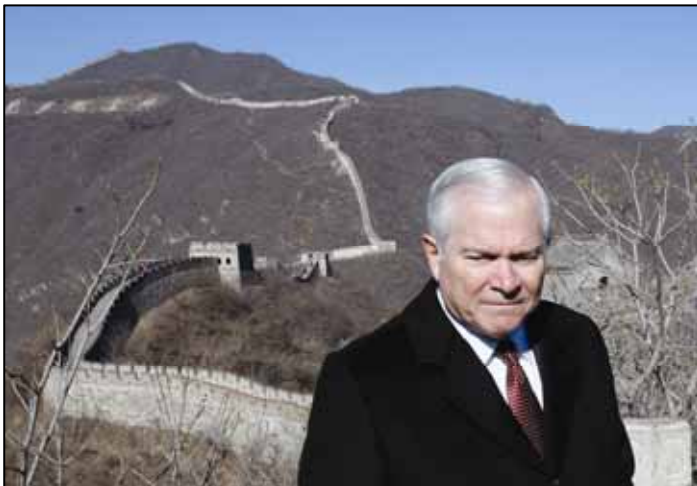
⁷³ However, out to 2040, the Chinese Renminbi may be increasingly viable as a reserve currency. See hot topic: The RENMINBI as the global reserve currency.



reflects an extension of its domestic priorities (where it engages out of necessity not inclination); China is *unlikely* to emerge as a dominant global power by 2040.⁷⁴

As Figure 5 illustrates, the US global economic position is likely to undergo a relative decline but the US will remain the pre-eminent military force. Although US political dominance may reduce it is unlikely to be replaced by a 'Beijing consensus' across the global stage.⁷⁵ Although the US *will* retain its status as the global superpower it is *likely* to re-orientate strategically, with a greater Pacific focus. Such changes would have significant impacts on international organisations such as NATO, which are still configured largely to reflect the Cold War balance of power. In such a context, the US may prefer India as the partner of choice due to shared cultures, language and a common 'trade-based' ideology.

Due to the enduring importance of the dollar to global financial systems, the US will remain a significant economic power in 2040 and *will* play a central role in shaping the growth of other currencies. Indian economic growth for example, *will* be based on its



Former US Secretary of Defence, Robert Gates
visit to the Great Wall, China

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sophisticated integration into the globalised market, facilitated by an enduring transactional relationship with the US that will increase in significance out to 2040.⁷⁶ The US and India are *likely* to sustain comparable economies assisted by many cultural similarities which encourage trade. The perception of Chinese encirclement of India and the increased significance of the Chinese/Pakistan relationship are also *likely* to drive military, security and technology cooperation between the US and India.

The growth of Chinese economic power and global influence *may* conversely, lead to an international system that gives more attention to other actors, rather than the traditional western powers, thus allowing a new distribution of power within the international system to emerge. This *will* create a complex, interdependent strategic environment with multiple actors responding to two balancing forces. In such a context, the role of India will be increasingly valuable as an alternative trading partner within South Asia, and the Rupee will be an increasingly competitive store of value, next to the dollar and the Renminbi. Common cultures and languages and the continued 'talent flow' of the US-Indian diaspora

⁷⁴ Wilton Park, *China towards a Harmonious Society*, November 2010.

⁷⁵ The Beijing Consensus is a term that represents an alternative economic development model to the Washington Consensus of market-friendly policies promoted by the IMF, World Bank and US Treasury, often for guiding reform in developing countries. The term Beijing Consensus has evolved into one describing alternative plans for economic development in the underdeveloped world, so-named as China is seen as a potential model for such actions.

⁷⁶ Currently, it is estimated that there are 1 million business transactions a day between India and the US.



will increase the significance of the US-Indian relationship within the 'G3'.⁷⁷ A significant proportion of this talent will contribute to the knowledge-based economy, and continued Indian and US technology development will feed off these connections. At present, US-based multinational corporations, that benefit from an educated and lower cost Indian workforce and the lure of an emerging market of one billion people, mostly facilitate these. However, by 2040, it is *likely* that the US will become increasingly global in outlook, situating many more US companies in both India and China.

The EU and the possibility of a 'G4'

The EU economy is likely to be of comparable size to the US economy as a proportion of global GDP by 2040, therefore the Euro *may* remain a significant global currency. The balance of global power by 2040 could be competed for between regional powers. The emerging powers in Latin America will bring increasing influence. The current scale of US investment in China and India, and Chinese investment in the US, increases the likelihood of this geopolitical 'triumvirate' coming to fruition.⁷⁸ The desire of China and India to emulate the financial and geopolitical success of the US will further increase the degree of association, as will the desire to communicate using English as the language of trade. Thus, it is *likely* that the US, due to its economic, political and military strength will be the enduring partner of choice for China and India. Europe *will* remain a significant source of trade and technology. As many Chinese industrial sectors by 2020, and Indian later in the period achieve parity however, it will find the global marketplace increasingly competitive. This, coupled with the *likely* strategic reorientation of the US to be Pacific rather than Atlantic-focused, may lead to a radical alteration of the international strategic context.

Europe is likely to face a number of internal challenges that *may* limit its ability to compete with the 'G3' nations and other emerging powers in the global market place. As articulated in the *Global Strategic Trends: Regional Survey Europe out to 2040* for example, the EU will need to confront internal demographic challenges and maintain its position as leading exporter of goods and services while addressing high internal labour costs, over the period. Additionally, without a significant external threat to Europe, defence spending is *likely* to reduce with more pooling of defence resources across member states and a continued reliance on US military superiority. Due to a range of economic, political, military and demographic factors, the EU is *unlikely* to compete as strongly as the 'G3' economies.

⁷⁷ See the 'Social dimension' for further details.

⁷⁸ 'China's policy of intervening in currency markets to limit the appreciation of its currency against the dollar (and other currencies) has made it the world's largest and fastest growing holder of foreign exchange reserves, which totalled \$3.2 trillion as of June 2011.' [Http://www.fas.org/sgp/crs/row/RL34314.pdf](http://www.fas.org/sgp/crs/row/RL34314.pdf). *China's Holdings of U.S. Securities: Implications for the U.S. Economy*, Congressional Research Service and <http://www.tradingeconomics.com/india/total-reserves-includes-gold-us-dollar-wb-data.html>.



Increasing significance of other South Asian states

The level of trade between southern hemisphere countries *will* increase over the period. This 'South-South' trading *will* therefore reduce the dominance of established North Atlantic economies in a large number of trades. All markets in South Asia will be increasingly significant to global trade, and most especially to trade with India and China who will value engagement with South Asian countries. China and India are unlikely to be passive in the development of their neighbours. China's concessional loans or grants to many countries, both in South Asia and further afield, often require reciprocation in the form of Chinese companies being hired to undertake the work in foreign countries. For example, the Export-Import Bank of China is providing 85% of the \$1 billion of financing required for a new port in Hambantota, Sri Lanka, which the Chinese state-owned enterprise China Harbour Engineering is building.⁷⁹ The Chinese government has similarly supported the development of port facilities in Bangladesh, Myanmar and Pakistan as well as railway lines in Nepal.⁸⁰ The China/Pakistan relationship *will* increase in strategic significance, providing economic, technological and nuclear opportunities to Pakistan while providing Chinese access to the Arabian Sea through port facilities in Gwadar.

The significance of bilateral arrangements *will* increase, as China and India translate their strong economic growth into national-level agreements with other countries to sustain access to their commodities and resources necessary for continued economic and industrial growth. China, India and existing global powers, such as the US and EU, *will* continue to exert their economic strength (as soft power) to influence resource-rich countries. China, for example, will continue to look for resources in South Asian states such as Myanmar, Nepal and Pakistan.

None of the remaining South Asian countries will rival China or India in terms of their economic power or the relative size of their populations. They will however, experience both economic benefits as well as internal and external challenges as the region increases in global significance.

Pakistan

Pakistan will remain be the third most populated South Asian state out to 2040.⁸¹ It will retain significant linkages with the UK due to the sizeable UK/Pakistan diaspora, which is *likely* to number 1.4 million by 2040.⁸² In addition, the volume of international travel is *likely* to increase, making Hyderabad an important hub for international migration.

⁷⁹ For further details see <http://www.ship-technology.com/projects/port-of-hambantota/>.

⁸⁰ It is estimated that as many as 750,000 Chinese from mainland China may now be working outside of the Chinese mainland on projects financed by the Chinese government.

⁸¹ By 2040, Pakistan is likely to have an estimated 257 million people. India is likely to be the most populated country with around 1.63 billion people, followed by China with 1.36 billion. *Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision*, <http://esa.un.org/unpd/wpp/index.htm>.

⁸² Research undertaken by the University of Leeds, based on 2008-based National Population Projections suggest that the UK population could grow to 77.7 million by 2051. Indian (2011 - 2.26% of total population, 2051 - 3.68%) Pakistani (2011- 1.64%, 2051 - 2.98%), Chinese (2011 - 0.67%, 2051 - 1.39%) and Bangladeshi (2011 - 0.59%, 2051 - 0.97%) http://www.geog.leeds.ac.uk/fileadmin/downloads/school/research/projects/migrants/WP_ETH_POP_PROJECTIONS.pdf.



A number of today's geopolitical concerns are still likely to be dominant in Pakistan in 2040. If present trends in governance continue, difficulties in addressing political corruption and frequent military coups *will* endure. Such cycles between military and civil leadership are *likely* to continually undermine civil society and the electoral system. Pakistan will continue to face the challenge of establishing countrywide Islamic unity (which is *unlikely* to be achieved without alienating the numerous and diverse rival groups which advocate varying degrees of political extremity). The military will continue to justify its role as a 'secular steward' defending the country against national disharmony. It will also argue that it is the only institution powerful enough to maintain Pakistani cohesion. If the present form of military governance endures out to 2040, strategic issues over shared borders and resources such as Kashmir and the Indus, *will* endure as flashpoints. In turn, the continuation of these issues, coupled with a perception of India as an existential threat to the state, will lead to a vicious circle that perpetuates the dominance of the military in Pakistani political life.

Historical animosity between Pakistan and India, and the concern about the US withdrawal from Afghanistan, are *likely* to lead to the Pakistani military maintaining its political influence. It is likely that, without substantial internal reform to tackle the current corruption and poor governance structures, the Pakistani military will continue to heavily influence national policy. A significant proportion of national GDP will therefore continue to be spent on defence, including a nuclear programme which Pakistan's military sees as a strategic imperative. It is likely that Pakistan's military spending *will* remain broadly constant out to 2040.



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An Indian sentry on duty in the Himalayas

Pakistan is *likely* to favour international engagement with countries whose trade is driven primarily by commercial considerations rather than ethical concerns, such as China and Russia. Pakistan *will* continue to invest in Chinese and Russian made military equipment, and continue its nuclear development programme, which is likely to include the



proliferation of nuclear technology for profit.⁸³ In the region, the importance of the Chinese/Pakistani economic relationship *will* grow. China *will* foster strong ties with Pakistan in order to develop naval bases on the Indian Ocean and so, facilitate Chinese operations therein. Such activity will continue to fuel tensions with India over encirclement.

The continued high levels of military spending will result in under investment in education and infrastructure making it *unlikely* that Pakistan will show strong economic growth over the period. The lack of a unifying language across the state will be a further barrier to economic growth, although the increased prevalence of information and communication technology (ICT) platforms and internet penetration *may* overcome this by 2040.

Pakistan's longer-term stability requires sustained investment in education, health, power generation and water distribution, and, more fundamentally, a rebalancing of power away from the Army and towards the development of more effective political structures. As long as the Army continues to intrude into politics, Pakistan's democracy is likely to remain fragile. Poor governance and a complex relationship between the state and local armed groups (including terrorists) will also perpetuate areas of lawlessness which will have both local and international impacts. Should present trends continue, Pakistan is *likely* to pursue military technology at the expense of economic development and, combined with the other trends described, perpetuate incidences of sustained unrest that mean its strategic importance to the West is *unlikely* to diminish. While bilateral links with China may help to stabilise the situation in the short term, it is *likely* that Pakistan will experience considerable internal challenges out to 2040. With nearly half of British Muslims describing their ethnic background as Pakistani, the UK will continue to be adversely affected by turbulence in South Asia.

Bangladesh

Bangladesh has achieved steady economic growth of almost 5% annually over the last 20 years and this is *likely* to continue out to 2040. In 2010, the population of Bangladesh consisted of 148 million, by 2040 this is *likely* to be around 190 million, thus representing an important source of labour within the region, and possibly the globe.⁸⁴ It is also *likely* to represent a strong emergent market with many opportunities for investment including access to minerals and resources. Urbanisation *will* also be a key feature of Bangladesh's development.⁸⁵ Although, rapid population growth *will* increase the pressure on resources, especially as the impacts of climate change are increasingly felt across the region.⁸⁶

Out to 2040, it is *likely* that Bangladesh will experience impacts from climate change, in particular increased flooding and degradation of agricultural land. It is likely to require support from its South Asian neighbours in times of humanitarian crises and the resulting large-scale migrations caused by extreme weather events. Bangladesh *will* also need

⁸³ While a number of nuclear hardware components can be controlled, the proliferation of technical knowledge cannot.

⁸⁴ UN Population Prospects 2010 revision.

⁸⁵ The pace of urbanisation in Bangladesh is presently occurring at double the rate of India and Pakistan.

⁸⁶ Population density in Bangladesh is amongst the highest in the world. By 2040, it is estimated that Bangladesh will have a population density of around 1,326 people per km. Source – UN Prospects Database, 2010 revision.



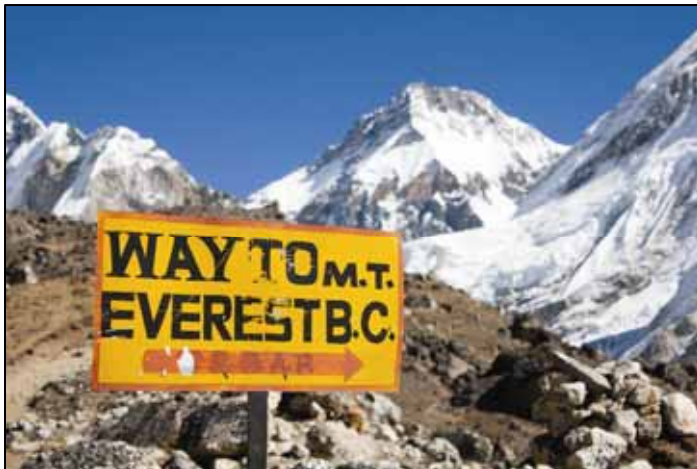
assistance to adapt to the more gradual climatic changes. In parallel, it *will* need to manage the transformation from a society that is traditionally based on agricultural employment, to one that is increasingly urban. Dhaka, for example, is currently one of the world's most rapidly expanding cities. By 2020 it *may* be the fourth largest city in the world.

Due to its proximity and the emergence of an increasingly competitive labour market, India is *likely* to sustain strong linkages with Bangladesh. It is also likely to provide financial support and humanitarian aid in times of environmental crisis, as well as access to its local information and communication technology and satellite networks.

Nepal

Nepal has an estimated population of 30 million people which is *likely* to reach 44 million by 2040, with significant growth in the urban centres of Kathmandu, Duran and Pakran. Nepalese society will become increasingly urban as the importance of agriculture reduces and manufacturing and service industries become more significant. The rural regions *will* however, remain important to Nepalese identity and politics.⁸⁷

The country is *likely* to continue its transition to democracy and away from a monarchy, with a political identity that is orientated towards Maoist/Marxist beliefs. As the country increasingly feels the benefits of exposure to globalisation, through its connections to the 'G3' powers and a buoyant tourist industry it *may*, however, move closer to the centre of the political spectrum.⁸⁸



The Himalayas will endure as a region of strategic significance for South Asia

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Nepal will sustain close linkages with China and India. Of the two, it is *likely* to retain a closer association with India due to shared languages (Nepalese has a close association with Hindi) and religion, roughly 88% of the population are Hindu. The proportion of other faiths however, such as Christianity and Buddhism, is *likely* to increase. India will retain a strategic interest in Nepal, trading military equipment and recruiting from it. The UK/Nepal/Indian tripartite agreement for Ghurkha recruitment is likely to endure and will represent an important source of military manpower for both the UK and India. Nepal *will* continue to benefit through these close associations. The Nepalese diaspora community in the UK consists of an estimated 40,000-50,000 people, who have significant influence on Nepalese

⁸⁷ At present it is estimated that around 73% of the Nepalese workforce is employed in agriculture. <http://www.state.gov/r/pa/ei/bgn/5283.htm>.

⁸⁸ Tourism is likely to remain an important source of revenue for Nepal. The Himalayas will provide an enduring appeal for international visitors.



society.⁸⁹ They provide an important source of remittances and can often provide the impetus for social change and development initiatives.⁹⁰

China *will* increasingly value Nepal, as a 'buffer' between itself and India. Over the period, its involvement in the country is *likely* to increase as China offers structural and developmental support in the form of road building and infrastructure provision. In return, China will seek access to Nepal's abundant supplies of construction materials, water supplies and its emerging hydroelectric power sector. Such developments are, however, *likely* to foster tensions between India and China due to an Indian perception of Chinese encirclement.

The recent Maoist insurgency in Nepal and the prevalence of former Maoist fighters and political leaders throughout the government and the armed forces *will* lead to some short-term tensions within the country. In the long term, it may lead to an ideological shift towards increased engagement with China. Certain policy changes, including the recent forced repatriation of a number of Tibetan refugees to Tibet, *may* signify the beginning of such a trend.⁹¹ The emergence of political violence/internal unrest from groups connected to Nepal *may* lead to either India or China attempting to implement a form of proxy-government. For example, if the Nepali Maoists aligned with the Indian Naxalites, it could provide a pretext for India to impose a proxy-government in Nepal to act as a buffer against China.

The varied ethnicity seen across Nepal *will* represent an enduring challenge to the establishment of a coherent political system. Reform *will* be required to address nepotism and high-level widespread corruption. Transformation of such deeply embedded behaviours is *likely* to occur but not without considerable tensions being experienced.

Nepal will continue to represent an important source of recruitment for the British Army. This relationship provides the UK with a number of high quality recruits, as well as benefitting the Nepalese economy through the continued association of the soldiers and their families with the UK economy.

Strategic shock – Earthquake in Nepal

The Kathmandu Valley will remain at risk of earthquakes and may experience an earthquake of similar magnitude to the, previously highest recorded earthquake of 8.4 on the Richter scale, which occurred in 1934. Surveys suggest that the infrastructure in Nepal currently has poor resilience against an earthquake of such magnitude, with an estimated six out of ten buildings likely to collapse.⁹²

⁸⁹ http://en.wikipedia.org/wiki/Nepalis_in_the_United_Kingdom.

⁹⁰ For example, the Gurkha welfare trust has a number of Gurkha welfare centres across Nepal. These play an important role in the provision of development support across the country.

⁹¹ 'China tries to repatriate 23 Tibetan refugees in Nepal',

http://www.nepstimes.com/?option=com_nepstimes_feature&task=details&FeatureId=656

⁹² www.earthquake-nepal.com.



Bhutan

The population of Bhutan is projected to increase from around 726,000 in 2011, to 943,000 by 2040.⁹³ It is *likely* to experience an increase in the average age of its population and a rise in its population density profile from 15/sq.km (2011) to 20/sq.km by 2040. Bhutan is the only official Hindu state in the world, although there is an increasing hybridisation of Hindu and Buddhist beliefs occurring in the country.⁹⁴

Industrially, Bhutan is an important source of cement and a viable source of hydropower. It is *likely* that tourism will be an important source of income over the period. Although a relatively small state, Bhutan has strategic significance to both India and China due to its position between the two larger states. Both countries *will* increasingly prize access to the Himalayas through Bhutan. India has historic associations due to Bhutan's support in episodes of regional unrest where it has helped to suppress terrorist organisations and improve stability in the area. China *will* value access to Bhutan's resources, with hydropower becoming an increasingly important source of energy. As with Nepal, Bhutan *will* remain an important buffer state between China and India throughout the period.

