

Long-term opportunities and challenges for the UK: analysis for the 2007 Comprehensive Spending Review

November 2006



HM TREASURY



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CONTENTS

	Page
Foreword by the Prime Minister and the Chancellor of the Exchequer	1
Chapter 1 Introduction and Summary	3
Chapter 2 Historical Perspective on the Challenges	13
Chapter 3 Demographic and Socio-Economic Change	27
Chapter 4 Globalisation	47
Chapter 5 Technological Change	65
Chapter 6 Global Uncertainty	89
Chapter 7 Pressure on Natural Resources and Global Climate	109
Chapter 8 Preparing for the Decade Ahead	125
Annex A Acknowledgements	135
Bibliography	141

FOREWORD BY THE PRIME MINISTER AND THE CHANCELLOR OF THE EXCHEQUER

When we launched our first Comprehensive Spending Review (CSR) in 1997 we faced a Britain that needed modernising. We faced an historic backlog of underinvestment in schools, hospitals and transport infrastructure and standards short of what people rightly expected. We also had a situation where society and social justice were undervalued.

In the years since we have invested for the long-term and this, combined with far reaching reforms and the dedication of millions of public servants, has delivered major improvements in performance and outcomes across public services, including virtually abolishing waits of over six months in the NHS, substantially improving performance at every key stage of schooling, and cutting crime year on year. We have acted to support deprived neighbourhoods and to start to tackle inequality and child poverty.

But the world has not stood still. Huge changes are occurring: globalisation, profoundly transforming the global economy with the challenges and opportunities of China and India's rapid economic expansion; rapid technological change opening up new possibilities for public services; demographic and socio-economic change, with an ageing population; global threats to our security from international terrorism; and the global challenge of climate change.

The very success of past policies on stability investment and jobs has changed the nature of debate in a number of areas.

Just as we have responded to the challenges of the last 10 years by delivering economic stability and jobs and correcting the under-investment in our public services, so we must renew both our programme in government and our resolve to meet the challenges ahead.

To address these challenges of the next ten years our focus is on:

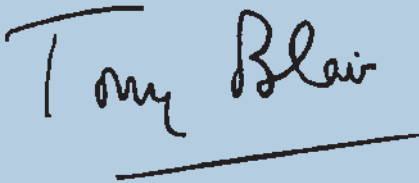
- meeting the global terrorist challenge by delivering security at home and abroad;
- meeting the global economic challenge by improving education and skills across the population;
- meeting the environmental challenge by acting on climate change; and
- responding to rising individual aspirations by advancing investment and reform in public services ensuring they are tailored to peoples needs.

So backed up by the current policy reviews now in motion, the focus of the next CSR, which will report next year, will be equipping Britain for the long-term challenges ahead and making the right long-term decisions for Britain's future.

In preparation for this, the Treasury has worked with experts across government, the Cabinet and other Ministers, think tanks, businesses, voluntary organisations, and the academic community to develop a detailed picture of these changes. This paper presents the results of that collaborative effort.

As a country it is essential that we are all equipped with the facts and knowledge about the new challenges and opportunities we face as we pursue our aspirations individually in the decade ahead. As a Government we need to be ready to respond, as will individuals, businesses and communities.

The next CSR will mark an important milestone in shaping the future direction of the UK's public services. In July, we set out the steps we are taking as part of the CSR to increase value for money across government and release the resources to front line services needed to meet long-term challenges. In the months ahead we will build on the analysis presented here through an open discussion about future priorities, together with consultation with frontline professionals and the public to identify the investments and reforms we should make in the CSR to equip Britain for the challenges ahead.



RT. HON. TONY BLAIR MP



RT. HON. GORDON BROWN MP

INTRODUCTION AND SUMMARY

I.1 In June 1997 the incoming Government launched the first Comprehensive Spending Review (CSR) – a fundamental and in-depth examination of public spending which set the course for public services over the following decade – to meet the Government’s overarching priorities for the long term: sustainable growth and employment; fairness and opportunity; a secure and fair world; and modern and effective public services.

I.2 Building on the platform of stability provided by the new fiscal code, the 1998 CSR and subsequent Spending Reviews in 2000, 2002 and 2004 delivered sustained increases in resources for key public services such as health, education, transport and policing. By matching this growth in spending with ambitious reforms to support the efficiency, delivery and accountability of public services, the Government has been able to achieve major improvements in the outcomes achieved across frontline services including:

- increased resources for the National Health Service (NHS) have helped save over 160,000 lives from 1996 to 2004 as a result of reductions to mortality rates from cancer and circulatory diseases among people aged under 75;
- in education, over 58 per cent of 15 year olds now achieve five or more good GCSEs, up from 45 per cent in 1997, with some of the biggest improvements seen in disadvantaged areas with a history of low achievement;
- between 1997 and 2005-06 overall crime rates fell by 35 per cent, and the risk of being a victim of crime is now the lowest recorded by the British Crime Survey since it began in 1981;
- the transport system is improving, with over 100 road schemes completed since 2000, people travelling further by rail than in any year since the 1940s, bus use increasing year on year for the first time in decades and guaranteed free fares for off peak travel on local buses for older and disabled people; and
- UK aid to developing countries is helping to reduce permanently the number of people living in poverty by an estimated total of 2 million each year.

A profoundly changing future context

I.3 While much has been achieved in the past decade, the world is changing rapidly, with new challenges emerging that must be addressed in order to lock in these benefits for the decades to come. Significant social, economic and technological trends are transforming the domestic context in which public services operate, and new geo-political and environmental trends have changed the UK’s role in the world.

I.4 These developments will continue over the decade ahead. The UK population is ageing, due to sustained increases in life expectancy and low fertility rates, and is becoming more affluent and diverse.¹ The global economy is in the midst of a radical transformation with far reaching and fundamental changes in technology, production and trading patterns.² Rapid technological change continues to impact on how individuals, business and communities interact with each other and how they expect to interact with the state.³ Global

¹ *Population Trends*, Office of National Statistics, 2006.

² *Why Globalisation Works*, Martin Wolf, Yale University Press, 2004.

³ *Globalisation: The Great Unbundling*, Baldwin, R. Economic Council of Finland, 2006 and *Transformational Government: enabled by technology*, Cabinet Office, 2005.

security is being reshaped as the international community responds to the ongoing threat of international terrorism, conflict, and the challenge of ending world poverty.⁴ The pressures that economic and population growth are placing on the earth's natural resources and climate are increasingly apparent, presenting an urgent need for international co-operation.⁵

1.5 Change will present great opportunities as well as great challenges for the UK, the global economy and the world community. Globalisation, with the growth of China and India, has the potential to lift hundreds of millions of people out of poverty. Alongside increasing competition and technological advance it will also provide new opportunities for developed economies like the UK. Stable, flexible, skilled and innovative economies will prosper. Individuals, businesses and communities will all need to be ready to respond to the changing global environment.

2007 Comprehensive Spending Review

1.6 To ensure the UK is equipped with the public services it needs to seize the opportunities and meet the challenges ahead, in July 2005 the Chief Secretary to the Treasury announced the launch of a second CSR reporting in 2007, which will set departmental spending plans and priorities for the years 2008-09, 2009-10 and 2010-11. A decade on from the first CSR, the 2007 CSR provides the opportunity for a fundamental review of the balance and pattern of public expenditure, taking stock of what the investments and reforms have delivered to date and identifying what further steps are needed to prepare for the decade ahead.

1.7 Over the last year the Government has been laying the groundwork for 2007 CSR by taking forward a detailed programme of analytical work involving:

- **an examination of the key long-term trends and challenges** that will shape the next decade, and which are the subject of this report;
- **detailed reviews on specific cross-cutting issues** where innovative policy responses and co-ordination across departmental boundaries will be required in order to meet the challenges ahead;⁶
- **an ambitious and far-reaching value for money programme** to release the resources needed to address these challenges, involving both further development of the efficiency programme in the areas identified by the Gershon Review, and a set of zero-based reviews of particular areas of departments' baseline expenditure to assess their effectiveness in delivering the Government's long-term objectives. The Government published an interim report on this work in July;⁷
- **a more strategic approach to asset management and investment decisions**, ensuring the UK is equipped with the infrastructure needed to support both public service delivery and the productivity and flexibility of the wider economy; and
- **a review of the performance management framework** to continue driving outcome-focussed improvements and ensure that public services are accountable and responsive to the needs and expectations of users.

⁴ *Delivering Security in a Changing World*, Ministry of Defence, December 2003 and *Active Diplomacy for a Changing World: The UK's International Priorities*, Foreign and Commonwealth Office, 2006.

⁵ *Stern Review on the Economics of Climate Change*, www.sternreview.org.uk and CUP (forthcoming).

⁶ Terms of reference for these review are available at www.hmtreasury.gov.uk/spending_review.

⁷ Further details of this programme are set out in *Releasing the resources to meet the challenges ahead: value for money in the 2007 Comprehensive Spending Review*, HMT, July 2006.

OUTLINE OF THIS REPORT

1.8 This document represents the next step in the Government's preparations for the 2007 CSR, setting out the conclusions of detailed analysis of the long-term opportunities and challenges for the UK, following extensive consultation with a range of experts from business, unions, non-governmental organisations (NGOs), think tanks and academia.

1.9 The approach taken in the document is to set out judgements about the most likely future developments. Throughout, it is important to bear in mind the significant uncertainty associated with future projections.

The changing international and domestic context

1.10 Chapter 2 puts expected future developments outlined in the subsequent chapters into the historical context of the changes that have faced UK society in the post-war era and looks at how the Government has redirected resources and policy to meet these challenges since the 1998 CSR.

1.11 The period since the Second World War has seen global economic integration proceeding apace, enabled by rapid technological advance, falling transport costs and the liberalisation of controls on the flow of goods, services, capital and labour internationally. These global trends, alongside domestic demographic and socio-economic forces, have been profoundly reshaping UK society: prosperity has increased, lifestyles have been transformed and attitudes and aspirations have shifted. Income inequality increased between the late 1970s and late 1990s, but has recently stabilised as result of policy interventions, including those aimed at tackling child and pensioner poverty. The population has become older, as life expectancy has risen and women have been having children later, and society has become considerably more racially and religiously diverse. Global ecosystems have changed more rapidly than over any other comparable time period and awareness of pressures on the environment has increased. The international security environment was transformed by the end of the Cold War and then, more recently, has been further redefined by the rise of the threat from international terrorism. While millions have been lifted out of poverty by economic growth, billions remain in poverty across the world.

1.12 Public spending and public services have evolved in response to this changing context. Over the last decade, the Government has: created a platform of macro-economic stability which has allowed the UK to withstand shocks; undertaken microeconomic reforms to enable the UK to adapt flexibly to change and improve its productivity performance; reduced child and pensioner poverty; provided investment and undertaken a reform programme to deliver modern public services; introduced a range of instruments that encourage more environmentally responsible behaviour, such as the Climate Change Levy, and participated in the EU Emissions Trading Scheme; responded to the terrorist threat by expanding the security services and working with other countries to tackle terrorist havens; and led international efforts to address continuing poverty in poor countries.

Long-term trends and challenges

1.13 Chapters 3 – 7 examine the key trends and challenges that will shape the UK policy environment in the decade to 2017. It looks in turn at five areas of change that Government will have to confront if it is to make further progress against its goals of sustainable growth and employment, fairness and opportunity, a secure and fair world, and modern and effective public services.

- First, demographic and socio-economic change, with rapid increases in the old age dependency ratio on the horizon, and rising consumer expectations of public services;
- Second, the intensification of cross-border economic competition, with new opportunities for growth, as the balance of international economic activity shifts toward emerging markets such as China and India;
- Third, the rapid pace of innovation and technological diffusion, which will continue to transform the way people live and open up of new ways of delivering public services;
- Fourth, continued global uncertainty with ongoing threats of international terrorism and global conflict, and the continued imperative to tackle global poverty; and
- Fifth, increasing pressures on our natural resources and global climate, requiring action by governments, businesses, and individuals to maintain prosperity and improve environmental care.

I.14 These challenges will have far-reaching implications for the UK, demanding innovative cross-government policy responses and early, co-ordinated action across departmental and organisational boundaries.

Demographic and socio-economic change

A rising population with more over 65s

I.15 Chapter 3 examines likely demographic and socio-economic change in the decade ahead. The UK's population growth will moderately accelerate over the next 10 years, with particularly marked growth projected in Southern England; the numbers and proportion of those over 65 will rise as a prelude to more rapid rises in future years as the "baby boomer" generation ages; the numbers of over 85s will see most rapid increases; the numbers of working age will rise, but fall as a proportion of the population; the number of young people will fall only slightly; and average household size is expected to continue to decline due to falls in the average family size, shifting lifestyle patterns for young adults and a rising elderly population.

Stable labour market participation; changing consumption patterns

I.16 The second half of chapter 3 looks at possible future socio-economic trends in ethnic diversity, the labour market, consumer preferences and attitudes, community cohesion and poverty. It describes how the UK is expected to become more ethnically diverse; the overall labour market participation rate is projected to remain broadly stable between now and 2017, as projected increases in female participation rates offset the marginal projected decline in male participation; participation rates among older workers are expected to continue to rise; changes in preferences and attitudes are likely to lead to more demand for many of the goods provided by public services, and higher expectations of service providers, with lifestyle choices posing new challenges for society; and the Government remains committed to its target to eradicate child poverty by 2020, and continuing to tackle pensioner poverty.

Intensification of cross-border economic competition

A changing global economy

I.17 Chapter 4 examines the expected continuation of the radical transformation of the global economy seen in recent years, with far-reaching and fundamental changes in technology, production, and trading patterns. It draws on previous HM Treasury publications, in particular: *'Long-term global economic challenges and opportunities for the UK'*, published at the Pre-Budget Report 2004, and *'Globalisation – strength and opportunity to meet the economic challenge'*, published at the Enterprise Conference in December 2005.

Key economic trends **I.18** The chapter begins by setting out six key trends that will shape global economic development, and that the Government will need to address in order to achieve its objective of building a strong economy and fair society, with opportunity for all: the rapid growth of large emerging economies, in particular China and India, shifting the balance of global economic activity; greater competition for investment flows; increasing international specialisation; greater rewards from innovation; higher levels of demand for skills; and increasing pressure on energy resources and the environment. As an open, flexible economy, the UK particularly stands to benefit from these trends.

Risks to globalisation **I.19** It then considers the potential international risks to globalisation over the decade ahead. Globalisation is expected to continue but the risk of negative public perceptions of globalisation creating protectionist pressures is perhaps the main risk to continued realisation of its benefits. The UK needs to play a positive role within Europe and globally to support continuing openness of global markets.

Social challenges **I.20** The social impacts of trade openness and technological change are then considered. While global integration offers significant benefits and will lift many individuals out of poverty in developed and developing countries, it may also result in periods of insecurity for some individuals. It reinforces the need to combine flexibility with policies that ensure fairness so that all can benefit from more open and competitive global markets where there are greater returns to skills.

Rapid innovation and technological diffusion

Continuing technological developments **I.21** Chapter 5 examines potential technological change in the decade ahead. The rapid technological change of the recent past can be expected to continue. This will underpin economic growth and the changes described in chapter 4, including greater returns to skills. Significant uncertainties are associated with predictions of technological changes. “Horizon scanning” work, carried out by the Office of Science and Innovation (OSI), has identified eight broad areas of technology that are likely to have significant impacts on society over the next decade. These are: information handling and knowledge management; sensors and tracking; network interactions; security technologies; advanced materials and robotics; nanotechnologies, body and mind sciences; and energy technologies.

Technological trends in public services **I.22** The second half of the chapter considers how these potential technological changes might lead to new ways of delivering public services. ICT and information handling processes in particular hold the potential to transform the interactions between users and providers of public services. The increasing prevalence of ICT in the delivery of private sector service organisations will raise consumer expectations and demands on public services. Technology will also create new possibilities and challenges in a number of service areas including transport, education, health, crime and security, and energy.

Continued global uncertainty

A challenging international security environment **I.23** Chapter 6 examines the global changes that will affect international security and development and their impact on the UK over the next decade. The world faces a range of complex and interconnected international security risks in the decade ahead, including threats from international terrorism, proliferation of Weapons of Mass Destruction (WMD), organised crime and inter-state and intra-state instability. Human and resource pressures will impact on stability and development activity, with population growth, disease, increasing pressures on water and energy supplies and climate change important factors. International efforts to fight poverty have the potential to contribute to global security but enormous challenges remain to meet the international community’s stated ambitions. International institutions are being

challenged to respond to these developments and wider changes in the international landscape. They will need to reform and modernise.

I.24 The chapter concludes by considering how these global trends might impact on the UK directly and have implications for the delivery of its strategic security and development objectives. In an increasingly interdependent world the UK's future security and prosperity, will be determined by the way UK reacts to these global trends. The UK will therefore need to continue to play a key role internationally to manage its security risks, tackle climate change, reduce global poverty, and modernise international institutions for the challenges ahead.

Pressures on natural resources and global climate

Global environmental degradation and climate change

I.25 Chapter 7 begins by describing how long-term pressures on natural resources and the global climate will develop in the decade ahead and beyond. If the pressures associated with projected population and economic growth are not well managed there will be a range of stresses on resource provision, and existing regulatory and protective mechanisms. Climate change, as the *Stern Review on the Economics of Climate Change* made clear, represents an urgent challenge. If left unchecked, the burning of fossil fuels and land use changes will lead to dangerous climate change with high economic costs.

Pressures on environment in the UK

I.26 The effects of climate change will be felt everywhere, but the most severe impacts will be felt in the developing world. In the UK the effects will be mainly mediated through water, with increases in the number of both flood and drought incidents expected. In terms of more localised environmental issues, pressures on waste and water will need to be carefully managed in the coming decades and continued action to prevent loss of biodiversity and make more efficient use of land will be needed too.

Preparing for the decade ahead in the CSR

I.27 The 1998 CSR and subsequent spending reviews articulated the Government's four overarching priorities for the long term: sustainable growth and employment; fairness and opportunity; a secure and fair world; and modern and effective public services. This paper, in looking to identify the key trends that will shape the policy environment in the decade ahead, aims to set the context for the long-term decisions that will need to be taken in the 2007 CSR to continue to make progress against those goals in the coming decade. The concluding chapter sets out how the Government is preparing for the 2007 CSR through a broad range of studies and reviews that will identify what investments and reforms must be made in order to equip the UK for the challenges ahead.⁸

I.28 The new and changing context facing the UK has implications for society as a whole. Government alone cannot ensure that the UK will meet the challenges and seize the opportunities ahead. Individuals, communities, businesses and Government at all levels will have to demonstrate flexibility and face up to difficult decisions.

I.29 The rapid pace of change in the coming years means that the UK must start preparing now to ensure it has sustainable and robust responses for the long term. The 2007 Comprehensive Spending Review will mark an important milestone in the Government's response.

⁸ In devolved areas of responsibility it will be for the devolved administrations to decide how to respond to challenges in their countries in their spending reviews.

I.30 Over the past decade the Government has shown how it is possible to deliver a strong economy, record levels of employment and sound public finances alongside sustained increases in resources for public services. By matching this investment with ambitious reforms to support the efficiency, delivery and accountability of public services, the Government has secured major improvements in outcomes including virtually abolishing waiting lists of over six months in the NHS, substantially improving performance at every key stage of schooling, and cutting crime year on year.

New challenges for meeting long-term goals

I.31 The Government is determined to build on these firm foundations and make further progress over the decade ahead in accordance with the principles of sustainable development. However, as this document has shown, the challenges of today are different from those of a decade ago. Therefore, alongside work to release resources to meet these new challenges, Government's priorities must also evolve if it is to achieve its established long-term goals:

- **sustainable growth and employment** – while the priority in 1997 was to secure macroeconomic stability with low and stable inflation alongside growth, low unemployment and sound public finances, the key challenges now are to maintain and build on those foundations, seize the opportunities of globalisation, ensuring every business and individual is equipped to prosper in an increasingly competitive global economy, and ensure appropriate environmental care for the long term;
- **fairness and opportunity** – a decade ago the priority was to halt the rapid rises in child poverty of the 1980s and 1990s and to address pensioner poverty through reforms to the tax and benefit system, the introduction of the minimum wage and widening access to key public services. Today the challenge is to make further progress in achieving social justice, including eradicating child poverty by 2020 in the context of continuing economic change, and to empower individuals and communities to achieve their rising aspirations so that all individuals can share in the gains from growth;
- **a secure and fair world** – in 1997 the challenge was to raise international development up the public agenda and to restructure defence and security forces following the end of the Cold War. The major challenges now are to confront the threat of international terrorism, to develop a long-term international consensus on actions to tackle climate change and to continue to tackle global poverty; and
- **modern and effective public services** – the priority for successive spending reviews since the 1998 CSR has been to address the legacy of underinvestment in public services and deal with areas of unacceptable performance. Despite the progress made, this remains a long-term challenge, although the priority now is to step up reform of public services to meet new demands from an older population with higher expectations, engaging the public on their rights and responsibilities as service users, and harnessing technology to improve efficiency and responsiveness.

I.32 The Government recognises that the solution to many problems in the future will be found in individuals and communities working in partnership with local and national government. Each will need to face up to its responsibilities. The Government must be more efficient and responsive at the local and national level, and improve the delivery of services so that they are shaped around the needs and preferences of the user.

I.33 As outlined below and set out in more detail in chapter 8, to inform the CSR the Government has announced a series of policy reviews to identify the cross-departmental actions and reforms necessary to make further progress against its goals over the decade ahead.

I.34 To inform further steps to ensure sustainable growth and employment:

- the Leitch Review of Skills will set out the skills profile that the UK should aim to achieve by 2020 in order to maximise productivity and growth over the long term;
- the Eddington Transport Study is reviewing the long-term impact of transport decisions on economic growth, productivity and stability;
- Lord Sainsbury of Turville is carrying out a review of science and innovation policies across government which will take a forward look at what needs to be done to ensure the UK's continued success in wealth creation and scientific policy making;
- the Government is conducting a policy review to ensure that appropriate infrastructure will be provided to support housing and population growth;
- Kate Barker is examining how planning policy can better deliver economic growth and prosperity alongside other sustainable development goals; and
- the Government is also reviewing the effectiveness of subnational interventions on economic development and the regeneration and renewal of deprived neighbourhoods.

I.35 To make further progress on delivering fairness and social justice:

- the Government is reviewing support for children and young people, looking in particular at how a stronger preventative approach can be taken to ensure that in the future the cycle of disadvantage across generations is not perpetuated; and
- the Government is reviewing the policies needed to improve mental health outcomes and employment, recognising that too many people are excluded from the world of work when, with the proper support, it should be possible for them to find or remain in work benefiting their health and the wider economy.

I.36 To inform continued action in the CSR and more widely with international partners to create a more secure and fair world:

- the Government is reviewing the delivery of the Government's counter-terrorism and security strategies, as announced at Budget 2006; and
- the *Stern Review of the Economics of Climate Change*, published in October, examined the consequences of climate change in both developed and developing countries.

I.37 To ensure modern, efficient and responsive local and national government and public services the CSR will:

- continue the Government's far-reaching programme to embed value for money across the public sector, to ensure that record levels of investment are translated into ongoing improvements in outcomes and service quality, and to release the resources needed to meet new priorities in the decade ahead;

- strengthen the Government's performance management framework to improve focus on key cross-government priorities, give front line workers more ability to respond to the needs of users and communities and to be able to join up services and galvanise departments to work together in tackling long-term challenges;
- take steps to improve the responsiveness of public services to the needs of users, by locating the accountability of services with the communities and citizens they serve, by reforming services to ensure they are personalised to meet the individual needs of citizens, and by exploiting new technologies and delivery mechanisms to make services more accessible and convenient for consumers. This will be informed by advice commissioned by the Chancellor from Sir David Varney, former Executive Chairman of HMRC and Chairman of 02, on the opportunities for transforming the delivery of public services, in particular through cross-government collaboration to make the channels through which services are delivered more responsive;
- be informed by the Local Government White Paper, the review of the Greater London Authority, and Sir Michael Lyons' Inquiry into the funding, role and function of local government, helping to ensure the right balance of local, regional and national interventions are taken across the country; and
- recognise the vital role the third sector has to play by engaging in the largest ever consultation with the sector as part of a review of its role in the social and economic regeneration of the UK.

FACING UP TO THE ISSUES AND CHOICES AHEAD

I.38 Every citizen, business, and community has a major stake in the outcomes of the 2007 CSR. The Government therefore wants to ensure that it is fully informed by widespread public engagement on the long-term challenges facing the UK. Through its analysis of these challenges, the Government has already undertaken extensive consultation with third sector organisations, services users, frontline professionals, businesses, think-tanks and academics, amongst others.

I.39 The Government has now begun the process of assessing the long-term policy choices it will have to confront in the 2007 CSR and beyond to deliver on its ambitions in the changing environment. As part of this, the Cabinet has set up Ministerial working groups on six key areas of policy: economic dynamism; public services; security, crime, justice and cohesion; energy and environment; the role of the state; and Britain in the world. These discussions are ongoing and will be informed by the analysis set out in this paper in the months ahead.

I.40 Through the policy reviews, Ministerial working groups and the development of delivery agreements, the Government seeks to stimulate public discussion and listen to people's views on the key challenges for the UK and how government, citizens, businesses and communities should be responding to them. Details of how to submit views to the Government are set out in Annex A.

CONCLUSION

I.41 This document describes how the UK faces profound change in the decade ahead at home and abroad. There will be significant demographic and social change. The global economy will undergo a radical transformation. Technology will open up new possibilities in

public services. Global trends will reshape the context in which the UK pursues its security and development objectives. There will be increasing pressures on the environment including the risk of severe and costly climate change, requiring the world to act.

1.42 Many of these changes present great opportunities but there will be significant challenges too. Countries such as the UK that are open and flexible can prosper in the rapidly changing global economy where there are new opportunities for trade and investment, large and growing new markets such as China and India, and new possibilities presented by rapid technological advance. Seizing these opportunities will require entrenching economic stability and promoting flexibility to react to new opportunities quickly, enhancing the skills of the workforce, delivering world-class infrastructure and encouraging a culture of innovation and enterprise. Reformed public services will have a central role to play in this changed world, providing the essential foundation for a society in which economic prosperity is combined with fairness and social justice. The UK will also need to play a leading role in international efforts aimed at meeting the global challenges of poverty, climate change and continued security threats.

1.43 The Government is determined take the steps required to make further progress against its established long-term goals of sustainable growth and employment; fairness and opportunity, a secure and fair world; and modern and efficient public services in this new context. The 2007 CSR will be an important milestone in delivering the reform and investment required to seize the opportunities and meet the challenges of the decade ahead.

2

HISTORICAL PERSPECTIVE ON THE CHALLENGES

2.1 This chapter puts expected future developments in the historical context of the changes that have faced the UK in the post-war era and sets out how the Government has redirected resources and policy to meet these challenges since the 1998 CSR.

Overview 2.2 The first section looks at the key trends that have changed the context for government since the Second World War:

- global markets have become increasingly integrated, with the liberalisation of controls on free flowing goods, services, capital and labour;
- rapid technological advance has underpinned this economic change, and transformed life in the social sphere;
- resulting from these trends and wider demographic and socio-economic forces there have been profound changes to the shape of UK society;
- environmental degradation has increased, along with awareness of the pressures on natural resources and the global climate; and
- the international security environment was transformed by the end of the Cold War and has been further redefined by the increased threat from international terrorism.