Sri Lanka

Sri Lanka is emerging from the effects of internal conflict and terrorism that has constrained its development for the past 20 years. It is also addressing the immediate humanitarian concerns of high levels of population displacement caused by the conflict between the governing powers and the 'Tamil Tigers'. Assuming that post-conflict stability endures, and the necessary societal, governance and security structures become established in the near term, considerable external investment is *likely* to allow Sri Lanka to show strong economic growth out to 2040.⁹⁵ Such investment is *likely* to occur in the northern regions first, gradually moving south over the next thirty years following the emergence of market opportunities such as fishing, agriculture and tourism.

Despite Sri Lanka attracting investment from a number of international stakeholders, China is *likely* to value its relationship with Sri Lanka, primarily due to its strategic location. China is entering into bilateral agreements aimed at assisting infrastructure construction and trade developments as well as strengthening cultural exchanges between the two countries. China is also *likely* to continue to equip and support the development of Sri Lanka's military. This trend is *likely* to continue out to 2040, as Sri Lanka's government uses its relationship with China as a foil to Indian pressure. Due to India's geographic proximity, and the presence of millions of Tamils in Tamil Nadu State in southern India, India will retain a close interest in the future development of Sri Lanka.

While, much of the investment in Sri Lanka will continue to come from China, the government is *likely* to balance this with established arrangements with India and Japan. All three of these states are involved in current efforts to rebuild the country. A massive infrastructure investment programme is underway, including roads, rail, port and aviation

⁹³ UN Population Prospects, 2010 edition.

⁹⁴ The population of Bhutan is predominately Lamistic Buddhists 75%, Indian- and Nepalese-influenced Hinduism 25%. Such a distribution of religious belief reflects its significant ethnic diversity that consists of Bhote 50%, ethnic Nepalese 35% (includes Lhotsampas - one of several Nepalese ethnic groups), indigenous or migrant tribes 15%.

⁹⁵ Sri Lanka's GDP growth rate was 9.13% in 2010, and 6.95% in 2011, <http://www.imf.org/>.



facilities, as well as irrigation projects.⁹⁶ A huge house-building programme has also been implemented in the north.

While the Tamil insurgency has been suppressed, Liberation Tigers of Tamil Eelam (LTTE) sleeper cells *may* have formed in the capital Colombo immediately after the war ended. As Sri Lanka continues to enjoy the benefits of its reconciliation, rehabilitation and reconstruction programmes and GDP increases, inequality is *likely* to reduce as employment and economic opportunities improve across the state. The longer the new peaceful, successful economic climate dominates, the more unlikely it becomes that LTTE activity will return to the levels experienced over the past 20 years. If it does transpire, activity is *likely* to occur in relatively small, isolated incidents that receive little support from the general public. The Tamil diaspora *may* remain vocal on the issue of Tamil separatism, particularly in London, and *may* attempt to keep it on the geopolitical agenda. The Sri Lankan Government however is *unlikely* to respond positively to what it perceives as interference from external groups, be they diasporas, non-governmental organisations or international agencies.



PA. 8670110

Ships queue up to enter Colombo port, in Colombo, Sri Lanka

Myanmar

The present system of military-led, authoritarian governance is *likely* to endure in Myanmar, supported by enduring Chinese economic and industrial development. As a neighbour of both China and India, Myanmar represents an important buffer state, which has many cultural and historic ties to China. China *will* value bilateral arrangements that secure its access to the country's resources, such as hardwood timber, natural gas, fish

⁹⁶ Hambantota - Sri Lanka's Hambantota port 'not deep enough'. <http://www.bbc.co.uk/news/world-asia-15661917>.



and minerals. The sale of natural gas contributes significantly to the Myanmar economy. US estimates suggest that the offshore Shwe and Shwephyu Fields hold an estimated 5.7-10 trillion cubic feet of natural gas.⁹⁷ As a comparator, the US itself produced some 21 trillion cubic feet of natural gas in 2010, approx 90% of its' total domestic consumption.⁹⁸ At present, China is constructing a pipeline to import gas from Myanmar to the Yunnan Province and another pipeline at a port in the Rakhine State where oil from the Middle East and Africa is discharged.

In 2040, Myanmar is *likely* to experience similar tensions to Pakistan on the issue of governance. Even though it is *likely* to have periods of economic growth, as long as the priority of the ruling class is to remain in power, the country's administration will be subject to endemic corruption and constant economic mismanagement. Over the next thirty years, Myanmar *may* mirror Chinese development with the progressive liberalisation of its leadership in order to encourage continued global trade. The advantages of such liberalisation in encouraging economic growth and new forms of industry, both service-based and tourism, *may* encourage the development of a fairer political system in the country and the gradual 'democratisation' of its leaders. Without the progressive liberalisation of the Chinese economy however, such a development is *unlikely*, especially given the reliance of the Myanmar economy on the trade of counterfeited foreign goods and illicit opium-based drugs. The considerable strength of the Buddhist faith in Myanmar is *likely* to endure as a source of tension for the authoritarian regime. See hot topic – *Religion in South Asia*.

Strategic shock – Chinese intervention in Myanmar

Buddhist-inspired internal unrest, fostered by increased access to information and communication technology, triggers wide-scale internal protests. This culminates in either in the overthrow of the military Junta, or Chinese intervention, to secure its interests.

Maldives

Nearly 1,200 islands, spread over 900 km² in the Indian Ocean, make up the Maldives. It has a population of about 300,000 and attracts about 500,000 tourists annually. Tourism drives the economy and accounts for about 70% of GDP. The highest point of land however, is just two metres above sea level. Rising sea levels and underwater coral reef erosion, both the result of climate change, now threaten the physical existence of the Maldives. Government scientists believe the sea level is rising by nearly 1 cm a year. With 80% of the islands less than one metre above sea level, in 100 years the Maldives are *likely* to be below sea level and the population forced to evacuate.

By 2040, the Maldives government is *likely* to have implemented a number of schemes to mitigate the impacts of climate change. It is currently encouraging tree planting to prevent beach erosion and is trying to clean litter and debris from the country's coral reefs - a natural barrier against tidal surges. These policies are however aimed mostly at

⁹⁷ <http://www.state.gov/r/pa/ei/bgn/35910.htm>.

⁹⁸ <http://www.naturalgas.org/business/supply.asp>. Accessed 28 September 2011.



mitigating the existing effects of climate change. Over the next 30 years, the country will increasingly call for concerted global action for the Islands to survive into the next century.⁹⁹ Other Islands in the region, including Diego Garcia, are also *likely* to be similarly affected.

South Asia's relationship with the rest of the world

Within South Asia, as well as the US and the EU, there are a number of other stakeholders, who are looking to develop economic, technological and resource-based ties to this rapidly emerging region. By 2040, it is *likely* there will be a sophisticated tapestry of bilateral arrangements with South Asia stretching across the world. The current US/China relationship will be an exemplar of how these complex interconnections can both fuse global relations and provide sources of new tensions.

South East Asia

As articulated in *Global Strategic Trends out to 2040*, the 'Asian Meridian' is *likely* to be a region of increasing strategic importance. This region stretches from Hong Kong in the North, through South East Asia into Australia. It has a diverse population with large Indian and Chinese diasporas and historic links to the US and Europe, in addition to treaty arrangements such as the Five Powers Defence Agreement.¹⁰⁰ The region sits astride the global trade routes of the Malacca and Lombok Straits through which 20% of global oil is transported, including 80% of China's oil imports. Over 60% of global shipping travelling through these choke-points is destined for Chinese ports.¹⁰¹ The importance of these choke-points is *likely* to grow out to 2040, placing the region at the intersection of competing Indian, US and Chinese interests.



Figure 7 – Map showing the Asian Meridian which stretches from Hong Kong to Darwin

Moreover, Australia and Indonesia together account for almost half the world's coal exports and Australia in particular is a large mineral exporter.¹⁰²

⁹⁹ 'The Maldives stands at the frontline of the climate change battle. We are one of the most vulnerable countries on Earth and therefore need to adapt to climate change', Dr. Mohammed Waheed Hassan, Honourable Vice President of Maldives.

¹⁰⁰ The Five Powers Defence Agreement links the UK, Australia, Singapore, Malaysia and New Zealand. These states agree to consult each other should a direct threat against Malaysia or Singapore occur.

¹⁰¹ Xuegang Z, *China's Energy Corridors in SE Asia*, 2008.

¹⁰² In 2007, global coal exports totalled 908 million tons of which Australia exported 247 million tons and Indonesia 187 million tons. Coal Portal.





China sources 80% of its oil imports through the Malacca and Lombok Straits

The region encompasses several states including city states, such as Hong Kong and Singapore, which are major centres of economic and financial activity. In particular, Vietnam has a large population and is *likely* to continue its economic development as an important manufacturing base, becoming increasingly influential within the ASEAN region.¹⁰³ Australia, the US and the UK's partner and ally, *will* remain a centre of innovation, resource production and stability acting as a bridge between the West and South Asian powers. So, Australia *will* become increasingly influential.

Islamic influences *will* be strong in the Asian Meridian, especially in Indonesia, Malaysia and Brunei, as well as among segments of the population in Thailand and the Philippines. Indonesia, the world's most populous Muslim majority country,¹⁰⁴ *may* experience robust economic development. Internal problems between differing religious and ethnic groups and the disproportionate effects of climate change in the region are *likely* to inhibit economic and political development. Irregular activity and terrorism in support of separatism is *likely* and state fragmentation is *possible*, affecting energy exports and leading to insecurity and a subsequent growth in maritime piracy, possibly to a level capable of disrupting global trade.¹⁰⁵ Any disruption is *likely* to elicit a multinational response with China and *possibly* India playing a significant role.

Competition for regional influence is *likely* to be significant, exacerbating instability and possible disputes over resources and sovereignty. ASEAN is *likely* to develop its economic interconnectivity between member states but it is unlikely to emulate the EU's aspiration to be a supranational power in its own right. The growth in defence spending along the Asian Meridian *will* continue with investment in maritime and air capabilities being substantially increased. While these forces are primarily for security purposes, (including countering piracy in the Indonesian and Philippine archipelagos) many states in the region *will* be looking to use them to reinforce claims of sovereignty. This will include along their borders and in the international straits to further their claims in the contested

¹⁰³ Goldman Sachs, *BRICs and Beyond: N-11; More than an Acronym*, 2007.

¹⁰⁴ Indonesia's population is 232.5 million. UN Population Division, 2008 medium variant. Muslim 86.1%, Protestant 5.7%, Roman Catholic 3%, Hindu 1.8%, other or unspecified 3.4% (2000 census) *CIA World Factbook*.

¹⁰⁵ Indonesia is the world's second largest exporter of coal. *British Geological Survey (BGS) Mineral Profile: Coal*, March 2007.



Exclusive Economic Zone (EEZ) areas, such as around the Spratly Islands in the South China Sea.

Russia

Russia *will* maintain strong links across South Asia, trading technology and military equipment with most states, especially China, India, Pakistan and Myanmar. The continued development of the Chinese and Indian space programmes *will* be a further avenue for Russian technology exchange, especially during the earlier stages of Chinese and Indian technology development while they are at the 'introduce' and 'imitate' phases of the 'introduction-imitation-innovation' (3'I') cycle.¹⁰⁶

Russia *will* also continue to be an important source of hydrocarbons crucial for South Asian growth, supplying both oil and gas to China and India. Over the period the number of pipelines from Russia to China and India *will* increase, and these markets will be an increasingly valued source of revenue to the Russian economy. Russia's economy is *likely* to be heavily dependent on resource wealth but fragility *may* occur due to relative demographic weakness, an ageing population, endemic corruption and poor infrastructure.¹⁰⁷ This makes it *likely* that Russia will increasingly wish to trade the technologies it developed to acquire its super-power status in the 20th Century. This increases the likelihood of it sharing military and nuclear technologies with many South Asian countries; especially those with whom the West will not share such technologies such as Pakistan, China and Myanmar.

Due to its superpower legacy, Russia is *likely* to pursue, and encourage, bilateral arrangements with many South Asian countries, often by-passing multinational organisations such as the UN and the World Trade Organisation. This *may* lead to the formation of a new regional authority created to reflect the eastern shift of global power.

Latin America

The emerging markets in Latin America, especially Mexico, Venezuela and Brazil, *will* be significant to many South Asian states in 2040 due to the availability of commodities and resources. It is *likely* that China's current strong economic growth will allow it to form the most linkages to the region which are likely to endure out to 2040. Many of these will be based on the exchange of technologies and support for industrialisation and urbanisation to secure enduring access to commodities and minerals. The region *may* also provide useful alternative forms of governance to western systems that can be studied by burgeoning South Asian political systems. For example, the CCP has shown an interest in understanding functioning systems of 'Intraparty' democracy which exist in places such as Mexico and has shared lessons learned on combating internal corruption.¹⁰⁸

¹⁰⁶ The 3'I' cycle details the technology development cycle a number of recent Asian states, such as Japan and South Korea, have experienced. Initially technology is 'introduced' to the state, then it is reverse engineered and 'imitated'. Then, as the country strengthens its internal research and development capacity and protection of its own intellectual property, it begins to 'innovate' and develop its own novel technologies.

¹⁰⁷ Russia is likely to experience a decline in the size of its populace from around 140 million in 2011 to an estimated 122 million by 2040.

¹⁰⁸ *Is Mexico China's future?* – Wall Street Journal blog discussing Mexico as potential template for Chinese development. <http://blogs.wsj.com/economics/2010/12/29/is-mexico-chinas-future/>.



Africa

China *will* continue to invest in, and support, infrastructure development in many African states. It *will* provide economic aid, construction and possibly communication technology through the development of satellite ground stations and telecoms infrastructure. China in exchange, *will* seek binding bilateral arrangements which give it long-term access to minerals and other natural resources including fossil fuels. The fertile regions of many African states *will* also be increasingly prized as agreements are made to provide China with access to productive arable land in order to feed the increasingly cosmopolitan demands of its expanding middle class consumer base. China *will* often engage with regimes deemed to be corrupt and immoral by Western powers, representing an important source of military equipment and finance for dictatorial regimes. Such arrangements will have enduring implications for human security in many African States, providing a significant opportunity for the proliferation of low-cost, low-tech military technologies. Such relationships *will* also foster global criminality as they allow the transmission of counterfeit goods and technologies.

Middle East

India is *likely* to have greater influence over the Middle East due to shared lineage with many Middle Eastern states, particularly the Gulf States. This *will* be sustained by a large diaspora of Indian workers in the region, the increasing influence of Indian culture (especially the continued rise of 'Bollywood' and the Indian media) and trade and proximity of the regions.

India *will* continue its relationship with Iran and act to influence the development of Iranian nuclear capability, maintaining that such activity is undertaken in a responsible and safe manner. Such technical knowledge exchange is *likely* to be underwritten by the provision of independent Indian access to Iranian oil and gas supplies. This relationship will endure strategically as India prizes Iran as an ally against enduring tensions with Pakistan.

China *will* increase its influence in the region and among the financial centres of Dubai and Abu Dhabi. The enduring importance of the Gulf States for hydrocarbon supply will mean that China continues to value its relationship with the region. The development of pipelines to transport oil and gas from the Middle East across Myanmar and Pakistan to China will further increase the importance of the Gulf States as sources of energy.

Pakistan, India and China will all trade technologies with Middle Eastern states. However, Pakistan is *likely* to prefer to trade with Syria, Yemen, Oman and other peripheral states, often with Sunni Muslim majorities. India is *likely* to favour technology trades with Iran, Israel and possibly Egypt.¹⁰⁹

¹⁰⁹ Israel will increasingly value technology exchanges such as radar and electronics and, in turn, access to Indian space launch capability.



Existing international institutions – UN, International Monetary Fund and the World Trade Organisation

The growth of South Asia, particularly the large economies and populations of China and India will have significant implications for international institutions. Institutions such as the UN, particularly the Security Council *will* increasingly need to reflect the rise of India and possibly either widen its membership of permanent members or review the presence of certain legacy countries, who politically, militarily and economically, are no longer as significant as the new South Asian powers.

Other structures, such as the International Monetary Fund *will* also come under increasing pressure to more adequately reflect the distribution of global power. Discontent with these institutions is likely to continue until China and India have adequate representation in key posts, which is *likely* by 2020.¹¹⁰

The reconfiguration of international organisations is *likely* to be difficult as they try to maintain the consensus of all their members. Particular issues *will* occur regarding the rise of certain states and the relative decline of others, aggravated by the perception of vested interests being protected. The power of veto could, for example, be increasingly invoked in the UN Security Council as certain countries protect the interests of authoritarian and corrupt regimes with whom they maintain bilateral arrangements. Similarly, the management and enforcement of intellectual property and a meaningful global system of patent protection *will* represent an enduring challenge and growing tension for international organisations, such as the World Trade Organisation, over the next 30 years.

South Asia and the global commons

The term 'global commons' is used to describe spaces that are not under sovereign control and are potentially accessible to all. The commons are best described by their domains:

- the high seas, including surface, sub-surface and seabed
- international airspace
- Antarctica
- outer space (which begins at the point above the earth where objects remain in orbit).

It is *likely* that the management of the global commons will be one of the key emerging challenges that face both the globe and South Asia over the next 30 years. Securing open and assured access to the global commons is inextricably linked to the security and prosperity of all. It is *likely* that South Asian countries, in particular China and India, will increasingly seek to protect their interests in the global commons. As the commons become increasingly indispensable to global growth and prosperity, the likelihood of

¹¹⁰ Oxford chancellor wants Montek Singh Ahluwalia as IMF head.
[Http://businesstoday.intoday.in/story/oxford-chancellor-wants-montek-singh-ahluwalia-as-imf-head/1/16052.html](http://businesstoday.intoday.in/story/oxford-chancellor-wants-montek-singh-ahluwalia-as-imf-head/1/16052.html).



confrontation will increase. Therefore, the need for robust international processes to manage them *will* be critical for maintaining security.

Both India and China *will* seek to develop a mature blue-water capability out to 2040 in order to maintain a routine maritime presence both in the oceans surrounding South Asia and increasingly in the oceans around the world. Confronting piracy *will* remain a priority for India and China, both of whom are likely to develop their own rules of engagement to protect their own supply chains and sovereign interests, which is likely to present a challenge to international laws. It is *likely* that India will maintain a continuous maritime presence in the Indian Ocean, similarly, China will continue to develop an extensive and technically proficient navy in order to both project its influence globally as necessary and as a counter to continued US operations in southern waters.¹¹¹

The South Asian countries, following the lead from China and India, *will* increasingly demand access to the open-ocean sea bed and *possibly* the pursuit of rights to resource-rich areas in the polar cap regions. The areas of greatest interest to South Asia are likely to be space and cyberspace as well as maintaining access to the high seas, with increasing use of Arctic shipping lanes.



Areas within the global commons, such as the Antarctic and Arctic, will be increasingly important to global trade

Strategic shock – Chinese assert historical claim over disputed territories

Evoking ancestral claims, similar to those made by Taiwan over the Spratly Islands,¹¹² China refuses to acknowledge the UN's authority, and uses military force to occupy other disputed territories.

¹¹¹ China will continue to justify this development as a counter to US encirclement, citing the US' continued involvement both militarily and politically with various South East Asian states.

¹¹² *Taiwan to boost forces in disputed Spratly Islands*, <http://www.bbc.co.uk/news/world-asia-pacific-13130208>.



Hot topic – Cyberspace

The dependence on complex cyberspace systems for support of social, economic, government and military activities will create new vulnerabilities which are *likely* to be exploited by a range of actors across South Asia. An abundance of relatively low-tech computing equipment and sophisticated software tools, the availability of a large pool of skilled labour, and an extensive information and communication technology infrastructure, will enable most South Asian countries to undertake state-sponsored cyber programmes. China, India and Pakistan are *likely* to emerge as the most prominent players. South Asian countries will develop their cyberspace activities to protect critical national infrastructure, but also potentially to compensate for limited power projection from conventional means.



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A range of cyberspace capabilities including intelligence gathering *will* be directed by South Asian countries. The type and severity of cyberspace targeting will vary locally, regionally and globally, partly due to informal state alliances, but will also reflect wider global interests such as monitoring of western industries and probing government infrastructure. Activities will include:

- espionage
- interfering with digital information and networks
- disrupting fragile civilian and military infrastructure.

Such activities will disrupt national infrastructure, manipulate financial systems and social networks and constrain situational awareness. South Asian countries *will* aim to become proficient in active cyber-offence, reconnaissance and computer exploitation activities.



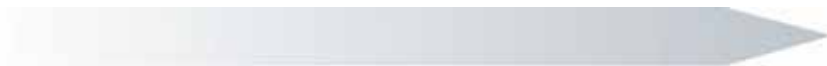
In South Asia the internet represents an increasingly important outlet for dissent and free expression, enjoying a wide and committed readership, and will be increasingly used to challenge political leadership and government. Conversely, South Asian countries will use cyberspace capabilities to monitor and enforce political censorship, suppressing freedom of expression with the intention of preventing internal unrest. Cyberspace activity will also be directed at internal control, either through propaganda, censorship and collusion or through schemes designed to bind and co-opt dangerous individuals.

China and India both possess buoyant information and communication technology sectors. In addition to financial resources, they have a significant and growing pool of highly-skilled information and communication technology professionals. China, India, and to a lesser extent Pakistan, all show emerging signs of cyberspace activities linked with national security and military command structures, undertaking computer network exercises integrated within national security activities. It is *likely* that South Asian countries will lead in certain areas of cyber doctrine and capability development.

China, India and many other South Asian countries *will* continue to invest in telecommunications, computer hardware and software, as well as encouraging foreign investment (partly to facilitate knowledge transfer). They will also nurture indigenous information and communication technology to reduce reliance on imports and overcome regulated technology barriers.

A large, active 'Internet militia' consisting of hacker communities and information security experts exists in several South Asian countries. The majority of these groups are likely to be part of governmental structures or programmes, while others, although operating independently, are under the influence of or tolerated by national authorities. Such groups will be geographically dispersed and often supplemented by uncontrolled diaspora groups motivated by patriotic ideologies. South Asian countries are *likely* to mobilise such groups as part of coordinated national effort during periods of conflict. Direct espionage, or disruption of government and commercial infrastructure, *may* occur during peacetime in order to achieve particular effects. Anti-government groups are also *likely* to use the technology to empower individuals and draw together communities of interest.





Key theme 2 – The challenge of transformation



The process of globalisation is likely to have an increasingly Asian influence out to 2040

This section details the challenges that many South Asian states will need to address in order to become the powers of tomorrow



How does South Asia get to 2040?

Scope

As South Asia moves towards 2040, much of its development will depend on how the region transforms politically, economically and socially. Unconstrained growth is unrealistic. Also without continued growth, the leaders of a number of countries may be unable to satisfy the demands of their people. Such demands are likely to include: political and financial propriety; societal reform; and establishing a credible rule of law. The region will also be subject to other significant pressures such as climate change, territorial disputes and the proliferation of nuclear technology.

Key theme 2: The challenge of transformation will include:

- governance
- protection of territory
- economic resilience
- using technological advantage
- globalisation of South Asian culture
- climate change
- nuclear proliferation.

The Hot topics are: **Religion in South Asia** and **Trends in social protes.**

Governance

Pervasive corruption, poor governance and the weak rule of law will represent significant challenges for many South Asia states. Failure to address these issues *will* constrain growth and prosperity over the next 30 years.¹¹³ Furthermore, even those South Asian countries that allow increased freedom of expression are *likely* to struggle to keep pace with the increased demands for policy and societal changes. South Asian countries with authoritarian governments such as China, Myanmar and Pakistan are *likely* to experience significant internal tensions, especially if the population directly challenges the strength of a single ruling party.

Confidence in emerging South Asian trade centres *will* be based upon their resilience and that of the international trading system. It is *likely* that some degree of liberalisation *will* occur within the Chinese economy as it experiences greater integration into the global market. Consequently, financial systems are *likely* to become increasingly transparent as perceptions of corruption challenge controlled systems. Over the past 30 years, the numbers of lawyers and judges in China has increased. Since the 1980s, rather than retired military officers interpreting the law and punishing criminality, there has been an

¹¹³ This is likely to be a significant challenge for even the more liberal democracies in South Asia. For example, in a recent DCDC Global Strategic Trends workshop in New Delhi, the number one risk to India's national security, identified by the broad-based Indian audience, was the country's governance 'deficit'. This particular audience thought it likely that a programme of social and welfare reform that tackled both corruption and urban infrastructure was a potential way to address this governance deficit.



increase in civil lawyers becoming judges as well as a rapid growth in students studying law. This suggests that China is placing increasing significance on effective judicial and commercial laws.^{114,115} Out to 2040, the increasing number of practising lawyers, along with the pervasiveness of information, *will* further drive the internal expectation for transparency within Chinese government and business.¹¹⁶ Global and regional trade organisations and trading partners will also demand adopting more transparent systems of governance. Globalisation *will* increase the need for legal systems across South Asia to tackle corruption effectively, thus preventing it acting as a barrier to trade. The need for effective intellectual property protection will require new legislation to be written and enforced. Although this demand for transformation will be strongest in China over the period, the same robust transformative action will be required across South Asia, if states are to feel the full benefit of globalisation.

China and India will be concerned with a stable transformation of their internal populations from 'developing' to 'developed' status. India, with an open society, liberal democracy and civil-led telecommunications programme is *likely* to be more resilient to the changes driven by open access to pervasive communication technology. Such a development will represent a significant challenge for the Chinese single party political structure.

In China, cheap, civil-led access to communication technology and the rise of 'citizen journalism' across multiple platforms *will* challenge rigid state control. The increasingly diverse and numerous forms of entrepreneurship, which the Chinese authorities will seek to accommodate to safeguard national prosperity, will also challenge it. The expanding middle class will also challenge state control, especially if the Chinese government strives to remain close to its authoritarian, communist roots. At present, control of information enables the CCP to control its people but such actions are likely to be increasingly difficult to maintain. They also limit economic growth in the long term. Liberalisation of telecommunications and the media are likely to increase entrepreneurial growth. However, giving up control of information is *likely* to be a significant challenge for the CCP, at least for the near term – unless there is a direct threat to internal stability or the Chinese economy. The Chinese government is *likely* to remain committed to its harmonious society programme¹¹⁷ and accommodate some internal changes, but this will be undertaken at a scale and pace that the CCP feels it can control. However, the speed of escalation of reactions to issues of party corruption and social inequality, particularly in rural areas are *likely* to occur more quickly than Beijing can control and *may* lead to increasing numbers of confrontations as Chinese governance attempts to adapt to a more liberal and open system.

With demands for increased transparency, the Chinese Government will have to undertake progressive economic reforms to maintain economic growth and strengthen the Renminbi as a global currency (see Hot topic – *The Renminbi as a reserve currency*). As the degree of integration and reliance on the global economy increases, the challenge for

¹¹⁴ For example, between 1949 and 1978 there were only two laws in China – the constitution of the state and marriage law. However, since 1978, over a thousand laws have been passed by the National People's Congress.

¹¹⁵ In the 1980s there were 2,000 law students by 2008 there were 520,000.

¹¹⁶ Wilton Park Conference 2010 - *China Towards a Harmonious Society*.

¹¹⁷ 'Harmonious society' is said to be the ultimate end result of Chinese leader Hu Jintao's signature ideology of the scientific development concept. It aims for a 'basically well-off' middle-class oriented society.



Chinese leaders will to keep the populace free from undesirable western influences while absorbing the desirable impacts of globalisation. Thus, to remain a global player and encourage trade and investment with the developed world, China *will* need to transform its internal institutions to become more attractive to foreign investors. Such a shift is *likely* to take the form of a peaceful evolution. The inflexible nature of Chinese government however, *may* lead to internal tensions within the CCP regarding the speed and depth of economic liberalisation. This *may*, in turn, lead to political tension within the CCP.

Strategic shock – Intraparty rivalries fracture the CCP

Polarising differences within the CCP, possibly driven by hardline ideologies within the PLA, result in a fracturing of the system of ‘intraparty democracy’. In such a context, ethnic and historic animosities could resurface in the pursuit of ‘Nationalistic conflicts’. These may focus on particular issues of Chinese interest such as the South China Sea, Taiwan or Tibet.

Other authoritarian regimes in South Asia *will* experience similar tensions to China. However, as countries like Myanmar and Pakistan are less integrated into the global marketplace. They are, to some extent, dependent on China for economic prosperity, therefore the drive for internal economic reform is *unlikely* to be as strong. Demands for transparency and challenges to government corruption however are *likely* to increase, especially in Myanmar, where calls for liberalisation are likely to continue to be led by the Buddhist Sinha (see Hot topic – *Religion in South Asia* for further details).

India is *likely* to experience different challenges to its governance with the free press playing a significant role in demanding the cleaning up of corrupt bureaucracies. Internal fears for future prosperity and market opportunities are also *likely* to increase the demand for political change. The importance of western financial systems and a regulatory rule of law underpinning trade *will* be increasingly understood and promoted. New systems for tackling corruption will be developed. For example, the ‘Zero Rupee’ note shames public officials who ask for bribes. Similarly, schemes highlighting incidents of bribery through social networking sites show how early adoption of freely available technologies are being used to drive forward transparency and political reform.¹¹⁸ Along with corruption, India will also need to address a lack of investment in infrastructure and strengthen the effectiveness central government. India’s relatively open democracy, free media and independent judiciary system may be a credible force on the global stage.



The ‘zero’ Rupee note is used in India as a statement of principle if an individual is asked for a bribe by a government official

¹¹⁸ ‘India against corruption’ and the ‘anti-corruption federation of India’ are selected examples - <http://www.indiaagainstcorruption.org/index1.html> and <http://www.tacfi.org/home.html>



The political consequences of high inequality, especially where inequality and poverty is concentrated in particular castes or even states, *will* represent another challenge for India. This situation has contributed to the creation of radicalised political movements such as the Naxalites and Maoist groups connected to Nepal. These are *likely* to endure as sources of internal strife within India as long as significant inequality remains. Such groups *may* pose threats to the unity of India, especially within the large eastern states of Bihar, Orissa, Andhra Pradesh and Chhattisgarh. A combination of long-term economic change management and significant welfare investment are *likely* to be necessary to address inequality across these states, and resolve the grievances of the rural poor.

Protection of territory

Certain key areas such as Kashmir and the Indus *will* remain as flash-points over the next 30 years with the the Sino-Indian Himalayan area *likely* to be increasingly disputed between China and India. China *may* seek to use this area to distract India, allowing it to pursue other strategic aims, such as improved bilateral trade links, with India's neighbours. The area will become of even greater significance if China, as seems likely, resolves its border disputes with all of its South Asian neighbours except India.

Water availability *will* be a key issue for the region, and the protection of resources will be a significant geopolitical tension between South Asian States. The prospect of 'riparian conflict' will endure, especially with regard to the Indus and the Brahmaputra Himalaya region. See Hot topic – *Riparian conflict*.

The perception of Chinese encirclement *will* be an on-going concern for India. India will object to China's policy of continued investment and integration with Bhutan, Nepal, Sri Lanka, Pakistan and Myanmar. China will increase its influence in the region through: the use of bilateral arrangements; technology and infrastructure provision (including satellite ground stations); and increasing its commercial operations. It will also develop ports and naval bases in Sri Lanka, Pakistan and Myanmar to increase its maritime presence.

The pursuit of increased Chinese influence across South Asia *will* itself be driven by China's own perception of US encirclement, through its likely ongoing alliances with India and many South East Asian states. Ongoing tensions regarding the US and increasing India presence in the South China Sea will influence this further. The South China Sea is *likely* to endure as a flashpoint for relations between the US and China.

Economic resilience

The economic resilience of many South Asian states, especially the larger economies of India and China, *will* be of crucial significance to continued global growth. Based upon the foundations of a liberal democracy and diverse internal markets the Indian economy is *likely* to be more resilient to potential shocks and crises than its larger Chinese counterpart. Through the use of social and welfare programmes to address both corruption and urban infrastructure, India's economy *may* undergo significant strengthening. A free press, although bringing its own complications, is *likely* to play a significant role in such transformation, by often holding the political ruling class to



account.¹¹⁹ However, the role of the free press and its relations with governments will generate new and, not always positive, influences on policy.

While global demand for manufactured products is *likely* to be the key driver of economic growth in China out to 2020, initial growth beyond this period is *likely* to depend on domestic demand.¹²⁰ Providing China stimulates internal markets, it is *likely* to maintain its economic position within the global marketplace. Then, as the rate of growth from internal markets plateaus, the integration of Chinese companies, particularly service-based companies, into the globalised market place will be increasingly important to the Chinese economy. Thus, over the next 10 years, various developing economies' need for capital, and China's surfeit of it, will give China a natural path to invest in those states in order to facilitate its long-term aim of greater integration into the global economy.

Out to 2040, China is *likely* to shift its economy from being a predominantly manufacturing-based one to being provision-based. To maintain the necessary levels of growth, China's economy *will* need to diversify away from manufacturing and start to compete within the global knowledge-based economy. It is already preparing for this shift, reflected in the increased investment in research and development and the increased number of patents filed. Consequently, China's economy *will* become less controlled by the state and more significant within the world economy. Furthermore, increasing integration into the global economy, the expansion of its middle class, the greater income of its populace, increased innovation and on-going urbanisation will act as drivers for economic growth. However, it may be constrained by: water availability; rising inflation; exchange rate volatility; and the tension of maintaining stability as the population ages and seeks change.

In parallel, it is *likely* that India will 'leapfrog' some traditional stages of industrial development, bypassing elements of the manufacturing phase by outsourcing production to surrounding states with cheap labour such as Sri Lanka and Bangladesh. Thus India will seek to compete in the knowledge-based economy as quickly as possible and rapidly implement the technical infrastructure required to support this objective.

Strong economic growth across South Asia, increased South-South trading¹²¹ and the 'equalisation' of global GDP levels¹²² are *likely* to lead to a period of stagnation for some western economies. During times of limited economic growth, western populations may feel increasingly disadvantaged by the process of globalisation while rising costs and insufficient resources challenge their way of life. In such a context, and with continued trade imbalances, protectionist sentiments may occur in the form of emerging trade blocs, such as Europe, North America and Latin America. Such a combination of recession and

¹¹⁹ Row after India minister calls homosexuality a disease. [Http://www.bbc.co.uk/news/world-south-asia-14024774](http://www.bbc.co.uk/news/world-south-asia-14024774).

¹²⁰ Such demand includes: resident demand, enterprise demand and government demand. At present resident demand is the direct impetus of accelerating economic growth. The Chinese internal market consists of an estimated 1.3 billion consumers and is strengthened by a high resident savings rate. Enterprise demand is induced by enterprises that have been encouraged by the Chinese Communist Party since the mid 1980's and are another direct impetus of accelerating economic growth. Government demand has increased due to greater investment programmes in the public sector further stimulating investment.

¹²¹ South-South Trading describes trades between two states that are both South of the equator.

¹²² For example, in recent years wages have risen in South Asia while they have been declining in the West. Up until the 2007 global economic crisis this was masked by increasing debt levels offsetting the perception of reduced inequality and this would not have been possible without China purchasing western debt.



protection in world trade *may* limit Chinese export growth while domestic demands for employment and expectations of higher living standards continue to rise internally. In such a situation, China's leaders might find it increasingly difficult to satisfy the demands of the masses.¹²³ Should the western economies experience a long period of stagnation, such an outcome may occur before 2020, while China is still attempting to reconfigure to a service-based economy.

Strategic shock – Western protectionism limits South Asian economic growth

As the global economic context becomes increasingly dependent on Asian economies, western powers and their populations may feel disadvantaged by globalisation as GDP per capita levels normalise. Sustained periods of slow economic growth, or even stagnation and recession in western economies may lead to tensions, especially if the 'western' way of life is threatened. In such a context, it is possible that increasingly protective bilateral trade arrangements favouring western interests will be enforced, potentially stalling the pace of globalisation, leading to an increased risk of conflict.

Traditionally, agriculture has played a central role in South Asian economies. Agricultural supply chains in South Asia differ significantly to those in the West. Subsistence farming, with localised systems of distribution, are the norm and industrial farming and irrigation schemes are not widely used.¹²⁴ As South Asian countries grow economically, it is *likely* that the agricultural sector will need to evolve to meet greater demands in quantity and diversity. Greater industrialisation of farming is *likely* to meet such demands. This is *likely* to be a delicate process especially where population pressures on land resources are also very heavy.¹²⁵ The gradual transformation of 'traditional' agricultural systems *will* represent a tension for all South Asian countries, especially the larger population centres of China and India. However, the development of new food generation techniques and increasingly efficient cultivation techniques may provide solutions. The transformation of agricultural systems of production may strengthen other aspects of economic growth by driving rural-urban migration. This *may* provide significant benefits but also creates the need for policies that balance the need for internal migration, with protecting the ability to feed the population.

¹²³ Russell Ong, *China's Security Interests in the 21st Century*, (Routledge: London, 2007), p.18.

¹²⁴ Estimates suggest that around 70% of food produced in such systems is subject to waste due to rapid degradation in higher temperature climates and inefficient supply chain systems.

¹²⁵ The scope for further expansion of agricultural land is virtually exhausted in most of the countries in South Asia.



Strategic shock – The rapid reconfiguration of agricultural supply systems in South Asia

Policy changes in food production, possibly due to the increasing influence of multinational companies with agricultural interests in the region, could drive changes in the availability of arable land and traditional farming practices. If such a shift occurs rapidly, many urban areas would receive large numbers of environmental migrants and instances of humanitarian crisis could result.

Exploiting opportunities to gain technological advantage

The development of high quality science and technology programmes, and their subsequent application, offers emerging South Asian States significant opportunities to develop further their societies, commercial sectors and governments. Furthermore, as communities increasingly appreciate the benefits that applied science and technology can deliver, then increased societal interaction can further stimulate innovation, guide commercial thinking and so increase the tempo of associated development cycles. For such a virtuous circle to be effective within South Asia however, intellectual property protection and enforcement *will* need to be sufficiently robust to encourage innovation and attract investment, while avoiding becoming so prescriptive that the diffusion of knowledge and technology is inhibited. Only by striking such a balance will South Asian states be able to guarantee access to, and affordability of, key technologies.¹²⁶

Across the region, science and technology developments are *likely* to remain predominantly evolutionary, but with occasional scientific breakthroughs possible, particularly where disciplines interact. Increasing levels of science and technology activity in the region and greater internationalisation of research and development *will* continue.^{127,128} South Asian owned innovation networks *will* have high quality, globally-distributed research and development centres that will integrate researchers. This will accelerate innovation and advancements across the region. China and India already have significant research and development capacities and *will* remain the regional leaders in providing such focused investment throughout the period.

For South Asian economies, the ability to adapt to globalisation, enable industrial specialisation and exploit dispersed of supply chains *will* influence the rate of their development. However, on the back of sustained economic growth, such initiatives will offer South Asia the opportunity to exploit the global marketplace to secure foreign direct investment and scientific knowledge. This in turn will allow diversification and strengthening of the regions industrial bases.

China is currently the world's largest exporter, with a manufacturing capability that exploits its nascent innovative capacity through re-engineering and imitation of foreign products.

¹²⁶ *Intellectual Property in Asian Countries: Studies on infrastructure and Economic Impact*, World Intellectual Property Organisation, 2010.