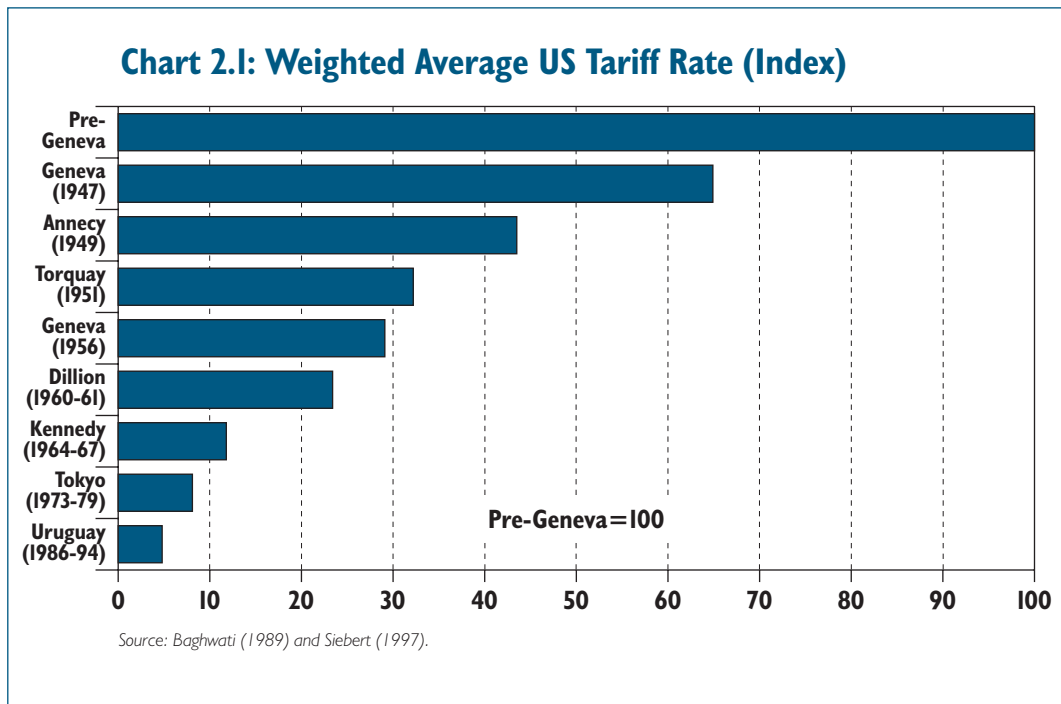
2.3 The second section sets out how government policy and spending have evolved in response to this changing context, with a focus on the last decade. It outlines how the Government has: created a platform of macroeconomic stability to allow the UK to withstand external shocks; implemented microeconomic reforms to enable the UK to adapt flexibly to change; undertaken a programme of sustained investment and far-reaching reform to deliver modern public services; halted and reversed the rise in child and pensioner poverty seen in previous decades; introduced measures to protect the environment; responded to the threat from international terrorism; and sought to address continuing poverty in developing countries.

HISTORICAL CONTEXT

Global economic integration

Multilateral cooperation 2.4 Following a contraction in international trade in the period following the First World War, global economic integration was given renewed impetus by an international commitment to economic cooperation and greater openness, underpinned by the Bretton Woods institutions. Two key institutions were put in place to promote stability and prosperity: the International Monetary Fund to promote a stable monetary system and so provide a sound basis for multilateral trade, and the World Bank to help restore economic activity in the devastated countries of Europe and Asia.

Greater openness 2.5 The impetus to promote economic cooperation and outward looking policies also led to the establishment of the General Agreement on Tariffs and Trade in 1947, which provided a framework for progressive mutual reductions in tariffs on trade goods and services. Chart 2.1 shows how successive trade rounds have supported a gradual, but steady and sustained reduction in trade barriers.



Economic growth 2.6 This decline in trade barriers has seen global trade and income per capita increase dramatically.¹ Initially the benefits flowed mainly to developed countries. In Europe, greater openness helped drive productivity and economic growth after the Second World War, in particular the “Golden Age of European growth” between 1950 and 1973. The formation of the European Economic Community in 1958 and the European Free Trade Area in 1960 reduced trade barriers within Europe and led to a strong expansion in intra-European trade. The late 1950s and 1960s also saw the rapid expansion of the Japanese economy, and by 1968 Japan was the second largest market economy in the world. Global economic growth has placed ever-greater demand on natural resources, while increased dependence on oil has meant that supply shocks have had significant impacts on the global economy.

Increasing capital flows 2.7 The latter part of the 20th century saw an expansion of international capital flows and greater integration of financial markets. The Bretton Woods system of exchange rate and capital controls was abandoned and developed economies progressively liberalised their financial sectors. In the past two decades financial integration (measured by the sum of countries’ foreign assets and liabilities as a ratio of global GDP) has risen threefold.² Foreign direct investment also accelerated during the 1980s and 1990s, expanding by an average of almost 50 per cent of global GDP per year during 1998-2000.³ The UK has been a significant beneficiary from these flows, as both a global financial centre and as a destination for foreign direct investment.

International specialisation and division of labour 2.8 Technological change has increasingly allowed the fragmentation and internationalisation of production processes. International specialisation has increased as firms have allocated their operations in line with countries’ comparative advantages. This has increasingly enabled the division of labour on a global scale, although cross-border migration remains below the levels that prevailed in the late 19th and early 20th centuries. The share of services in the UK and other developed economies has increased, with a corresponding fall in the share of manufacturing.

¹ UK per capita GDP has increased by about 240 per cent since 1948, Office for National Statistics.

² *International Financial Integration*, Lane and Milesi-Felletti, 2003.

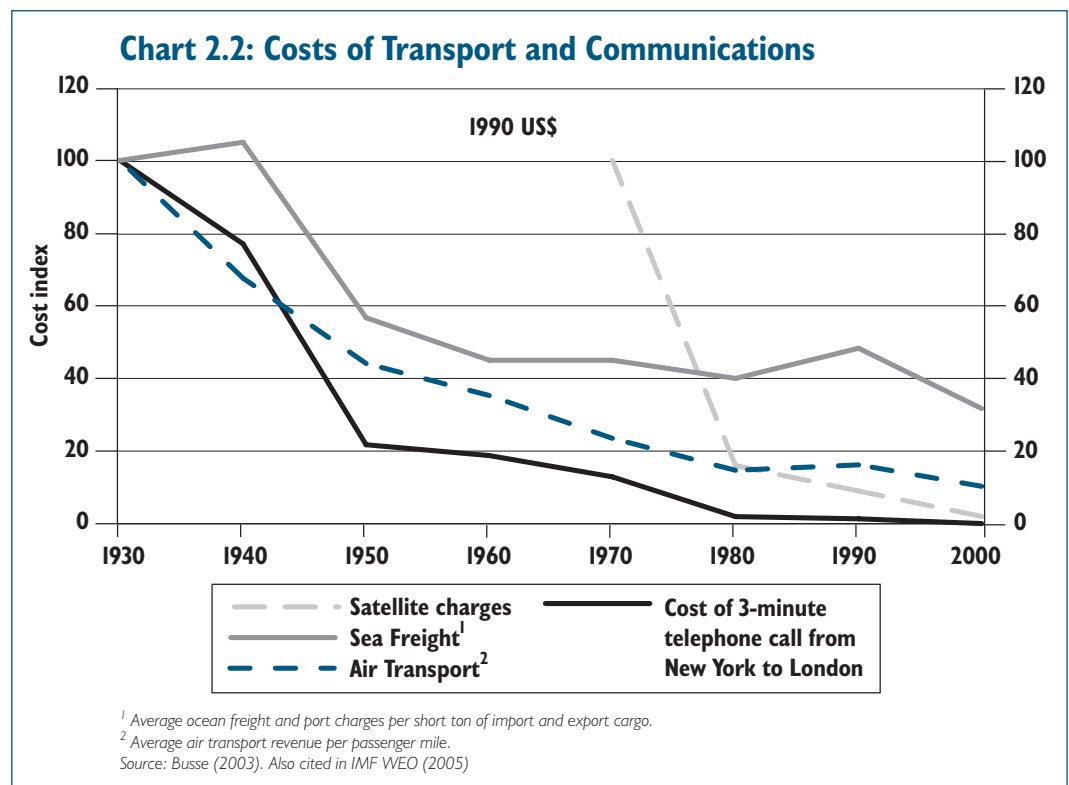
³ *Foreign Direct Investment Trends and Statistics*, IMF, 2003.

Integration of emerging economies **2.9** The past two decades have seen the integration of the economies of the former Soviet Union, emerging markets and developing countries into the global economy. Many countries in Asia, Latin America, Africa and the former Soviet Union have opened up their economies. In particular China and India have experienced rapid economic growth and become increasingly integrated with the world economy. The combined contribution of China and India to global GDP (at purchasing power parity) has increased from 6 per cent in 1980 to 22 per cent in 2005.⁴

Technological advance

Technology has driven global integration **2.10** Rapid technological advance has been a principal driver in the integration of world markets. Advances in transport and communication technologies have made specialisation and the fragmentation and internationalisation of production processes increasingly feasible and cost effective.

2.11 Technology has substantially lowered the costs, increased the speed, and improved the reliability of transport. This has extended the geographical reach of firms, making new markets accessible on a cost-effective basis, although lower costs have not reflected the environmental costs of international transportation. Similarly, major technological progress in the area of communication has been a powerful driver in facilitating global transactions and improving information flows. Recently computers have allowed virtually costless communication via email and the Internet, with national borders providing diminishing boundaries to communication. Chart 2.2 illustrates how technological advances substantially lowered communication and transport costs during the 20th century.



⁴HMT calculations based on IMF, EIU and Consensus forecasts.

2.12 Recent decades have seen rapid advances in the area of information technology. Computing speed and storage capacity have progressed at an exponential rate. Between 1970 and 1999, the cost of 1 megahertz of processing power fell from US\$17,601 to 17 cents.⁵ The invention of the personal computer and the internet have also changed the way that many markets operate, promoting productivity and growth. Increasing public availability of information has enabled more effective competition and price convergence for traded goods and services.

Technology has influenced how people live their lives

2.13 Technology has transformed life in the social sphere. “Time-saving” technologies such as the vacuum cleaner and washing machine have reduced the workload in the home. This has helped facilitate a transformation in family lives. The uptake of “time-using” consumer technologies such as the television and video recorder has brought dramatic changes in the way people spend their free time. Uptake of these technologies has often been rapid. The proportion of households with a dishwasher increased from 6 per cent in 1985 to 32 per cent in 2004. The proportion with a video recorder increased from 31 per cent to 88 per cent over the same period.⁶

2.14 More recently access to information and communication technologies has increased dramatically. Uptake of the mobile phone and the Internet has been rapid. In 2004, 79 per cent of households had a mobile phone, compared with 58 per cent in 2000, and 51 per cent of households had a home internet connection compared with 33 per cent in 2000.⁷

Changes to society

Society has become more prosperous

2.15 Technological progress and global economic change have led to society becoming more affluent. Real household disposable income has consistently doubled every 25 years. Even those in the bottom decile have experienced significant increases in real income. Rising incomes have meant a smaller proportion of income is spent on essentials such as food, fuel and housing, leaving a greater proportion of disposable income to be spent on other goods and services.

Transforming lifestyles

2.16 This has facilitated a dramatic change in lifestyles. As already outlined, technology, along with greater affluence, has transformed work in the home and the way people spend their free time. Ownership of durable goods has increased dramatically, and a growing portion of income is now spent on leisure activities. The number of private cars licensed in Great Britain has increased from less than 2 million in 1950 to over 26 million by 2005.⁸ Spending on recreation and culture increased by 683 per cent between 1971 and 2004.⁹ UK residents made 42.9 million holiday trips abroad in 2004 compared with 6.7 million in 1971.¹⁰ This reflects a huge increase in living standards over time. However not all changes have been positive. The prevalence of obesity has increased dramatically – adult obesity has nearly quadrupled over the past 25 years and childhood obesity has tripled over the past 20 years.¹¹

⁵ *The 21st Century at Work*, Karoly and Panis, 2004.

⁶ *General Household Survey 2004*, Office for National Statistics, December 2005.

⁷ *Ibid.*

⁸ *Transport Statistics Great Britain: 2006 edition*, Department for Transport, November 2006.

⁹ *Social Trends 36*, Office for National Statistics, February 2006.

¹⁰ *Ibid.*

¹¹ NHS Direct. In contrast the prevalence of smoking declined steadily from the 1970s – the proportion of adults who smoke fell from 45 per cent in 1974 to 25 per cent by 2004. *General Household Survey 2004*, Office for National Statistics, December 2005.

- Attitudes have changed** **2.17** There has been a marked shift in attitudes and values within society since the end of the Second World War. The British Social Attitudes Survey indicates that political trust has declined and there are signs of political disengagement.¹² Certainly turnout at general elections has fallen – from 83.9 per cent in 1950 to 61.4 per cent in 2005 – along with membership of political parties.¹³ The British Social Attitudes Survey suggests that social trust also declined between the late 1950s and early 1980s before stabilising.¹⁴
- Self-reported well-being has remained largely unchanged** **2.18** Throughout all these changes, self-reported well-being appears to have remained largely unchanged. For example survey evidence suggests that while household income increased significantly over the period 1973-1997, there was little change in reported life satisfaction.¹⁵ Other measures of economic welfare also indicate that greater affluence has not lead to corresponding gains in welfare.¹⁶ Part of the explanation for this may be that the aspirations and expectations of consumers have risen with increases in income and material comfort.¹⁷
- Greater inequality** **2.19** In the context of rising living standards the latter part of the 20th century saw increasing income inequality in the UK. Having remained largely flat in the post-war period income inequality declined slightly during the 1970s. It then increased rapidly between 1978 and 1990 due to a number of factors including skills-biased technological change, changes in the composition of employment (including increasing polarisation between zero-earner and two-earner households), changes in industrial relations, and changes in taxation. This upward trend continued at a slower rate during the 1990s, but in recent years has stabilised, in part due to policy interventions including those targeted at reducing child and pensioner poverty.
- Fertility has fallen following the baby boom** **2.20** A post-war “baby boom” was followed by a peak in the total fertility rate of nearly three children per woman in 1964. As educational opportunities for women increased and provided new scope for achievement in the workplace, motherhood was increasingly postponed. Female labour force participation increased from 47 per cent in 1959 to 70 per cent in 2004.¹⁸ Chart 2.3 illustrates how the UK fertility rate has declined rapidly, with an equilibrium below replacement fertility of about 1.75 prevailing from the mid-1970s to today. Completed family size has also fallen from 2.46 in 1962 to 1.81 in 2004.
- Population ageing** **2.21** Increasing life expectancy combined with below replacement fertility has led to society as a whole becoming older. The average age of the population increased from 34.1 years in 1971 to 38.6 years in 2004.¹⁹ Population ageing has been experienced not just in the UK but in most developed countries. However the rate of population ageing in the UK has been relatively slow by comparison with the rate of ageing projected in the future. While the number of people aged over 65 has increased, the old-age dependency ratio has increased only slightly from 28 per cent in 1971 to 30 per cent in 2004.²⁰ This is because the working-age population has been swelled by the baby boom of the 1950s and 1960s.

¹² *British Social Attitudes Survey*, National Centre for Social Research.

¹³ *The Report of Power: An Independent Inquiry into Britain's Democracy*, The Power Commission, March 2006.

¹⁴ *British Social Attitudes Survey*, National Centre for Social Research.

¹⁵ Eurobarometer. Evidence shows there is a very weak relationship between income per head and life satisfaction at higher income levels.

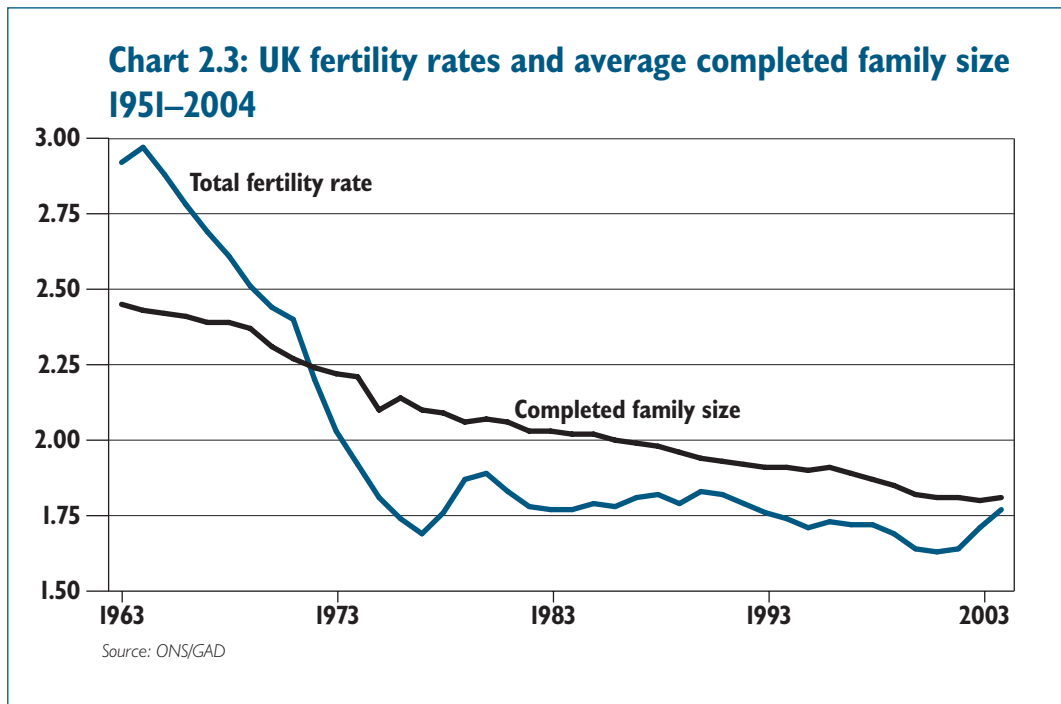
¹⁶ For example the Index of Sustainable Economic Welfare and the New Economics Foundation's Measure of Domestic progress have both declined since the 1970s.

¹⁷ There is a growing literature exploring this. See for example *Happiness, Lessons from a New Science*, Layard, R. Penguin, 2005 and *The Challenge of Affluence: Self-control and Well-being in the USA and Britain since 1950*, Offer, A. Oxford, 2006.

¹⁸ Office for National Statistics, based on DfEE and *Labour Force Survey* data.

¹⁹ *Focus on People and Migration*, Office for National Statistics, December 2005.

²⁰ *Ibid.*



More single living **2.22** Declining family size and an increase in single living has meant that the size of the average household has fallen. The proportion of single person households in Britain increased from 17 per cent in 1971 to 31 per cent by 2004.²¹ Rates of divorce and separation have increased, and the proportion of dependent children living in lone parent households more than tripled between 1972 and 2004.²² Combined with the rise in the overall population these changes have seen the number of households in Britain increase from 16.3 million in 1961 to 24.2 million by 2005.²³

Migration has brought greater diversity **2.23** The UK has become more ethnically diverse, driven by migration patterns in the second half of the 20th century. During the 1950s and 1960s labour shortages in Britain saw mass immigration from the New Commonwealth countries, in particular India, Pakistan and the Caribbean. Migration from Bangladesh, Hong Kong and Africa followed. Throughout the period there was steady migration from Old Commonwealth countries. Greater economic integration and labour mobility have led to increasing migration within the EU, and more recently there has been an increase in migration from Eastern European countries. By 1991 Britain's ethnic minority population had reached 3.1 million and this increased to 4.6 million in 2001, representing 8.1 per cent of the population.²⁴ Migrants have brought economic benefits together with considerable linguistic, religious and cultural diversity to the UK.²⁵

Increasing environmental degradation

Increasing pressure on ecosystems **2.24** The period since the Second World War has seen ecosystems change more rapidly than at any comparable time in human history. The growth of the global population, from 2.5 billion in 1950 to 6 billion in 2000, and expanding economic activity, has placed increasing pressure on the healthy functioning of the environment worldwide. Between 1960 and 2000

²¹ *General Household Survey 2004*, Office for National Statistics, December 2005.

²² *Social Trends 35*, Office for National Statistics, March 2005.

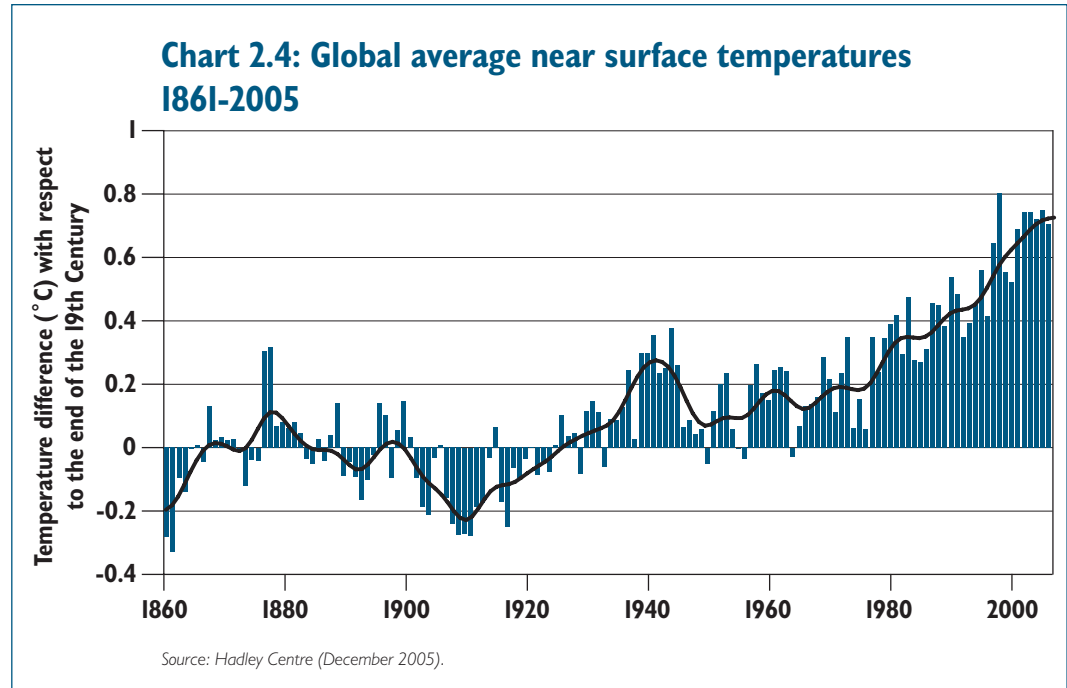
²³ *Social Trends 36*, Office for National Statistics, February 2006.

²⁴ *Ibid.*

²⁵ Migrants have a positive impact on the economy and a positive fiscal impact, contributing more in taxes and social insurance than they consume in benefits and other public services. For example, see *The Migrant Population in the UK: Fiscal effects*, Home Office, 2002.

food production increased by roughly two and a half times, water use doubled and wood harvests for pulp and paper trebled.²⁶ This intensive use of the environment has not always been sustainable. Stocks of particular fish species have been depleted. Some natural habitats have been lost and wildlife threatened.

Global climate change 2.25 The global climate has warmed by 0.7°C since 1900,²⁷ in large part due to increasing concentrations of greenhouse gases in the atmosphere, resulting from land use change and increasing energy consumption. This rate of warming was unprecedented for at least the past 1,000 years. Chart 2.4 illustrates the rapid increase in global temperatures since 1970.



Greater public awareness 2.26 It has become increasingly clear that natural resources and the global climate are under pressure from human actions. An overwhelming body of evidence from around the world has established that human activity is responsible for increasing concentrations of greenhouse gases in the atmosphere, and therefore is responsible for at least part of the observed warming. Pressures on the environment have been increasingly drawn to public attention through the development of the green movement, the introduction of environmental regulation, and publicity surrounding international climate change action including the Kyoto Protocol.

UK has seen some improvements 2.27 Despite worldwide environmental degradation, the UK has achieved significant improvements against some environmental measures in recent decades. Emissions of major air pollutants including carbon monoxide, sulphur dioxide and nitrogen oxides have fallen dramatically since 1970. Between 1970 and 2003 total carbon dioxide emissions decreased by 19 per cent.²⁸ Regulation, taxation and concerted international action has often been responsible for improvements. The Montreal Protocol saw UK production of chlorofluorocarbons (CFCs), which was 102,000 tonnes in 1986, cease by 1995 except for essential uses.²⁹ However in other areas the picture has been less positive. Biodiversity has

²⁶ *Ecosystems and Human Well-being: General Synthesis*, Millennium Ecosystem Assessment, 2005.

²⁷ Hadley Centre for Climate Prediction and Research.

²⁸ National Environmental Technology Centre.

²⁹ United Nations Environment Programme and Department for Environment, Food and Rural Affairs.

declined across many measures, although on some measures this decline has been halted in recent years.³⁰ Households and businesses have produced increasing quantities of waste.

2.28 In the UK, and other developed countries, improvements have been achieved alongside continued economic and population growth. Between 1990 and 2002 greenhouse gas emissions in the UK were reduced by 12 per cent.³¹ Over the same period the economy grew by 35 per cent and population grew by 3.5 per cent.³²

Changing international security environment

The Cold War period

2.29 For more than forty years until the break-up of the Warsaw Pact, international relations and security policies were dominated by the Cold War between the United States and the Soviet Union, and their alliance partners. Within this context of bipolar conflict, many changes occurred which had significance for the global security landscape and the balance and composition of the international system. These included: independence for all major colonies including India, now the world's largest democracy; the rapid economic growth of Japan; and the beginnings of the reawakening of China as an economic and political force. Throughout this period, the UK maintained a strong tradition of internationalism and engagement with the wider world, playing a key role in international institutions including the United Nations (UN), the North Atlantic Treaty Organisation (NATO) and the European Union (EU).

Post-Cold War uncertainty

2.30 The break-up of the Warsaw Pact heralded a period of uncertainty and transition in the international environment, despite some predictions that the end of the Cold War would usher in a period of global stability.³³ New challenges have emerged and the level of some existing threats has risen: international terrorism has become a defining threat for many countries; concern about the spread of weapons of mass destruction has increased; and the reach of organised crime has grown. Many conflicts have taken place, although largely within states rather than between them. NATO and the EU have increased in size, and their role has evolved. The UN has increasingly become involved in peacekeeping and mediation.

Global poverty

2.31 Poverty has remained a challenge for the international community, and has moved increasingly to centre stage. During the post-war period aid was often focused on strategic concerns, with foreign affairs sometimes taking priority over poverty reduction. Since the end of the Cold War aid and debt relief have increasingly been targeted at low-income countries. Millions of people have been lifted out of poverty, particularly in China, due both to foreign aid and the benefits of globalisation. However, despite a decline in the proportion of the world's people living in severe poverty,³⁴ billions remain in poverty across the world. Around half of the world's population still live on less than two dollars a day, many without adequate food, shelter, safe water and sanitation.

Changing priorities for the UK

2.32 Threats to the UK have shifted over time as a result of global and domestic trends. Irish related terrorism was a key threat to the security of British citizens from the 1960s with loyalist and republican terrorist groupings operating both in Northern Ireland and on mainland Britain. This threat has receded in recent years. The conventional military threat that faced the UK and its overseas territories during the Cold War has also receded and not

³⁰ *The UK Biodiversity Action Plan: Highlights from the 2005 reporting round*, Department for Environment, Food and Rural Affairs, 2006.

³¹ Department for Environment, Food and Rural Affairs.

³² Government Actuary's Department, 2004-based projections.

³³ For example see *The End of History and the Last Man*, Francis Fukuyama, 1992.

³⁴ The proportion of people living on less than one dollar a day in developing countries declined from 27.9 per cent in 1990 to 19.4 per cent in 2002. *The Millennium Development Goals Report 2006*, United Nations, 2006.

been replaced. Recently international terrorism has emerged as a direct threat facing the UK along with many other countries. The strategic priorities for the UK have changed as a consequence of these developments.

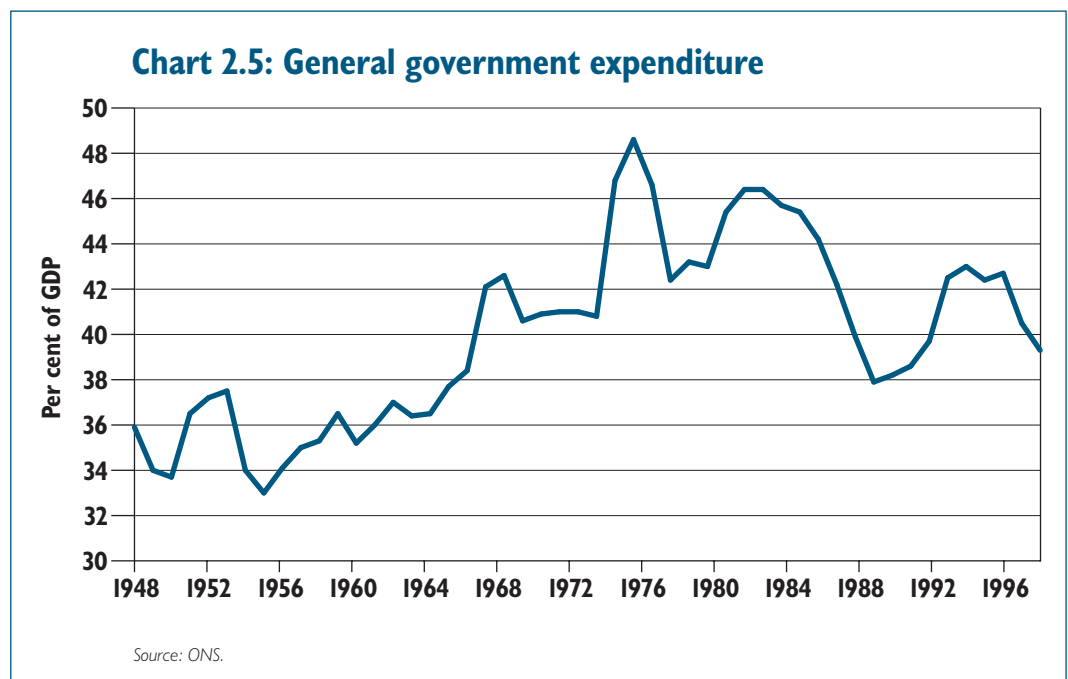
GOVERNMENT RESPONSE TO THIS CHANGING CONTEXT

2.33 Throughout the post-war period government policy and spending has evolved in response to this changing context. This has been reflected by significant changes in the size of the state, and the composition of government spending.