¹²⁷ Krishna and Bhattacharya, *Internationalisation of research and development and global nature of innovation*, ARI, September 2009.

¹²⁸ *China and India: Opportunities and Challenges for UK Business*, BERR Economics Paper No. 5, February 2009.



However, China *will* increasingly exploit educational and research-led initiatives to transform imitation into true innovation.¹²⁹ China *will* also continue to pursue policies aimed at acquiring foreign intellectual capital to enhance its own domestic markets and brands. Up until 2030, when the Chinese economy is likely to be at its strongest, state-led initiatives *will* acquire, and develop, key research and development assets. It will also seek to address knowledge gaps through technology transfer. Such policies, along with investment in key disciplines such as nanotechnology, biotechnology, computing and materials science, *will* see China attain global leadership in some of these disciplines, possibly eclipsing the UK's science and technology base, in certain niche areas, by 2015 and the US by 2020. However, currently, most of Chinese technical advances imitate existing ideas and technologies. It will need to overcome a number of significant challenges, such as the strongly bureaucratic nature of its society, if it is to develop a truly indigenous-innovative capacity that is capable of competing with western-market leaders.

By contrast, India with its market-based and open society is *likely* to provide a more fertile ground for new ideas. India already has a buoyant civil sector in many technology areas including information and communication technology, pharmaceuticals, engineering and renewable energy. Consequently, assisted by the sustained expansion of its indigenous science and technology sector, India *may* 'leapfrog' China in the development of its indigenous-innovative capability.¹³⁰ A number of issues, including greater domestic access to scientific education and the need for increased commercial science and technology investment, *may* hinder India's development.

India and China represent significant 'prosumer'¹³¹ markets which will attract foreign investment out to 2040 to a much greater extent than other South Asian countries.¹³² Unlike the rapid competitive ascent of Japan, Taiwan and South Korea; China and India are *likely* to continue to entice transnational corporations as clients and investors, and not just as rivals. A factor that will further assist each nation developing their science and technology sectors.

Globalisation and South Asia

The process of globalisation *will* continue, but it will have an increasingly Asian influence. The cultures of many South Asian countries will also be subjected to the new influences it brings. Therefore, many traditional societies across South Asia will change. This transformation will convey many benefits as standards of living, and access to education and health care increase. However, it *will* also lead to tensions, challenging traditional values and beliefs and material expectations to increase. Should such increasing expectations and aspirations not be met, episodes of insecurity are *likely* to result, especially in groups that feel excluded from economic growth, such as recent urban

¹²⁹ Such as Project 863, which has run since 2001 and stimulated niche technological areas; Project 211, a national project to stimulate educational development and Project 985, a project to develop universities. http://www.most.gov.cn/eng/programmes1/200610/t20061009_36225.htm and <http://www.chinaeducenter.com/en/cedu/ceduproject211.php>.

¹³⁰ A P Kalam, J Abdul, and Y S Rajan, *India 2020; A Vision for the New Millennium*. New Delhi: Penguin Books India Pvt Ltd, 1998.

¹³¹ A 'prosumer' market is one that has both the benefits of cheap production and a large consumer base.

¹³² For example, China is now Rolls Royces' second-biggest market, where sales rose by 600% in 2010, similarly they rose 400% in India. 'The new high Rollers - A glamorous British success story (sort of)' <http://www.economist.com/node/17902971>



migrants from rural areas or those of lower castes. Although, such variations in wealth will be an economic necessity to drive the huge growth expected of South Asian economies, there are many tension points that will result, including sustained inequality and slum development.

Globalisation will expose traditional societies, particularly the younger generations, to different values and beliefs, thus changing aspects of the character and culture of each country. Similarly, South Asian culture will be increasingly influential throughout the world. Many South Asian countries *will* increasingly value their 'soft power' as a means to project their influence, using media and recognised cultural symbols to promote themselves on the national stage.



A couple walk by a movie poster for China's propaganda film, *Beginning of the Great Revival* that documents the founding of the Chinese Communist Party

Each South Asian country will respond differently to challenges to their values and 'ways of life'. India, as a religiously plural and open society, *will* continue to host a wide range of different belief systems and is *likely* to adopt successfully many cultural influences exported via globalisation. However, traditional spiritual and religious leaders are *likely* to continue to influence policy decisions based on their popularity and role within Indian society. For example, currently, spiritual leaders in India are pursuing a number of anti-corruption initiatives.¹³³ Through the Internet and open media, new forms of religious and spiritual belief *may* arise and propagate rapidly.

¹³³ Indian activist Anna Hazare on hunger strike as MPs debate anti-graft bill - <http://www.guardian.co.uk/world/2011/dec/27/indian-anti-graft-hunger-strike>



Chinese belief systems are *likely* to experience a degree of transformation based on continued exposure to western culture. Confucian¹³⁴ ideas have influenced China's political development and are often cited in the country's strategic and scientific development. Out to 2040 however, with greater exposure to other international cultures as well as new scientific, legal and business environments, observance of Confucian traditions *may* decline in Chinese society. In parallel, this *may* lead to a shift away from traditional notion of 'communitarian good' to a greater focus on individual or local interests. However, as China becomes increasingly aware of the value of 'soft power' on the global stage, Beijing is *likely* to increasingly use Confucianism traditions to project their culture, possibly leading to a paradox where the ideal of Confucianism is more significant internationally than internally.

The UK, with its historic ties to many different countries and cultures, and its capacity to adapt its internal society to adjust, stands well-placed to absorb, and enjoy, the many different cultural, societal and economic opportunities generated by this evolution in global culture. The UK *will* remain a tolerant and open society, underpinned by democratic principles and the rule of law. The continued importance of immigration to the UK populace and economy will continue to see the UK develop as a society that is able to absorb and grow through the diverse and varied cultural influences of its citizens.

Trading systems among the 'G3' powers and across the globe are also *likely* to favour English as the internationally-dominant language for data and global services, with the emerging financial centres in Shanghai and Mumbai adopting it as the principal language of trade. Supplementary transnational languages, such as Mandarin, Spanish and Arabic, *may* proliferate as engagement in globalised communication increases. However, the growth of sophisticated translation devices are *likely* to become widely available before 2040, further increasing the ease of Chinese-English trading. In parallel, such technology is likely to facilitate the decline of a large number of languages, with some projections suggesting there may be as few as 10 languages commonly spoken around the world within the next 100 years. Such a trend may lead to the most popular languages, such as Mandarin, English and Spanish, becoming even more prevalent by 2040. Other languages that are not so common will become less practised over the period.¹³⁵

Climate change

South Asia *will* remain highly sensitive to the impacts of climate change. As well as rising sea levels, the area is likely to face increased incidents of seasonal floods, heat-waves, storms, and unpredictable farm yields. As well as the increased incidence of extreme events, the 2°C rise in global average temperature will have a considerable impact on the availability of arable land and stable agricultural habitats.¹³⁶ The monsoon season is *likely* to be affected by rising surface air temperatures and mean winter temperatures *may* increase by as much as 3.2°C with summer temperatures rising 2.2°C by 2040. Such climatic alterations are *likely* to contribute to a vicious circle that may lead to irregularities

¹³⁴ Confucianism is a system of philosophical and ethical teachings founded by the Chinese philosopher Confucius. *Concise Oxford English Dictionary*, 12th Edition.

¹³⁵ Brian Ferren and Steven M. Huybrechts, *iphones and Dinosaurs in an Exponential World*, Space News, 27 July 2011.

¹³⁶ See 'Hadley Centre' analysis in *Global Strategic Trends out to 2040* for further discussion of this trend.



in the pattern of monsoon rains which are vital for South Asia's agricultural and domestic water needs.

Rises in temperature and changes in humidity are *likely* to adversely affect human health across the region. Higher temperatures will increase the range of vector-borne diseases such as malaria, particularly in regions where minimum temperatures currently limit the spread of such diseases. Climate change is *likely* to alter the distribution of important vector species such as mosquitoes and *may* increase the spread of disease to new areas that currently lack suitable public health infrastructure. Malaria is endemic in most of South Asia except at elevations above 1,800 metres and in some coastal areas. Considering a *possible* 3.8°C increase in temperature and a 7% increase in relative humidity by the 2050s, malaria is *likely* to become prevalent all-year-round, as opposed to its current annual transmission window of 4-6 months. While that Maldives had previously eradicated malaria, climate change is *likely* to reintroduce a threat of outbreaks of the disease. In Nepal, there *will* be a greater risk of catching Kala-azar and Japanese Encephalitis.¹³⁷ A similar shift and the expansion of malarial transmission zones is also *likely* across Sri Lanka. The mountainous regions of South Asia are also particularly vulnerable to temperature increases and associated climate changes. High altitude populations that currently fall outside areas of stable endemic malaria transmission, and have therefore not been previously exposed, *may* be particularly vulnerable.

Water, whether too much or too little, *will* become a key factor, *possibly* a destabilising one, in South Asia over the period, with for example some 2.5 billion people likely to be affected by water stress and scarcity.¹³⁸ Water *will* increase in value in South Asia as access to it is more and more contested and demand increasingly outstrips supply. The increasing requirement for access to large quantities of water for industrial processing, *may* limit the growth of some South Asian economies. China especially *may* experience limitations in its economic growth by 2030 due to a shortage of water and is likely to increasingly pursue both desalination and water harvesting technologies, alongside bilateral arrangements with other states.¹³⁹ The increasing demand for water is also likely to heighten tensions over shared resources such as the Brahma-Putra Himalayan region and the River Indus.

South Asia will require sustained access to all forms of energy – hydrocarbon-based, renewable and nuclear. For the period out to 2020 however, most South Asian countries, especially China and India will predominantly pursue hydrocarbon-based fuel sources. This increasing demand for fossil fuels, combined with greater volatility in supply and the expected passing of the point of peak 'easy oil', *will* mean that oil prices will rise significantly out to 2040.¹⁴⁰ Rapid increases in price are *likely* to increase the viability of alternative fuel sources, such as tar sands, shale gas, coal and renewable technologies as well as nuclear energy, especially for India which has large thorium reserves. Thus, the increasing price of oil, which is *likely* to reach \$500 a barrel by 2040, *will* drive the

¹³⁷ Kala-azar or Leishmaniasis is a disease spread by the bite of the female sandfly. Japanese encephalitis is a disease caused by the mosquito-borne Japanese encephalitis virus.

¹³⁸ *Booming Middle-Class Diet May Stress Asia's Water Needs*. A (2009) study by the International Water Management Institute (IWMI) and the U.N. Food and Agriculture Organization (FAO) estimate that Asian demand for food and livestock fodder will double in 40 years.

<http://news.nationalgeographic.com/news/2009/08/090827-asian-water-crisis/>

¹³⁹ http://www.2030waterresourcesgroup.com/water_full/Charting_Our_Water_Future_Final.pdf.

¹⁴⁰ See *Global Strategic Trends out to 2040* for further discussion of peak 'easy oil'.



development of alternative fuel sources. Of the South Asian countries, China is *likely* to have the best access to oil, due to enduring bilateral agreements. China is also likely to exploit its significant coal reserves and *will* increasingly lead in the development of more efficient coal-based energy generation techniques.¹⁴¹

Agriculture is the mainstay of several economies in South Asia, the single largest contributor to GDP, and the largest source of employment in the region. Agricultural output *will* be adversely affected not only by changes in the overall amounts of rainfall, but also by shifts in the timing of the rains. Higher temperatures *will* also affect the crop cycle, leading to a lower yield per unit area, especially for wheat and paddy crops. Along with soil erosion, an increased number of pests and weeds *will* also adversely affect agricultural output. Nearly all of those who are either close to, or below, the poverty line *will* be disproportionately affected by changes in the monsoon cycle. As 60% of the cropped area is rain-fed, the economy of South Asia hinges critically on the predictable annual arrival of the monsoons.



Agriculture and water availability will be an increasing issue for South Asia out to 2040

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To meet the required targets to support continued economic growth, South Asian countries are *likely* to require large investment programmes in irrigation and significant improvements to rural infrastructure. China's long-term economic growth *may* be limited by resource constraints. If China's rate of oil consumption continues in line with the current trend, by 2030 it will consume the equivalent of the total output of today's entire global oil industry.¹⁴² China is already using its economic might to put in place enduring bilateral arrangements that seek to guarantee long-term access to resources and minerals.¹⁴³ It is also *likely* to pursue similar policies for the foreseeable future. India, however, has not yet developed similar long-term arrangements. Its rate of economic growth, therefore, *may* slow as resources increase in cost and decrease in availability.

China and India are *likely* to continue to perceive themselves as resilient to many of the impacts of climate change thanks to their large physical sizes, which yield regions of arable land of considerable size and diversity. Therefore, their policies will continue to

¹⁴¹ Estimates suggest that a barrel of oil costing \$500 in 2012, will cost approximately \$1200 assuming an inflation rate of 3% per year.

¹⁴² Wilton Park Conference 2010 – *China: Toward a Harmonious Society*.

¹⁴³ 'China is moving confidently into bilateral trade agreements with numerous countries, mainly in the Asia-Pacific region. It has so far sealed 15 free trade arrangements (FTA) including those with ASEAN (2002), Hong Kong (2002), Macau (2003), Thailand (2003), Niger (2005), Chile (2006), Pakistan (2006), New Zealand (2008), Peru (2008), Singapore (2008) and Costa Rica (2010). It is currently in FTA negotiations with Australia, Pakistan, the Southern Africa Customs Union, the Gulf Cooperation Council, Iceland, Norway, Switzerland and Taiwan. Further down the horizon there is talk of eventual negotiations with Japan, India, Mongolia and South Korea.' [Http://www.bilaterals.org/spip.php?rubrique118](http://www.bilaterals.org/spip.php?rubrique118).



focus primarily on economic growth, is unlikely to be to the complete detriment of sustainable development. However, the smaller South Asian states who are likely to be vulnerable to incidences of climate-related stress are likely to seek assistance. Pakistan for example, which is likely to be poorly placed to deal with the realities of a changing climate and the increased incidents of extreme weather events (such as the floods experienced in 2008, 2010 and 2011) is *likely* to seek support from China in particular. Alternatively, Bangladesh, which is also likely to be greatly affected by climate change, *will* primarily seek support from India. Other states, such as Nepal, Sri Lanka and Bhutan are *likely* to rely on a combination of support from both China and India.

Despite India's and China's stance on environmental issues, the localised affects of industrialisation will be increasingly felt. As such, sustainable development *will* become an increasingly important issue.^{144, 145} For example, in China there are significant issues with water supplies, due to industrial pollution of the Yangtze, Yellow, Pearl, and Song Hua Jiang River systems. Air pollution also continues to be an issue; of 113 major Chinese cities, one third do not meet minimal air quality.¹⁴⁶ Currently, the bulk of this pollution is from car exhausts. In 2008, there were an estimated fifty million cars in China and this number is set to increase exponentially across South Asia. Increased urbanisation *will* also generate a significant increase in solid waste. At present, Beijing generates 18,000 tonnes of solid waste every day. Often, they burn this waste but, at significant cost to the environment. The distribution of solid waste treatment areas around rapidly growing South Asian cities, especially within China, will endure as a source of internal tension and protest.¹⁴⁷

China and India will implement long-term environmental policies, but economic growth will remain the imperative. Recent Chinese 5-Year plans, for example, have focussed increasingly on the need for environmental governance, especially through using emission-charging systems, environmental taxes, and energy management and saving schemes.¹⁴⁸ Such schemes will be necessary from the present out to 2040. China is now the world's largest producer of greenhouse gases. At some point in the period, India will match emissions. To address energy intensity, and carbon emission targets for 2010 and 2020, a long-term change programme will be necessary across both Chinese and Indian industrial systems. At present, although there are significant conflicts between developed and developing countries with regard to emissions targets, it is mostly developed countries that are making the greatest reductions and implementing more effective policies to meet long-term targets.¹⁴⁹

Given the rapid industrial and urban growth being experienced across the region, South Asian economies do have the opportunity to respond to environmental concerns as they

¹⁴⁴ See *Global Strategic Trends out to 2040* for a greater discussion of the probability of a 2C rise in global temperature.

¹⁴⁵ In China, the 11th 5-Year Plan has shown significant focus on environmental targets, striving to achieve 10% reductions in SO₂ and CO₂ and a 20% reduction in energy use per unit GDP.

¹⁴⁶ *Clearing the Air*, The Economist 14 January 2012. <http://www.economist.com/node/21542826>.

¹⁴⁷ Wilton Park Conference 2010 – *China: Towards a 'Harmonious' Society*.

¹⁴⁸ *Ibid*.

¹⁴⁹ 'The *Climate Change Act* requires that greenhouse gas emissions are reduced by at least 80 per cent below base year levels by 2050 (equivalent to 155.6 MtCO₂e on the basis of the 2008 inventory)'. UK Greenhouse gas emissions: performance against emissions reduction targets, 2010 provisional figures, 29 July 2011, <http://www.decc.gov.uk/assets/decc/11/stats/climate-change/2351-uk-greenhouse-gas-emissions-performance.pdf>.



emerge. Eastern perception that climate change, especially the concept of ‘climate security’,¹⁵⁰ is a western creation aimed at stifling South Asian development however, *may* emerge. The perception of Western moral hypocrisy, especially regarding the long-term sustainability of the US-inspired ‘way of life’ that requires significant resources and generates high levels of waste, will be a key tension constraining how quickly South Asian countries embrace sustainable development. The expectation in the West that the emerging economies should also develop sustainable industrial growth is likely to be an enduring international tension. Emerging power will argue that they should be free to pursue the same benefits of industrial growth enjoyed historically by the West. The tensions surrounding climate negotiations such as Copenhagen and Kyoto are *likely* to remain, especially as each side within the argument demands significant change from the other.¹⁵¹

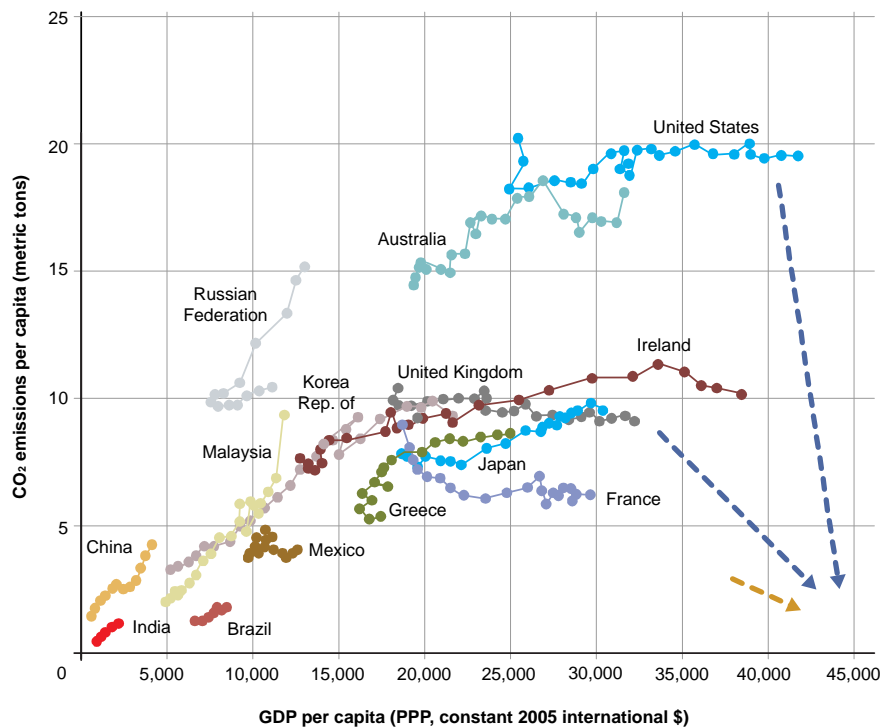


Figure 8 – Illustrates CO2 Emissions per capita

As emerging powers are likely to use the growth of the West as a template for their own further development, they are *likely* to look to the West (principally the US) to take their stance first, as was the case in Copenhagen. Figure 8 illustrates the tensions surrounding the debate. It illustrates how, at today’s level, the western powers have the highest levels of CO₂ emissions. Whatever arguments are presented on the international stage however, it is likely that the impacts of climate change will be felt more readily across South Asia than across the US and Europe. It is *likely*, therefore, that each South Asian nation will face challenges to moderate its industrial emissions while sustaining its population, and attempting to remain competitive to pursue significant economic growth.