Public spending 1945-1997

Fluctuating size of government

2.34 The Second World War caused a large spike in government expenditure, and the years immediately following the end of the war saw a rapid decline in spending. In the following decades until 1997 there were significant fluctuations in the size of the state, as illustrated in Chart 2.5.



2.35 From 1948 general government expenditure as a percentage of GDP declined, reaching a low of 33 per cent in 1955, despite a temporary increase during the Korean War in the early 1950s. From the mid-1950s until the 1970s there was a clear trend towards higher spending, despite some volatility, reaching a peak of 48.6 per cent of GDP in 1975. This pattern was then reversed, and general government expenditure fell to 39.3 per cent of GDP by 1997. However this trend again masked considerable volatility. In particular there were two significant phases of growth, during the periods 1979-1981 and 1988-1993, which coincided with economic downturns.

Changing composition of spending

2.36 Within this picture, the composition of public spending varied markedly through the post-war period. The welfare state became more important, with a growing share of spending going on social security, health and education. Other areas such as defence and housing saw significant falls in their share of government spending. Debt interest payments also declined but fluctuated significantly during the 1980s and 1990s.

2.37 Social security spending as a proportion of government expenditure doubled in the second half of the 20th century. In the decades following the Second World War benefit payments grew relatively slowly from 15 per cent of general government expenditure to reach 20 per cent by 1975,³⁵ with strong economic growth helping to counteract more generous benefits and an increase in the number of people entitled to retirement benefits. Spending then grew more rapidly, reaching 30 per cent of government spending by 1987, with economic and demographic factors driving a large increase in the number of people claiming benefits. In the following decade the share of social security spending in government expenditure remained relatively stable despite large cyclical fluctuations.

2.38 The share of health and education spending also increased. Following a period of relative stability from the 1950s until the mid-1970s, the share of health spending increased from less than 10 per cent of general government expenditure to around 13 per cent by 1997. This was driven by a combination of factors including demographic change and the rising cost of healthcare due to medical advances and increasing public expectations. The share of education spending increased steadily during the 1950s and 1960s, partly driven by the “baby boom” and increases in the school-leaving age. This was followed by a period of broad stability, with the share of spending remaining between 11 and 13 per cent, reflecting a relatively stable school-age population. Despite these increases, in 1997 the UK was investing less in health and education than comparable countries.³⁶

2.39 In contrast, spending in other areas fell sharply as a proportion of government expenditure. Defence spending showed a steady decline, falling from over a quarter of government spending at the end of the Korean War to just 10 per cent by 1975. This reflected the decline of the British Empire and a relatively benign international security landscape. Spending increased over the next decade, but then declined significantly in real terms from the mid-1980s, following the end of the UK’s NATO commitment to 3 per cent spending growth. By 1997 defence spending accounted for less than 8 per cent of general government expenditure.

2.40 Housing investment rose, stabilised and then fell dramatically. Following rapid increases associated with reconstruction after the Second World War, council housing investment remained relatively stable at around 5.5 per cent of general government expenditure from the mid-1950s to the mid-1970s. It then fell to almost zero by 1982, with the state largely withdrawing from house building.

2.41 Debt interest payments also declined significantly over time but showed considerable volatility. They fell from 14.3 per cent of general government expenditure in 1955 to 9.4 per cent by 1975, and then fluctuated substantially during the 1980s and 1990s. There was a large increase during the mid-1990s, with debt interest payments increasing from 7.3 per cent of general government expenditure in 1992-93 to 9.5 per cent by 1997-98 due to high levels of public sector borrowing.³⁷

³⁵ Spending data in the following paragraphs is sourced from *Long-term Trends in British Taxation and Spending*, Institute for Fiscal Studies, June 2002.

³⁶ Spending on health and education as a proportion of GDP were both below the OECD average in 1997, OECD.

³⁷ *Public Expenditure Statistical Analyses*, HM Treasury.

Government response since 1997

2.42 Since 1997 the Government has continued to respond to the changing context. The 1998 CSR set the Government's priorities for the long-term: sustainable growth and employment; modern and efficient public services; fairness and opportunity; and a secure and fair world. Resources and policy have been redirected to achieve these objectives within the context of evolving domestic and global trends.

Platform of macro-stability

2.43 The Government has put in place a macroeconomic framework to achieve and entrench long-term stability. The monetary policy framework seeks to ensure low and stable inflation. The adoption of a symmetric inflation target coupled with full operational independence for the Monetary Policy Committee in setting interest rates ensures that the decision-making process is open, transparent and accountable. The fiscal policy framework is underpinned by clear objectives and two strict rules introduced in 1997 to safeguard sound public finances over the medium term. The golden rule states that Government will borrow only to invest over the economic cycle. The sustainable investment rule ensures public sector net debt is held over the economic cycle at a sustainable and prudent level.

2.44 This framework has seen the UK economy experience unparalleled macroeconomic stability, with the OECD describing the UK as 'a paragon of stability'.³⁸ The UK economy has expanded for the last 57 quarters, the longest unbroken economic expansion on record. It remained resilient in the face of a number of challenges in 2005 including sustained higher oil prices, weak demand in the euro area and a slowing housing market. Labour market reforms have contributed to historically low unemployment. This has been achieved alongside the National Minimum Wage, which combined with tax credits guarantees a fair minimum income for all workers. The monetary policy framework has delivered low interest rates and low and stable inflation. The public finances have been restored to a sustainable position, with public sector net debt falling from 44 per cent of GDP in 1996-97 to 36.5 per cent at the end of 2005-06.

Microeconomic reforms

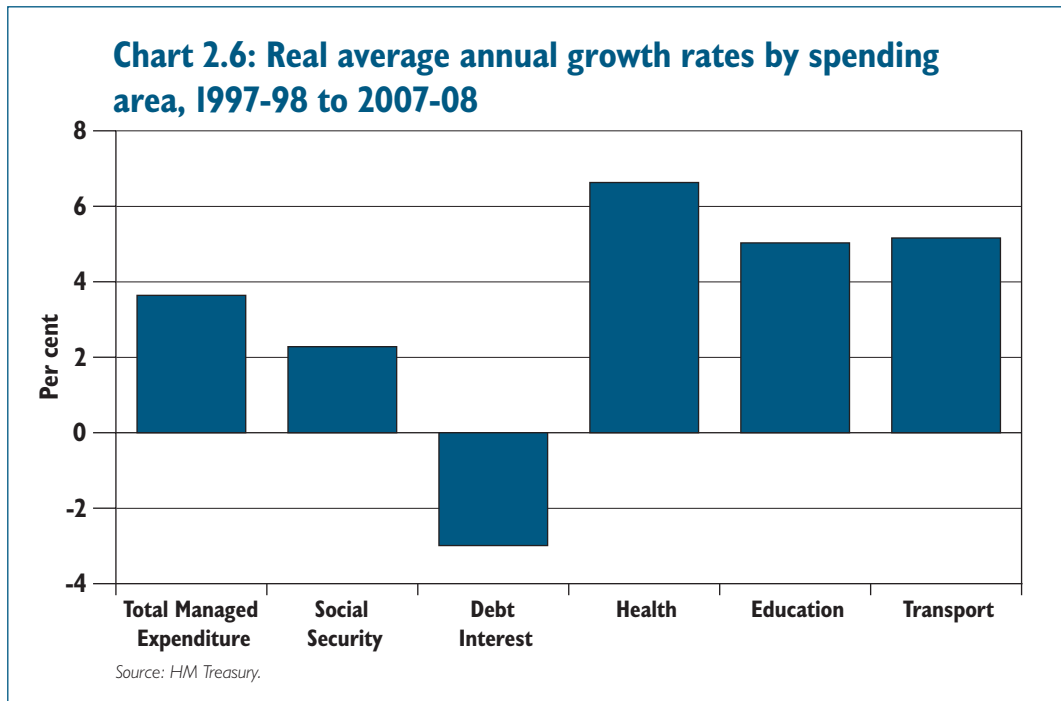
2.45 The Government has also implemented a programme of microeconomic reforms to increase productivity and improve flexibility. Important elements include: steps to strengthen the competition regime, including: the introduction of the Enterprise Act in 2002 which gave independence to the Office of Fair Trading; the *Science and Innovation Investment Framework 2004-14*, which made strengthening the UK's position in science and research and development (R&D) a long-term priority; the introduction of a system of R&D tax credits to ensure that the right incentives are in place for businesses to undertake innovation; reforms to improve the efficiency and responsiveness of the planning system; and following the Hampton review of regulatory burdens on business, the introduction of far-reaching reforms to the UK's regulatory framework, including setting up the Better Regulation Executive. The UK is ranked highest in the OECD on measures of economic flexibility, with the lowest barriers to entrepreneurship of any major economy.

Delivering modern public services

2.46 The Government has undertaken a programme of sustained investment and far-reaching reform to deliver modern public services and meet increasing consumer expectations. High quality education and training, a modern and reliable transport network, an effective criminal justice system, and a modern health service provide the essential foundations for a flexible economy and a fair society, equipped to deal with the global challenges ahead. Chart 2.6 shows how resources have been targeted since 1997 on the Government's priorities in health, education and transport, made possible by stable and

³⁸ *Economic Survey of the United Kingdom*, OECD, 2005.

sustained economic growth with falling debt interest payments and low unemployment. By 2007-08 spending on the NHS will be nearly 90 per cent higher in real terms than in 1997-98, and public expenditure on education and transport will both be over 60 per cent higher in real terms.



2.47 Sustained investment has been matched by steps to ensure value for money and to reform the delivery of public services. The first systematic, transparent, outcome-based performance management system for public services was introduced in the 1998 CSR in the form of the Public Service Agreements (PSAs) framework, and this has been refined through successive Spending Reviews. In line with the recommendations of the Gershon Review, the 2004 Spending Review set out the Government's ambition of achieving over £20 billion worth of annual efficiencies by the end of 2007-08. By the end of September 2006 departments and local authorities reported annual efficiency gains totalling £13.3 billion. Significant progress has been made in reducing the size of the Civil Service and relocating public sector posts out of London and the South East. By the end of September 2006 departments had achieved a gross reduction of nearly 55,500 civil service posts, and over 10,500 posts had been relocated.

2.48 The combination of sustained investment and far-reaching reform has seen outcomes improve across public services. Increased resources for the NHS have helped save over 160,000 lives from 1996 to 2004 as a result of reductions in mortality rates from cancer and circulatory diseases among people aged under 75. In education, over 58 per cent of 15 year olds now achieve five or more good GCSEs, up from 45 per cent in 1997, with some of the biggest improvements seen in disadvantaged areas with a history of low achievement. Between 1997 and 2005-06 overall crime rates fell by 35 per cent, and the risk of being a victim of crime is now the lowest recorded by the British Crime Survey since it began in 1981. The transport system is improving, with over 100 road schemes completed since 2000, people travelling further by rail than in any year since the 1940s, bus use increasing year on year for the first time in decades and guaranteed free fares for off peak travel on local buses for older and disabled people.

Tackling poverty 2.49 The Government has made tackling child poverty one of its key priorities and has committed to eradicating child poverty within a generation. In the 1980s and early 1990s the number of children growing up in poor households more than doubled. Since 1996-97 the Government has more than halved the number of children living in absolute poverty. 700,000 children have been lifted out of relative poverty since 1998-99, a faster reduction than anywhere else in Europe.³⁹ A number of measures have driven this progress: radical reform of financial support for families with children, delivered primarily through Child Tax Credit and Child Benefit; helping more parents into work; and providing better public services for children and their families, in particular flexible, affordable and high-quality childcare provision.

2.50 The Government has also taken steps to tackle pensioner poverty and ensure security in old age. Resources have been targeted at the poorest pensioners through the Pension Credit. The Government has introduced Winter Fuel Payments, free television licenses for over 75s, and free prescriptions and eye tests for those over 65. Between 1996-97 and 2004-05 over one million pensioner households were lifted out of relative low-income poverty and 2.1 million pensioner households were lifted out of absolute low-income poverty.

Protecting the environment 2.51 The Government has taken steps to ensure that economic growth is sustainable. The Climate Change Levy (CCL) and associated climate change agreements were introduced in 2001 to encourage business to reduce energy demand. Enhanced capital allowances for energy-saving technologies and funding for the Carbon Trust were also introduced as part of the CCL package, to help business improve energy efficiency levels. This package has already saved over 28 million tonnes of carbon (MtC) since it was introduced.⁴⁰ The EU Emissions Trading Scheme (ETS) was introduced in 2005 to deliver emissions reductions at least cost. In June 2006 the UK announced that its contributions for the second phase of the EU ETS would be 8 MtC a year below business as usual between 2008 and 2012. A target has been set for renewable sources to supply 10 per cent of UK electricity by 2010, to be achieved principally through the Renewables Obligation. The proportion of UK electricity generated from renewable sources increased by more than half between 2003 and 2005. The UK has taken the lead internationally on climate change and championed this issue, through its G8 and EU presidencies during 2005 and the publication of the *Stern Review on the Economics of Climate Change*,⁴¹ to drive forward multilateral action. UK greenhouse gas emissions were 14.6 per cent below 1990 levels in 2004. Carbon dioxide emissions fell by 5.6 per cent over the same period.

2.52 Other measures have been introduced to ensure high environmental standards. Fuel duty and vehicle tax incentives have contributed to significant reductions in the key pollutants affecting air quality. The introduction of the aggregates levy has resulted in an increase in the use of recycled materials for construction. Increasing the standard rate of landfill tax has contributed to a sharp fall in the proportion of waste disposed of in landfill. Biodiversity and river quality have improved in the last decade.

Responding to the changing security challenges 2.53 Changes in the international and domestic security environment have required a re-orientation of the UK's objectives and its security capability – including through the Strategic Defence Review in 1998.⁴² The Government has responded to the threat from international terrorism by increasing the capacity of the security services and working with other countries to tackle terrorist havens. Existing resources have been reprioritised and departmental budgets increased to strengthen the UK's resilience to, and capability to deal with, a terrorist

³⁹ *Households Below Average Income 2004/05*, Department for Work and Pensions, 2006. Relative poverty is measured against a household income threshold of 60 per cent of contemporary median income. Absolute poverty is measured against a household income threshold of 60 per cent of median income held constant in real terms from a 1996-97 baseline.

⁴⁰ *Modelling the Initial Effects of the Climate Change Levy*, Cambridge Econometrics, March 2005.

⁴¹ *Stern Review on the Economics of Climate Change*, www.sternreview.gov.uk and CUP (forthcoming).

⁴² *The Strategic Defence Review*, Ministry of Defence, July 1998.

attack. In total, planned spending on counter-terrorism and resilience across departments will be more than £2 billion by 2007-08, compared with less than £1 billion prior to 11 September 2001. The UK has reviewed its priorities for multilateral and bilateral engagement. The UK's armed forces have been modernised and investment has been sustained to ensure that they can continue to adapt to changing international threats. British armed forces have played pivotal roles in the international coalitions in Afghanistan and the Gulf.

Addressing global poverty

2.54 The Government has played a leading role in international efforts to tackle continuing poverty in developing nations and achieve the internationally agreed Millennium Development Goals. The UK is now at the forefront of global efforts to deliver effective and sustainable development through multilateral and bilateral means including aid and debt relief. UK overseas development assistance as a proportion of gross national income has increased from 0.26 per cent in 1997 to 0.47 per cent in 2005.⁴² The International Development Act introduced in 2002 ensures that this aid is targeted effectively at poverty reduction, with aid being focused on low-income countries committed to reducing poverty. UK aid to developing countries is helping to reduce permanently the number of people living in poverty by an estimated 2 million each year.

CONCLUSION

2.55 This chapter has discussed changes that have affected UK society in the post-war era. It has looked at the economic integration of global markets; the rapid technological advance that has underpinned this economic change and impacted the social sphere; rising affluence and profound changes to the shape of UK society; environmental degradation, along with increasing awareness of the pressures on natural resources and the global climate; transformation of the international security environment; and progress in addressing global poverty.

2.56 It has also summarised the evolution of government spending during the post-war period and set out how the Government has redirected resources and policy to meet these challenges since 1997. The Government has: created the platform of macro-stability that has enabled the UK to withstand external economic shocks; implemented microeconomic reforms to enable the UK to adapt flexibly to change; undertaken a programme of sustained investment and far-reaching reform to deliver modern public services; halted and reversed the rise in child and pensioner poverty seen in previous decades; introduced measures to protect the environment; responded to the threat from international terrorism; and sought to address continuing poverty in developing countries.

2.57 The Government is using the 2007 CSR as an opportunity to reassess the key long-term trends and challenges that face the UK and examine how the Government and public services will need to respond to ensure that Britain is fully equipped to seize the opportunities and meet the challenges of the decade ahead. The chapters that follow set out these challenges in detail and explain how the Government will use the CSR to help ensure that the UK is well placed to respond to them.

⁴² The 2005 figure reflects a significant unprojected short term increase due to the debt relief deal agreed with Nigeria and Iraq in addition to the implementation of spending plans to increase expenditure on overseas development assistance.

3

DEMOGRAPHIC AND SOCIO-ECONOMIC CHANGE

INTRODUCTION

3.1 This chapter examines the challenges presented by demographic and socio-economic trends. A number of these trends have been identified in HM Treasury's *Long-term public finance report: an analysis of fiscal sustainability*, which is updated annually.¹

3.2 Today the UK population is growing faster than in the recent past and the average age is increasing. Average incomes are rising and society is becoming more diverse. These changes are altering the dynamics of communities, influencing behaviours, and changing demands on public services.

Overview 3.3 The first section sets out the broad outlook in the decade ahead by discussing trends in the size, characteristics and structure of the population both at the UK level and sub-nationally. The UK faces continued growth in the overall population, driven by increased life expectancy and migration, and the proportion of those over 65 will begin to rise rapidly at the end of the CSR period. Trends differ considerably by region and much of the population growth will be in southern parts of England.

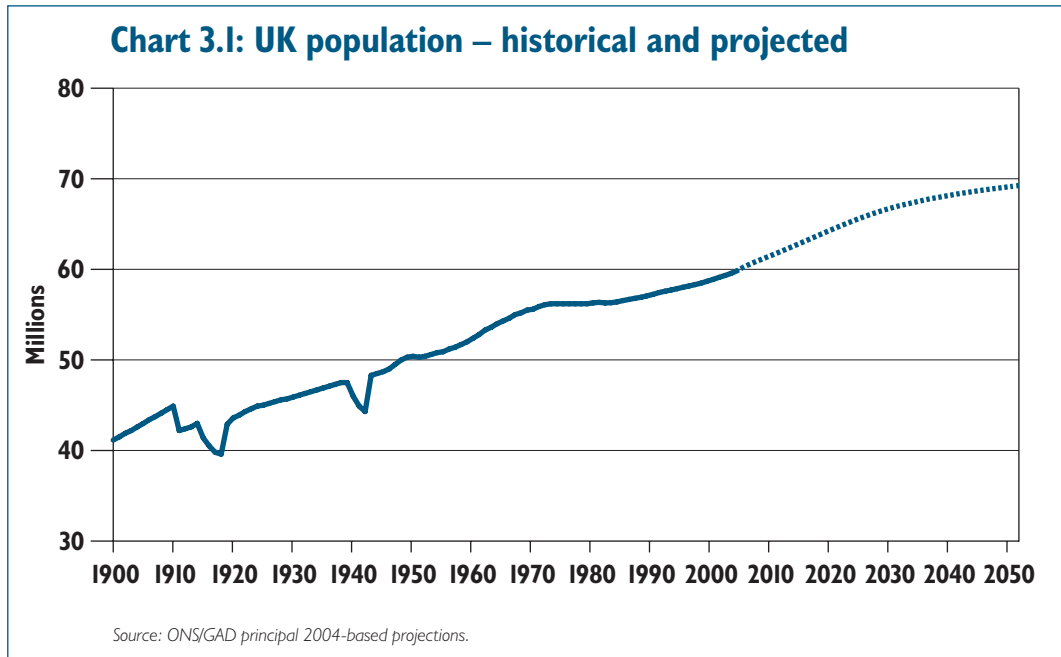
3.4 The second section looks at trends across the life cycle, in relation to young people, families, those of working age, and the elderly. There is likely to be a small decline in the number of young people and a continued fall in the average household size. Migration is expected to increase the working age population, while there will be large increase in the number of older people.

3.5 The third section sets out past and potential future socio-economic trends, including labour-market trends. The overall labour market participation rate is expected to be stable, with participation among women and older workers continuing to rise. People's preferences are likely to change, demanding more of certain goods as they become wealthier and posing new challenges for public services and wider society. Community cohesion will be an important issue but trends are difficult to predict. The Government remains committed to reducing the number of children and pensioners in poverty. Increasing returns to skills will continue to contribute to pressures on inequality.

POPULATION SIZE AND STRUCTURE

3.6 The UK population has grown by around 50 per cent over the last century. In 1900 the UK population was 41 million. It grew to reach 50 million in 1951, and 60 million in 2005 (Chart 3.1). Growth rates have been relatively steady over this period.

¹ *Long-term public finance report: an analysis of fiscal sustainability*, HMT, 2005.



3.7 The main drivers of the growth in population have been greater longevity and falling infant mortality. Male life expectancy at birth rose from 45 years in 1900 to 75 years in 2000 and infant mortality rates fell from 140 deaths per 1000 births to just 6 a century later. The main impact of these trends has been partly offset by a fall in completed family size from 3.5 children in 1900 to 1.8 in 2000.²

Population trends and projections

Overall UK population is rising **3.8** Official population projections produced by the Government Actuary's Department (GAD) suggest a moderate acceleration in population growth over the decade from 2007, with the UK population expected to reach 64 million by 2017 in the principal projections. The population is projected to be around 70 million by 2054. This is shown in Chart 3.1.

Natural change and migration are the drivers **3.9** These estimates are based on projections of natural population change and net inward migration. **Natural change** is projected to account for 50 per cent of UK population growth between 2007 and 2017 because the number of births over that period are expected to exceed the number of deaths. However, natural change is expected to become a negative component of population growth from the early 2030s.

3.10 Positive **net migration** is projected to account for the other half of UK population growth 2007-17 under GAD's principal projection and, based on historical trends, is projected to remain positive in the longer term. Migration projections, and variations around these, are discussed later in this chapter.

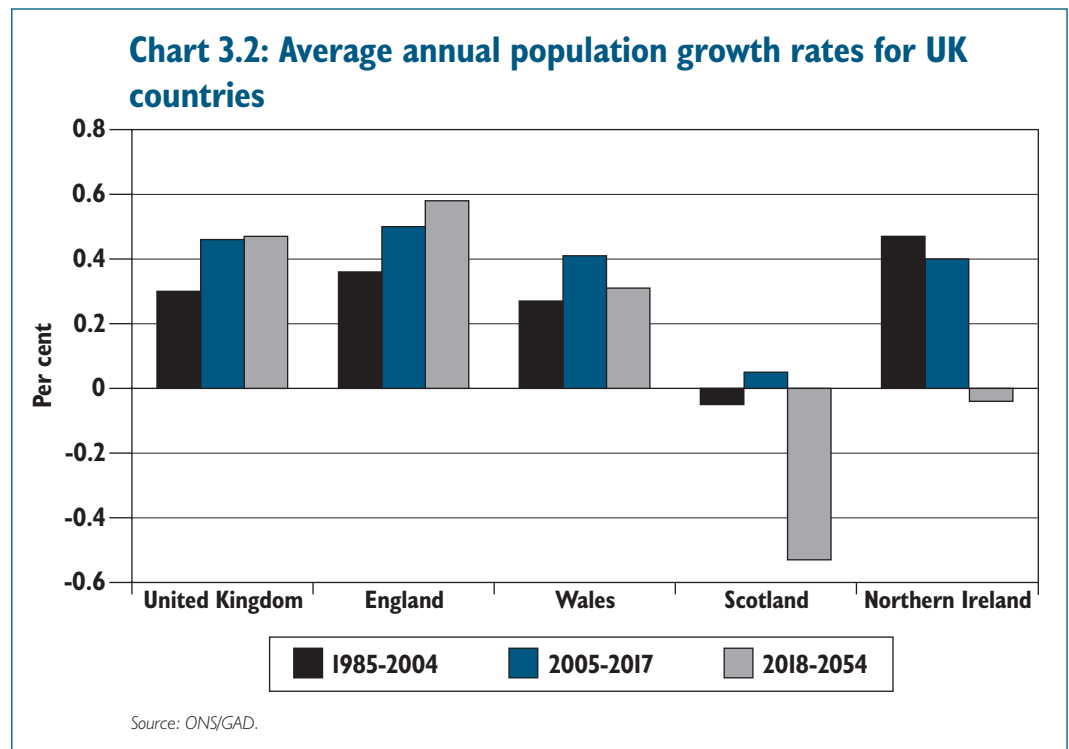
² *British Social Trends Since 1900*, Office for National Statistics.

3.11 These projections are subject to some uncertainty,³ as they require explicit assumptions concerning future trends in life expectancy, fertility rates⁴ and net migration. GAD’s “low” and “high” projection variants show the UK population as 62 million and 66 million in 2017 respectively, and even these estimates do not represent absolute lower or upper bounds. Alternative “stochastic” projections,⁵ in which key parameters (including the fertility rate, morbidity rates and migration) are “shocked” at random, yield a much wider range of projected population levels than implied by GAD’s projection variants.

Population trends by UK country and region

Population growth will vary across UK

3.12 Chart 3.2 shows that the population of England is expected to rise faster than other parts of the UK over the next 12 years. Beyond 2017, population growth will increase in England, but is projected to slow in Wales, and the populations of Scotland and Northern Ireland are projected to decline.



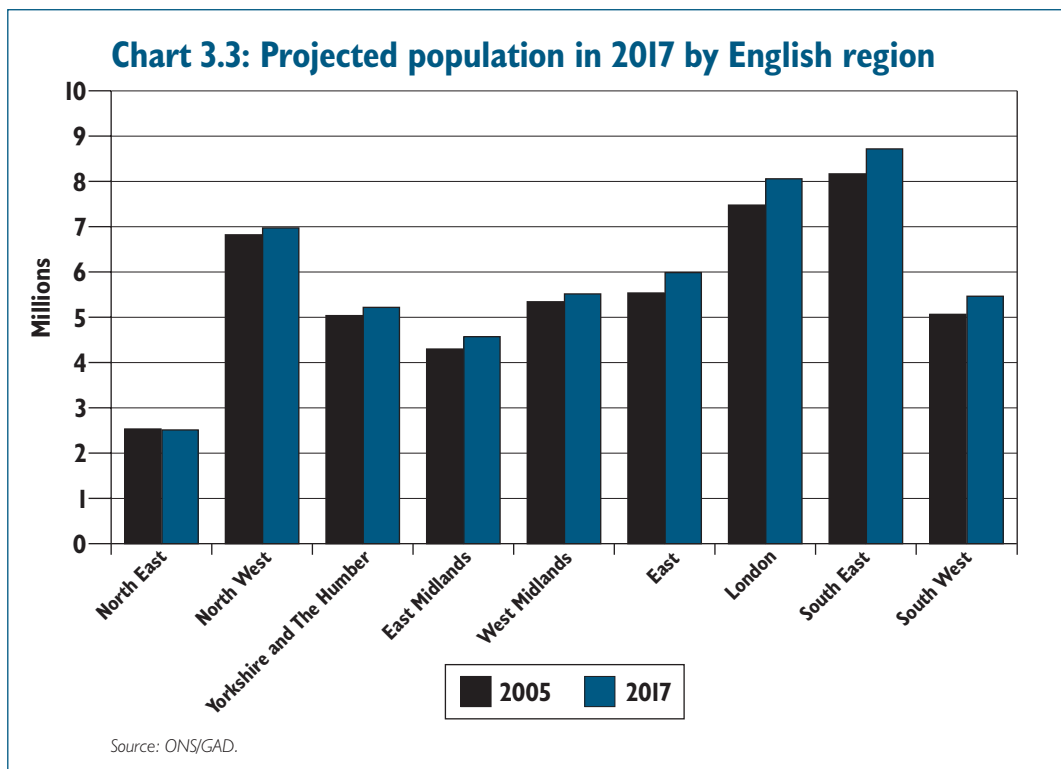
³ For example, projections made in 2000 overestimated the 2004 population by around 700,000 persons. Consistent positive population projection errors in projections made between 1995 and 2000 largely reflect the impact of the 2001 Census, which revealed that the estimates of the current population were around 1 million persons too high.

⁴ Defined as the average number of children who would be born per woman if women experienced the age-specific fertility rates of the reference period throughout their childbearing lifespan.

⁵ See *Fiscal Implications of Demographic Uncertainty for the United Kingdom*, James Sefton and Martin Weale, NIESR, 2005.