¹⁵⁰ Climate security first arose after a UN Security Council debate on the impact of climate change on peace and security in 2007. It is a term used to describe the association of ‘Climate Change with Human Security’.

¹⁵¹ For example, the emerging powers are likely to continue to demand the moderation of western lifestyles, whilst the West demands sustainable development from emerging powers.



Nuclear proliferation

As the cost of fossil fuels rise, and the availability of 'easy oil' reduces, the region will inevitably turn to nuclear power as the immediate energy alternative. The potential revenue from an emerging South Asian nuclear industry is *likely* to be substantial and therefore attractive to many foreign investors. A rapidly expanding nuclear industry is *likely* to see corporations assuming liability for nuclear safety. In an attempt to make investments more attractive, India and China may not feel it necessary to fully comply with internationally recognised standards.^{152,153} Corporate concerns about assuming liability, will be offset by the prospect of huge markets. India will build multiple nuclear power stations to guarantee improved energy security. Pakistan will also continue to build up its civil nuclear power programme. Bangladesh is building Russian supplied reactors to give it greater energy independence. Myanmar is expected to also build Chinese-supplied reactors.

The spread of civil nuclear power installations will increase the amount of fissile material available in this region. While most states have genuine energy security issues, the ability to use spent fuel, or to develop technology for military use, is *likely* to be of significant concern regarding proliferation. In parallel, the presence of nuclear weapons will endure in the region throughout the period. China will maintain nuclear weapons to balance US capability. The US will retain its own capability because of the size of the Chinese arsenal. India will maintain its stockpile because of the constant risk of proliferation and the threat along its borders.

With about six times more thorium than uranium, for large-scale energy production, India has made using thorium a major goal in its nuclear power programme. The programme also uses pressurised heavy-water reactors, fast-breeder reactors and advanced heavy-water reactors. Thorium reactors, if used effectively and with appropriate safeguards, may be an alternative capability that could permit wide spread use of nuclear power without the increased risk of nuclear weapon proliferation.¹⁵⁴

¹⁵² Previous accidents in the South Asia region and recent global events have provided heightened consciousness of the risks associated with such technology and stimulated debate on who will bears that risk.

¹⁵³ 1984 Bhopal Union Carbide gas tragedy, 2010 Meltdown of nuclear reactors at Fukushima, Japan.

¹⁵⁴ 'Thorium is a naturally-occurring, slightly radioactive metal found in small amounts in most rocks and soils, where it is about three times more abundant than uranium. [Http://www.world-nuclear.org/info/inf62.html](http://www.world-nuclear.org/info/inf62.html)



Hot topic – Religion in South Asia

There is a diverse variety of religious beliefs practised across South Asia. All of the major world religions are represented, including Buddhism, Hinduism, Islam and Christianity. The dominant religion varies from country to country with many having internal issues due to tensions arising from different belief systems. For example, incidences of religious-inspired terrorism and inter-communal violence are likely to continue across Myanmar, India, Sri Lanka, Bangladesh and Pakistan.¹⁵⁵ Religious extremism is likely to endure in all these countries driven primarily by; inequality, economic crises and ethno-religious tensions.

In **Myanmar**, the Buddhist Sangha is the oldest surviving cultural institution and at present, the Buddhists constitute around 90% of the population.¹⁵⁶ Consequently, Buddhism is the most significant religion and Buddhist Sangha retain the moral authority to 'speak the truth' to those in power. Sangha criticisms have often led to incidences of protest and political violence against the current authorities, as seen in widespread rioting in 2009. Here, the perpetrators and victims of violent clashes were often Buddhist monks.¹⁵⁷ Internal tensions surrounding the introduction of secularism to the state are likely to endure as long as the Sangha occupies its current position in Burmese society. Conversely, the government may use the need to



In 2007, Buddhist monks marched in a street in protest against the military government in Yangon, Myanmar

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protect the purity of the Buddhist faith as a justification to force integration of minority groups of Christians, Animist hill tribes and other ethnic minorities to bring them under more effective state control. In addition, during times of insufficiency, such minority groups *may* be blamed for the country's problems, as seen historically in the Anti-Muslim riots in Mandalay in 1997 which prompted Muslim migration from Arakan to Bangladesh.

Buddhism is *likely* to remain as the most popular religion in **Sri Lanka** spanning a variety of ethnicities. These ethnic divides retain the potential for fuelling conflict. For example, currently, the Sri Lankan political structure is very closely aligned to Buddhist Nationalism, which may lead to instances of persecution and internal unrest if the political class serves the needs of one particular group over others.

¹⁵⁵ Cady and Simon, *Religion and Conflict in South and Southeast Asia. Disrupting Violence*, Routledge, 2007.

¹⁵⁶ The Burmese Sangha is predominantly Burman. It also recruits significant membership among ethnic minorities, including the Mon, Karen, Arakanese and Shan. Almost all ethnic Burmese, who make up 65-80% of the population, are Buddhist.

¹⁵⁷ *Monks' Protest Is Challenging Burmese Junta*, September 2007, <http://www.nytimes.com/2007/09/24/world/asia/24myanmar.html?pagewanted=all>.



In **Pakistan**, high levels of inequality are likely to lead to sustained support for religiously-motivated political movements, many with radical Islamic tendencies. Islam will endure as an ideology central to the country's governance. Internal factions and disputes within different Islamic groups, however, are *likely* to continue to generate significant internal tensions.¹⁵⁸ In such circumstances, different groups are *likely* to be driven into lawless areas, such as the tribal regions shared with Afghanistan. Such areas will enable the continued operation of radical Islamic groups who are likely to pursue terrorist activity both in Pakistan and internationally. Also, when current NATO operations in Afghanistan end, anti-Western sentiments which dominate current thinking in the region are likely to reduce. Subsequently, local grievances and ambitions are *likely* to resurface which, in turn, are *likely* to lead to a resurgence of domestically-inspired tensions within Pakistan. For further details, see Hot topic – *Pakistan and the UK*.

Bangladesh was created in 1971 as a secular state following a turbulent succession from Pakistan. Pakistan, therefore, is *likely* to continue to attempt to influence the country's ability to implement secular and democratic structures, although this is *likely* to diminish out to 2040. As with many other South Asian states however, Bangladesh is likely to experience tensions arising from the presence of significant ethnic minorities. In times of insufficiency and uncertainty, violence against smaller Hindu communities (as seen in the 2001 Legislative elections) *may* occur.

India, although committed to its founding principles of secular, democratic nationalism and the maintenance of a pluralist policy, is *likely* to maintain a high degree of ethno-religious diversity across its many states. However, as is the case with many other South Asian countries, during times of resource insufficiency and poor economic growth, cases of religiously defined violence are *likely* to occur. This *will* be further exacerbated by any incidences of weak government control which allows local political influence to be dictated by ethnicity, caste or religion, thus creating the conditions for bias against minority groups.

The capacity of many South Asia states to manage the diverse ethno-religious groups within their borders will be a critical factor in maintaining internal and regional stability out to 2040. The success with which conflict between different groups is managed will depend upon the effectiveness of government institutions. States which are able to implement fair and open systems of governance are *likely* to be the most successful in such endeavours. In states such as Myanmar and Pakistan, where religiously motivated internal instability is likely to endure, there will be a common trend where both the state and non-state actors' invoke religion as a justification for violence against other faith communities. Similarly, in such a context, limiting the political space available to minority religious groups will drive such groups underground and the formation of radical, extremist ideologies therefore is likely to increase. The opening up of particular nations through trade links, and the increased influence exerted by an increasingly tolerant and secular middle class, may lead to continued moderation regarding the treatment of ethnic minorities. Increased scrutiny from the media and public is also likely to expose incidences of poor governance and corruption and so further limit the scope for mistreatment of minority communities.

¹⁵⁸ For example, the growth of Sunni-based Islamism in Pakistan and existing tensions are likely to become aggravated between Sunni and minority Shia communities.



Hot topic – Trends in social protest

The incidence and reporting of protests across South Asia are *likely* to increase. India and Bangladesh, with free press and accountable government are likely to regard protest as part of the fabric of a democracy. Countries with authoritarian regimes, state-controlled media and only fledgling legal systems however are *likely* to be less tolerant. They may experience, therefore, significant tensions as the possible scale and frequency of protests increases.

China *will* continue to experience increased incidences of internal protest as it moves towards a more liberal democracy. Trends show that the incidence of internal protests have increased significantly over the past 20 years, with better access to information and communication technology making it easier for protests to be both coordinated and reported without censorship by the governing party. Figure 9 shows the rise in incidents of protest in China post the Tiananmen Square massacre of 1989.

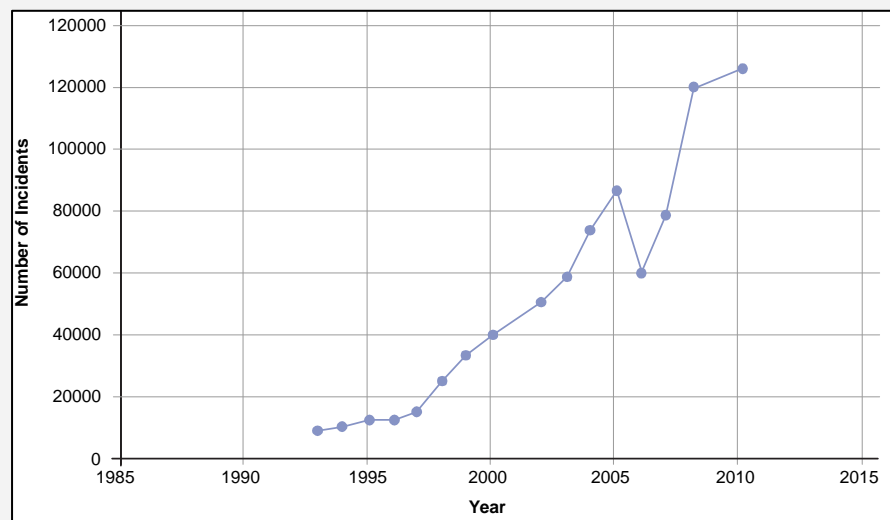


Figure 9 – The rise in incidents of protest in China post the Tiananmen Square massacre of 1989

The majority of recent protests have centred on single-issues, for example the treatment of a particular class or group. Regular protests have occurred in rural areas for example, due to the forced relocation of farmers and rural workers,¹⁵⁹ or sometimes in response to environmental concerns.¹⁶⁰ Knowledge and awareness of such protests is *likely* to lead to further demonstrations around the country in an attempt to address similar issues.

¹⁵⁹ On 05 May 2010 at least 1000 people protest in Jiangxi province, in response to the local officials allegedly banning members of Dongxia Village from going to Beijing to protest against forced relocations. [Http://www.theepochtimes.com/n2/china/top-ten-china-mass-protests-of-2010-48458.html](http://www.theepochtimes.com/n2/china/top-ten-china-mass-protests-of-2010-48458.html).

¹⁶⁰ On 31 August 2009 a protest of an estimated 10,000 people took place against a polluting tannery and oil refinery in Fengwei, Fujian province.



In particular, protests regarding issues of worker rights against particular companies, both Chinese and multinational, *may* increase, as these are likely to be perceived to be less threatening to CCP authority. So, they can provide a useful pressure-valve for frustrations without the position of the Party being challenged.¹⁶¹ The perception of inequality and limited rights among many ethnic minorities is likely to endure as a cause of internal protest and unrest. Many of the protests and riots seen across China have been due to issues surrounding unfair treatment of different ethnicities. The largest ethnic group, the Han, according to a 2005 sampling, constitute about 91.9% of the total population. The next largest ethnic groups, in terms of population, include the Zhuang at 18 million (M), the Manchu at 10.7M, the Hui at 10.0M, the Miao at 9.0M, the Uyghur at 11.3M, the Yi at 7.8Million, the Tujia at 8.0Million, the Mongols at 5.8Million, the Tibetans at 5.4Million, the Buyei at 3.0M, the Yao at 3.1M, and the Koreans at 2.5M.¹⁶² In recent years, Hui Muslims have clashed with Han Chinese in Yanjin,¹⁶³ Uyghers have clashed with Han Chinese in Shaoguan,¹⁶⁴ followed by greater rioting in Xinjiang.¹⁶⁵ Recently, ethnic Mongolians have clashed with Han Chinese in Shulun Huh Banner country.¹⁶⁶

Controlling the media and suppressing selective information (such as historical references to Tiananmen Square and the status of numerous political dissidents) creates an environment in which government communications are mistrusted, especially by ethnic minorities and lower class workers who feel increasingly disenfranchised from the state. Rumours and speculation can spread rapidly via increasingly abundant ICT. This enables interest groups to mobilise more quickly. Due to the high population densities in most Chinese cities however, word-of-mouth *will* still prove at least as effective. The combination of increased ICT access, and word-of-mouth will lead to an increase in mass mobilisation regarding issues such as perceived injustice, corruption and worker rights.

Perhaps China's largest challenge to transforming itself into a global power, *will* be internally transforming and gradual relaxing the CCP's capacity to censor information. China will increasingly face protests based on single issues and is *likely* to respond in a relatively benign manner, implementing long-term policies of social reform and welfare to achieve social stability. For example, the recent attempts to address the Hukuo systems and the response to the Shizuan earthquakes.¹⁶⁷ When an alternative political or religious ideology, such as the formation of a new democratic party, challenges the CCP's ruling power, it will be aggressively suppressed by force. A key question for China over the next thirty years is whether (or not) the CCP will be able to surrender its current level of control to allow the creation of independent systems of law and a liberalised economy.

¹⁶¹ *Rotten apple - worldwide protests against IT giant's labour abuses.*

<http://chinaworker.info/en/content/news/1451/>.

¹⁶² http://en.wikipedia.org/wiki/Ethnic_minorities_in_China

¹⁶³ Riots have been reported since 2000, with further riots in Henan in 10/2004.

<http://www.usc.edu/dept/LAS/ir/calis/pdf/0194.pdf>, <http://www.freerepublic.com/focus/f-news/1890827/posts>,

<http://www.bangladesh.com/forums/religion/3724-chinese-police-fire-muslims.html>.

¹⁶⁴ <http://www.guardian.co.uk/world/2009/jul/10/china-riots-uyghurs-han-urumqi>.

¹⁶⁵ <http://www.rfa.org/english/news/uyghur/newprotests-09032009122558.html>,

<http://english.aljazeera.net/news/asia-pacific/2009/09/2009954184928330.html>.

¹⁶⁶ <http://www.atimes.com/atimes/China/MF08Ad01.html>.

¹⁶⁷ The Hukuo system is China's traditional house registration system that effectively affords different social, economic and political rights between urban and rural workers.



Part 2 Key trends and drivers



Incidents of protest in South Asia are likely to increase, especially around issues of worker rights

The section details the underlying trends and drivers. It summarises the evidence upon which they are based. It is intended to be used as a reference section.



Social dimension

Scope

We have conducted horizon scanning within the social dimension that has identified the following significant trends in:

- demographics
- identity
- migration
- class/caste.

In this section, we consider the drivers of social change and their impact on South Asia.

The Hot topic is: **Urbanisation.**

Trends and drivers

Changing demographics. The global population is *likely* to grow from 6.9 billion in 2010 to 8.9 billion by 2040.¹⁶⁸ South Asia and Sub-Saharan Africa *will* account for most of the global population growth over the period. Within South Asia, the bulk of the population growth is likely to occur in Bangladesh, India and Pakistan, as is illustrated in figure 10 below. As well as high levels of population growth, India and Pakistan are likely to have the youngest populations in the region. This contrasts greatly with China, which is *likely* to show a very small level of population growth and a significant rise in the median age of its population.

Country	Median Age (Years)		Population (Millions)		% Population Growth from 2010 - 2040
	2010	2040	2010	2040	
Bangladesh	24.2	37.3	148.69	190.90	28.39
Bhutan	24.6	37.8	0.73	0.94	28.77
China	34.5	46.4	1341.33	1360.91	1.46
India	25.1	34.3	1224.61	1627.03	32.86
Maldives	24.6	43.5	0.32	0.40	25.00
Myanmar	28.2	39.4	47.96	55.41	15.53
Pakistan	21.7	31.3	173.60	257.78	48.49
Sri Lanka	30.7	38.7	20.86	23.43	12.32

Figure 10 shows how India and Pakistan will have both low median ages and large populations in 2040

¹⁶⁸ World Population Prospects 2010 Revision, medium variant.



Demographics and economic growth. Currently, Chinese economic growth is reaping the benefits of the one-child policy which has created a ‘demographic dividend’ for cheap labour.¹⁶⁹ This dividend however is *likely* to peak by 2015 when the working age population that has sustained China’s economic boom starts to reach retirement age. Thus, from 2015 out to 2040, China will need to undertake significant social support and welfare initiatives to support the population that drove its economic prosperity. The rapid decline in the average size of a Chinese family caused by the one-child policy creates a significant societal burden-of-care which traditionally was met through extensive family networks. Now, increasingly, it places additional demands upon the state. China will need to invest internally to meet the societal expectations and domestic resource demands of the future. In parallel, India *may* enjoy a ‘demographic dividend’ due to its large and young population and lowered average family size. However, significant internal reforms regarding welfare, high levels of inequality and improved access to education, will be required to translate this into an economic advantage by 2050. Figures 11 and 12 provide projections on likely age profiles for both the Indian and Chinese populations out to 2100.

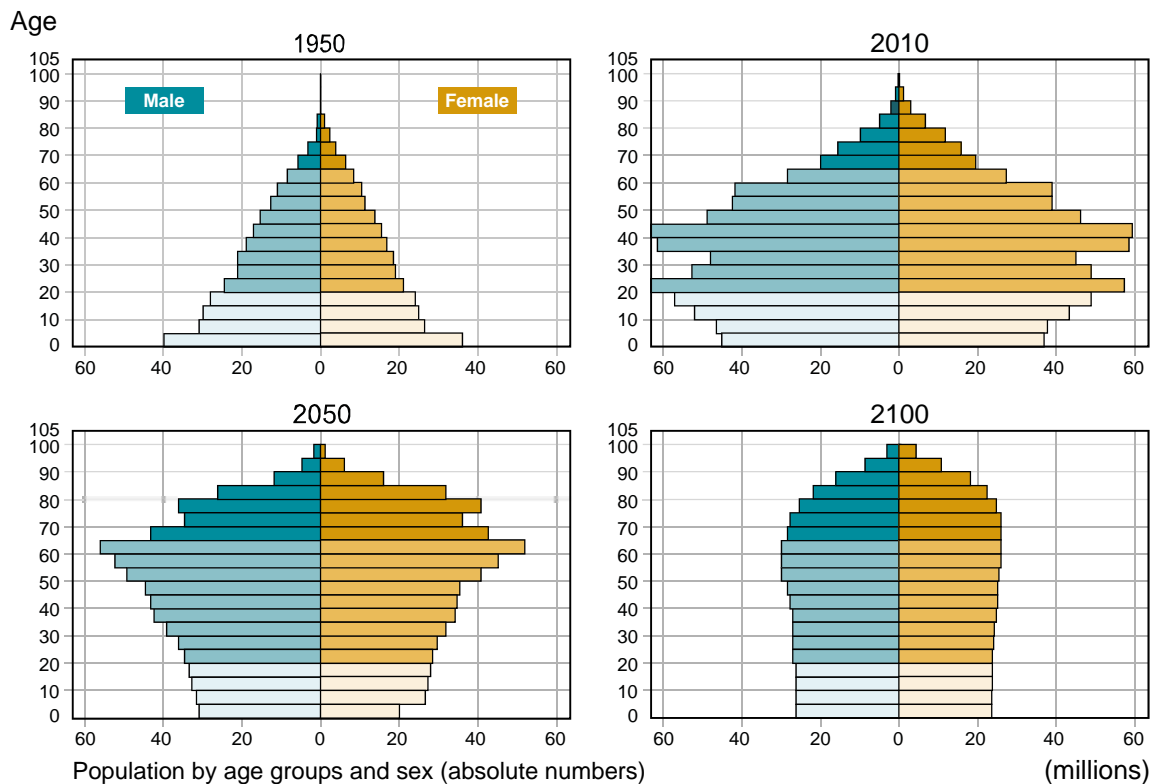


Figure 11 – Population projections for China out to 2100¹⁷⁰

¹⁶⁹ A demographic dividend is experienced when a state experiences a combination of falling birth-rate coupled with increased longevity which together can lead to growing workforce and a reduced dependency ratio.

¹⁷⁰ UN Population Prospects Database, 2010 Revision.



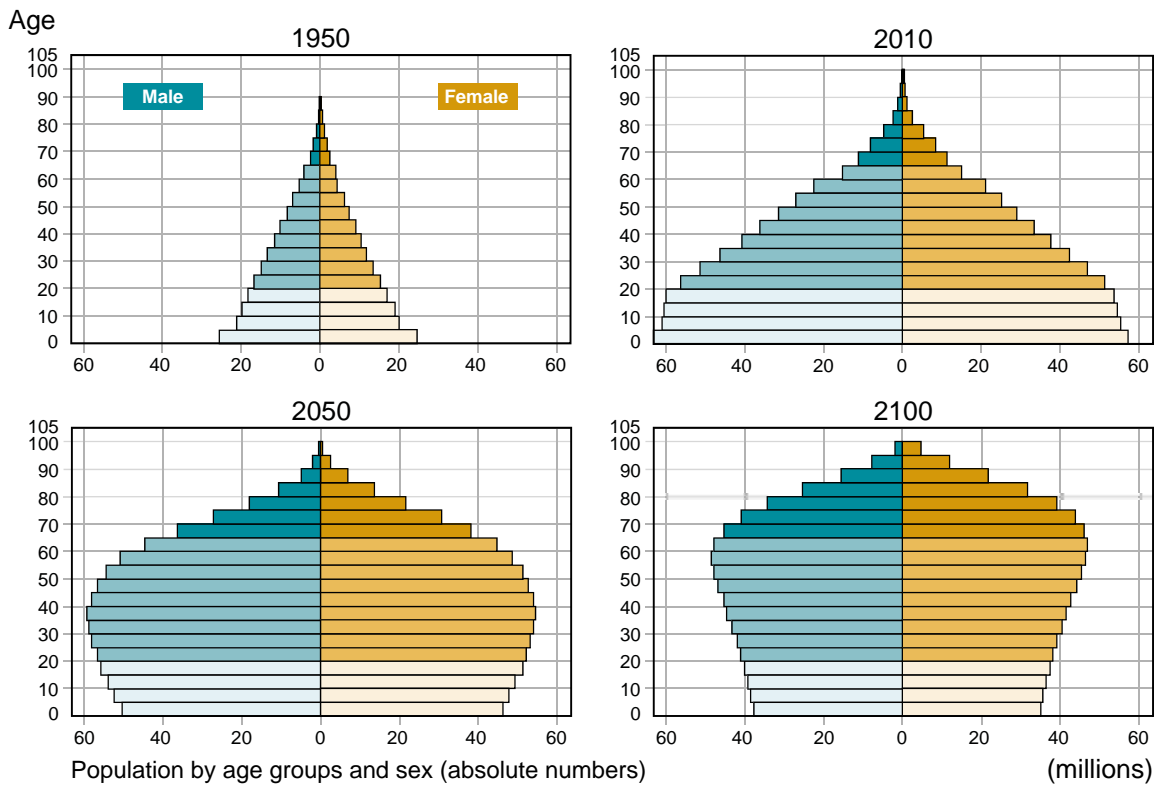


Figure 12 – Population projections for India out to 2100¹⁷¹

Social support in South Asia. At present many social groupings and support networks, across South Asia, are based on family, ethnicity and caste. As subsequent generations lead more independent lifestyles, based on new forms of employment and have smaller families, such traditional forms of welfare provision are *likely* to deteriorate. Thus, as with China, many South Asian economies will incur new costs as family and community based systems of welfare decline.

Skewed gender ratios in India and China. In China, as a consequence of the one-child policy and a cultural preference for boys, many regions have shown greater proportions of male births. The nationwide gender ratio rose from 108 male births to 100 female, to 124 in the 2000-2004 period.¹⁷² In China's under-20 age group there are almost 33 million more males than females. However, present trends suggest that China's gender ratios have stabilised whilst India's continues to widen, where in 2011 there were 914 girls under six to every 1000 boys. This imbalance has been more strongly seen in the richer states – including Punjab, Haryana and Gujarat, where screening is available to wealthier, middle class parents who select for male foetuses. If such ratios endure, 600,000 'missing' baby girls in 2011 will translate to 10 million missing brides in 18 years time.¹⁷³ It is *likely* however, that population monitoring as a policy response to the 2011 census will reduce this trend, mitigating its impact to some extent over the next 30 years.

¹⁷¹ *Ibid.*

¹⁷² *British Medical Journal* 2009, 338, b1211.

¹⁷³ *The Economist, Add Sugar and Spice; Gendercide in India*, 9 April 2011.



Education and training in India. Without access to education and better skills training, the younger Indian populace *may* become a huge liability if millions of uneducated young people are unable to attain employment. Provided the necessary educational policies are implemented, (through policies such as the 'Right to Education Act' 2009), a high level of education within the populace is *likely* to convey advantages to the economy. Figure 13 below provides a projection for the number of tertiary educated individuals in 2030, which along with the high level of English speakers and a close association with the US, is *likely* to mean that India can more quickly configure and adapt to be part of the knowledge based global economy over the next 30 years.

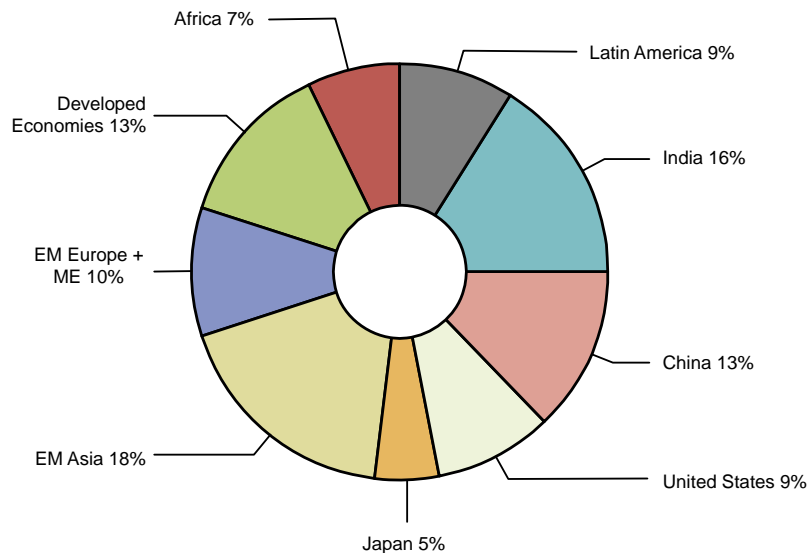


Figure 13 – Projected distribution of the global tertiary educated population in 2030.

Changing norms of the leading classes. In China, the selection of the next generation of Chinese leaders was done in 2007 by 450 high ranking officials. This represented a marked contrast to the selection of previous leaders which was conducted in secret by the three most powerful party members. Such trends for 'intra-party democracy' *may* lead to significant generational change in the Chinese governing elite. By 2027 Communist Chinese leadership will be in its 6th Generation.¹⁷⁴ Such leaders may have studied abroad and have a less technocratic outlook along with an awareness of international law and the importance of foreign policy. Such a generation *may* be more visionary and push more strongly to make attempts to reconfigure the political landscape. By 2040, Chinese leadership will be in the 8th Generation; such leaders are likely to be born in the 1980s and *may* be more inclined to establish Deng Xiaoping's objective of having a democracy one hundred years after the revolution. India and other South Asian nations may undergo similar, but less pronounced changes, also due to more of its leaders being globally aware and having an increased awareness of legal, economic and political disciplines in contrast to the technocratic leaders often seen today.

¹⁷⁴ This is based on the assumption that 5th generation leaders will step back from 2022 onwards.



Increased interconnectivity. Greater connectivity in South Asia, brought about by technology, deregulation, globalisation, low-cost travel and migration, *will* change how people live, work and think. Internet access and mobile telephone use is *likely* to double every decade – information overload (too much, too fast) *may* trigger disproportionate responses to rumours and drive policy changes – See ‘A History of Protest’ in China for further details. Increased access to information, however, *will* make government censorship increasingly difficult. This trend, coupled with the increasing significance of the rule of law, is *likely* to lead to greater transparency which may in turn, result in clearer responsibility and accountability.

South Asian diaspora. South Asia and the West will maintain extensive cultural linkages. Large South Asia diaspora populations *will* be sustained within the UK. Projections suggest that by 2051, the UK is *likely* to have 2.8 million citizens of Indian origin, 2.3 million of Pakistani, 0.76 million from Bangladesh and 1.1 million from China.¹⁷⁵ Such communities will be reflected in many other western countries and have significant influence in both trade and policy spheres. Any tensions along ethnic or caste/class based lines that occur in South Asian countries, *may* be mirrored amongst the diaspora populations abroad. Out to 2040, networks of diaspora *will* increasingly form in other emerging economies, leading to new cultural linkages around the world.



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Over 2000 people were present to attend the Hindu festival of colour - March 2012, in Twickenham, London

¹⁷⁵ Research undertaken by the University of Leeds, based on 2008-based National Population Projections (NPP TREND-EF) suggest that the UK population could grow to 77.7 million by 2051 with the following South Asian ethnic minorities showing growth: Indian (2011 - 2.26% of Total Pop, 2051 - 3.68%) Pakistani (2011 - 1.64%, 2051 - 2.98%), Chinese (2011 - 0.67%, 2051 - 1.39%) and Bangladeshi (2011 - 0.59%, 2051 - 0.97%). http://www.geog.leeds.ac.uk/fileadmin/downloads/school/research/projects/migrants/WP_ETH_POP_PROJECTIONS.pdf



Strategic shock – Attack on Chinese nationals overseas

Out to 2040, the number of Chinese national overseas is likely to increase, as Chinese companies provide overseas resource and production projects. Such populations are likely to be based in secure compounds with limited integration into their host nations. Should conflict arise that affect such groups, possibly driven by issues of worker rights between the Chinese and native workers, Beijing could respond militarily, seeking to protect its overseas citizens. This could lead to significant international tensions.

Growth of the middle class. The middle class *will* expand across South Asia.¹⁷⁶ This class is *likely* to demand more services and resources, oppose corruption and have a more globalised outlook. Such a class *may* impact on the culture of both businesses and government organisations as they demand systems that select for merit and achievement as opposed to class and family. This cultural change is *likely* to increase the demand for transparency and the development of regulatory processes which reduce corruption. The growth of the middle class and the greater opportunities afforded across society *will* further sustain employment and migration.

Inequality and poverty. In 2040, China, India, Pakistan and Bangladesh combined are *likely* to contribute around 40% of the world's population. With the exception of China, each of these countries will experience extensive population growth over the next 30 years requiring increasing and continued access to food, fuel and energy, all of which will need to be financed by continued economic growth. Any disruption to supply chains or stalled growth is *likely* to be felt across their populations, most



Large numbers of people in South Asia will continue to live in poverty out to 2040

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keenly among the poor. Due to the structure of many South Asian societies and their economies, the large numbers of people living in poverty is likely to continue over the period and may lead to periods of unrest or instability. It is estimated that in 2040 approximately one billion people living in South Asia *will* be in poverty.

¹⁷⁶ Some models suggests that the size of the global middle class will increase from 1.8 billion people in 2009 to 3.2 billion in 2020 and 4.9 billion by 2030, with Asia accounting for 85% of the growth. *Middle Class Size in the Past, Present, and Future: A Description of Trends in Asia*, Asian Development Bank.



Hot topic – Urbanisation in South Asia

Urbanisation *will* endure as a primary driver of economic growth for all South Asian countries. People *will* continue to migrate from rural hinterlands to urban environments for a wide variety of reasons, but the pursuit of economic opportunity *will* remain the most significant cause. Such movement *will* continue to provide an important source of labour as the bulk of this migration will consist of unskilled labourers who will be employed in manufacturing areas.

Many South Asian economies, especially China, are dependant on sustained rural-urban migration and this movement of people *may* define the upper limit for Chinese growth. At present, continued urbanisation in China means there are 12-15 million people moving into urban areas each year. Such populations provide important sources of cheap labour which have underpinned the Chinese rise as the 'workshop of the world'. China will seek to pursue this strategy until at least 2020 while it attempts to reconfigure its economy to be more reliant on services. At present, policies to relax the one-child policy in rural areas are being implemented. These may sustain the level of rural-urban migration for a longer period.¹⁷⁷

South Asia contains eight of the world's 25 largest cities - see Figure 14. This number *will* increase out to 2040 due to the natural increase of existing populations and continued rural migration. Along with these trends, many urban regions *will* coalesce, to form major urban belts and the process of peri-urbanisation will absorb the areas surrounding cities, increasing their size and complexity.

Both urban sprawl and urban density will remain concerns throughout the period. Without resilient forms of urban planning and development, a large component of the urbanisation experienced across South Asia is *likely* to be subject to poor infrastructure provision. It is also *likely* that the scale and pace of rural migration will also be unplanned and unregulated, with large numbers of new migrants finding housing in slum areas that have poor infrastructure and are often unsuitable for human habitation. Such areas are also likely to be the least resilient to climatic disturbances, such as storms, flooding and coastal inundation.

Similarly, the pace and the size of city development across South Asia *will* lead to a network of interconnected, densely populated cities far in excess of anything seen today. At present, the complexity of urban development across Japan would offer the closest comparison, but is likely to be a magnitude of scale smaller than the South Asian urban network in 2040. Such huge urban areas increase the risk and impact of widespread failures in key services, especially when based on complex logistic supply chains for

¹⁷⁷ Province wants relaxation of China's one-child policy, <http://www.bbc.co.uk/news/world-asia-pacific-14112066>.



food, water and energy. The exponential increase in complexity caused by the continued growth of cities and the formation of global networks *will* increase the risks associated with systems failure. Such physical complexity is *likely* to make dealing with humanitarian crises in such environments a particular challenge.

Rank	Megacity	Country	Pop (Millions)	Annual Growth (%)
1	Tokyo	Japan	34.2	0.6
2	Guangzhou	China	24.9	4
3	Seoul	South Korea	24.5	1.4
4	Delhi	India	23.9	4.6
5	Mumbai	India	23.3	2.9
6	Mexico City	Mexico	22.8	2
7	New York City	US	22.2	0.3
8	Sao Paulo	Brazil	20.8	1.4
9	Manila	Philippines	20.1	2.5
10	Shanghai	China	18.8	2.2
11	Jakarta	Indonesia	18.7	2
12	Los Angeles	US	17.9	1.1
13	Osaka	Japan	16.8	0.15
14	Karachi	Pakistan	16.7	4.9
15	Kolkata	India	16.6	2
16	Cairo	Egypt	15.3	2.6
17=	Buenos Aires	Argentina	14.8	1
17=	Moscow	Russia	14.8	0.2
19	Dhaka	Bangladesh	14	4.1
20	Beijing	China	13.9	2.7

Figure 14 – Table ranking megacities by population size and rate of annual growth



The emergence of the city as the new living space for the majority of the South Asian populace *may* offer a number of positive developments. Despite the immediate problems of housing new arrivals, migrants are *likely* to have greater opportunities for better health, welfare, food and technology access. The containment of large numbers of people in a relatively small area provides an opportunity for more efficient, greener cities as food supply becomes based on urban and peri-urban agriculture.¹⁷⁸ Increasingly sophisticated 'energy harvesting' techniques can also be used to take advantage of the abundance of available energy in the city space.

The process of urban and peri-urban agriculture will increasingly be used to allow cities to achieve self-sufficiency for some foodstuffs.^{179,180} Such a concept is *likely* to grow significantly across South Asia due to the 'value-added' by such production mechanisms, the promotion of the 'garden city' concept and the continued emergence of community gardens and rooftop planting. Schemes in Shanghai, Beijing and Dakhar have shown how urban farming can contribute to poverty reduction, greater food security and improved nutrition. Countries like Singapore have made significant strides in developing this form of agriculture and led the development of innovative agricultural technologies such as 'aeroponics',¹⁸¹ fish breeding, city gardens and agrotech¹⁸² parks. This has provided a template which is *likely* to be emulated by many South Asian countries as they develop.

Urbanisation is also *likely* to have a number of positive social developments. For example, in China, rural migration has been occurring since the 1990's and up until 2009, the precise numbers of rural/urban migrants were not regulated. In 2009, Beijing created the Ministry of Human Resources and Social Security to regulate such migration and has recently estimated that there are around 135 million urban migrants in the larger cities, and 500 million in smaller towns. With such a large proportion of its 'rural' populace living in such areas there is *likely* to be considerable demand to reform systems of caste, ethnicity or race which limit employment opportunities for particular groups. At present, for example, significant changes are being made to the Chinese Hukou system.¹⁸³ Protests by migrant communities seeking to address single-issue grievances, such as employment or housing standards, are *likely* to increase across South Asia.

¹⁷⁸ The process of urban and peri-urban agriculture is increasingly being used to allow cities to achieve self-sufficiency for some foodstuffs.

¹⁷⁹ Paul Teng, Margarita Escaler and Mely Caballero-Anthony, *Urban Food Security: Feeding Tomorrow's cities*, Significance, June 2011.

¹⁸⁰ Urban and peri-urban agriculture uses features of the 'urban ecosystem' to grow plants and raise animals within and around cities, using urban residents as labourers and urban resources (such as waste water and organic waste for compost) as inputs. An estimated 800 million people currently contribute to urban agriculture, of these 200 million produce for the market and 150 million work full-time.

¹⁸¹ Aeroponics describes a technique for growing plants without soil or hydroponic systems, through which plant roots are constantly exposed to nutrient-laden water.

¹⁸² Agrotechnology describes the development of commercial ventures, often using biotechnological processes, to research and develop agricultural systems.

¹⁸³ 'A Hukou refers to the system of 'class system' residency permits which dates back to ancient China, where household registration is required by law in People's Republic of China (China) and Republic of China (Taiwan). A household registration record officially identifies a person as a resident of an area and includes identifying information such as name, parents, spouse, and date of birth
http://en.wikipedia.org/wiki/Hukou_system.



Economic dimension

Scope

The next 30 years will see South Asia become increasingly significant within the global economy. The economic dimension will be shaped by:

- resource prices
- South Asian consumer demand
- protection of intellectual property
- economic intimidation and demographic changes in South Asia.

The Hot topic is: **The Renminbi as the global reserve currency.**

Trends and drivers

Chinese economic growth rate and resource dependency. The increasing significance of climate change and the need to grow sustainably has led China to commit to a 20% energy-intensity reduction target. It will seek to achieve such a reduction by slowing down its GDP growth rate without damaging long-term economic prospects.¹⁸⁴ Due to its high strategic reserves of coal however, China *will* have to invest heavily to develop carbon capture and clean coal technologies if it is to achieve this.¹⁸⁵ At present, China is developing joint ventures with multinational corporations such as British Petroleum to improve carbon capture and storage technologies.