Overall UK population is rising

3.13 In addition, as shown in Chart 3.3, significant regional variations are also likely, with the South East, London, the East, and the South West projected to experience particularly large increases in population. These projections also capture assumptions about future trends in migration between regions, with the East, South East and South West assumed to observe a net internal (within UK) inflow between now and 2017. By contrast, London and the North West are assumed to observe a net internal outflow over this period.⁶



3.14 Variation in projected population growth rates across the UK reflects differences in the assumptions (based on past trends) about life expectancy, fertility rates and migration. For example, life expectancy at birth⁷ for males in 2017 is assumed to be 77.3 years in Scotland, compared to 79.9 years in England. Scotland is assumed to observe a fertility rate of 1.6 in contrast to 1.75 for both England and Wales, and 1.8 for Northern Ireland. England is assumed to observe relatively high net inward migration (130,000), compared to Wales (12,000), Scotland (4,000) and Northern Ireland (-1,000). A combination of the above assumptions explains the fall in the population of Scotland after 2017.

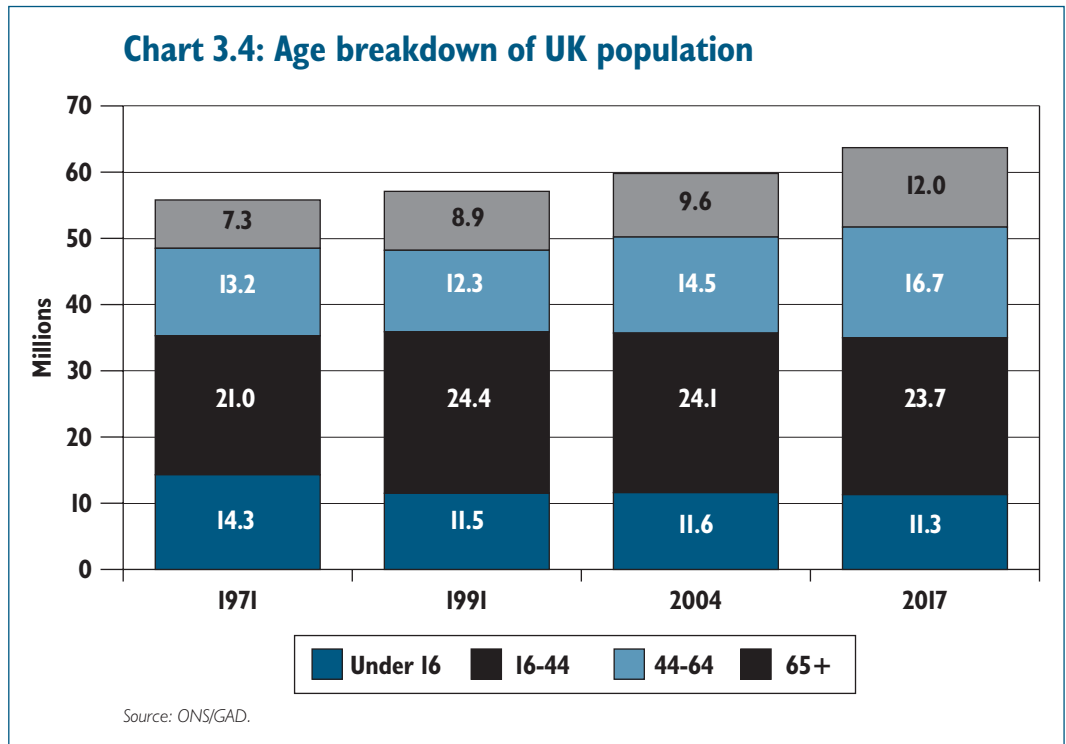
THE LIFE CYCLE

3.15 This section looks at demographic trends in more detail, considering trends across the life cycle: in relation to young people, families, those of working age, and the elderly. As well as changes in the size and structure of the population, issues such as household and family structure are considered.

⁶ See <http://www.statistics.gov.uk/STATBASE/Product.asp?vlnk=997>.

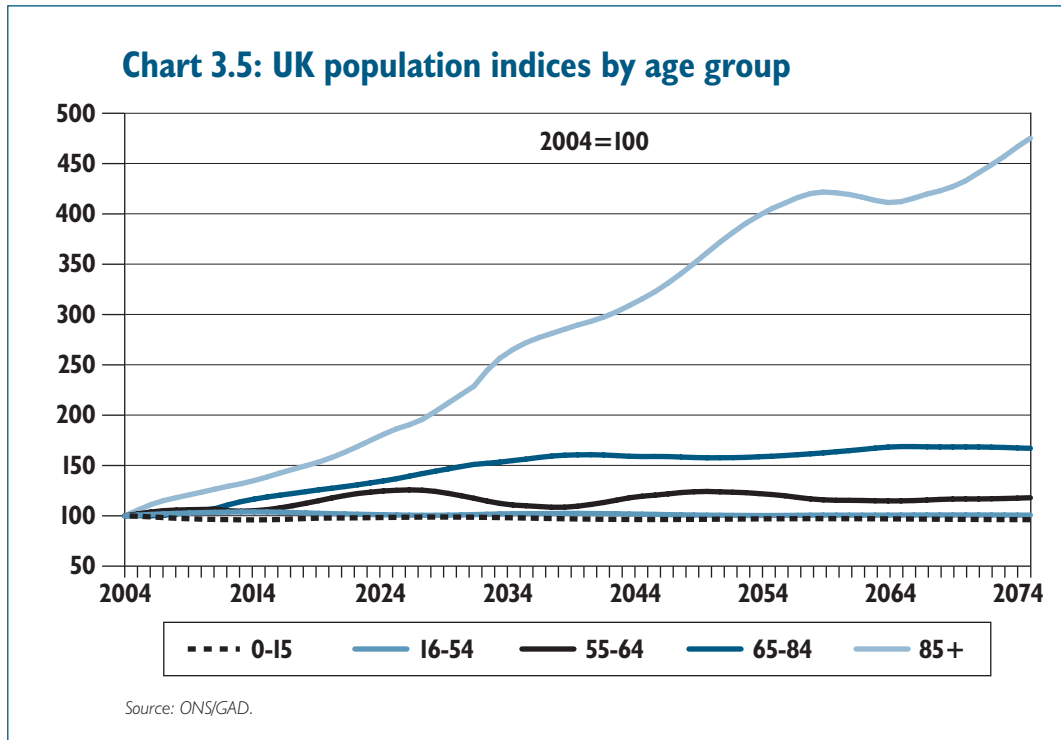
⁷ This is a period life expectancy, which provides a good indication of how long the average person is currently living. It would be expected that someone born on this date would live longer than this, due to anticipated future increases in life expectancy.

3.16 In 1901 the proportion of the population aged over 50 was around 15 per cent.⁸ This rose to 25 per cent in 1951, 31 per cent in 1991 and 33 per cent in 2005. Chart 3.4 illustrates that, alongside population growth, there will continue to be significant change in the age structure of the UK population. In 2017 the UK is expected to have 1.9 million more people aged 65-84 and 0.5 million more aged over 85, compared to 2004.



3.17 Chart 3.5 shows how the proportion of over 65s and especially over 85s is expected to rise sharply over the longer term. Changes in the size of different age groups, and the associated trends, are discussed in more detail below.

⁸British Historical Statistics, Mitchell, 1998; and GAD.



3.18 An ageing population is expected to be a phenomenon common across the developed world. The increase in the share of elderly people in the UK (from 21 per cent of the population aged over 60 in 2006 to 29 per cent in 2050) is likely to be less than the European average (21 per cent in 2006 to 34 per cent in 2050), according to UN projections.⁹

Young people and families

Slightly fewer children after 2007

3.19 Chapter 2 showed that fertility rates have declined significantly since the 1960s from almost three children per woman in 1964 to around 1.8 today. Over the past decade, the fertility rate has contributed to a 3 per cent fall in the number of children aged under 16 years. A projected continuation of lower levels of fertility, at a rate of 1.73 children per woman, helps to account for a continued decrease in the number of children of around 3 per cent over the next decade.¹⁰ This is below the fertility rate necessary to stabilise the aggregate population level (the ‘replacement rate’) in the absence of positive net migration and continued increases in life expectancy.

Families and households have become smaller

3.20 The historical fall in the average completed family size has coincided, as might be expected, with an overall fall in the proportion of large families. While couples with three or more children accounted for more than 40 per cent of all families in 1972, their share had dropped to just over 20 per cent by 2004. Correspondingly, average household size has fallen from nearly 2.9 people in 1971 to around 2.3 at present. Contributing to that trend, lone-parent families, as a share of the total, have risen significantly over the past three decades, in England from around 2.5 per cent in 1971 to over 7.5 per cent in 2006. In addition, the proportion of single-person households increased by 20 per cent between 1991 and 2006.¹¹

⁹ <http://www.un.org/esa/population/publications/ageing/ageing2006table.xls>.

¹⁰ This overall decline masks variations between age groups: for example, there is projected to be an increase in the population aged 0 to 5 years over the next decade and this will begin to filter through to the 5 to 11 age group later in the period.

¹¹ Department for Communities and Local Government Household Projections, March 2006 (based on Census, Office for National Statistics and GAD data).

3.21 Crucial to understanding the factors underlying this trend of falling household size is not only the fall in the average family size, but also the shift in the composition of total households away from larger household structures towards smaller structures (such as couples with no children and those living alone). For example, the share of the population living alone has increased from 6 per cent in 1971 to around 13 per cent in 2003, driven by a particularly large increase in the proportion of males aged 25 to 64 living alone.¹²

3.22 People are choosing to have families later in life. The average age at childbearing 30 years ago was 26; now it is over 29. There are significant differences between regions. Although overall birth rates do not vary significantly, women in London are more likely to give birth aged 35-39 than they are aged 20-24. In the North-East of England, 20-24 year olds are 2.5 times as likely to give birth than 35-39 year olds.¹³

Households expected to continue getting smaller

3.23 Projections by the Department for Communities and Local Government (DCLG) suggest a levelling off in the total number of lone-parent households and a projected decline in their relative share of households over the next 15 years, driven by divorce and fertility rates. DCLG projections also suggest that average household size will fall further, from around 2.3 now to about 2.14 by 2021. The assumed continuation of the growth in living alone, both due to changing lifestyles among the working-age population and a rising elderly population, helps to account for a major part of the projected reduction in average household size between now and 2021, in combination with an assumed further fall in average family size.

3.24 Projections of household and family structure must be treated with caution, as they are founded on assumptions in relation to uncertain factors (for example, marriage, divorce and partnership formation trends), and may be liable to change in the future.

Working-age population and migration

3.25 Over the past decade, the size of the working-age population (16-64) has increased by around 6 per cent and GAD projections suggest an increase of a further 2 per cent between 2007 and 2017. Despite this, the share of the working-age population in the total population is projected to fall slightly, from 65 to 63 per cent.¹⁴ The age structure of the working-age population is projected to remain relatively stable, with the median age of this group projected to increase from 38 to 39 years between now and 2017.¹⁵ Indeed, the share of those aged 50 to 64 years in the working-age population is projected to increase by just over 1 percentage point in this period. The actual number of people working will also depend on people's lifestyle preferences, which are considered later under socio-economic trends.

3.26 Migration is an important component of projections of the future size of the working-age population as a relatively high proportion of migrants are of working age. Net migration added around 185,000 to the population in 2005.¹⁶ GAD's 2004-based principal population projections assume positive net inward migration of 145,000 per year from 2008 onwards,

¹²A report by the Institute for Public Policy Research notes that increased financial independence and people forming partnerships later on in life has helped to contribute to the significant expansion in living alone. See *Population Politics*, IPPR, 2006.

¹³*Social Trends 36*, Office for National Statistics, 2006.

¹⁴This figure relates to the 16-64 population only, and does not refer to GAD's "working age population", which for females is defined by the age group 16-59, and is then adjusted from 2010 in accordance with the increase in the female state pension age.

¹⁵The median age of the "formal" working age population, which currently excludes females aged between 60 and 64, is projected to increase from 37 to 39 between now and 2017, reflecting both the projected ageing of the population and the increase in the female state pension age between 2010 and 2020.

¹⁶"Total International Migration" data, Office for National Statistics, November 2006.

comprising an inflow of 500,000 people and an outflow of 355,000 people per annum. Nearly 90 per cent of this net migration is assumed to be working age. However, these numbers are subject to significant uncertainty. GAD's high migration scenario presents net inward migration of 205,000 per year, which is closer to recent outturn data.¹⁷

The elderly population

The number of people aged 85 years and over will rise dramatically

3.27 As already noted, one of the most significant demographic trends projected to occur over the 2007-2017 period will be the increase in the number of people aged 65 years and over. An important aspect of this is the ageing of the “baby-boom” cohort who, as shown in Chapter 2, were born during a period of high birth rates between 1945 and 1965. Additionally, a particularly important driver is the sharp projected increase in the number of “oldest old” (those aged 85 years and over). The size of this group is projected to increase by 38 per cent between 2005 and 2017, compared to 17 per cent between 1995 and 2005. The increase in the future elderly population can be predicted with sufficient certainty to mark it out as an important trend.

3.28 Recent and projected gains in life expectancy, particularly when evaluated at later ages, largely explain the projected expansion of this age group. However, levels of life expectancy at 65 vary widely across the UK, and are projected to continue to do so between now and 2017. At present, life expectancy at 65 for a male living in Scotland is 15.9 years, as opposed to nearly 17 years for a male living in England, Northern Ireland or Wales. Such differences are projected to be maintained in the future, with the projected life expectancy of a male aged 65 in 2017 equal to 18.3 years in Scotland, as opposed to 19.4 years in England.

3.29 There have also been significant variations in life expectancy across different social groups over the past two decades. According to the Office for National Statistics (ONS), the difference in life expectancy at 65 between “professionals” class and the “unskilled” was nearly four years for women and five years for men between 1997 and 2001.¹⁸ In addition, these gaps have increased in general over the past 30 years. On the basis of this evidence, such differences may persist into the future.

Healthy ageing is a key uncertainty

3.30 Crucial to understanding the policy implications of the increase in the number of elderly people (and especially over 85s) is the proportion of additional years of life that are spent in good health. A measure often used to capture recent trends in healthy life expectancy is “life expectancy in self-perceived good or fairly good general health”. Using this definition, ONS data suggests that healthy life expectancy at 65 has increased steadily over the past two decades, while remaining broadly stable as a proportion of overall life expectancy.¹⁹

3.31 However, it is far from clear that future trends in healthy ageing will reflect a simple extrapolation the past. Projected trends in healthy ageing are subject to substantial uncertainty, and a consensus has yet to emerge on the future outlook. Some studies have observed that many illnesses were being increasingly compressed towards the later part of life. Other commentators have suggested that projected increases in life expectancy may result in an increase in age-related, non-fatal diseases.²⁰

¹⁷ Further discussion of some of the trends underlying components of net migration can be found in *Accession Monitoring Report*, HM Government, 2006; *Foreign Labour in the United Kingdom: Current patterns and trends*, Office for National Statistics, August 2006; and *National insurance number allocations to overseas nationals entering the UK*, Office for National Statistics, July 2006.

¹⁸ In England and Wales.

¹⁹ For both males and females.

²⁰ See, for example, *The new morbidity picture: Substitution versus compression*, McCallum, 1999.

SOCIO-ECONOMIC TRENDS

A century of social change **3.32** As discussed above, the last century has seen major demographic change, including big increases in life expectancy, declining infant mortality and a rising UK population. Alongside this, incremental, but significant, social change has occurred. The UK has become more diverse, affluence has significantly increased and consumption patterns have fundamentally changed. Opportunities for travel and education have increased enormously.

3.33 There have been noticeable lifestyle changes too. Female participation in the workforce has increased while motherhood has increasingly been postponed, helping to drive down completed family size to today's below-replacement level. This partly explains the trend towards smaller households and single-living described above. Combined with increases in life expectancy, this has led to society as a whole becoming older.

3.34 The second half of the last century also saw a reduction in absolute poverty but an increase in income inequality. Recent government intervention has achieved significant further poverty reduction, particularly for pensioners and families with children, and halted the rising trend of inequality in the process.

3.35 Looking ahead continued socio-economic change is inevitable – though it can be difficult to predict. Nevertheless an increase in diversity, higher labour market participation and increased demand for certain goods and services, as well as changing lifestyle patterns can be expected. The Government remains committed to significant further reductions in poverty. There will be a continuing challenge to tackle pressures on community cohesion.

Ethnic diversity

The UK will become more ethnically diverse **3.36** According to the 2001 Census, 8.3 per cent of people in the UK in 2001 were born abroad.²¹ This compares with 6.2 per cent in 1981 and 6.7 per cent in 1991. The ethnic minority share can be expected to increase over time due to continued positive net migration and higher birth rates among some incumbent ethnic groups. As the minority ethnic population grows, it is becoming less culturally and ethnically homogeneous. For example, the Indian population is 45 per cent Hindu, 29 per cent Sikh, 13 per cent Muslim and 5 per cent Christian. With more new migrants coming from countries without a strong historical connection to the UK, this diversity is set to increase.

3.37 Ethnic minority groups will continue to be concentrated in particular areas. In 2001 just over half of the 1.1 million people of Indian origin in the UK lived in just 15 out of 431 districts. Around half of the 0.75 million people of Pakistani origin in the UK lived in just 13 districts. The 0.57 million people of Black African origin and 0.53 million of Black Caribbean origin were concentrated in a similar way.²²

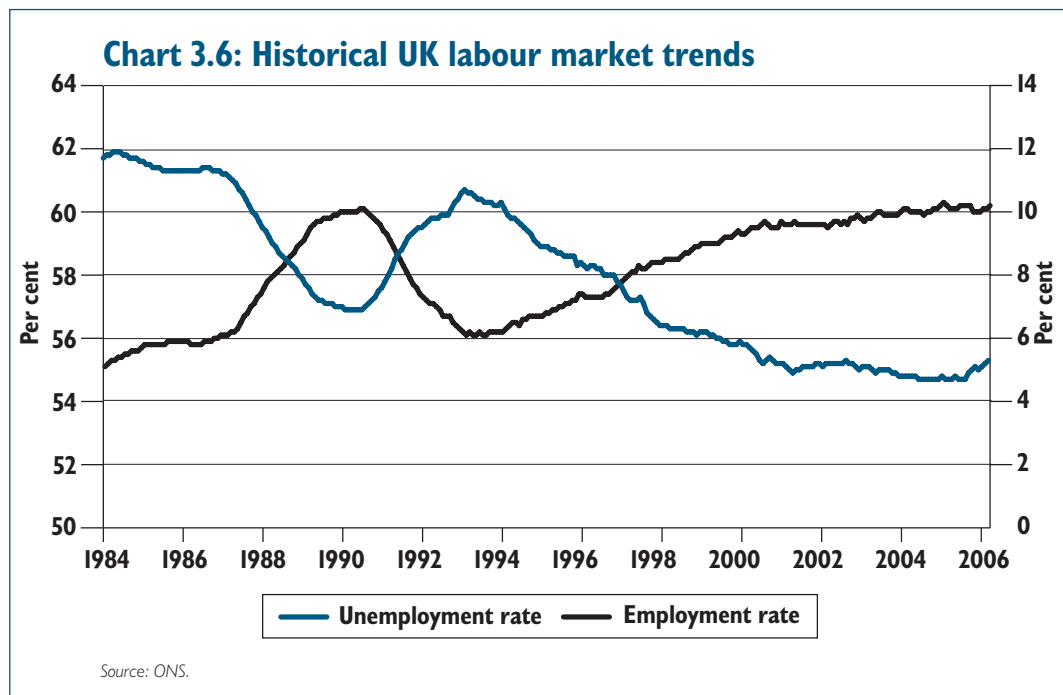
²¹ This includes British citizens born abroad.

²² *People and Places: A 2001 Census of the UK*, Daniel Dorling and Bethan Thomas.

Labour markets

Recent decades have seen major labour market change **3.38** One important area of socio-economic change has been in labour markets. Chart 3.6 shows aggregate labour-market trends over the last 20 years. Total economic activity rates (i.e. those active in the labour market as a proportion of the total population aged 16 and over) have increased steadily in recent years.

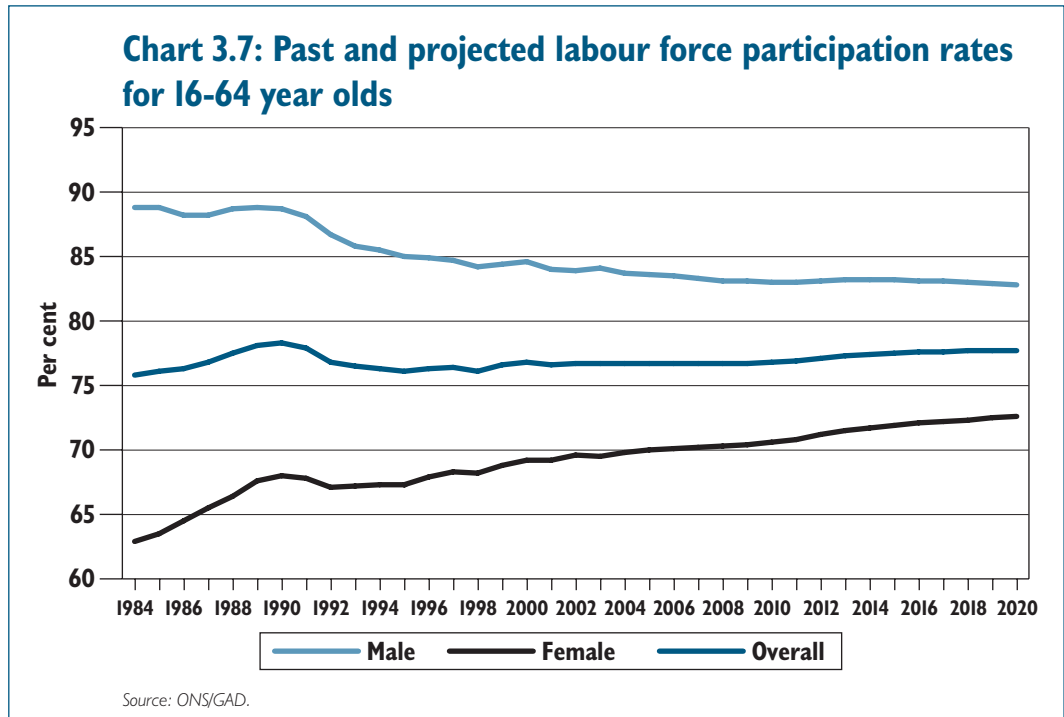
3.39 The unemployment rate has fallen sharply since its peak in 1993, and long-term unemployment has fallen too. In 2004 around a fifth of all unemployed were unemployed for more than a year compared with around half in the mid-1990s. After sharp declines in the early 1990s, the total employment rate has risen sharply over the last ten years.²³



Significant differences in labour market trends for men and women **3.40** Educational opportunities for women have increased over time and women have faced fewer barriers to participation in the workforce. This is reflected in labour market trends, shown in Chart 3.7. Female participation rates increased markedly, from 63 per cent of the 16-64 population in 1984 to 70 per cent in 2005. By contrast, male participation rates have fallen since the mid-1980s. In 2004 the inactivity rate among men was over three times as high as in the mid-1970s, while the male unemployment rate had fallen to its 1970s level.²⁴

²³ Note that the economy was well above trend in 1990 but was operating closer to trend in 2005. This suggests that, cyclically adjusted, the employment rate is now higher than it was in the early 1990s.

²⁴ *Inactivity among prime age men in the UK*, CEP, February 2005.



Participation rates projected to remain fairly stable to 2017

3.4I Taking into account demographic and socio-economic trends, but not the future impacts of policy, the overall labour market participation rate might be expected to remain broadly stable between now and 2017, as projected increases in female participation rates offset the moderate projected decline in male participation.²⁵ The projection of women’s increased participation is discussed further in Box 3.1.

Box 3.1: Future female labour market participation

The UK already has the highest overall employment rate of the major industrialised nations,²⁶ but there is still scope to raise labour force participation rates, particularly for older workers.

Rising educational attainment, implementation of the EU Directive on Age Discrimination in Employment and Training and a more general trend of rising labour market activity among older workers may all influence future levels of employment.

In addition, the state pension age for women will increase from 60 to 65 between 2010 and 2020. International evidence from New Zealand, where a similar reform was introduced between 1992 and 2001, suggests that this may have a significant impact on labour market participation. To account for this, HM Treasury’s projections assume that female and male labour market exit probabilities will gradually converge, and equalise by 2020.²⁷

²⁵ Alternative projections by the ONS provide a broadly similar picture. The ONS projections suggest an increase in the total labour market participation rate of around 1 percentage point between now and 2017, as a projected increase in female participation rates more than offsets a projected fall in male participation rates.

²⁶ ‘Industrialised nations’ here refers to the countries of the G7, and the ‘employment rate’ is defined as the number of persons aged 15-64 in employment as a proportion of the total number of persons aged 15-64. See OECD *Employment Outlook 2005*, OECD, July 2005, Statistical Annex, Table B.

²⁷ For a fuller discussion, see Annex B, *Long-term public finance report*, HMT, 2005.

3.42 Because labour market participation is projected to remain relatively stable, HM Treasury projections, as set out in the *Long-term public finance report*, assume that the level of employment will rise roughly in line with population growth. Consequently, the labour force is projected to grow by around 5 per cent between now and 2017.

3.43 The above projections take into account the projected shift in the age structure of the workforce and recent trends in participation rates among each age group. Participation rates are considerably lower for older workers. Therefore, all things being equal, an ageing workforce should lead to lower overall participation rates. However, participation rates of particular age groups are likely to change over time, which may partly offset this. For example, participation rates of those aged 55-64 have increased over the past two decades. Consequently, these estimates may well be an underestimate depending on the success of current and future policies to increase employment, such as helping more disabled people and lone parents into work. To this end, the Government continues to work towards its long-term ambition of 80 per cent employment.

3.44 The relative share of older workers (55-64) is projected to remain broadly stable between now and 2017. Any significant demographic impact on participation is likely to occur beyond this horizon. Labour force projections by the ONS also indicate very little compositional change over this period, with the relative share of older workers increasing by just one percentage point between now and 2017.

Economic dependency ratio rising from early next decade

3.45 The projected population and labour market trends affect the economic dependency ratio, which represents the combined number of those aged 65+ and under 16 as a proportion of the projected number of individuals in employment. Chart 3.8 shows that the fall in the economic dependency ratio observed over the past decade is forecast to continue until 2009,²⁸ as total employment growth outstrips the increase in the number of dependents. Beyond 2009, however, the economic dependency ratio remains flat for a few years and is then projected to increase, reaching 78 per cent by 2017, two percentage points higher than now and the same as 2002. The ratio then continues to rise in the longer term.

Several factors may influence future labour market trends

3.46 It is not possible to predict future labour market trends with certainty. For instance, increasing **overall prosperity** (wages) might induce people to work more or to spend less time at work and more time spending their higher incomes on leisure activities. A preference for more leisure could take the form of people choosing to do more part-time work.

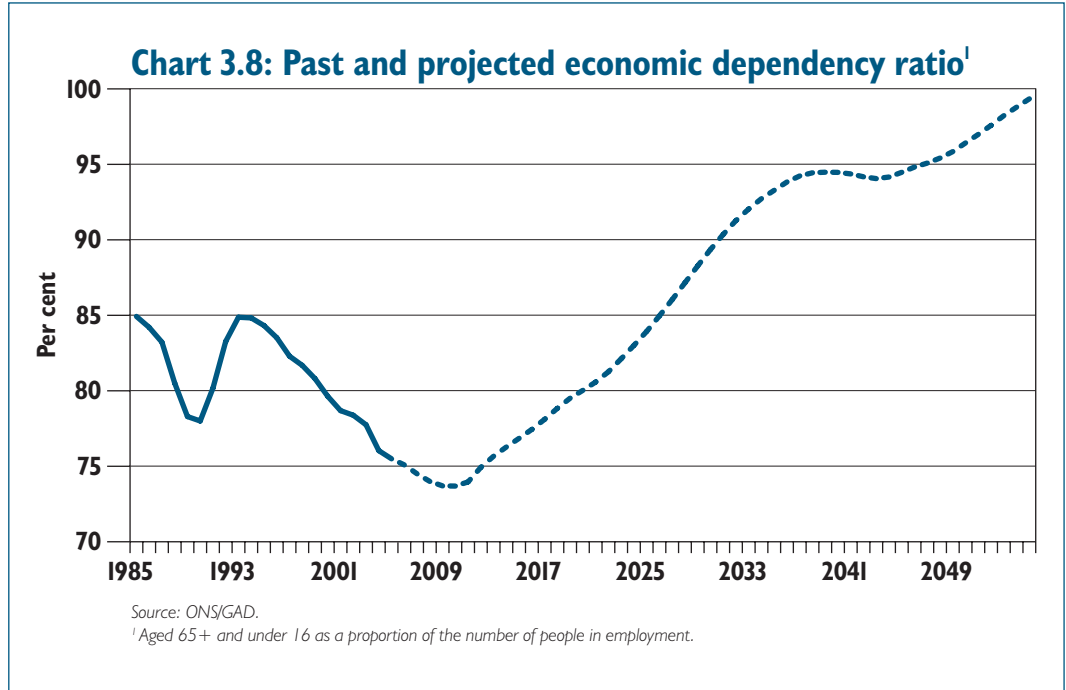
3.47 Projected increases in **life expectancy** may also cause individuals to choose to work longer in order to finance a longer retirement. Older workers will also have higher levels of **qualifications** over time. Labour market participation by people with qualifications has historically been higher than by those fewer or no qualifications.