Rising resource prices. Currently the global demand for minerals increases at around 3.5% per annum, representing a potential doubling of demand over the past 20 years. Projections suggest that the world will use more copper in the next 25 years than it did in the last 10,000.¹⁸⁶ Industrial growth across South Asia will be a significant factor that will drive rising prices. To meet rapidly expanding consumer and industrial demands, China and many other countries, are investing heavily in renewable energy generation techniques to reduce the cost of, and dependency on, increasingly expensive traditional fuel sources. Research into wind, water and solar energy schemes across the region is also being pursued. The pursuit of new technologies *may* also drive the formation of new resource price bubbles. As new technologies demand new strategic minerals, such as selenium in solar cells, prices will rise, making currently affordable energy sources increasingly expensive.

¹⁸⁴ China's Premier: Wen Jiabao in 2010.

¹⁸⁵ China accounted for about 46% of global coal consumption in 2009 and consumes a similar share of the world's zinc and aluminium. Also China accounts for some 68% of the global iron ore trade and is a leading consumer of copper, aluminium and nickel.

¹⁸⁶ Wilton Park Conference 2010 – *China: Towards a 'Harmonious' Society.*



International support of the Chinese economy. If the Chinese economy does falter over the next 30 years, it *may* receive lower levels of international assistance than previously given to other nations. Possible reasons for this reluctance may include: the sheer size of the Chinese economy; the desire to link financial assistance to progress on issues such as human rights and free speech; and a perception of China as a military threat. Even given these considerations, it is *likely* that the Chinese economy will be simply too big and too integrated into the globalised system for the wider international community to allow it to fail.

Strategic shock – The US defaults on Chinese debts

Should the credit rating of the US continue to decline and the twin impacts of rising resource prices and the equalisation of global GDP levels directly challenge the national way of life, it could become in the US national interest to default on its debt to China. Indeed, if tensions should arise between the two powers, the US could pursue this as a strategy to weaken the Chinese currency.

The influence of large South Asia markets. Allied to improved industry standards and governance legislation, China and India *will* use their large domestic consumer bases to secure access to innovative products and technologies and therefore reduce dependence on foreign innovation.¹⁸⁷ In China, the absence of a suitably innovative manufacturing base *will*, at least in the short-term, perpetuate a reliance on imported components.

Economic intimidation. At present, the size of China's foreign reserves, combined with projections for strong economic growth over the next ten years, gives China significant influence within international financial markets. In particular, China's foreign reserves give it the power to disrupt the markets for US-treasuries and euro-dominated debt. Although it is unlikely that China would wish to cause instability in the global system, due to its many investments and the importance of the global economy to its continued economic growth, it is *possible* that it would use its economic strength to garner greater geopolitical influence. However, the amount of foreign reserves China holds are likely to reduce post-2020 if China successfully liberalises its economy and its future relies more on domestic consumption for growth.

Long term Chinese economic resilience. Assuming the Renminbi becomes a free-floating exchange currency, existing global financial markets could actively challenge the strength of the Chinese economy. In such circumstances, the managed Chinese economy is *unlikely* to cope with a run on the Renminbi and it has no track record to predict how it might cope in times of recession. China's future internal stability depends upon sustained economic growth. Therefore, China's ability to develop a system of sufficient economic resilience to cope with such an event will be an enduring challenge out to 2040.

¹⁸⁷ Consumer Champion, *Special report technology in India and China*, Economist, 08 November 2007.



Counterfeiting and the guarantee of intellectual property rights. By 2040, the global knowledge-based economy will be of key importance. Increased access to globalised communications and the advance of 3d-printing technology will increase the value of ideas. Blue prints, patents and formulas *will* be increasingly seen as the foundations of wealth generation and therefore, the protection of such assets will be increasingly valued. Many South Asian countries are *likely* to have established networks of counterfeiters supported by extensive industrial infrastructure who are able to take advantage of lax or absent regulation. These operations will grow in sophistication out to 2040, and will probably originate in the smaller, authoritarian South Asian states such as Myanmar and Pakistan. The larger states, such as India and China, are *likely* to attempt to implement their own systems of intellectual property protection to both safeguard their own industries and attract foreign investment.



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The counterfeiting of internationally distributed products is likely to be an enduring security issue

Strategic shock – A virtual reserve currency

Due to tensions in the global system financial markets regarding trading in a currency from an emerging power, such as the Renminbi or the Rupee, a new virtual currency is chosen as a global alternative, reflecting the level of trading done virtually and the role of cyberspace in the coordination of all global trades. Such a currency could be more closely linked to a global regulatory authority, such as the International Monetary Fund, reducing the chances of selected competitive benefit being conveyed to whoever holds the 'strongest' global currency.



Hot topic – The Renminbi as a Reserve Currency

By 2040, should current trends continue, it is *likely* that the Chinese Renminbi will be an international unit of account, a medium of exchange and a store of value. Such capital-account convertibility would be advantageous to the Chinese economy in the long term as it would increase the influence of China within international financial institutions and strengthen the resilience of its currency. If the Renminbi were to become a viable reserve currency, it is *likely* that Shanghai would become a major financial centre akin to New York or London allowing Chinese financial institutions to compete internationally.¹⁸⁸ Other Chinese financial hubs *may* appear, such as Hong Kong, which could enjoy greater financial freedoms; benefitting from its geographic location and potentially more relaxed levels of financial control from Beijing.

Currently, the Chinese economy benefits from currency restrictions which strictly control capital flows.¹⁸⁹ If these were relaxed before 2020, Chinese capital would be *likely* to flow, both more freely within the country and increasingly overseas as global market forces encourage the pursuit of investments that offer the highest returns. As such, cheap capital readily available at present for domestic businesses, which has been a key driver of Chinese growth, could disappear as investors pursue opportunities overseas. Higher capital costs and stiffer competition would hurt export-dependent businesses in China. In turn, this is *likely* to lead to economic disruption and a relatively weaker economy. Similarly, free capital flows would create big agglomerations of economic power that could act increasingly to counter-balance the power of the CCP. These factors suggest that the currency convertibility of the Renminbi is unlikely while China is currently configured as a manufacturing-based economy. The following reasons also limit Chinese pursuit of the Renminbi as the world reserve currency before 2020.

*Chinese investment abroad is further limited by the allure of better opportunities in the domestic market. The Chinese economy has grown so rapidly compared to others that it requires an unusual impetus for Chinese companies to invest elsewhere. Moreover, since English remains the international language of business and finance, the Chinese feel much more comfortable at home. They also believe that the Renminbi is destined to strengthen against the other major currencies, which would impair returns on non-Chinese investments.*¹⁹⁰

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Beyond 2020 however, as China seeks greater integration into the global system to continue its economic growth and shift its economy towards a more service-based pattern of industry, the likelihood of currency restrictions being lifted increases. In such a context, it is possible that China will favour the Renminbi becoming the global reserve currency. As outlined, there are likely to be a number of challenges that will need to be overcome.

¹⁸⁸ Ken Miller, *Coping with China's Financial Power*, Foreign Affairs, July/August 2010, p. 108.

¹⁸⁹ However, these restrictions do cause other issues such as limiting the purchasing power of Chinese consumers.

¹⁹⁰ Ken Miller, *Op.Cit.*, p.108.



Science and technology dimension

Scope

Developments in the science and technology dimension will be dominated by three issues:

- generation and protection of new ideas
- global interconnectivity and the protection of linkages
- development of emerging technologies.

This section considers the drivers of scientific and technical change, and their impact on South Asia.

The Hot topic is: **the battle for ideas**.

Trends and drivers

The rise of the South Asian giants. Technological advances by China and India *will* serve to increase South Asian confidence to compete in high-tech markets long dominated by the US, Europe and Japan. In particular, India and China aim to achieve technological parity with the western world and *possibly* exceed it in some niche areas. Currently, many South Asian economies play a subsidiary role within high-tech industry. For example, supplying talent, cheap manufacturing facilities, as well as customising and servicing.¹⁹¹ Increasingly, Asian technological capability *will* transition away from counterfeiting and imitation to genuine indigenous innovation assisted by foreign corporations increasingly basing their research and development in South Asian countries.¹⁹² China *will* continue to trade access to its' domestic market for reasons of technology transfer, while India *will* push for knowledge export via industrial science parks. Skill shortages in science and engineering in the West *will* also drive research and development offshore to South Asia.

Transfer and extraction of knowledge and critical technologies. China and India *will* strive to establish internationally competitive technology sectors, pushing particularly for military equipment to be indigenously designed and produced. A viable alternative route to accelerating the development of their industries *will* be through leveraging cutting-edge technology transfer either through foreign direct investment for collaborative research and development. This is also likely to include acquiring foreign equipment to bridge knowledge or capability gaps. Acquiring foreign civil and, more importantly, defence equipment embedded with critical technologies *will* be part of routine trading arrangements. Legislation *will* demand foreign acquisitions incorporate indigenous components and provide domestic production and/or assembly. This *will* encourage technology transfers through passive acquisition and, in turn, reduce dependency on foreign suppliers for select components.

¹⁹¹ *Technology in Asia: Howling at the Moon*, Economist, 8 November 2007.

¹⁹² *World Investment Prospects 2009-2011*, survey, UN Conference on Trade and Development.



New centres of intellectual excellence. The growth of Asian intellectual centres, along with forming new financial centres, makes it *likely* that patterns of international travel and migration will intensify between leading technological western and South Asian nations. This trend is *likely* to lead to higher levels of migration from Western countries and greater numbers of UK nationals being based overseas.¹⁹³ Transnational corporations for the automobile, information and communication technology, machinery, electronics, biotechnology and pharmaceuticals sectors *will* continue to make significant high-tech investment in China and India, establishing a 'hub' for several research and development centres. India, with its mercantile culture, *will* provide both a developed research and development capability and a significant proving ground for low-cost innovation across numerous emerging markets.¹⁹⁴ In China, the manufacturing base *will* expand into other provinces to maintain manufacturing competitiveness and attract foreign investment.¹⁹⁵ These trends are *likely* to lead to China competing with India as the technology hub of Asia, and indicate the likely establishment of a regional innovation network.

International collaboration.¹⁹⁶ Foreign corporations *will* continue to increase the presence of research and development intensive industries close to the burgeoning consumer markets of both China and India. Joint Chinese-foreign ventures will transition to wholly foreign-owned enterprises, but are *likely* to protect their businesses from security and intellectual property concerns. China's expanding regional collaborations also suggest that Asia-Pacific nations will increasingly work together to reduce their dependency on western or Japanese partners. The US and South Korea are significant research partners with India, though the level of collaboration is lower for India than it is for other emergent nations and G8 partners. India has a large and diverse research base, but still retains significant capacity to expand its collaborative links through low-cost infrastructure and a large pool of skilled people. These collaborative networks *will* expand eastwards towards new and emerging research economies rather than traditional trans-Atlantic research hubs.¹⁹⁷

Pursuit of new resources due to new technology developments. Some South Asian countries, without legacy power-generation infrastructures, *may*, through significant research and development, leap to the use of alternative energy sources. These may include micro generation and nuclear power.^{198,199} India, Bangladesh and Pakistan *will* be key for the development of alternative energy techniques as they are *unlikely* to enjoy the same access to hydrocarbon fuel reserves as countries such as China. India is also *likely* to focus on: climate change control mechanisms; refining fuel emission and efficiency regulations and exploiting solar power.²⁰⁰

¹⁹³ Foreign and Commonwealth Office current estimates for the number of UK citizens abroad.

¹⁹⁴ *The pursuit of global appeal*, Financial Times, 12 October 2006.

¹⁹⁵ *Manufacturing base starts to move inland from the coast*, Financial Times, 27 October 2010.

¹⁹⁶ International collaboration is an important indicator of research activity in a nation but also a measure of the ability of partner countries or corporations to engage with the nation's research base; for example, the Chinese research base has been marked by an equal growth in collaboration.

¹⁹⁷ Krishna and Bhattacharya *Internationalisation of Research and Development and Global Nature of Innovation, Emerging Trends in India*, Asia Research Institute, National University of Singapore, Sep 09.

¹⁹⁸ Microgeneration is a term used for the generation of low, zero or renewable energy at a 'micro' scale. It covers energy generation resource that is decentralised, not centralised, http://www.decc.gov.uk/en/content/cms/meeting_energy/microgen/microgen.aspx

¹⁹⁹ *Rising Tigers, Sleeping Giant*, Information Technology and Innovation Foundation, 18 November 2009.

²⁰⁰ *Research and Development Ecosystem in India*, Evalueserve, October 2008.



Chinese scientific advances. The desire for economic growth and the continued significance of national prestige *will* drive continued scientific and technological research. At present, the high rate of economic growth is enabling China to invest heavily in science and technology.²⁰¹ In parallel with this trend, economic and social reforms have helped formulate a series of national programmes strategically aiming to improve science and technology competitiveness across a broad range of research topics including information and communication technology, nanotechnology, power generation and biotechnology. China *will* continue to account for a large share of research activity in material science,²⁰² using advances to modernise national heavy industry and manufacturing. Current trends suggest that future investment is *likely* to increase in agricultural sciences and bio-medical disciplines to meet greater demands for food and medical care. The pursuit of science and technology will endure as national priorities focus on helping to modernise society, address environmental issues and secure access to resources. China will continue to treat atomic energy, space-science, high-energy physics and biology as areas of key strategic interest.

Indian scientific advances. Both scientifically and technologically, India is *likely* to be broadly comparable with China by 2040. Similar to China, India is seeking to develop its own indigenous capacity for strategic technologies, spending a large amount on research and development, particularly within the government sector and defence technologies. India is likely to develop significantly in the following areas: atomic research; space; life and physical sciences; agricultural sciences; pharmacology; computer science; biotechnology and nanotechnology. Progress in, and across, these areas however, *may* be constrained by global competition for talent, and the logistic demands of transforming its basic science and technology infrastructure. While government support in research and development and application disciplines *will* continue, there is also *likely* to be strong demand for support and financial resources from the private sector, particularly between industry, research organisations and universities.²⁰³

Space science. Space industries in South Asia will be dominated by China and India, within a rivalry similar to that witnessed between the US and Soviet Union in the 1960s. China and India have both embarked on ambitious space programmes that *will* transition through the launching of satellites, to conducting manned missions into orbit and pursuing further planetary exploration. Both states *will* strive to end dependency on foreign rocket technologies, such as Russian-made engines. This should increase indigenous capability and avoid technology integration issues. Both countries will also continue to develop indigenous satellite design and launch capability. India, however, *will* make low cost access to space a priority, while seeking to exploit its 'dual-use' (civil and military) space programme.

²⁰¹ Organisation for Economic Cooperation and Development data.

²⁰² A statistic distorted by other countries switching to more high value technology areas such as biotechnology. *Thomson-Reuters Global Research Report*, China, November 2009.

²⁰³ 'Research and Development Ecosystem in India', Evalueserve, October 2008.



Alternatively, consolidating recent military advances, with some technologies being made available to commerce, is *likely* to drive China's space programme.²⁰⁴ Upgrades to space infrastructure are therefore, *likely* to be significant due to both civil and military demand. For India, collaborative ventures or bilateral arrangements are *likely* to seek cooperation on human spaceflight, earth observation, space exploration and access to foreign satellites.^{205,206} Primarily as a result of security concerns, dual-purpose indigenous satellite navigation systems *will* also be developed by both states thus enhancing transport security, air traffic management as well as search and rescue operations. Missile targeting, remote spectral-imaging capabilities and the tracking of troops and weapon deployments will also increasingly use this technology.

Nanotechnology.²⁰⁷ Nanotechnology promises to revolutionise many industries, with a range of applications in medicine, electronics, biomaterials and energy production. Increasingly, nations will also use this as indicators of their technological competence. The worldwide nanotechnology industry is still nascent, although there is significant financial global market potential for its products and applications. Although dominated by the US, Europe and Japan, by 2020 we *will* witness the rise of South Korea, China and India as key players in nanotechnology research and development. This will be characterised by:

- focused national research and development strategies and programmes
- establishing specialised institutions
- expanding postgraduate programmes
- increasing availability of open-source research publications.

Since 2001, China's national science and technology strategy has promoted nanotechnology development and seen significant increases in research and development investment.²⁰⁸ So far, despite such investment, outputs have been underwhelming. However, China will seek to overcome this through improved commercialisation, applying technology as well as expanding indigenous capability through policy-stimulus incentives. India has also invested US\$ 20 million over the period 2004-2009 for their 'Nano-materials Science and Technology Initiative'.²⁰⁹ Investments in new research programmes and centres increased significantly after 2007. Over the last five years, India however has not made the same progress in conducting research and publishing papers as China.²¹⁰

²⁰⁴ The launch in late 2003 of the 'Shenzhou V' made China the third country to master manned spaceflight. A subsequent launch in 2008 witnessed a brief spacewalk. The 'Moon Probe' project started in February 2004, forecasts that China will launch unmanned probes to the Moon to gather soil samples before 2020. It will also launch its own space station and manned lunar landing by 2030.

²⁰⁵ US-India Joint Space Working group on Civil Space Cooperations, July 2011.

²⁰⁶ Russia on the GLONASS navigation satellite system, and the EU Galileo global positioning system programme.

²⁰⁷ Nanotechnology concerns the manipulation of matter on an atomic and molecular scale, dealing with structures between 1-100 nanometres in size.

²⁰⁸ China's nanotechnology research and development investment estimated to be USD 250 million in 2008.

²⁰⁹ National Academies Press, *Globalization, Biosecurity, and the Future of the Life Sciences*, 2006, pp. 89.

²¹⁰ Professor CNR Rao, Chairman of Special Advisory Committee to Indian PM, 31 May 2011.



Biotechnology is a rapidly growing sector in both China and India. India is likely to focus heavily on this area, increasing the number of centres of excellence for biotechnology research, from eight to, at least, 50 by 2016. It will also aim to attract foreign investment and compete with China by making itself attractive to contract research, clinical trials and validation studies. Although national goals are balanced between biopharmaceuticals and agriculture-biotechnology, they are *likely* to focus on specialised research in areas such as stem cells, animal biotechnology, and plant health with short-term efforts geared towards diagnostics. In China, state-sponsored plans (for example, the Medium and Long Term Science and Technology Development Plan, overseas talent attraction programmes, financial incentives and the establishment of high-technology science parks) will continue to sustain research covering similar areas.

The 'Introduction-imitation-innovation cycle' and South Asia. Out to 2040, many South Asian countries *will* develop their research and development capabilities allowing them to move from the introduction and then imitation stages of the 'Introduction-imitation-innovation' 3'I' cycle,²¹¹ through to the genuine innovation stage. Resilient systems for protecting intellectual property are *likely* to accompany this development.²¹² The protection of intellectual property *will* be vital for the competitiveness of South Asian research and development institutes. India *will* continue with various technological programmes, promoting large-scale science projects including atomic physics.²¹³ It will also develop a capable research and development network which *may* rival China's in a number of areas. Significant potential exists to improve innovation linkages across India by capitalising on its educated population to become a major exporter of computer and information services. China is also *likely* to develop a robust research and development network over the period, however, its success will be dependant on how well the CCP manages the process of commercial liberalisation.

Innovation as the engine of social change. Innovation *will* be a key factor affecting to what degree South Asian countries are able to alleviate poverty, contribute to the global knowledge economy and achieve economic and social transformation.^{214,215} China and India are *likely* to make the most significant contribution to innovation due to the size of their educated workforce and the scale and diversity of their domestic markets. They *will* also drive the development of products for export to the West.

Development of indigenous military-industrial complex. Ongoing research and development and investment in South Asia *will* result in the establishment of an indigenous Military-Industrial Complex (MIC) within both India and China. This industrial base will serve civil, defence and homeland security sectors, and be essential in providing a focus for improving military capability. The science and technology infrastructure within the MIC will draw upon a sizeable new generation of scientists and engineers, to meet the

²¹¹ The 3'I' cycle details the technology development cycle a number of recent Asian states, such as Japan and South Korea, have experienced. Initially technology is 'Introduced' to the state, then it is reverse engineered and 'Imitated', then as the country strengthens its internal research and development capacity and protection of its own intellectual property, it begins to 'Innovate' and develop its own Novel technologies.

²¹² *Discovering High Growth: How UK Subject Matter Experts are Breaking into High-growth Markets*, UK Trade and Investment, 2011.

²¹³ Other examples include the establishment of the National Science and Technology Nano Mission and the National Council for Skills Development which will focus on modernising training institutes.

²¹⁴ *India: A Nation Develops*, Financial Times, 10 January 2010.

²¹⁵ *How GE is Disrupting Itself*, Harvard Business Review, October 2009.



demands of acquiring strategic national capabilities. At present, the scale and pace of Chinese industrial growth is leading to the creation of a MIC that is *likely* to exceed the productive capacity of the US by 2040. However, the Chinese MIC, though *likely* to be a magnitude of scale larger in capacity, is *unlikely* to surpass the US in terms of efficiency and technological sophistication.

Strategic shock – Propaganda and scientific advances

Out to 2040, national economies *will* be increasingly reliant on research and development in a number of high tech areas. The lack of transparency within authoritarian states such as China and Myanmar, coupled with the pressure to achieve long-term targets laid down in five year, ten year and sometimes 30 year objectives, may increase the likelihood of plagiarism, counterfeiting and false reporting in order to meet targets. Consequently, technological advances in such conditions may not be proven and the actual capability concealed. Also, the importance of 'face' and the 'honour of the wise' in traditional societies may lead to selective reporting and cause economic 'bubbles' to form around promised technologies and processes that cannot, in reality, be delivered.²¹⁶

Scientific education in South Asia. Education *will* continue to be a prized investment in South Asia, building the technical skills and competencies needed for a successful economy. Both China and India have undertaken significant investment in their education systems; a trend that is *likely* to continue out to 2040. China's and India's rapid economic growth has created a huge demand for talent which already outstrips supply; the need to attract and retain personnel will be critical over the period. China, through the implementation of its' five year plans, is *likely* to continue to run programmes similar to 'Project 863', 'Spark' and 'Torch', which invest resources into research institutions aimed at developing key technologies. China's government laboratories however, suffer from a critical shortage of highly qualified scientists and engineers, lured away by the private sector. To stem this brain drain, Chinese universities aim to increase the quality and quantity of their output by allocating more tertiary education student spaces. As a consequence of this investment, by 2020 some Chinese universities are *likely* to be amongst the best in the world.²¹⁷

²¹⁶ 'South Korea's Hwang Woo-suk was feted as a national hero when, in 2004, his research team said it had successfully cloned a human embryo and produced stem cells from it, a technique that could one day provide cures for a range of diseases. But allegations he used unacceptable practices to acquire eggs from human donors, then faked two landmark pieces of research into cloning human stem cells, left his reputation in tatters.' [Http://news.bbc.co.uk/1/hi/world/asia-pacific/4554704.stm](http://news.bbc.co.uk/1/hi/world/asia-pacific/4554704.stm)

²¹⁷ China's share of scientific and engineering citations grew by about 20% annually between 1974 and 2005. It leads internationally in publication of articles on certain cutting-edge technologies (particularly nanotechnology) and has 25% of other research papers attributed to China due to the results of international collaboration.



Hot topic – The battle for ideas

Global science and technology developments *will* continue to drive globalisation and shape the international economic environment. In South Asia, China and India rank in the top five destinations for foreign companies to invest in research and development. To provide a favourable environment for innovation to succeed *will* need them to develop their own coherent science and technology policies, institutions and capabilities.

Both China and India have gained technological advantages from following the 'introduction-imitation-innovation' cycle. This has allowed them to learn, absorb and understand foreign knowledge and develop their own indigenous capabilities in many areas. Developing this independent innovation will help both countries upgrade their industrial infrastructure, and especially China, enable the country to transition from being a purely manufacturing centre to one that invents, and designs, its own products. Chinese and Indian adaptability and willingness to learn from other nations *will* be essential to their science and technology advancement and innovation capacity. Technological development strategies such as 'architectural innovation' *will* continue to be witnessed across South Asia where components of a product are linked together, while leaving the core design concepts and the basic knowledge underlying the components untouched. This type of innovation will neither draw on new science, nor require the vast outlays on research which remain unaffordable for many South Asian countries.



Ratan Tata, head of Indian conglomerate - Tata, stands by his newest creation, the 'Nano', the world's cheapest car at 100,000 Rupees (£1200), 2008



For China, adopting a western-style innovation or entrepreneurship is often hindered by its broadly risk-averse, collective-oriented culture. To overcome such barriers, the central government *will* have to intervene to stimulate more high-risk ventures, as well as providing grants and tax incentives for the enterprise sector. Collaborative ventures between foreign corporations and the Chinese industrial sector *will* be strengthened. Due to the scientific community remaining decoupled from the dynamic market, it *may* be less evident in the areas of government and academic research.

South Asian countries recognise the importance of intellectual property as a driver for economic and technological development, and its impact on future foreign investment. Patents are seen as a strong assertion that novel technologies are being created. Inadequate intellectual property regulation is often cited as a barrier to closer collaboration and failure to protect intellectual property *may* lead to limited cutting-edge research and development being performed. Granting patent protection to inventions and inspiring innovation will need to be evident to domestic and foreign investors. Such trends will also be characterised by the increasing creativity and impact of research and development in South Asia. The increasing scientific literature and patent publications, as well as the vast number of technology-aware consumers underpin this trend.

India with a long-established intellectual property system has been a relatively quiet contributor to global innovation. India has undertaken several initiatives²¹⁸ along with updates to the Indian patent law that *will* transition it from an interdependent innovator to ultimately a creator of intellectual property. Although the absence of a national innovation policy endures, India has articulated and budgeted for three main innovation policy challenges: enhancing innovation potential in new technologies; building technological capabilities and competitiveness in the manufacturing sector; and reconfiguring the formal and informal sectors.



Similarities between the BMW X5 and Chinese equivalent

²¹⁸ Accession to the World Trade Organisation in 1995, and subsequent discharge of obligations under the TRIPS agreement. World Trade Organisation Trade - Related Intellectual Property Rights.



Environmental dimension

Scope

South Asia is one of the most diverse ecological regions on the planet. It is also a region afflicted by environmental instability. It is prone to severe weather events, extremes of drought and flooding, and is heavily reliant on the monsoon seasons to replenish the riparian reserves which enable agriculture to flourish. It holds significant natural resources, but limited fossil fuel energy supplies. Horizon scanning in the environmental dimension indicates significant trends for South Asia in the following areas:

- energy security
- minerals
- food and water availability
- hydrocarbons.

The Hot topic in this section is: **Riparian conflict**.

Trends and drivers

Energy infrastructure. In South Asia, the demand for infrastructure, particularly electricity, has been growing rapidly as China and India continue their economic growth. The World Bank reports that electricity is still not available to about half of the region's population, especially in rural areas.²¹⁹ This lack of access to modern forms of energy has prolonged the widespread traditional use of biomass, with adverse environmental and health impacts. At the same time, electrical supply is often unreliable and of poor quality. There are also high technical and commercial losses and poor commercial performance of service providers. At present, national energy systems across South Asia remain economically independent, with weak or nonexistent interconnections. There is little cross-border trade in electricity, with the exception of India-Bhutan trade, and none in natural gas. There are, however, proposals for an inter-regional connector with gas being supplied from Iran to India via Pakistan.²²⁰

Energy security risks. China currently imports most of its oil by sea, 85% of which passes through the Malacca Straits (see Key theme 1: South East Asia subsection for further details). The need to protect these, and similar sea-lanes, to preserve a guaranteed supply of vital natural resources *will* lead to China developing a powerful and potent maritime capability over the next 30 years. Similarly, all South Asian countries will increasingly value both land and sea supply chains for the energy required to drive national industrial and economic growth. India and China will field the economic and military power to safeguard their supply chains while the smaller countries will rely on their ongoing relations with one or both of these two regional powers.

²¹⁹ *Addressing the Electricity Access Gap*, Background Paper for the World Bank Group Energy Sector Strategy available at

http://siteresources.worldbank.org/EXTESC/Resources/Addressing_the_Electricity_Access_Gap.pdf.

²²⁰ 'The Iran-Pakistan-India (IPI), 2700 km, pipeline is aimed to transfer gas from Iran's South Pars fields in the Persian Gulf to Pakistan's major cities of Karachi and Multan and then further to Delhi, India, with an estimated value of USD 7 billion.' [Http://www.gulfoilandgas.com/webpro1/projects/3dreport.asp?id=100730](http://www.gulfoilandgas.com/webpro1/projects/3dreport.asp?id=100730)



Hydropower and gas. There are abundant energy resources within, and adjacent to, the region, notably natural gas in the west (Central Asia and Iran) and in the east (Myanmar and Bangladesh).²²¹ Bhutan, Nepal, Myanmar and Central Asian economies²²² (such as Tajikistan and Kyrgyz Republic) have hydropower energy resources vastly exceeding their current domestic needs. The development of these resources for export is *likely* to enable the growth of these relatively small economies. China, India and Pakistan, which provide the major import markets for the surplus energy from these countries as well as from Iran and Turkmenistan, *will* try to secure additional energy supplies to relieve shortages and sustain economic growth. Imports of gas from Central Asia, as well as from Iran, to Pakistan and India are also *likely* to increase.

Coal. Both China and India will remain major consumers of coal in the region and retain high levels of reserves. At present India's power sector consumes more than the two-third of the production. The other industries that depend on coal are steel, cement, fertilizers and chemicals. India has substantial coal deposits in the states of Bihar, Madhya Pradesh, and West Bengal. In China, 3.2 billion tonnes of coal was used for energy generation in 2010 and predictions suggest this will rise to almost 5 billion tonnes by 2020. The Chinese provinces of Xinjiang, Inner Mongolia, Shaanxi and Shanxi all have particularly high resource levels. Due to the high levels of coal reserves, both in the region and globally, some estimates suggest that coal will be used as a fuel source for at least the next 100 years.^{223,224}

Feeding growing populations. All South Asian countries *will* demand increased food and water resources for their growing populations. India, for example is likely to experience an increase in demand of 2.7% per year for grain production.²²⁵ At present, even the most optimistic projections suggest that for the next half century ensuring sustained food production and availability without becoming critically dependent on external support *will* remain a key challenge for national security within all South Asian countries. Climate change and the sensitivity of the monsoon cycle to disruption are *likely* to significantly affect how these demands are met.

Rice production. After China, India is the second biggest grower of paddy rice in the world (Figure 15). Together, India, Pakistan and Bangladesh grow about 30% of the global total of paddy rice, which is the major food crop for South Asian populations. Across Asia as a whole, nearly 90% of the world's rice is both produced and consumed as a staple food for nearly 2.4 billion people. The 'green revolution' of the late 1960s and early 1970s has helped make most states in the region self-sufficient in rice, but growing land exhaustion and increasing demographic pressure are *likely* to create shortfalls in staple food production by 2040. Changes in food technology, wider diversification and improvements in distribution however, *may* mitigate reductions in rice production. The sector is also the largest consumer of water in the region further sensitising it to the consequences of a changing climate. India alone uses more than 85% of water for irrigation purposes.

²²¹ Total gas reserves of Turkmenistan, Iran and Myanmar exceed 1000 trillion cubic feet, World Bank.

²²² Total hydro potential of the five countries exceeds 170,000 megawatts – World Bank.

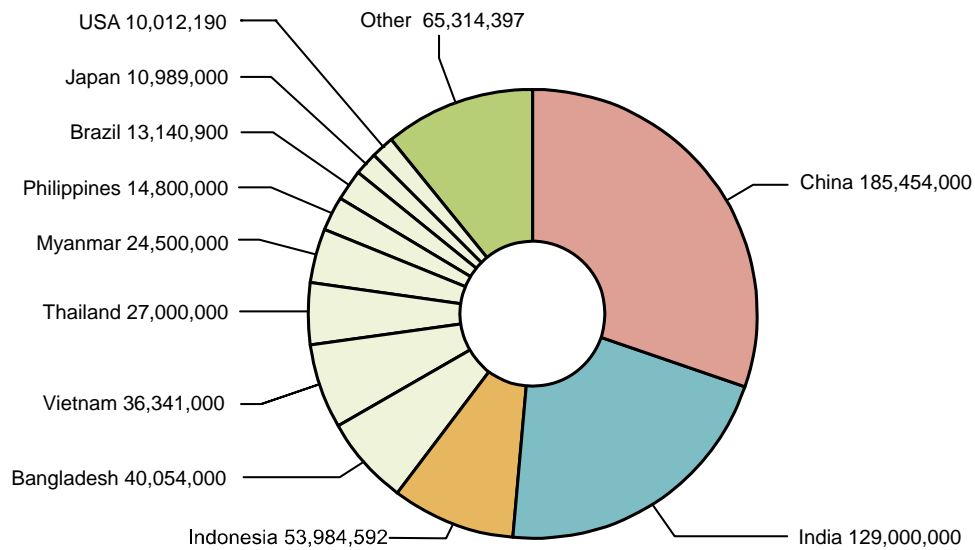
²²³ <http://www.guardian.co.uk/environment/2012/jan/12/china-renewable-energy-coal-consumption>

²²⁴ <http://www.worldcoal.org/coal/where-is-coal-found>.

²²⁵ This projection is based on the historical average demand. Also, some projections suggest there likely to be a gap in the grain production required to feed the growing Indian populace, by 2020 is grain production is likely to be around 290 million tonnes, with the population requiring 310 million tonnes. By 2050, the country is likely to produce 410 million tonnes and require 425 million tonnes.



Bhutan and Nepal have fragile mountainous ecosystems. Bangladesh and Sri Lanka have low-lying coastal areas, while India and Pakistan depend on irrigated cultivation of arid and semi-arid lands.



Source: UN Food and Agriculture Organization 2006

Figure 15 – 2006 rice-production figures (in million tonnes)

Source: UN Food and Agriculture Organization

Impacts on crop yield. Rising temperatures *will* negatively impact rice and wheat yields in tropical parts of South Asia where such crops are already being grown close to their temperature-tolerance threshold. While direct impacts are associated with rises in temperatures, indirect impacts due to water availability, changing soil moisture status and pest and disease incidence are *likely* to be felt. The most significant impacts are *likely* to be borne by farmers in this region who lack the financial and technical capacity to adapt to climatic variations.

Fisheries and aquaculture. In recent decades, South Asia has seen a continuous growth in fish production. This expansion however, is now levelling off, or even declining as overfishing depletes stocks. This trend appears *likely* to continue out to 2040. Most of the past growth had resulted from production in marine waters, however South Asia also has the largest share of inland capture production (30% of total capture fisheries production) globally. With regard to aquaculture however,²²⁶ South Asia's production has continued to rise and is *likely* to continue to do so while sufficient clean water remains. The majority of production comes from inland waters. Hence, the growth of the sector has been mostly due to increasing freshwater consumption of Indian carps (Rohu, Catla and Mrigal carp).

Sea level rises in South Asia. All South Asian states will be subject to the impacts of climate change. Even though the geographically large states of China and India are likely to show a degree of resilience due to the range of environs within their borders, they are still likely to be tested by sea-level rise and declining water availability. A 10-year study in,

²²⁶ Aquaculture refers to the farming of fresh and saltwater organisms including molluscs, crustaceans and aquatic plants. Unlike fishing, aquaculture, also known as aqua-farming, implies the cultivation of aquatic populations under controlled conditions.



and around, the Bay of Bengal for example points to the sea rising 3.14 mm a year in the mangrove swamps of the Sunderbans delta against a global average of 2 mm, threatening a low-lying area which is home to several million people. A trend of sea-level rise of 1 cm per decade has been recorded along the Indian coast. The major delta area of the Ganges, Brahmaputra and Indus rivers, which have large populations reliant on riverine resources, *will* be affected by changes in water regimes, salt-water intrusions and land loss out to 2040 and beyond. As discussed in Key theme 1, the projected rise in sea levels and the saltwater intrusion into freshwater particularly threatens the Maldives. Similarly, other Islands in the region, including Diego Garcia, are *likely* to be affected.

Declining summer rainfall. In addition to the impact of sea level rises, India is likely to experience a decline in summer rainfall by 2040. The monsoon accounts for almost 70% of the country's total annual rainfall. Winter rains are also predicted to fall by 10-20%. Higher temperatures also mean faster melting of Himalayan glaciers and as the melting season coincides with the monsoon season, any intensification of the monsoon is *likely* to contribute to flood disasters in the Himalayan catchment area throughout the region.

Disruption to Himalayan glacial melt. The Himalayan range contains high altitude glaciers which supply water to many rivers in Asia. These rivers provide water to more than half of the world's population, many of whom are completely dependent on glacial meltwater during the dry season. Accelerated glacial melt *will* affect Himalayan rivers. In Nepal and Bhutan, melting glaciers are filling glacial lakes beyond their capacities, contributing to flooding. Research suggests that glacial melt is expected to increase under changed climate conditions, which is *likely* to lead to increased summer flows in glacier-fed river systems for a few decades, followed by a reduction in flow as the glaciers disappear. China, India, Bhutan and Nepal all depend on the flow of snow-fed rivers.

Increased incidents of flooding. Large-scale floods, as experienced in Pakistan in 2010, *will* remain a recurring threat for the region. Urban areas will also be prone to large-scale flooding as they expand, and encroach, on estuary and coastal areas. These areas will become more vulnerable to flooding because of higher seawater levels and poor coastal drainage. These water variability issues *will* significantly effect coastal and river communities throughout South Asia during the period.



The incidence of flooding events in South Asia will increase due to the impact of climate change

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Hot topic – Riparian conflict?

Water security is about assured access to clean water for agricultural, industrial and household use. Water, along with food and energy, forms a critical part of the regional resource framework and will be one of the main defence and security issues for the whole region out to 2040. The potential for 'riparian conflict' is significant and it is *likely* that there will be some form of state-on-state confrontation over water during this period. Water security for the region will require effective responses to changing water conditions in terms of quality, quantity and uneven distribution if conflict is to be avoided.

South Asia has large river systems. Prominent are the Indus basin in the west and the Ganga-Brahamaputra-Meghna basin in the east. A number of bilateral treaties exist but are often hostage to prevailing political animosity. Resource nationalism *will* become increasingly dominant and often define regional politics.

The upstream-downstream supply disputes *will* be a growing feature in riparian politics. India's riparian relation with its neighbours *will* become progressively more fragile with Pakistan, Bangladesh and Nepal continuously raising concerns over the regulation and sharing of river waters. China is *likely* to divert water south-to-north on the rivers that originate from the Tibet region, particularly on the Yarlung-Tsangpo. This is *likely* to open up a new front of uncertainty in Sino-Indian relations. International laws on allocating water within river-basins are difficult to implement and often contradictory – it is *unlikely* that international regulation will have much regional influence over the period.

The use of water as a bargaining tool *will* predominate because the political stakes are so high. Water issues between Pakistan, India and China have the potential to become catalysts for conflict. Though the importance of politics cannot be discounted in India's water relations with Nepal and Bangladesh, there is however, far more scope to overcome and break political deadlocks through sensible water-sharing arrangements and resource development.



Sources and acknowledgements

For *South Asia out to 2040* to be both comprehensive and independent in its analysis of the future trends, it requires rigour and objectivity. This has meant we have consulted and reviewed widely. We have, therefore, exploited a wide range of experts in Academia, Industry, Government and Defence, both within the UK and overseas. We used individual interviews and participation in several conferences to benchmark our findings against current thinking. Finally, we also conducted a number of themed workshops to fact-find and validate the themes and concepts within this survey.

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