3.48 Future trends in **incapacity and disability** will also have an impact since around 70 per cent of inactive prime aged men are reported as sick or disabled.²⁹

²⁸ As the economic dependency ratio is based on age, it does not take into account dependency post-16 through increased education participation, early and late retirement or greater financial independence in old age – all of which can significantly alter the ratio of dependents to non-dependents.

²⁹ *Poverty and Worklessness in Britain*, Nickell, 2003.

3.49 Trends in **fertility and childbearing** will also be important. The number of women aged between 25 and 34 (who observed the highest age-specific fertility rates over the past ten years) is projected to increase by around 10 per cent between now and 2017. All other things being equal, this would suggest an increase in the incidence of childbearing in the female working population over this period. However, the proportion of women with a dependent child and in full-time work increased from around 20 per cent in 1991 to around 25 per cent in 2001, while those in part-time employment rose from 36 per cent to over 39 per cent.



3.50 As discussed above, GAD projects positive net **migration** in coming decades. Almost 90 per cent of these migrants are projected to be of working age.

Preferences and attitudes

3.51 People’s lifestyle preferences are changing. This is most obviously manifested in day-to-day activities such as people’s increased propensity to eat out or spend time on the internet. On the other hand people in the UK are less likely to participate in religious activities or get involved in politics. In general people are enjoying a more flexible approach to work and leisure.³⁰

3.52 An important area where lifestyles are changing is in matters of health, posing challenges for both individuals and public services. Smoking has declined sharply: in 1974 more than half of men in Britain were smokers; now it is around a quarter.³¹ The ban on

³⁰ For example, survey data shows the proportion of employees in part-time work has been increasing over time. *The Labour Force Survey*, Office for National Statistics, 2006.

³¹ *General Household Survey 2004*, Office for National Statistics, 2005.

smoking in public places should help this downward trend to continue. On the other hand, obesity is a growing challenge. Two-thirds of UK adults are now overweight and by 2010 obesity is projected to overtake smoking as the leading preventable cause of illness and death.³² The number of obese children has tripled over the last 20 years. Unchecked, this could offset trends in healthy ageing in the more distant future as obesity in childhood is a strong predictor of obesity and serious health risks in adulthood.³³ Behavioural trends such as this present obvious issues for public services but pose more significant challenges to society raising questions about individual responsibility in terms of lifestyle and parenting choices.

Changing composition of consumer demands

3.53 As the economy grows average incomes will continue to rise. Even on cautious assumptions, real GDP will increase by around a third between now and 2020. The UK will have a substantially more prosperous society than it has now. It is likely that rising average income will have an effect on individuals' consumption decisions. Indeed, economics literature identifies a group of goods and services on which a richer society is likely to spend a larger share of their incomes than poorer societies.³⁴

3.54 Leisure is generally considered to fall into this category. It has been argued above that future employment rates will to some extent depend on individuals' work and leisure decisions. Theory predicts that, everything else being equal and in the long run, the richer society becomes, the more individuals will want to consume leisure.

3.55 There are a number of other types of goods and services, on which societies are likely to spend an increasing share of their income as they grow richer. These include:

- **Health:** people are likely to value more good health and bear fewer small dysfunctions as income increases;
- **Environment:** more prosperous societies are likely to attach more value to a clean environment and are therefore likely to spend relatively more on preventing environmental damage and improving the physical and natural environment;³⁵
- **Culture and sport:** more prosperous societies will have the financial means to consume leisure-related goods such as culture (e.g. museums, the arts) and sport; and
- **Education:** as they become richer, people and societies tend to spend a higher proportion of their income on education.

3.56 These, combined with rising expectations associated with technological change (discussed in chapter 5), are likely to lead to changing demands on public services.

³² *Forecasting Obesity to 2010*, Report for the Department of Health.

³³ NHS Direct.

³⁴ More precisely, in the economics literature a good is considered to be a "luxury good" if its income elasticity of demand is greater than one.

Baby boomers may have different attitudes and expectations **3.57** Some commentators have argued that the shift towards a more high-demand society, as discussed above, has partly been driven by the baby-boom generation. According to this view, baby boomers are more individualistic than earlier generations. In addition, it is suggested they may be more liberal in their attitudes having experienced changes such as reforms of divorce and abortion laws and the introduction of the contraceptive pill. Baby boomers have often been at the forefront of progressive social movements on matters such as anti-racism, gender equality and the green movement. Some examples of how baby boomer's attitudes may differ from the predecessors are as follows:³⁶

- 15 per cent of baby boomers agree with the statement that 'the man's job is to be the breadwinner and the woman's is to look after the home'. Among the over-55 age group, however, the figure for those who agree to that statement is 39 per cent.
- 77 per cent of baby boomers agree that 'it is all right for a couple to live together without intending to get married', compared with 46 per cent among the older generation.
- 69 per cent of baby boomers are interested in undertaking learning activities in the future, more than double the figure for their predecessors.

3.58 Many baby boomers will also have spent their working life in much better health and higher material comfort than any preceding generation and none will have experienced the great depression and the war years. They have grown up in a consumer society. Some may be used to diversity, choice and have experience of international benchmarks of customer service. As a consequence, the baby boomers are likely to be more demanding consumers even in older age, including of public services, than previous cohorts.

3.59 Changing attitudes including those described above could influence the way in which communities operate. The Government defines a "cohesive society" as one where there is a common vision and a sense of belonging for all communities; the diversity of people's different backgrounds and circumstances are appreciated and positively valued; those from different backgrounds have similar life opportunities; and strong and positive relationships are being developed between people from different backgrounds in the workplace, in schools and within neighbourhoods.³⁷ Currently 80 per cent of people agree that they live in an area where people from different backgrounds get on well together.³⁸

Levels of community cohesion might change over time **3.60** Since community cohesion has multiple elements it is difficult to forecast clear trends. It is, however, possible to identify past trends in some variables that may act as drivers of community cohesion. For instance, overall crime and fear of crime have followed a downward trend over recent years.³⁹ The number of people reporting they are racially prejudiced has fallen over time,⁴⁰ although the number who view race and immigration as an important issue has increased.⁴¹

³⁵ This does not necessarily mean though that richer individuals have a proportionately lower adverse impact on the environment than poorer individuals. Richer individuals will – on average – own bigger houses, run bigger cars, use air travel more frequently and own more goods, which were energy-intensive to produce and will require energy to run than poorer individuals.

³⁶ *The new old: Why Baby Boomers won't be pensioned off*, Demos, 2003.

³⁷ *Guidance on Community Cohesion*, LGA and HM Government, December 2002.

³⁸ *Early Findings from the 2005 Home Office Citizenship Survey*, Home Office, 2005

³⁹ *Crime in England and Wales 2005-06*: Home Office, June 2006

⁴⁰ *British Social Attitudes Survey*, National Centre for Social Research, December 2005

⁴¹ *MORI Political Monitor: The most important trends facing Britain today*, data to October 2006.

3.61 There is evidence of individuals and communities increasingly demonstrating “active citizenship” and coming together in pursuit of common goals, although there has been a move away from traditional forms of engagement in politics. People have become much more likely to sign a petition or participate in a demonstration over the past 30 years⁴² and membership of organisations such as the National Trust have increased dramatically.⁴³ Since 2001, volunteering has also been increasing.⁴⁴ However, turnout at general elections has fallen from nearly 80 per cent in 1979 to just over 60 per cent in 2005⁴⁵ and membership of political parties has also declined sharply.

3.62 It is difficult to predict future trends in community cohesion as many of its drivers are difficult to identify and project. In the context of a rapidly shifting society – with changing age, ethnic and geographical distributions as well as evolving preferences – it will remain an important issue.

Poverty and inequality

3.63 As discussed in Chapter 2, there was a dramatic increase in relative poverty and income inequality in the UK during the 1980s and 1990s. This was particularly acute at the bottom of the income distribution: during the 1980s and early 1990s the number of children growing up in poor households more than doubled.

Success in tackling poverty

3.64 In the past decade the Government has been successful in tackling poverty and raising the incomes of those at the bottom of the distribution. In the UK the number of children living in absolute poverty has more than halved due to economic growth,⁴⁶ radical reform of financial support for families, active labour market policies, and better public services. Even in relative terms, poverty is in decline. As Chart 3.9 shows, after housing costs, a quarter of the population were in relative poverty (earning below 60 per cent of median income) in 1997; now it is below a fifth. The upward path of inequality of post-tax incomes has also been halted over the last 10 years, with inequality, as measured by the Gini Coefficient,⁴⁷ stabilised at around the level of 1997.

3.65 This success in removing people from relative poverty is evident across a number of groups. Pensioner poverty after housing costs (AHC) fell by over a third, from 2.8 million in 1996/97 to 1.8 million in 2004-05, and child poverty has reduced by 700,000 since 1998-99. The Government remains committed to its target to eradicate child poverty by 2020, and continuing to tackle pensioner poverty.⁴⁸

⁴² The World Values Survey (see *The Report of Power: An Independent Inquiry into Britain's Democracy*, The Power Commission, March 2006) found that the proportion of the British population that had taken part in a demonstration increased from 6 per cent in 1974 to 13 per cent in 2000 and those signing a petition rose from 23 per cent to 81 per cent.

⁴³ National Trust membership increased from 278,000 in 1971 to 3.4 million today.

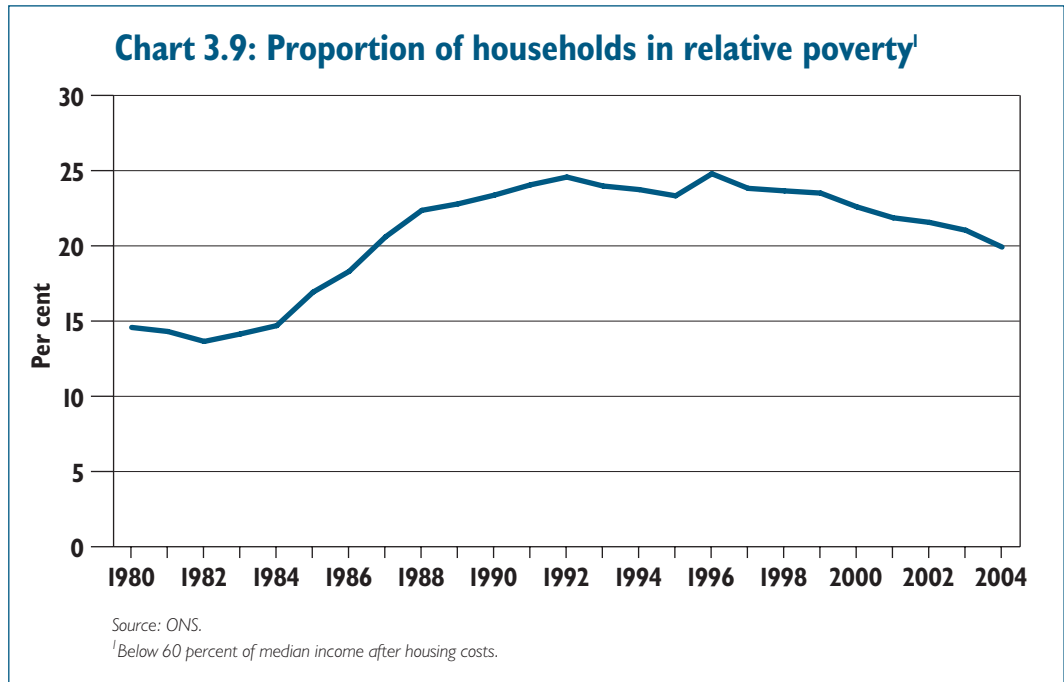
⁴⁴ *Early findings from the 2005 Home Office Citizenship Survey*, Home Office, 2005.

⁴⁵ UK Independent Electoral Commission

⁴⁶ Between 1996/7 and 2004/5, with absolute poverty measured against a household income threshold of 60 per cent of median income held constant in real terms, from a 1996/7 baseline.

⁴⁷ The Gini coefficient is a widely-used measure of the inequality of the distribution of incomes or other datasets.

⁴⁸ The Public Service Agreement set out by the 2004 Spending Review commits the Government to “halving the number of children in relative low-income households between 1998-99 and 2010-11, on the way to eradicating child poverty by 2020”.



Success is counter to underlying trends 3.66 Analysis suggests that falls in relative poverty are largely attributable to Government policy, rather than a change in the underlying exogenous trends in relative poverty and inequality, which remain upwards. For example, analysis by the Institute of Fiscal Studies shows that, in the absence of changes to tax and benefits policy, particularly since 2000, there would have been a marked increase in income inequality since 1997, rather than the stabilisation observed.⁴⁹

Causes of underlying pressures 3.67 Demographic and socio-economic changes may have contributed to increasing pressures on relative poverty. Changes to household structures mean that some groups that are more likely to be in poverty by this and other measures – such as single person, older and lone parent households – have grown in size relative to the rest of the population. There has also been some polarisation of two-person households between those where both work and those where neither work. A recent study by the IPPR concludes that one fifth of the rise in the Gini coefficient between 1979 and 2003-04 was due to changes in household structure.⁵⁰

3.68 Standard explanations for the increase in underlying pressures on relative incomes, both in the UK and many other developed countries, also tend to focus on the impact of trade openness and technological change which increase the premiums placed on being skilled. The interim report of the Leitch Review argues that the past 20 years has witnessed a large increase in the proportion of jobs requiring high skills.⁵¹ According to commentators, there is clear evidence of increasing income returns to skills and educational qualifications in the period even though there has been a substantial increase in the supply of workers with degrees.⁵²

⁴⁹ *Poverty and Inequality in Britain: 2006*, IPPR, March 2006.

⁵⁰ *Population Politics*, IPPR, February 2006.

⁵¹ *Skills in the UK: The long-term challenge*, Leitch Review of Skills, December 2005.

⁵² e.g. see *What's the good of education? The economics of education in the United Kingdom*, Machin and Vignoles (eds), 2005.

Continued challenge of alleviating poverty **3.69** These underlying pressures are likely to continue. Shifts in the economy's age structure, with a growing number of elderly people, may also have some effect on relative incomes and inequality, although individuals and government can take action to offset these underlying pressures. The future nature of migration and household structure may also lead to pressures on relative incomes and inequality. Chapter 4 describes how rapid technological change and trade openness are likely to continue to increase the skills premium in the future, with a move towards a more knowledge-based global economy and increased competition leading to higher demand for skills, particularly at the higher end of the occupational spectrum (professional and technical occupations).

CONCLUSION

3.70 This chapter has shown that the UK faces significant demographic change. The next ten years will see further increases in the UK population, especially in the south of England. The numbers and proportion of those over 65 will rise as a prelude to rapid rises in future years as the "baby boomers" age. Net migration is expected to bolster the working age population. Average household sizes will continue to fall.

3.71 There will be significant further socio-economic change too. The UK is becoming more diverse. There will be more women and older people in the workforce. Average incomes are expected to rise and consumers will become more demanding. The Government remains committed to further reductions in poverty. There will underlying be pressures on relative incomes.

3.73 The UK must be ready to respond to these trends – to maximise the dividends from people living longer lives, increases in average incomes, and a more diverse society, while also being ready to meet the challenges. The concluding chapter of this document sets out how the Government will take steps to ensure it reponds to these challenges in the 2007 CSR, including through:

- Maintaining fiscal sustainability and strong and stable economic growth as the UK approaches a period where the average age of the population will increase. The UK's robust macro-economic framework provides a strong platform and the Government is committed to entrenching stability and fiscal sustainability through the CSR period. The 2007 CSR will be informed by a set of reviews on the key priorities for economic reform including the Leitch Review of Skills, a study by Sir Rod Eddington on the economic impact of long-term transport decisions, Lord Sainsbury's review of science and innovation policies across government, a review of land use planning led by Kate Barker and a review of the effectiveness of sub-national interventions on economic development and the regeneration and renewal of deprived areas.
- Addressing the increasing demand for housing, services and supporting infrastructure that will result from continued population growth and the projected decline in average household size. In response to Kate Barker's Review of Housing Supply, the Government announced a policy review for the 2007 CSR into supporting housing growth. This will establish a framework for sustainable, cost-effective growth and ensure that departmental resources are targeted appropriately.
- Progressing the Government's programme of public service reform, the CSR will be based on the principles of embedding value for money, focusing on key cross-government priorities and responding to the changing needs and rising expectations of public service users.

- Enabling all regions, cities and communities to respond to the local challenges they face. The 2007 CSR will be informed by the Local Government White Paper, the review of the Greater London Authority and the review by Sir Michael Lyons of the role of local government. The importance of this agenda is reinforced by the expected local variations in demographic change.
- Continuing action to meet the Government's target of 80 per cent workforce participation in the context of labour market projections. It will be imperative to ensure that people of working age with a mental health condition have the help and support to find or remain in work, benefiting their health and the wider economy. Nearly 40 per cent of Incapacity Benefit (IB) claimants report a mental health condition as their main health issue and remain on IB longer than those with any other health condition. A policy review of mental health and employment outcomes will feed into the CSR and inform Government's next steps in seeking to increase workforce participation to 80 per cent.

INTRODUCTION

4.1 This chapter sets out a summary of the key trends of globalisation, and highlights the opportunities and challenges they pose for the UK over the next decade. These trends and their implications for policy have been explored in previous HM Treasury publications, in particular *‘Long-term global economic challenges and opportunities for the UK’*,¹ published at the Pre-Budget Report 2004, and *‘Globalisation and the UK – strength and opportunity to meet the economic challenge’*,² published at the Enterprise Conference in December 2005.

4.2 Today, the global economy is undergoing a profound transformation – with shifting trading patterns, the rise of new sources of economic growth, and advances in technology bringing radical changes to the nature of economic relationships. There is an increasingly competitive global environment for firms and individuals. This global change has the potential to increase prosperity in the UK and in all countries.

Overview 4.3 The chapter begins by setting out six key trends and challenges that will shape global economic development in the decade ahead: the rapid growth of large emerging economies, in particular China and India, and the shifting balance of global economic activity; greater competition for investment flows; increasing international specialisation; greater rewards from innovation; higher levels of demand for skills; and growing pressure on energy resources and the environment. As an open, flexible economy, the UK particularly stands to benefit from global economic integration, more competitive markets, and continued technological change, and policy needs to take account of these trends.

4.4 These global trends are expected to continue, but it is important to recognise that periods of globalisation have been reversed in the past, and risks to continued openness and integration remain. These risks are summarised in the second section. Growing protectionist trends in many countries pose a particular challenge.

4.5 The third section recognises the social challenges of globalisation. Some individuals and regions face an adjustment process as globalisation continues. More needs to be done to facilitate adjustment and ensure that all individuals can benefit from a more integrated global economy.

GLOBALISATION – SIX KEY TRENDS

4.6 Globalisation is not a new phenomenon. There have been previous waves of globalisation when cross-border flows of goods, capital and labour have led to integration between economies. The current phase of globalisation is notable for the scale and pace of change. It began with rounds of trade liberalisation under the General Agreement on Tariffs and Trade (GATT), now the World Trade Organisation (WTO), and has been driven in particular by rapid technological advances and the fall in transport and communication costs³ – facilitating trade and enabling integration of markets – the rise of emerging markets, most recently India and China, the recent increases in foreign direct investment (FDI), and the fall of barriers to trade.

¹ *Long-term global economic challenges and opportunities for the UK*, HM Treasury, December 2004; http://www.hm-treasury.gov.uk/media/8F5/77/pbr04global_421.pdf.

² *Globalisation and the UK: Strength and opportunity to meet the economic challenge*, HM Treasury, December 2005; http://www.hm-treasury.gov.uk/media/E7A/10/ent_globaluk021205.pdf.

³ See, for instance: *The Death of Distance: How the Communications Revolution will Change our Lives*, F. Cairncross, 1997.

4.7 This section outlines and updates the six key trends identified in this period of globalisation. These were first set out in *'Long-term Global Economic Challenges and Opportunities for the UK'*, in December 2004:

- the changing balance of global economic activity;
- rising flows of goods, services and capital;
- increasing international specialisation;
- greater rewards from innovation;
- higher levels of demand for skills; and
- increasing pressures on energy and the environment.

The changing balance of global economic activity

4.8 Over time the balance of world economic activity has shifted as consumer demand for goods has changed, countries have opened or closed their economies, and comparative advantage has evolved. In the sixteenth century China and India were the world's largest economies. By 1820 the balance of economic activity had shifted firmly to Western Europe and European settlements in the New World, and by the end of the Second World War this shift had become much more pronounced. From the end of the Second World War to the early 1990s these countries continued to diverge from most of the rest of the world. A significant exception to this trend was the rapid growth of Japan from the 1950s which by 1968 was the world's second largest economy. Rapid growth was seen too in the smaller Asian economies of Hong Kong, Korea and Taiwan.⁴

Emerging economies driving global growth

4.9 In the last two decades, the integration of China and India into the global economy has had a major impact on global growth and the global pattern of production. As these economies grow, the balance of economic activity is shifting, primarily from Europe and the US to Asia – a process that is expected to continue for the foreseeable future. In 1950, the Asian economies' share of world GDP was 18.5 per cent,⁵ and by 2020 their share is expected to have increased to 30.3 per cent.⁶ By 2017, China and India will have nearly doubled their share of world income and are likely to be bigger than the UK, French and German economies combined.⁷ However, while globalisation is having a significant impact on many countries, some regions, in particular Africa, are still to be integrated fully into the world economy.

4.10 China and India's impact is unprecedented in scale. Commentators have noted the effective doubling of the global labour force.⁸ China alone has 934 million people of working age compared with 616 million in the EU, US, Canada and Japan combined.⁹ So far, only a relatively small proportion of Chinese and Indian workers are integrated into the global economy, but they are already having a major impact – China is on course to become the world's largest exporter by 2007, and both countries are becoming major exporters of services and are growing in importance as sources of cross-border investment.

⁴ *The World Economy: A Millennial Perspective*, Angus Maddison, 2001.

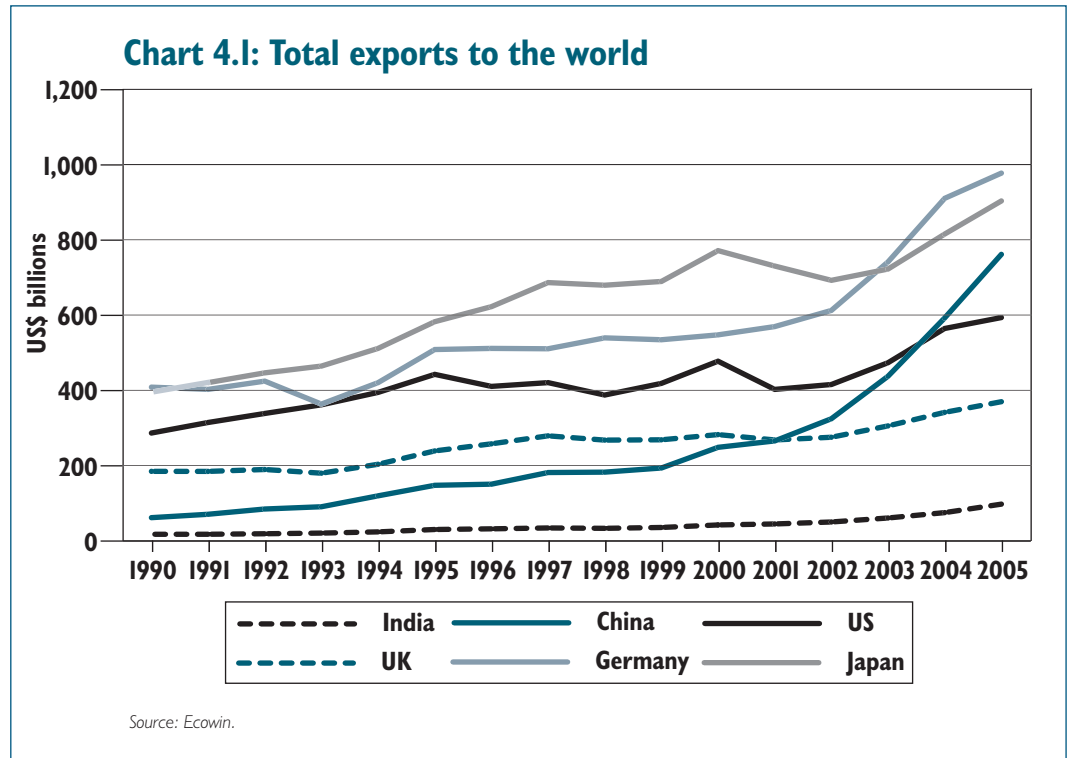
⁵ Maddison Historical Statistics: http://www.ggdnc.net/maddison/Historical_Statistics/horizontal-file_2006.xls.

⁶ HMT estimates.

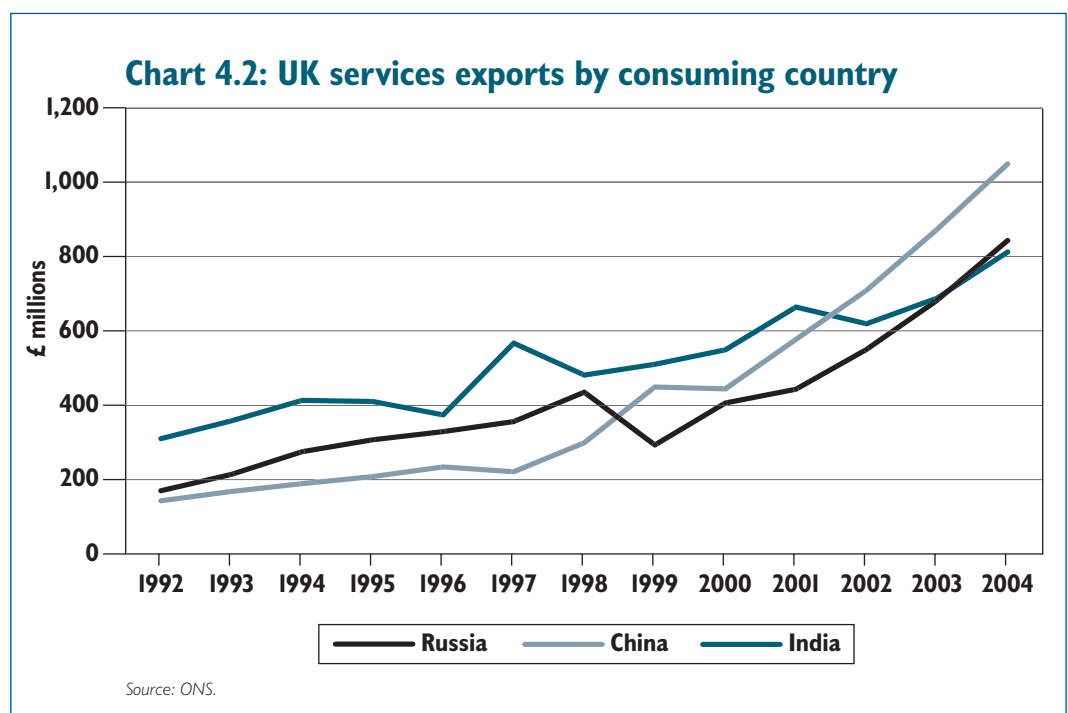
⁷ HMT estimates.

⁸ See, for instance: *The Great Doubling*, Richard Freeman, 2005.

⁹ 2005 figures, from the United Nations Population Database.



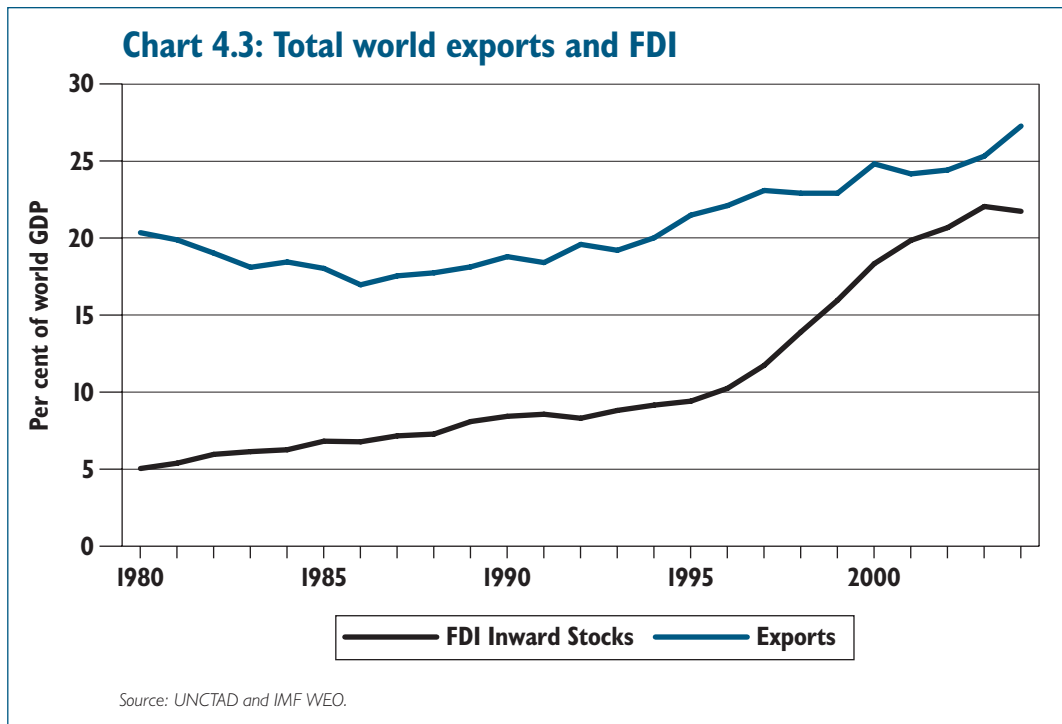
New markets 4.11 Globalisation will intensify competition across a wide range of sectors, increasing the importance of having a flexible, highly skilled economy. It will also create unprecedented opportunities for the UK. In both China and India, a billion potential consumers and booming economies will generate growing demand for British goods and services – UK exports to China more than doubled between 2000 and 2005, and China is already the biggest single source of foreign students at UK universities, bringing roughly £200 million a year of additional revenues into the higher education sector.¹⁰



¹⁰ Higher Education Statistics Agency.

Rising flows of goods, services and capital

4.12 Since the establishment of GATT in 1947 global trade has increased dramatically in absolute terms.¹¹ Global capital flows grew rapidly from the 1960s, facilitated by the dismantling of post war exchange controls and the creation of the Eurodollar market. The past two decades have seen trade and FDI grow steadily as a proportion of GDP – FDI in particular was accelerated in recent years. Today continued growth in trade and capital flows provide the clearest indicator of continuing globalisation. These flows are both a feature of globalisation and a driver of it, facilitating increased openness, increased specialisation, the international disaggregation of supply chains, and stronger incentives for technological progress. As liberalisation and market integration drive globalisation, international trade and investment flows should continue to grow over the next decade.



4.13 Barriers to trade and investment are progressively falling around the world, notably through: the implementation of the Uruguay Round commitments, including in the field of financial services and telecoms; unilateral tariff reductions and liberalisations; and the reform of the EU's sugar regime. This trend is however threatened by a rise in protectionism, as discussed later in this chapter.

Multilateral liberalisation key to future growth

4.14 Looking ahead, securing further trade reform through the Doha Development Agenda has the potential to generate further benefits for the global economy and, under the right circumstances, be a driver for poverty reduction. It is by embracing greater openness to trade that countries increase their economic strength and hence the prospects for their citizens and around the globe. In an increasingly integrated and globalised economy, it is through commitment to multilateralism that the greatest economic gains can be achieved, and this is why the UK is pressing for the world trade talks, which stalled last summer, to be revived and concluded as soon as possible. The world's belief in the strength of the

¹¹ As a percentage of GDP, developed economies' trade has risen from just over 20 percent in 1980 to almost 26 percent in 2005.

multilateral rules-based system is also underlined by the ever-increasing membership of the WTO, with the recent accession of China (2001), Taiwan (2002) and Saudi Arabia (2005). In total, 149 countries are now members of the WTO.¹²

Spillover benefits from openness 4.15 The benefits from increasing trade and FDI are well documented. Increasing trade brings: improved economic efficiency (through specialisation and the productivity-enhancing pressure of increased competition), new sources of growth, reduced consumer prices; and, increased choice for consumers. And openness to foreign investors brings not only capital, but also new technologies, new skills, and access to new markets. For instance, research shows that foreign-owned enterprises have on average, significantly higher productivity than locally owned enterprises, and this can lead to positive spillover benefits for the wider economy. The UK economy, already open and integrated into competitive global markets, stands ready to benefit from increasing trade and capital flows.

Competition from investment 4.16 Competition for FDI flows is increasing, though the UK continues to do well, hosting the world's second largest stock of foreign investment (after the US), and having attracted more foreign investment in 2005 than any other economy.¹³ The UK is also the world's second largest outward investor, enabling UK firms to tap into new markets, diversify their market exposure, and gain economies of scale. Roughly one quarter of all UK corporate profits are now earned overseas.¹⁴

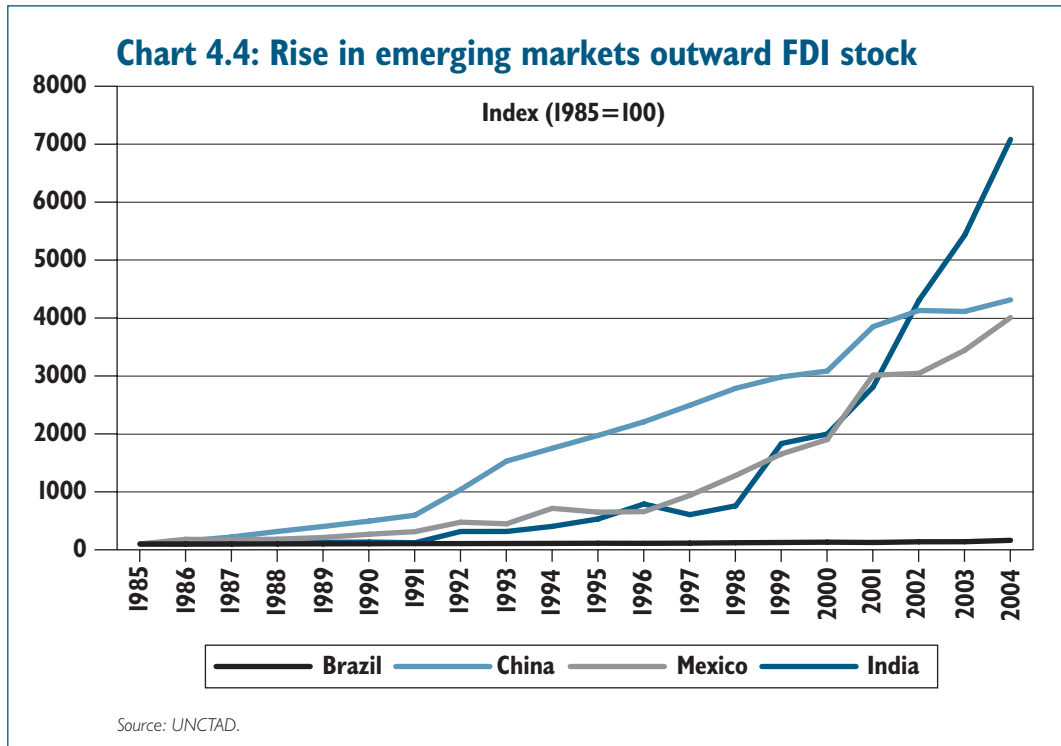
4.17 Emerging markets, particularly China, have been major destinations of FDI for many years and are likely to continue to attract investment. But trends suggest that they are also becoming significant outward investors, reinforcing their emergence as significant future players in the world economy. This is a trend which the UK is well positioned to benefit from, given its openness to FDI, its recognised strengths in science and key sectors, and our positioning as a European and global business hub. Inward investment projects from India to the UK increased by 111 per cent in 2005, making India the UK's third largest investor. Information and Communications Technology (ICT) is the dominant sector for these projects, but there has also been strong growth in pharmaceuticals and engineering.¹⁵

¹² As of December 2005.

¹³ United Nations Commission for Trade and Development.

¹⁴ Office for National Statistics.

¹⁵ *UK Inward Investment Report 2005-06*, UK Trade and Investment.



Increasing international specialisation

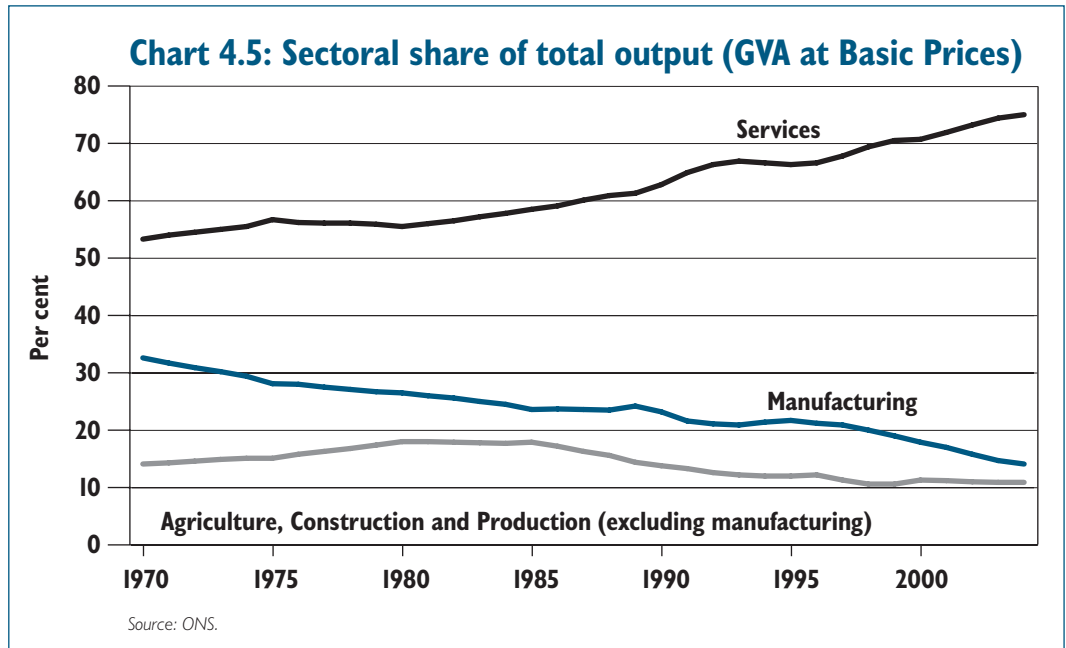
Specialisation and gains from trade

4.18 In recent decades, technological innovations, economic integration, and the increased participation of emerging and developing economies into the global trading system have enabled the increasing geographical dispersion of economic activity between countries, and consequent specialisation. As barriers between markets have fallen and production chains have become more fragmented, developing countries and emerging economies account for a greater share of international production, particularly in manufacturing. In advanced economies, services have become increasingly important – they now account for over 70 per cent of the UK economy, compared to just over 50 per cent in 1970.¹⁶ Over the next decade, as emerging markets continue to grow and develop new capabilities in new areas, and technological progress reduces trade and transport costs, international relocation of economic activity is expected to continue and intensify. In particular, recent technological advances in ICT and digitisation mean that continued global restructuring is particularly likely in services, where trade has previously been more limited.

4.19 This increased specialisation on an international scale has the potential to benefit the global economy through increased efficiency, in accordance with traditional gains from trade theory. More important than the static efficiency gains however, are the likely dynamic productivity gains from new sources of competition, greater incentives to innovate and more diverse sources of investment.

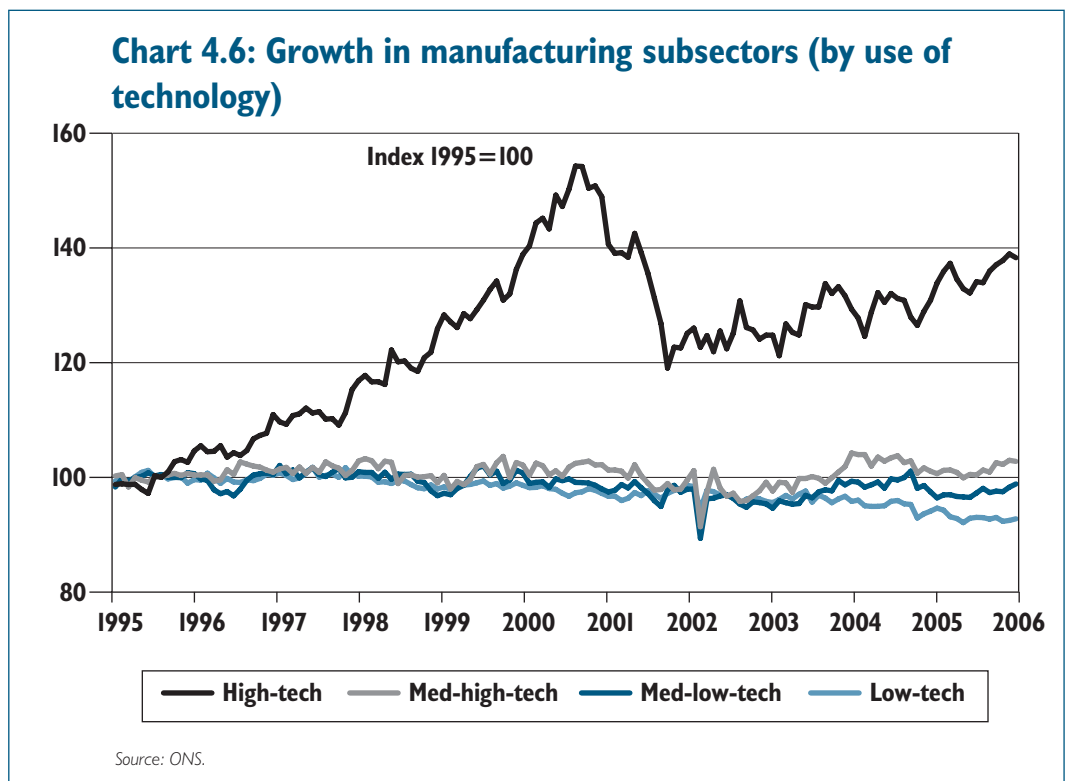
4.20 Continued specialisation inevitably implies economic restructuring to enable countries to benefit from their comparative advantage, leading to gains from trade. In advanced economies such as the UK, this can be seen in the increasing importance to the economy of high value-added manufacturing and services. As such, specialisation in the UK provides the opportunity for firms to concentrate on the high value-added, knowledge intensive activities in which they have a comparative advantage, many of these are high value-added services, such as business, legal and financial services. The chart below shows the increased importance of services in the UK economy since the 1970s.

¹⁶ Office for National Statistics.



High-value manufacturing in the UK

4.21 However, while services are making an increasing contribution to the UK economy, manufacturing still plays an important role, in particular in the high value-added areas where the UK continues to have a comparative advantage. The following chart shows how manufacturing growth in high-technology sub-sectors, such as aerospace, pharmaceuticals, and computer manufacturing has outpaced growth in all other sub-sectors, even following the slowdown at the start of the decade. In 2002, 38.5 per cent of the UK's exports were 'high-tech',¹⁷ and over the next decade a challenge for the UK is to remain an attractive location for high value-added industries and tasks.



¹⁷Office for National Statistics.

4.22 The scope and pace of global market integration, and the opportunities for trade provided by new technologies mean that specialisation is likely to continue. However, as economic activity becomes more mobile, and as developing and emerging economies build strengths in skills and higher-technology activities, competition is spreading beyond low-value products, processes and services, and companies are increasingly looking to relocate higher value activities. As emerging economies develop their capabilities they are challenging advanced economies further up the value chain, increasing the importance for the UK of improving productivity, delivering a reliable and efficient transport network, maintaining flexible markets, attracting international investment, and fostering internationally competitive industries.

Increasing rewards from innovation

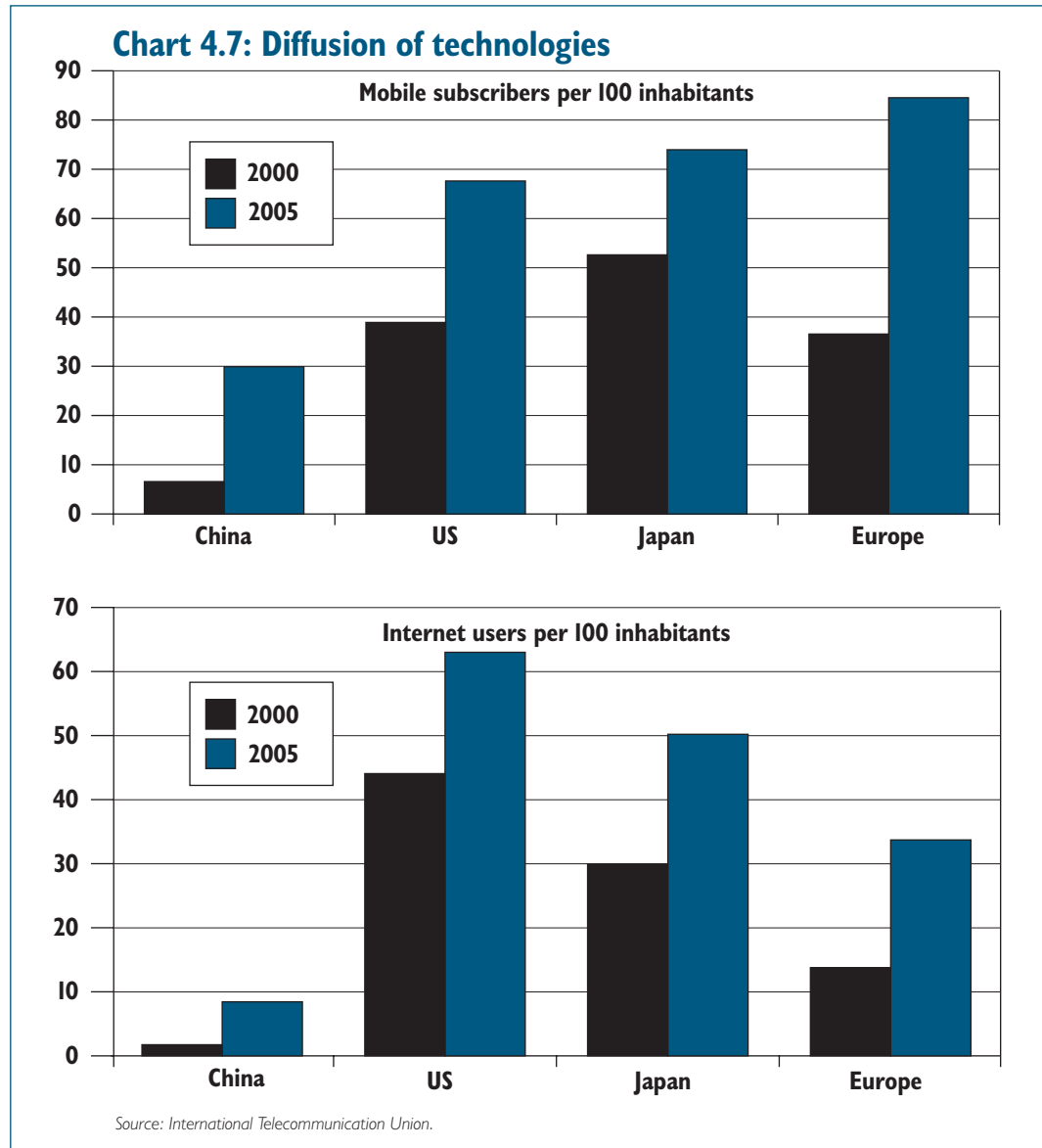
Technology drives globalisation **4.23** Technology is a key driver of productivity, economic reform and growth.¹⁸ Technological change over the recent past has been dramatic, fostering trade integration between markets as the cost of transport, trade and communication has fallen dramatically. Most significant is the rapid pace of change in ICT over the last two decades, which has significant implications for productivity in the wider economy. Given the nature of technological change, the future pace of change over the next decade is uncertain, but expected to remain high. The positive impact of technological innovation on economic growth will remain a principal driver of global development in the 21st Century as it was in the previous century.

4.24 The spread of new technologies through countries and to new economic activities, complemented by falling transport costs, as shown in Chart 2.2, has driven market integration and enabled the realisation of the benefits of globalisation and gains from trade around the world. The Internet in particular has been an important factor in globalisation over the last fifteen years, enabling knowledge and information to be shared rapidly and at low cost around the globe, and changing the way people trade goods and services, bringing markets together and enabling more people to participate in the global economy than ever before. For example, advances in ICT and digitisation have increased the tradability of services, providing the opportunity for the UK to capitalise on its comparative advantage in this area. This in turn fosters the greater dispersion of economic activity.

Technological diffusion **4.25** The global pace of diffusion of new technologies in recent years has been rapid, as shown in the charts below.¹⁹ This highlights the importance of technology spillovers for the global economy and for developing countries, and demonstrates how developing countries have the potential to ‘leap frog’ technological progress – China in 2005 had more mobile subscribers than the US, in part because it does not have the extensive land line network of advanced economies. As technological diffusion continues over the next decade and beyond, it will continue to impact on the global economy, facilitating further dispersion of production chains and making global markets more competitive.

¹⁸ See, for instance: *Endogenous Technological Change*, Romer, P, 1990, NBER Working Papers 3210, and: *A model of growth through creative destruction*, Aghion, P & Howitt, P, 1992.

¹⁹ International Telecommunication Union.



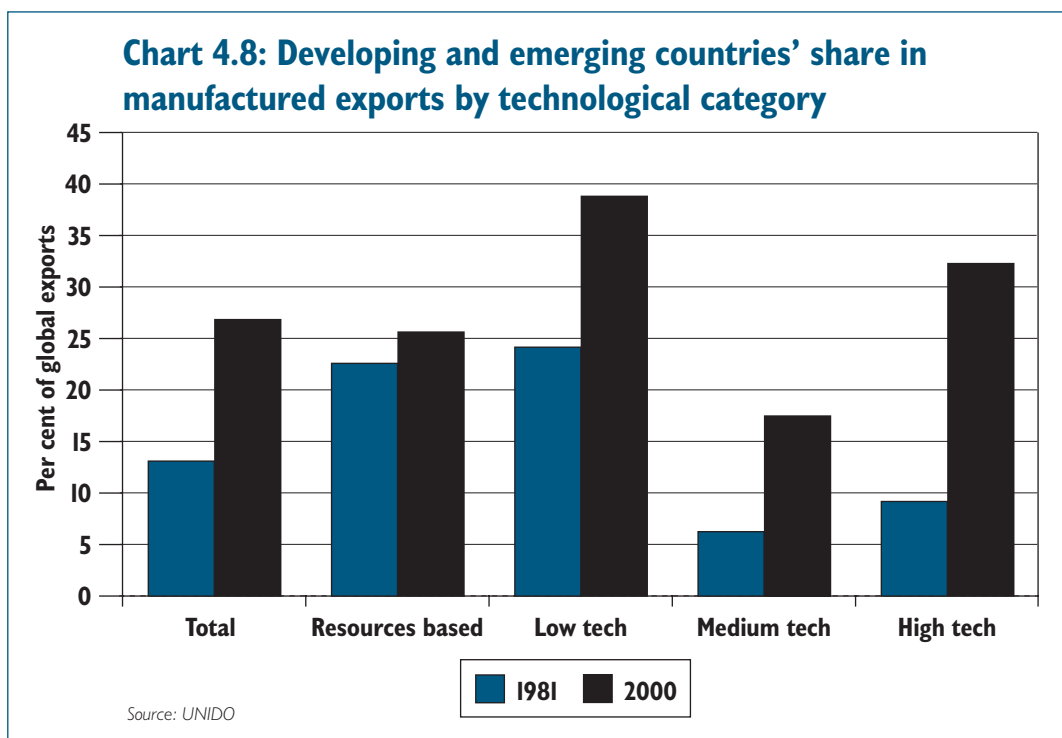
Increasing rewards to innovation **4.26** The increase in global competition and the rapid pace of technological change in recent years has resulted in greater rewards to innovation. There is now a greater pressure on firms to foster innovative activities, promote the adoption and application of new technologies, and remove barriers to new ideas in order to ‘stay ahead of the game’. At a country level, those who foster R&D and innovation will attract businesses in the key high-growth areas of the future. In addition, those countries that are able to apply new technologies, particularly ICTs, to existing production processes can expand their production possibilities, improve their efficiency, and enhance their attractiveness as centres for high value investment.²⁰

4.27 The UK is well positioned to benefit from these trends. The UK has a world-class science base – second only to the US in global scientific excellence as measured by citations²¹ – complemented by an internationally respected legal and administrative framework for intellectual property. The Gowers Review of Intellectual Property (IP) launched last year is looking at what further steps are required to enable the IP system to adapt to the challenges of the digital age. This strength in science and IP is important to attracting inward investment into the UK, in

²⁰ See, for instance: *Mapping the Two Faces of R&D: Productivity Growth in a Panel of OECD Industries*, Griffith, Redding & Van Reenen, 2004, *Review of Economics and Statistics* 86(4).

²¹ Thomson Scientific.

particular in high value-added activities. However, emerging markets are also now increasingly able to challenge advanced economies in innovation, and the rapid expansion of their economies will have implications for long-term trends in innovation. For instance, India's emerging strengths in ICT and pharmaceuticals will increasingly be of interest to business – Goldman Sachs estimates that India's overall R&D costs are 1/6th of western levels²² (although over time, high-skilled salaries and R&D costs in emerging economies will also begin to rise), and over 225 companies in the Fortune 500 have R&D and product design centres in India.²³ India's enforcement of IP is improving, and this too is increasing its attraction to international business – in 2005 2000 software patent applications were filed in India, 85 per cent by multinationals.²⁴ The chart below illustrates how emerging countries are moving rapidly from low technology manufacturing to develop capabilities in high-technology industries.



4.28 As a result, remaining at the cutting edge of R&D and innovation will become increasingly important in ever more competitive markets over the next decade. However, the UK lags other countries on R&D and innovation activity – UK business R&D investment is 1.2 per cent of GDP, compared to 1.4 per cent in France, 1.7 per cent in Germany and the US, and 2.4 per cent in Japan, and up to one quarter of the UK's productivity gap with the US and France can be accounted for by the relative R&D deficit.²⁵ In an increasingly competitive environment, more needs to be done so that UK businesses fully exploit the UK science base and new technologies.

²² Referenced in *The Economist*, 2 February 2006.

²³ India Brand Equity Foundation, *Davos 2006 Brochure*, January 2006.

²⁴ *Business Standard*, 4 January 2006.

²⁵ *Main Science and Technology Indicators*, OECD, June 2006.

Higher levels of demand for skills

Growing importance of skills **4.29** Globalisation has increased the importance of skills for developed economies. International specialisation has contributed to the increased relative importance of high value-added activities in the traded sector of such economies, and the opening up of world markets has increased the opportunities presented by these sectors. Skills affect the capacity of economies to respond flexibly to changing sectoral demand caused in part by international specialisation, and skill levels are an important factor in attracting growing flows of FDI. There has been at the same time an increased need for high-level skills and equally a strong base of intermediate and basic transferable skills that can respond quickly to changing business demand.

4.30 In the decade ahead and beyond these trends are expected to intensify. As global markets become more integrated, more goods and services will become internationally tradable.²⁶ The structure of the UK economy will adapt and the skills requirements of business will change. The interim report of the Leitch Review interim report has shown how shifts in industrial structure will impact on the demand for skills in the UK in the period up to 2020.²⁷ The groups that are expected to show the largest expansion of demand in the next 15 years are at the higher end of the occupational spectrum, such as managers, professional occupations, associate professional and technical occupations. However, this does not mean that demand for all low-skilled labour will decline – there are also large increases in demand predicted for occupations that employ less-skilled labour, such as personal service occupations and sales and customer service. Rather, pressure on low-skill jobs is likely to occur in more internationally tradable or outsourceable sectors, such as low-skill manufacturing.

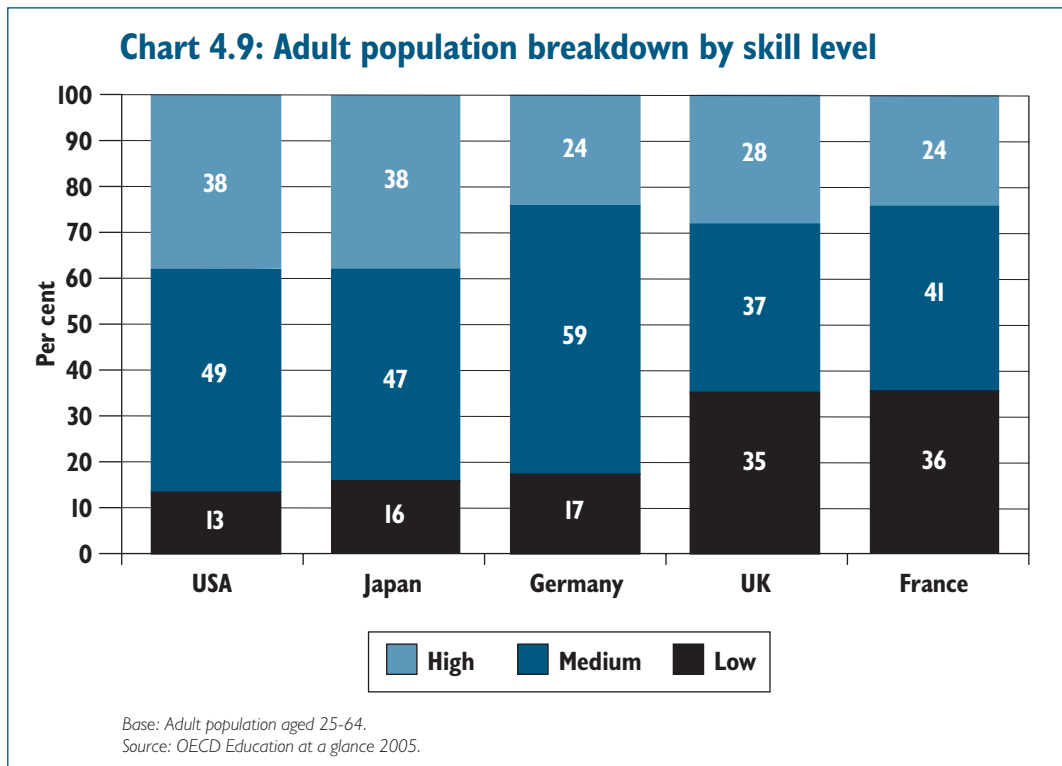
Migration to meet skills needs **4.31** Alongside economic integration and increasing trade and capital flows, migration and international flows of labour are a feature of the current phase of globalisation, discussed in more detail in the chapter on demography. Positive net migration is projected to account for 50 per cent of UK population growth between 2007-17, and is expected to remain positive in the longer term. Evidence suggests a small but positive impact on the UK economy through overall migration flows. While research suggests that the labour market effects of migration have so far been modest,²⁸ the continuing flow of migrants will affect the skills profile of the labour market. With a focus on attracting high-skilled labour, migration can make a contribution to meeting the long-term economic needs of the economy.

The UK's skills challenge **4.32** The UK benefits from a strong higher education sector with world-class universities, and attracts investment from firms in many knowledge-intensive industries, e.g. pharmaceuticals. However, the UK fares less well when looking at the overall skills profile of the workforce. The Leitch Review interim report identified that, although the UK skills profile has improved over the last decade, the UK still does not have a world-class skills base, and, the UK will still not be in the upper quartile of the OECD skills profile by 2020. In particular, the UK still has a relatively large proportion of the workforce with low skills – over one third of adults in the UK do not have a basic school-leaving qualification, double the proportion of Canada and Germany. Relatively low skills are a key contributor to the UK's relatively poor productivity performance, as well as having wider consequences for social welfare and inequality. At the same time globalisation is increasing pressure on the low-skilled, as continued growth in higher-skilled areas and growing competition from developing countries and emerging markets are set to continue.

²⁶ For recent theoretical work on the impact of this increased tradeability of goods and services see for instance: *Trading Tasks: A Simple Theory of Offshoring*, Grossman and Rossi-Hansberg, 2006, and, *Globalisation: the Great Unbundling*, R. Baldwin, 2006.

²⁷ *Skills in the UK: The long-term challenge. Interim Report*, Leitch Review of Skills, December 2005.

²⁸ See, for instance: *The impact of migration on the British labour market*, Dustman, C, 2005.



4.33 As well as basic skills, the UK also faces a challenge in future years in ensuring adequate levels of higher-level skills. Improving UK skills performance in science and technology areas, likely to be at the core of a future high-skilled specialist workforce, is essential to ensure that the UK remains an attractive location for business. Yet the UK is witnessing a fall in the popularity of these subjects in the education system. Between 1994 and 2004 the number of 16-18 year olds taking chemistry A-level fell by 7.5 per cent and physics A-level by 20 per cent, with a knock-on effect on entries to undergraduate degrees. There are positive trends emerging on science in schools – in 2005, entries into A-level biological sciences were up by 1,427 students to 45,662, and chemistry up by 1,034 to 33,164, but with physics down by 506 to 24,094 it is clear this remains a challenge.²⁹ In addition, the numbers of graduates in science, technology, engineering and maths (STEM subjects) that go on to undertake STEM jobs has declined in recent years. Only 46 per cent of STEM graduates are in STEM jobs, with a further 8 per cent in teaching.

4.34 This implies a need for improved signalling within the market and the education system to ensure that skills are developed in the right areas. This includes non-cognitive skills, such as communication skills and team-working, which are becoming more important in determining labour market outcomes. Management skills are another key driver of business productivity performance – managers need to have the right skills and incentives to respond to new challenges and opportunities. Studies looking at UK management practices have raised some questions about UK management performance compared to international competitors.³⁰

²⁹ *Science and Innovation Investment Framework 2004-14: Annual Report 2006*, HM Treasury, DfES & DTI, 2006.

³⁰ For instance: *Measuring and Explaining Management Practices across Firms and Nations*, Bloom, N & Van Reenen, J., 2006. CEP Discussion Paper No 716; *Mind the Gap! Using management practices to close UK manufacturing's productivity gap*, LSE/McKinsey, Dorgan, S & Dowdy, J., 2005; *Catching up with the Continent: Final Report on EU and UK Manufacturing Productivity*, Institute of Electrical Engineers, 2004; *Catching UP with Uncle Sam: EEF's Final Report on UK and US Productivity*, Institute of Electrical Engineers, 2003.

Role for business 4.35 Adjusting the skills base will also require increased participation from the business sector. Firms have a key role to play in skills development, collaborating with the Government to ensure that workforce skills are kept up-to-date and relevant to the needs of the economy. This will require focus on the stock as well as flow of skills: seven out of ten of the workforce in fifteen years' time have already finished compulsory education.³¹

4.36 Emerging economies also appreciate the importance of skills in the global economy, and are investing heavily in skills. In China, the enrolment ratio for tertiary education increased from 2.9 per cent to 9.5 per cent during the 1990s, and in India it rose from 6.2 per cent to 10.5 per cent over the same period. This significant investment in skills, combined with cost advantages, reinforces the fact that over the next decade the UK and other advanced economies will face increasing competition for jobs and inward investment in skill-intensive, high value-added sectors from emerging markets such as China and India.

Increasing pressures on energy and the environment

Growing energy demand 4.37 As economic activity has increased so has demand for energy, potentially putting pressure on security of energy supplies and causing environmental impacts without taking full account of the costs. Since the nineteenth century energy needs have largely been met from fossil fuels: first coal; then oil; and increasingly natural gas. Robust economic growth means that, all things being equal, global energy demand is expected to grow strongly over the next ten years. In the absence of policy changes growth of 2.2 per cent per year is projected to 2030.³² More than two thirds of the increase in demand is expected to result from rapid economic and population growth and trends towards industrialisation and urbanisation in the developing world, most notably in China and India. The non-OECD share of total energy consumption is projected to increase from 44.3 per cent in 2003 to 52.1 per cent in 2015.³³

4.38 Over the next decade global energy supply is expected to sufficient to meet the increase in demand. Worldwide fossil fuel resources are very large. The International Energy Agency (IEA) project that proven energy reserves are adequate to meet global energy demand until at least 2030, although new discoveries will be needed to renew reserves.³⁴ Together with non-conventional reserves and improvements in technology, there is potential for oil reserves to last much longer. Nevertheless the demand picture will, as in the past, contribute to making energy security an important issue.

4.39 However, allowing these trends to continue to play out under 'business as usual' scenarios would lead to unsustainable pressures on the environment. The Stern Review on the Economics of Climate Change shows that greenhouse gas emissions are the most widespread market failure the world has known, and demonstrates the likely economic and environmental impact of unchecked growth in carbon emissions from fossil fuel consumption and other sources.³⁵ The environmental implications of increased energy generation from fossil fuels are the starkest example of wider trends of economic activity causing damage to the environment and undermining its current and future value. These trends, and the potential to manage them, are covered in more detail in the chapter on increasing pressures on natural resources and global climate, which explains how sustainable economic growth itself will depend on the sustainable use of the environment.

³¹ *Skills in the UK: The Long-term Challenge: Interim Report*, Leitch Review of Skills, December 2005.

³² *World Energy Outlook 2006*, International Energy Agency, 2006.

³³ US Department of Energy, June 2006.

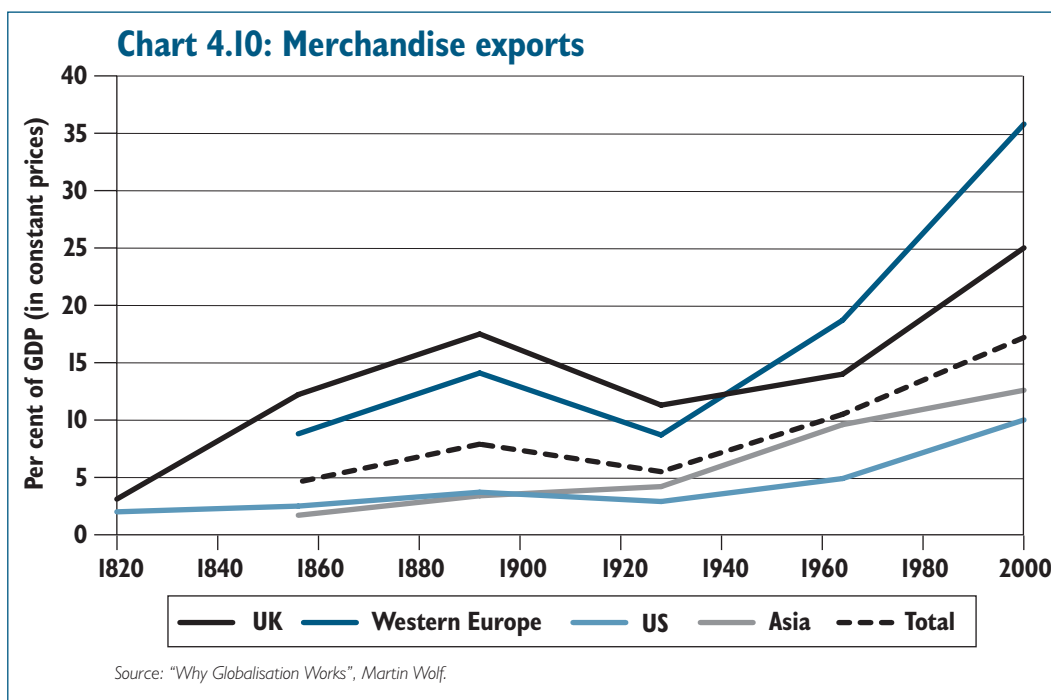
³⁴ *Energy White Paper: Our Energy Future – Creating a Low Carbon Economy*, DTI, 2003.

³⁵ *Stern Review on the Economics of Climate Change*, www.sternreview.org.uk and CUP (forthcoming).

RISKS TO GLOBALISATION

Globalisation is set to continue

4.40 The prevailing view amongst most commentators is that the process of globalisation set out above will continue, and this should set the scene for planning over the next ten years. However, history offers several examples in which economic integration has gone into reverse, as can be seen in the chart below, such as the outbreak of war in 1914, and the protectionism of the 1920s and 1930s. While the Government, businesses and individuals should plan on the basis that globalisation will continue, it is important to be aware of the risks, and mitigate them where possible.



Important to acknowledge the risks

4.41 These risks include, inter alia, protectionism, global recession, geopolitical instability and conflict affecting the global economy, and pandemics.³⁶ Of these, protectionism – and the risk of negative public perceptions of globalisation creating protectionist pressures – is perhaps the main risk to globalisation in the current global environment. We can already see this in the rise of ‘economic patriotism’ in certain countries, as they seek to shelter their economies from change.

Protectionist pressures

4.42 Under the WTO, and before it the GATT, there has been a progressive and sustained reduction in tariff barriers. This process has been an important driver of the increased global trade in goods, allowing countries to specialise in areas of comparative advantage, facilitating the growth in global supply chains, and increasing competition and accelerating productivity growth globally. Continuing this liberalisation is important to secure further gains for global growth and poverty reduction, and there is no substitute to an ambitious and pro-development outcome to the current WTO round, the Doha Development Agenda (DDA). The UK is pressing for negotiations to be revived as soon as possible.

4.43 The current rise of emerging markets could increase competitive pressures in developed economies on a greater scale than in the past. There is a need to make the case for the benefits of globalisation – as countries respond to change there are already indications of rising protectionist pressures in the US and EU. There is a risk that if these pressures continue they could negatively impact on the process of globalisation and consequently dampen

³⁶ These categories broadly concur with scenarios set out elsewhere, for example Martin Wolf: *Why Globalization works*, 2004; and Shell's Global Scenarios Report, 2005.

growth and prosperity in the UK and elsewhere. There is evidence of this, highlighted by the increased use of antidumping actions in recent years. Globally, antidumping measures in force have grown steadily from around 800 in 1995 to nearly 1350 in 2004. China was named in 25 per cent of all antidumping investigations initiated in 2003/04, far more than any other country. In turn, emerging markets such as China, India, Brazil and South Africa are becoming users of these measures themselves.³⁷

Trade growth and development

4.44 The UK has a long tradition of openness, and has been a major proponent of progress on trade liberalisation, and will continue to pursue more open global markets. Progress in multilateral liberalisation through the WTO Doha Round of trade negotiations offers the best opportunity for driving economic growth and long-term prosperity, and the world must ensure developing countries have the flexibility to design, plan and sequence trade reform in line with their country-led development and poverty reduction programmes. In parallel, developing countries also need support in building the social, human and physical capital necessary to benefit from more open global markets. The UK has been a leader on this 'Aid for Trade' agenda and recently announced that its total support for aid for trade, including support for infrastructure, is expected to increase by 50 per cent by 2010/11. The Government is working to ensure that all donors deliver on their Aid for Trade commitments, particularly the G8 expectation of US\$4 billion a year by 2010. This means transforming commitments into concrete and credible financing, within the new WTO Aid for Trade framework, as well as making the Enhanced Integrated Framework operational as soon as possible. Within Aid for Trade, donors need to prioritise the investment in physical infrastructure – roads, ports, power and telecommunications – that countries need to get goods to global markets and generate higher economic growth. The Commission for Africa called for donor funding for infrastructure in Africa alone to increase by US\$10 billion a year up to 2010, and US\$20 billion thereafter.

Global imbalances

4.45 Greater global integration of markets can introduce new tensions into the economy as the current unprecedented imbalances in the world economy have demonstrated. Export-oriented growth policies in Asia, high oil prices and low US savings rates are reflected in the largest US current account deficit in history and substantial investments in emerging markets, all financed at relatively low cost. However, such significant unbalanced demand increases both domestic economic risks and systemic global risks. The orderly unwinding of global imbalances and solving other macroeconomic spillovers will require sustained actions to implement a policy of: boosting national savings in the US, including fiscal consolidation; further progress on growth-enhancing reforms in Europe; further structural reforms, including fiscal consolidation in Japan; reforms to boost domestic demand in emerging Asia, together with greater exchange rate flexibility in a number of surplus countries; and increased spending consistent with absorptive capacity and macroeconomic stability in oil producing countries. The UK welcomes the multilateral consultation by the IMF, which provides an opportunity to support the agreed policy strategy.

4.46 Although globalisation is likely to be resilient to all but the most severe occurrence of these threats, and recognising that in many cases mitigating these risks requires a global response, it is important that these risks are taken into consideration in government policymaking. The future is uncertain and the risks to globalisation are increasing. With its open, flexible economy increasingly integrated with the rest of the world and standing to benefit significantly from continuing globalisation, the UK could be badly affected by a reversal of globalisation. In particular, globalisation is contingent on maintaining open markets and pursuing further liberalisation, highlighting the importance of building a consensus, both domestically and multilaterally, around the benefits of globalisation. The

³⁷ *Antidumping in Brazil, China, India and South Africa – Rules, Trends and Causes*, McCarthy, C, Trade Law Centre for Southern Africa, 2005.

Government will continue to play a positive role within Europe to ensure the EU is a force for continuing openness both in Europe and more generally and pursue policies to ensure that all have the opportunity to share in the benefits of globalisation.

SOCIAL CHALLENGES OF GLOBALISATION

4.47 The previous sections have highlighted the trends and challenges of global economic change, their large potential benefits to the UK and others, and the potential risks to globalisation's continuation, particularly from protectionism. This final section explores the social challenges of globalisation that can contribute to those risks and need to be recognised and addressed if a consensus for globalisation is to be built and the full potential benefits of globalisation are to be realised by all individuals. These challenges include pressures on relative incomes resulting from higher premiums on skills combined with increasing competition for low-skilled activity, adjustment costs as labour and capital are redeployed from declining sectors to expanding ones, and localised impacts in specific communities and regions. If not properly managed, the combined effect of the social challenges outlined here can be a sense of insecurity for individuals and firms undermining support for globalisation even among significant net beneficiaries of it

Skills biased technological change **4.48** Globalisation, while bringing considerable benefits both in the UK and overseas, can contribute to underlying pressures on relative incomes by increasing the premiums attached to skill. Evidence suggests that skills biased technological change (SBTC) has been a bigger factor driving pressure on inequality than trade openness.³⁸ However the relative effects are difficult to disentangle. As set out in chapter 3 there have been increasing income returns to skills and educational qualifications over the past twenty years, even though there has been a substantial increase in the supply of workers with degrees. SBTC is a change in technology that favours skilled labour over unskilled labour, increasing its relative productivity, demand and wage. This could be through a new technology that increases demand for skilled labour or reduces the demand for low skilled labour.³⁹

Combined with lesser impact of trade **4.49** In addition, lower-skilled labour intensive production is shifting to lower-wage labour abundant countries in line with comparative advantage. However, competition from emerging economies will not remain limited to low-value areas – evidence suggests that increasingly higher-value added tasks are also beginning to feel the impact of globalisation.⁴⁰ Developed countries like the UK will therefore need to increasingly specialise in producing goods and services with a higher skills content. This specialisation will increase the productivity of those skills tasks and the relative demand for workers who can undertake them, further increasing the skills premium in advanced economies.

Shift to demand for service sector skills **4.50** As labour demand has fallen in labour intensive production there has been increased demand for low-skilled workers in non-traded service sectors, such as hospitality and personal services. As society has become more affluent due to economic change, consumers have tended to demand more of these services in developed economies. However, demand for low-skilled workers is expected to fall as the UK continues to become an increasingly knowledge-intensive economy.

³⁸ *Helping workers to navigate in 'globalised' labour markets*, OECD Policy Brief June 2005 and *Trade-adjustment Costs in OECD Labour Markets: A Mountain or a Molehill?* Chapter 1, OECD Economic Outlook 2005.

³⁹ The automation of basic production process means that less unskilled labour is needed, but the skill requirements for creating and running more complex production may increase demand for labour.

⁴⁰ *Changes in Wage Inequality*. Machin, S & Van Reenen, J, 2006.

4.51 Overall, the effects of technological change and trade liberalisation on returns to skills are expected to contribute to continued underlying pressures on relative incomes, in the context of overall rises in prosperity. In developed economies, skills premiums will rise, and pressure on the incomes of the low-skilled will continue. This reinforces the importance of raising the UK skills profile and ensuring flexible labour markets, so that all individuals are in a position to share the gains of economic change.

Adjustment costs 4.52 Liberalisation and technological change also entail adjustment costs as the transition to new economic and employment structures takes place, such as greater job insecurity and time between jobs, and any loss of wage resulting from displacement. These adjustment costs may not be evenly spread between individuals and regions, and while small compared to the gains from globalisation, may be significant at the individual level. Facilitating adjustment is important, both to ensure that the whole of the UK can benefit from globalisation, and to maintain a consensus behind continuing global change. Flexible labour markets must be underpinned by a modern and flexible welfare state that provides security for people when they need it and supports people to move into and progress in work. Responsive welfare policies can also further enhance flexibility by encouraging risk-taking and entrepreneurship and enabling individuals to make the transition between different forms of employment more rapidly. To maximise the economic benefits of globalisation, all individuals must have the opportunity to upskill and receive regular training in the basic skills required to participate in the labour market.

Adjustment at a regional level 4.53 The diversity of the UK economy means that different areas at all spatial levels will be affected in different ways as further global integration and technological progress affects comparative advantage. The Government has a target to 'make sustainable improvements in the economic performance of all English regions by 2008, and over the long-term reduce the gap in growth rates between the regions'. Geographical economic inequalities can undermine economic efficiency in a number of ways. Increased activity in some regions may create demand pressures by firms for labour and skills, leading to inflationary pressure, while other regions experience weaker demand if there is insufficient flexibility between regions. While flexibility enables regions to build on their strengths and develop successful industrial clusters, it can also mean that other regions with declining sectors find it harder to attract skilled labour and knowledge-intensive industries and to promote regional centres of growth. This will also have important implications for, and may be addressed by, areas within regions too.

4.54 In the decade ahead, some regions of the UK with clusters of successful sectors in high value-added manufacturing and services, such as financial and business services in London and the South East, the technology cluster in Cambridge, and petrochemicals in the North East, stand to gain from shifting comparative advantage, particularly as the importance of high value services, for which clustering in cities can be particularly important, grows. At the same time, other regions, for instance those with concentrations of traditional manufacturing firms, may need support through the transition to the global economy. The regional impact of previous globalisation and technological change can be seen in the decline of the UK textile industry at the start of the twentieth century, as successful textile industries emerged in Asia and the Pacific. The costs of decline in the UK were particularly borne by individuals in textile producing regions, such as Lancashire.

CONCLUSION

4.55 This chapter has shown how the global economy is undergoing a profound transformation, with the trends identified set to continue over the next decade and beyond. The balance of global economic activity will continue to shift, with emerging economies

accounting for a greater proportion of production, flows of investment and trade will remain drivers of global growth. International specialisation will continue as production chains become more fragmented and dispersed, leading to the restructuring of national economies. Remaining at the cutting-edge of science and innovation, and ensuring a skilled and flexible workforce will become increasingly important. This competitive global economic environment will set the context for government policy-making.

4.56 Continued openness, new sources of global growth, and continuing technological innovation has the potential to increase prosperity in all countries, developed and developing. As outlined above, as an open economy, with strength in key sectors and the flexibility to respond to change, the UK is in a strong position to benefit from these trends. However, there is also a need to recognise the challenges that arise in adjusting to global change. In *Globalisation and the UK: Strength and opportunity to meet the economic challenge*, the Government set out priorities for reform to ensure that the UK is able to maximise the gains from globalisation – emphasising the importance of meeting the economy’s changing skills needs; strengthening science and innovation; reducing regulatory burdens on business; ensuring a responsive planning system; and ensuring a better transport infrastructure to meet the needs of the economy. The final chapter of this document sets out in detail how this will be taken further in the Comprehensive Spending Review including through:

- Entrenching macro-economic stability in the decade ahead. This is vital if the UK is to seize the huge potential opportunities from globalisation, and master the challenge of a more integrated global economy where shocks from one parts of the world can be rapidly transferred to others regions. The UK’s robust macro-economic framework provides a strong platform and the Government is committed to entrenching stability and fiscal sustainability through the CSR period.
- Pressing for the resumption of a successful conclusion of the WTO negotiations and continuing to combat protectionism. Maintaining a consensus behind globalisation and further multilateral liberalism is key to reaping benefits for the global economy and the UK.
- Taking further steps to progress economic reform. The CSR will be informed by a set of reviews on the key priorities for economic reform addressing the areas where further progress is needed to fully unlock and secure the gains from globalisation, including: the Leitch Review of Skills, a study by Sir Rod Eddington on the economic impact of long-term transport decisions, a review by Lord Sainsbury of Turville of science and innovation policies across government, a review of land use planning led by Kate Barker, and a review of the effectiveness of sub-national interventions on economic development and the regeneration and renewal of deprived areas.
- Delivering on the Government’s commitment to improve the life chances of children and young people, creating equality of opportunity. In a world where China and India are producing 4 million graduates between them each year, over ten times more than the UK, the importance of ensuring that the potential of each child is realized is reinforced. A review of children and young people, reflecting on the future challenges and opportunities for their life chances and further steps the Government should take in response will inform the CSR.

5

TECHNOLOGICAL CHANGE

INTRODUCTION

5.1 This chapter covers the challenge of technological change, summarising the key trends expected over the CSR period and beyond, and how these will provide opportunities and challenges for individuals, businesses and government.

5.2 Today, rapid advances in technology are bringing changes to the nature of economic and social relationships. Technological change and innovation are increasing levels of prosperity and providing opportunities to improve public service outcomes in the UK and in all countries. However in addition to being a tool for increased efficiency and new policy possibilities, technological change can be cost driving in some areas, and can bring with it cultural, legal and ethical challenges.

Overview 5.3 The first section of this chapter considers the overarching technological trends expected in the decade ahead. Rates of change and uptake of new technologies will remain high. While there are significant uncertainties associated with forecasting the development of specific technologies, as now, innovation will remain an important driver of economic growth, and contribute to increasing returns to skills.

5.4 The second section outlines eight areas or clusters of technologies in which “horizon scanning”¹ suggests developments over the next decade are likely to impact on Government, businesses and individuals: information handling and knowledge management, sensors and tracking, network interactions, security, advanced materials and robotics, nanotechnologies, body and mind sciences, and energy technologies.

5.5 The final section considers how changes within these clusters will be reflected in opportunities to transform public service delivery and in new policy possibilities in key public service areas such as transport, education, health, security and energy where new technologies could present opportunities for Government but bring with them several related challenges.

OVERARCHING TECHNOLOGICAL TRENDS

Dramatic historical change

5.6 In the past, the pace of scientific and technological change and the rate of uptake and diffusion of new innovations have been dramatic. Transformational technologies have emerged: the steam engine, railways, internal combustion engines, electricity and the telephone during the 18th and 19th centuries; the motor vehicle, airplane, mass production factory processes and later, computing, the internet, biotechnology and more in the 20th century. Over the last decade, technology has continued to advance, with innovations occurring in many areas of science and technology including energy, manufacturing, and nanotechnology, spectacular leaps in Information and Communication Technologies (ICT) and continued advances in medical knowledge. As in the past, technological change, both transformational and incremental, continues to affect the lives of citizens. It brings new opportunities and responsibilities for government and raises expectations of public services, as consumers experience services enabled by technology.

¹ See 5.14. Horizon Scanning is the systematic examination of potential threats, opportunities and likely developments including but not restricted to those at the margins of current thinking and planning. Horizon scanning may explore novel and unexpected issues as well as persistent problems or trends.

Rates of technological change will remain high 5.7 Looking to the future, many factors will affect the rate of technological change. The chapter on globalisation explained that changes in the global economy and technological advance have been interlinked – technology has facilitated work and trading over long distances, and globalisation has brought new opportunities for trade in innovative goods and services as well as increased competition. Over the next decade, the continued unparalleled changes in the global economy will place increased pressure on all countries to move into more value-added products and services. This, together with continued increases in technologically capable graduates worldwide,² and increased prosperity will see levels of innovation remaining high.

Government policy and public opinion will affect rates of change 5.8 While globalisation will remain a key driver of global technological change, more locally, government policy will also have an important influence on domestic rates of innovation and uptake of new technologies. Policies that support research and development (R&D) directly, those aimed at demonstration or deployment of new technologies and those that affect competition, Intellectual Property and skill levels will all impact on the UK's science base and the conversion of R&D into innovative products and services. Government's communication and framing of scientific debates and resulting public opinion is also crucial. For example, as discussed in Box 5.1, careful handling of stem cell research has resulted in the UK now being a global leader in this field, with significant economic benefits for the UK as well as future health possibilities.

Box 5.1: Stem cell research in the UK

Stem cells are undifferentiated cells that have the potential to develop into specialised forms (eg liver, nervous tissue) in adults. They offer the potential for safe therapies that do not rely on pharmaceuticals or surgery that could be developed for a wide range of diseases and injuries.

The creation of a new "line" of human stem cells usually requires a fertilized egg to be cloned. Hence the research raises a number of moral and ethical concerns.

The UK is a world-leader in this fast-developing area of science. This has been made possible by a combination of an established science base, and legislation, with independent oversight, which sets boundaries within which researchers can continue to make useful progress, but which retain the general support of the public. In contrast, the US has banned the use of federal funds for stem cell research, although state and private funds are in place. The UK's legislation governing stem cell research is derived from a wide-ranging consultative exercise on in-vitro fertilisation (IVF) which pre-dated specific interest in embryonic stem cell research. This inquiry was characterised by agreement on what the key ethical problems were (even if solutions continued to be debated), and wide public involvement involving professionals and lay people at all levels. Public engagement continues in this area to take account of the rise of new technologies, changes in societal attitudes, international developments, and the need to ensure effective regulation.

Stem cell research is one example of the many emerging areas of science that are characterised by a mass of ethical and technical issues which Government needs to consider well in advance if the economic and social opportunities they offer the UK are to be realised, and the risks mitigated.

² Long-term global economic challenges and opportunities for the UK, HMT, 2004.

A source of economic growth 5.9 The chapter on globalisation sets out how over the next decade, and beyond, rapid technological change will continue to act as a key underlying driver of economic productivity, economic reform and growth,³ contributing to rising incomes and living standards in developed and developing countries. Countries who foster R&D and innovation will attract businesses in the key high-growth areas of the future and Skills Biased Technological Change will contribute to increasing returns to skills, reinforcing the importance of raising the UK skills profile.

High levels of uncertainty about specific developments 5.10 While the rapid rates of technological change and their impact on economic growth and prosperity can be predicted with some certainty, it is more difficult to forecast the specific forms that innovations will take over the next decade. Past developments show the complex routes that innovations take in reaching the market and achieving viable levels of uptake. Box 5.2 sets out some case studies which demonstrate this complexity – for example where the best technology has not won the largest market share, where technologies have achieved mainstream use as an unintended consequence of developments elsewhere and where uptake has occurred suddenly outstripping expectations.

5.11 A complex set of technical, social and economic factors and the influence of existing systems can therefore either encourage innovation or act as barriers to change. Innovation theory systemises this complexity but is less helpful as a tool to predict the future. All evidence suggests that accurate prediction of specific future technological changes is severely limited. Unlike several of the other long-term challenges discussed in this publication, the challenge of technological change cannot readily be considered with a detailed and accurate future trend analysis.

³ See, for instance, *Endogenous Technological Change*, Romer, P, NBER Working Papers 3210, 1990 and, *A model of growth through creative destruction*, Agion, P & Howitt, P, 1992.

Box 5.2 Examples of the difficulty in predicting innovation and uptake rates

The QWERTY keyboard, which has persisted since 1873 was designed to slow down typists to prevent early typewriters jamming. As typewriters became mechanically more efficient, the QWERTY design was no longer needed. Following time-and-motion studies, in 1932 the Dvorak keyboard which avoided the typing inefficiencies of QWERTY was developed. However despite the overwhelming advantages of the Dvorak keyboard, due in part to vested interests – from manufacturers to typists themselves – most keyboards still follow the QWERTY design.⁴

Text messages emerged in the early 1990s. While reports of their original purpose varies between commentators, there is agreement that few believed or planned for text messages to be habitually used to send messages between mobile phones or to then become a dominant form of communication – 3.7 billion texts were sent in the UK in September 2006.⁵ Text messages are now being used by both the private and public sector as a delivery channel – for example patient appointment reminders in some Primary Care Trusts.

‘Web 2.0’ or an internet model where content is created and shared by users, has given birth to some of the most popular sites the internet has ever seen⁶ – for example, wikipedia, a free online encyclopaedia where users provide the content contains nearly 1.5million articles in English; youtube – a site which allows users to share video clips was sold in October 2006 for \$1.65bn.⁷ Part of the Web 2.0 trend includes social networking sites which since emerging in the late 1990s and have grown significantly in popularity – myspace.com, the market leader was founded in July 2003, and by July 2006 had achieved a 4300 per cent increase in visits over two years and 132 per cent per cent increase in visits since the same time in the previous year.⁸ Social networking sites, and other forms of information and communication technologies can create a new landscape for engagement with the citizen. The ramifications of this for both private and public sectors are complex and only just beginning to be understood.

Benefits, challenges and risks to individuals and society

5.12 Despite this uncertainty, in addition to wealth creation and increased skill requirements, technological change will present other opportunities and challenges for individuals and society as a whole. For example, increased travel facilitated by technological advances has been an important tool in generating economic growth and tackling social exclusion but has also contributed to congestion and environmental challenges; medical advances have produced new and improved treatments, but in doing so, presented society with challenges in terms of future costs and difficult ethical questions about availability; in ICT, increased ubiquity and mobility has allowed development of communities joined by the Internet, changed working patterns and the nature of employment, created new options for consumers and more, but has raised concerns ranging from digital exclusion to internet security and identity fraud. The future will see similar opportunities and challenges arise. This chapter explores what some of these might be in key public services areas.

⁴ *Diffusion of Innovation*, Everett M. Rogers, The Free Press New York, 1995.

⁵ Press Release, Mobile Data Association, Oct 2006.

http://www.text.it/mediacentre/press_release_list.cfm?thePublicationID=83E7AB71-FB6A-62C1-56C04C5FF069169B

⁶ *Rise of the Web's social network*, BBC News Online, September 2006.

http://news.bbc.co.uk/1/hi/programmes/click_online/5391258.stm.

⁷ *Google buys YouTube for £1.65 billion*, BBC News Online, October 2006.

⁸ *MySpace Moves Into #1 Position for all Internet Sites*, Hitwise Intelligence, July 2006. http://weblogs.hitwise.com/bill-tancer/2006/07/myspace_moves_into_1_position.html.

A range of roles for Government 5.13 Against a background of certainty of rapid technological progress combined with uncertainty in projecting specific technological developments, the Government's overarching goals are to maximise the opportunities and meet the challenges that technological change will bring. In doing this, as now, Government will have two distinct roles:

- First, the Government will have role in helping to maintain the world-class standard of the UK science base and helping to create the right environment for businesses and individuals to seize the opportunities presented by continued globalisation.
- Second, the Government will need to respond to the challenges and harness the potential benefits that technological change will bring for public services. In this latter role, the choices the Government makes will depend on the technology in question and on the policy area affected – with the rationale for intervention varying according to the market. For example, in the pharmaceutical market the Government might be seen as regulator and purchaser. Its response to the development of new drugs is therefore likely to be very different to the development of new energy technologies, where Government acts to correct the market failure from the externality of climate change.

5.14 Throughout these choices, the Government will need to use new and emerging technologies with due care, taking into account legal, ethical and social concerns, for example around the rights of individuals to privacy.

EMERGING TRENDS IN THE SCIENCE BASE

Horizon scanning

Horizon scanning is a vital tool 5.15 The previous section concluded that past technological change and innovation theory do not provide sufficient evidence to accurately project future technological developments. Horizon scanning provides an alternative approach. Horizon scanning does not produce forecasts. By considering possible developments in science and innovation and likely opportunities and threats, it allows government and others to understand the implications of technologies that may be developed in the future. Such analysis by the Office of Science and Innovation (OSI) suggests that in the decade ahead, technological change will occur across all scientific disciplines. Within this, Government should in particular anticipate developments happening in eight broad areas of technology in the decade to 2017, that could create wealth, challenge society or transform public services. These are summarised in Box 5.3 and explained in more detail below.⁹

⁹ Additional information on the 8 clusters, including their development and the OSI horizon scans can be found on the OSI website: http://www.foresight.gov.uk/horizon_scanning_centre/

Box 5.3: Eight clusters of technology

OSI's work to identify these eight clusters of technology was based on their horizon scanning data and informed by the Government's Technology Strategy and its associated key technology areas.¹⁰ Horizon scanning is the systematic examination of potential threats, opportunities and likely developments. OSI have two scans:

- the Sigma scan which explores the context in which technology is considered; and
- the Delta scan which is an overview of future science and technology issues and trends derived from interviews and workshops with over 200 UK and US scientists and technological experts.

The eight clusters were derived from this information by a workshop involving 14 government departments which prioritised the clusters according to potential impacts on wealth creation, public policy and engagement, and public service delivery. The eight clusters were then refined and reviewed by the Chief Scientific Adviser's Committee and members of the Council for Science and Technology.

- Information handling & knowledge management – tools to store, process, collect, interpret and transmit data.
- Sensors & tracking – tools to enhance our knowledge of the physical world through effective monitoring of the environment, goods etc.
- Network interactions – virtual and physical processes through networks.
- Security – monitoring, tracking and detection tools plus understanding and identification of complex behavioural patterns to prevent, protect and profile security risks.
- Advanced materials and robotics – production, distribution and logistics, use, disposal and recycling of new materials. Developments in processing, manufacturing, including robotics.
- Nanotechnologies – production and use of nanoscale materials and devices. Associated developments in processing and manufacturing.
- Body and mind sciences – tools to understand, repair and enhance physical, mental and behavioural capabilities.
- Energy – technologies to meet society's energy and environmental needs.

These clusters are explained below. Fuller information about the clusters, including how they were developed can be found at www.foresight.gov.uk.

Eight clusters of technology

5.16 Information handling and knowledge management are activities underpinned by a wide range of ICT. They allow transformation of complex data into information from which knowledge can be developed. Through use of ICT, including new types of user interface and new software, this knowledge can be explored, refined and used to influence decision-making. The range of applications is wide and includes: medicine, for example analysis of new treatments; finance, including credit assessment, stock market prediction and fraud detection; engineering, such as fault detection and diagnostics; and more. For Government, advances in information handling and knowledge management could present opportunities and challenges in several areas from public service delivery and transport to fraud detection.

¹⁰ The Technology Strategy Board Strategies can be found at <http://www.dti.gov.uk/innovation/technologystrategy/tsb/index.html>.

5.17 Sensor and tracking technologies allow parts of the physical world to be detected, identified and monitored. These technologies are already in general use. For example, location devices, identification chips, tools to monitor the natural world, Automatic Number Plate Recognition. In the decade to 2017 further developments of these technologies could provide better initial inputs into monitoring, modelling and potentially management of various systems. Applications are varied and include: monitoring of natural hazards, space and weather systems, changes in plant, animal and human activities and the movement of goods.

5.18 Network interactions deal with virtual and physical processes. New types of network interactions are arising as technologies converge – for example, higher bandwidth, greater and more distributed processing power, larger datasets, smaller sensors and greater understanding of physical, virtual and human network behaviour. Network interactions will potentially impact on many areas of life, from the nature and capacity of early warning systems, to the design of formal or informal organisations. In some instances, the distinction between the physical and virtual worlds may be reduced – for example, there may be developments towards greater automation of vehicles, or shifting patterns in the physical location of network-enabled communities, such as social networks or lobbying groups which may become geographically disparate, but connected by the Internet and able to form quickly. With developments in sensor and tracking technologies, network interactions could provide Government with a series of opportunities in a range of policy areas, most notably in transport, security and environmental research.

5.19 Security technologies include tools to monitor, track and detect the movement of goods and people, and also methods for understanding and identifying behavioural patterns to prevent and profile security risks. The development of technologies that underpin our understanding of crime and security are wide-ranging and draw on other technologies including surveillance, sensors and tracking, information handling and network interactions. For individuals and society, security technologies will continue to be tools to protect our person, homes and finances. For government, such developments have clear implications for policies aimed at crime, defence and counter-terrorism, including raising important social, legal and ethical questions, for example about privacy.

5.20 Advanced materials can reduce construction and maintenance costs of infrastructure, vehicles and machinery, and improve many aspects of their performance. Advances in structural and functional materials for hostile environments (temperature, stress, chemical) are at the core of much advanced high value-added manufacturing. Smart materials can change certain properties in predictable ways in response to variations in their surroundings or some other stimulus – for example, smart materials are used in ‘react to light’ sunglasses. In the future, while timing is uncertain, smart materials will be able to indicate when repairs are required, or may even be self-repairing or self cleaning – with possible applications for example in hospital equipment. **Robotics** and some aspects of automation are related fields. These are increasingly being applied in manufacturing, hazardous environments and transportation.

5.21 Nanotechnologies comprise a wide range of technologies derived from growing abilities to manipulate materials at a molecular level. Materials manufactured at the molecular level may have improved properties – harder, tougher, self-healing, non-wettable, lighter, smarter. While, the potential application of nanotechnologies is wide, there are uncertainties about timing of developments and the precise forms these will take. Box 5.4 refers to some of the major reports that have recently been carried out into nanotechnology. Nanotechnologies could have impacts in: healthcare through better diagnosis and treatment of some diseases; faster and more efficient computing devices; cleaner energy sources; stronger and more cost effective physical infrastructures; but bring with them risks and unknowns that need to be better understood.

Box 5.4 Key government reports on nanotechnologies

In January 2003, The Royal Society and the Royal Academy of Engineering published their joint report *'Nanoscience and nanotechnologies: opportunities and uncertainties'*.¹¹ The report identified specific applications of new nanotechnologies and areas where nanotechnologies are already in use. The report concluded that nanotechnology comprises a disparate number of unrelated technologies that cut across many traditional scientific disciplines. It also noted that we are at an early stage of the technologies' development curve, but that much progress is expected – for example continued miniaturisation of the computer chip as well as promising applications in bio-nanotechnology and nano-medicine. The report highlighted the need for more research and discussion into the potential benefits and risks involved. In February 2005, the Government published its response to the Royal Society and Royal Academy of Engineering Report.¹² This noted the opportunities that nanotechnology could present and set out the Government's commitment to filling gaps in knowledge through a programme of research aimed at reducing the uncertainties relating to toxicity and exposure pathways for nanoparticulates. It also undertook to ensure that developments benefited society and the environment without overburdening the industry with regulation. More recently, in September 2006, Defra launched the Voluntary Reporting Scheme that invites research organisations and others to provide Government with information on the engineered nanoscale materials with which they are working. More information on the scheme and nanotechnologies in general, can be found at <http://www.defra.gov.uk/environment/nanotech/index.htm>.

5.22 Mind and body sciences include the development of new and better treatments and greater understanding of how the human mind and body functions. Disciplines such as medicine, surgery and psychiatry, underpinned by knowledge in areas of science such as microbiology, pharmacology, genetics, the social sciences and increasingly materials science, nanotechnology and electronics can assist in prevention, cure, mitigation, adaptation or other form of medical management.

5.23 Energy technologies include technologies dealing with: the management of energy demand; energy supply and energy storage; energy transmission and distribution; and mitigation of the environmental impacts resulting from the generation, storage, distribution and use of energy. Developments in energy technologies are expected over the next decade as part of the global response needed to meet the twin challenges of climate change and providing for energy requirements.

¹¹ *Nanoscience and Nanotechnologies: Opportunities and Uncertainties*, Royal Society & The Royal Academy of Engineering, 2004.

¹² *Response to the Royal Society and Royal Academy of Engineering Report*, HM Government, 2005.

TECHNOLOGICAL TRENDS AND PUBLIC SERVICES

Opportunities and challenges from technological change **5.24** Technological change in the areas of science and innovation outlined in the previous section, will impact on a wide range of public service and public policy areas. Developments in information handling and knowledge management together with network interactions could provide new opportunities for how public services are delivered – giving greater scope for increased effectiveness, efficiency and personalisation. Within individual policy areas, technology will open new possibilities, responsibilities and challenges for the Government. In transport, developments in network interactions, sensors and tracking technologies could open up new policy possibilities; in health, advances in body and mind sciences could result in new treatments becoming available with great benefits, but possible costs; new security technologies may help the Government in the fight against crime and terrorism; and developments in energy technologies could help meet the challenges of climate change and energy security. Technological change will also add to the increased consumer demands on public services discussed in the chapter on demographic change. As people experience better services, enabled by technology, in parts of the private and public sector, so their expectations of public services rise across the board.¹³

Readiness for unforeseen change **5.25** Because future trends in technological change are uncertain, the Government should expect to have to respond to unforeseen developments, in both the short and longer terms. This will require being prepared for new transforming technologies or new applications of existing technologies as they emerge, as well as being able to swiftly harness new technologies for its own operations. For both, the links between science and innovation and government, as now will be crucial, and good management and use of science within government will remain essential.

5.26 This section considers the main predicted trends in technological change in key areas of public services. Technological change will impact to some degree on all public services, and therefore this subsection does not attempt an exhaustive analysis.

Information technology and public service delivery

5.27 The use of information handling and knowledge management through ICT, has become part of everyday life. Over the next decade, existing and further advances in ICT and information handling processes have the potential to transform how public services are delivered. At the same time, consumer expectations of public services will increase. This subsection considers how ICT can provide opportunities to transform public service delivery, and outlines some of the challenges the Government will face in fully harnessing the benefits of both new and existing information technologies.

Increasing ubiquity of Information Technologies **5.28** ICT, in particular the telephone, is now largely ubiquitous, affordable, familiar to most citizens and robustly tested by the private sector for service delivery. Over the past decade, uptake of ICT has increased markedly. For example, more than 79 per cent of households now have a mobile phone,¹⁴ compared with 21 per cent in 1997;¹⁵ more than 70 per cent of households now receive digital television;¹⁶ home internet connections have risen from less than 10 per cent of households in 1997 to over 53 per cent by 2005.¹⁷

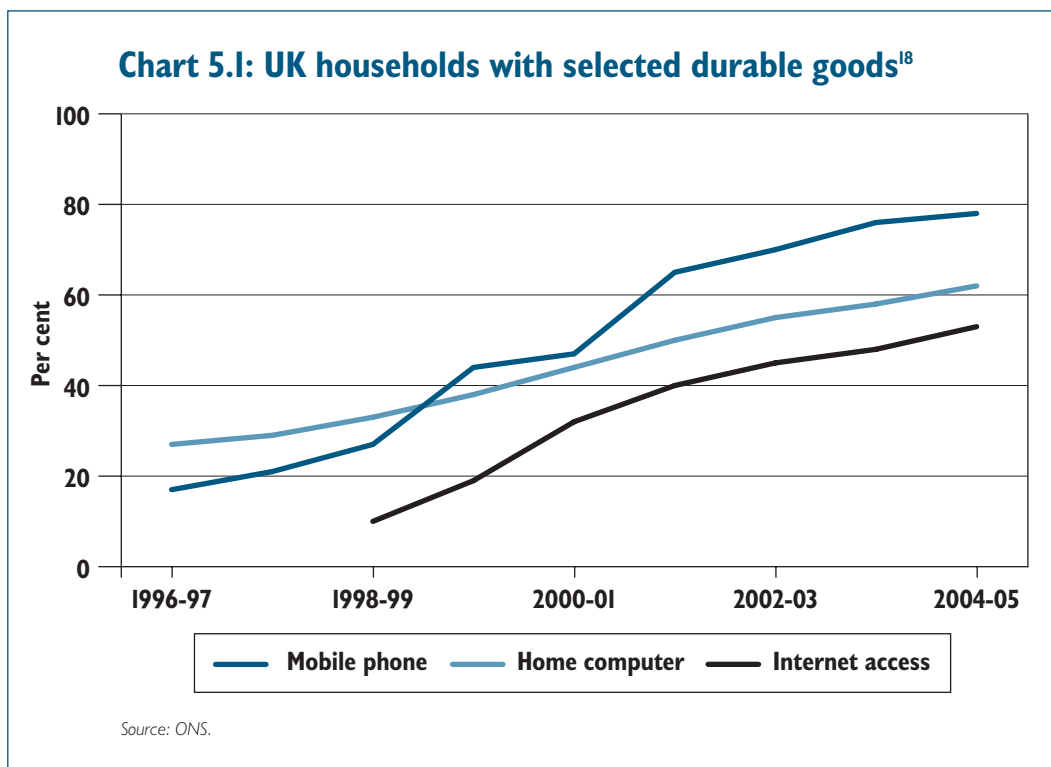
¹³ *Transformational Government: enabled by technology*, Cabinet Office, 2005.

¹⁴ *Consumers and the Communication Market: Where we are now?*, Ofcom, 2005.

¹⁵ *Social Trends 36*, Office for National Statistics, 2006.

¹⁶ *The Communications Market: Digital Progress Report: Digital TV Q1 2006*, Ofcom, 2006.

¹⁷ *Social Trends 36*, Office for National Statistics, 2006.



A reducing digital divide and increased uptake in the future

5.29 Although the ‘digital’ divide has reduced over recent years, take up of ICT remains uneven. Take up tends to be lower in groups that experience other forms of social exclusion such as lower income groups, older people and the disabled. For example, ABC1 households are more likely to have home access to a computer than C2DEs (79 per cent and 50 per cent respectively).¹⁹ Access to ICT is however about more than home take-up – communal access points, via the network of over 6,000 UK Online Centres for example, provide disadvantaged groups with the opportunity to engage with ICT. The digital divide is less evident in other forms of ICT: over 90 per cent of households have a telephone; there is just one per cent separating mobile phone ownership rates among low income households aged under 65 from the UK average (78 per cent and 79 per cent respectively).²⁰ Research has shown that many excluded groups positively engage with certain types of ICT and are supportive of efforts to use technology to help join up public services.²¹

5.30 In the decade to 2017, continued reductions in the price of ICT, an increasingly ICT literate population and the convergence of technologies – such as more internet connections on mobile phones – are all expected to increase uptake of ICT generally and reduce the digital divide further. As set out in the Social Exclusion Unit report ‘Inclusion through innovation’²² the Government is also already taking action to address the challenge of ‘digital exclusion’. In May, the Government announced the establishment of a dedicated Digital Inclusion Team, to drive this agenda forward.²³ The work of this team will include a cross government coordination role for digital inclusion.

¹⁸ Based on weighted data. Data for 1998/99 onwards include children's expenditure.

¹⁹ *The Communications Market: Nations and Regions Research Reports*, Ofcom, 2006. Socio Economic Group classifications: A – Professional, B – Intermediate, C1 – Skilled non-manual, C2 – Skilled manual, D-Partly skilled, E – unskilled.

²⁰ *Consumers and the Communication Market: Where we are now?*, Ofcom, 2005.

²¹ *Inclusion through Innovation: tackling social exclusion through new technologies*, Social Exclusion Unit, ODPM, 2005.

²² *Ibid.*

²³ *Hansard, (the Official Report)*, Column 879, 2nd May 2006.

http://www.publications.parliament.uk/pa/cm200506/cmhansrd/cm060502/debtext/60502-19.htm#60502-19_spnew0.

Better and more efficient public services **5.31** The Transformational Government Strategy set out a vision to seize the opportunities of these trends by creating “a Twenty First Century Government enabled by technology” to be realised over the next decade.²⁴ This vision would take advantage of the increased ubiquity of ICT and help to meet the rising demand of citizens by using ICT not just better but differently.

Box 5.5: Benefits from effective use of technology in government²⁵

Specific opportunities in using ICT to transform public services lie in improved transactional services; in helping frontline public servants to be more effective; in supporting effective policy outcomes; in reforming the corporate services and infrastructure which government uses behind the scenes and in taking swifter advantage of the latest technologies developed for the wider market. Overall, this technology-enabled transformation will help ensure that:

- citizens and businesses have choice and personalisation in their interactions with government. Choice will come through new channels and more fundamentally through new opportunities for service competition;
- taxpayers benefit from efficiency gains;
- citizens, businesses and the voluntary and community sector benefit from the better regulation, reduced paperwork and lower costs from a leaner, modern, more effective public sector;
- public servants have better tools to undertake their jobs, and the opportunity to provide better service as a result;
- policy makers will be better able to achieve intended outcomes in practice;
- managers are able to free resources from back office to the front-line; and
- citizens feel more engaged with the processes of democratic government.

5.32 As set out in Box 5.5, the Strategy identified that when used as a strategic asset, technology could help underpin improvements along the whole delivery chain, from helping to deliver services designed around the business or user, to helping to generate significant back office efficiency savings within public services and raising public sector productivity.

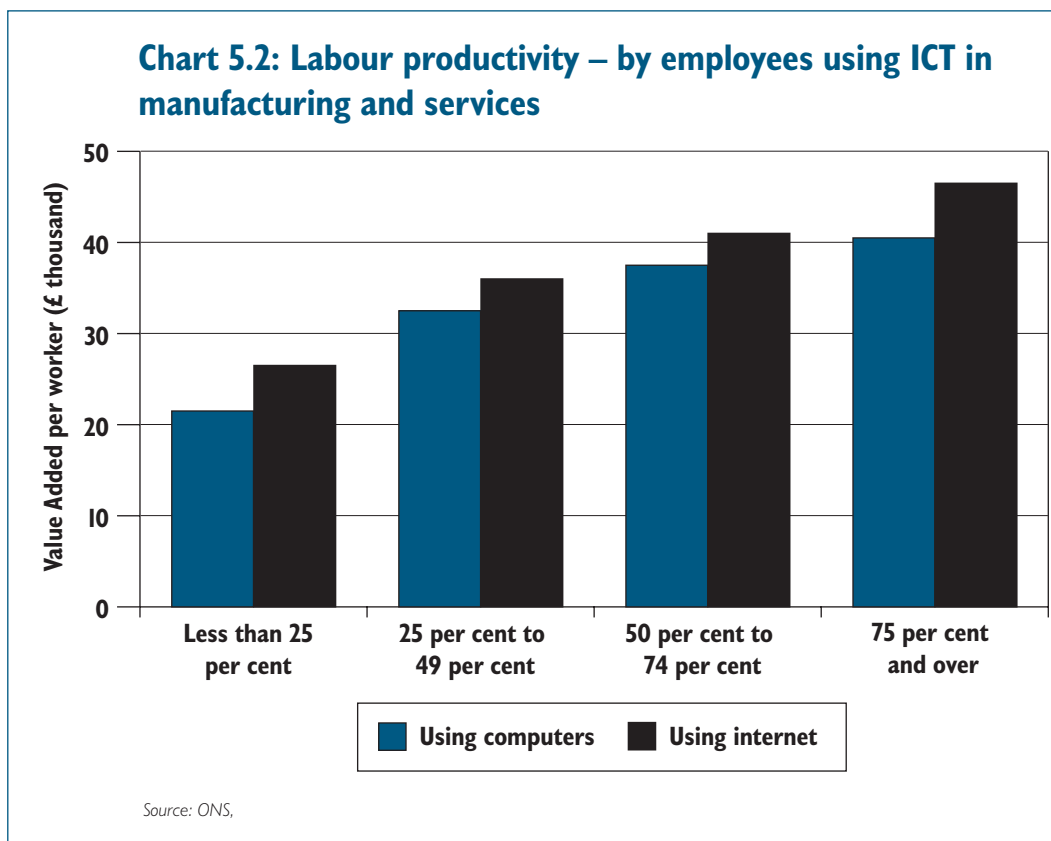
if organisational change can be achieved **5.33** In order to achieve the above benefits, it is clear that investment in ICT alone is not sufficient. While, as shown in Chart 5.2, a growing body of evidence suggests that effective use of ICT is a major contributor to productivity growth in the private sector,²⁶ complementary organisational change to extract the greatest returns from ICT investment is also needed and this may be a greater challenge than the technology itself.²⁷

²⁴ *Transformational Government: enabled by technology*, Cabinet Office, 2005.

²⁵ *Ibid.*

²⁶ *Information Technology and the U.S. Economy*, Jorgenson, D. *American Economic Review* 91(1), pp. 1-32, 2001.

²⁷ *Beyond Computation: Information Technology, Organizational Transformation and Business Performance*, Brynjolfsson, Erik and Hitt, Lorin M, *Journal of Economic Perspectives*, 14(4), pp. 23-48, 2000.



Progress has been made since 1997 **5.34** Since 1997, the Government has therefore made investments in public sector ICT alongside organisational changes. Over the last decade, funding for ICT in the public sector has increased substantially to reverse past under investment, for example as identified in the NHS by the Wanless report.²⁸ Across the whole public sector, spending on IT is now around £14 billion per year or 1.2 per cent GDP.²⁹ Since 1997 the Government has started to use ICT to help organise services around the customer, for example through Directgov and Business Link, launched a Digital Inclusion Unit, and has overseen a concerted drive to improve Government’s use of ICT by establishing the Office of Government Commerce and a dedicated Delivery and Transformation Group in the Cabinet Office.

Challenges remain in the decade ahead **5.35** The Transformational Government Strategy recognised that there is more the Government needs to do in the decade ahead. Despite progress since 1997, the Strategy contained a candid assessment of the current position. Findings included an over reliance on old, custom built and obsolete systems which are costly to maintain; continued use of paper-based and staff intensive processes; systems structured around the provider rather than the customer; a lack of coordination between systems leading to duplication of effort; and a lack of investment in technologies which support front line staff and corporate services, where government lags significantly behind the private sector in both effectiveness and efficiency.³⁰ It therefore set out three key transformations as summarised in Box 5.6 which need to take place: services designed around the citizen or business, a move to shared services within government, and broadening and deepening of the Government’s professionalism in managing technology. A detailed Implementation Plan setting out how these transformations were to be achieved was published in March 2006.³¹

²⁸ *Securing our future health: taking a long term view*, Derek Wanless, 2002.

²⁹ *Transformational Government: enabled by technology*, Cabinet Office, 2005.

³⁰ Extract from *Transformational Government: enabled by technology*, Cabinet Office, 2005.

³¹ *Transformational Government Implementation Plan*, Cabinet Office, 2006.

Box 5.6: Three key transformations required in government³²

- (1) **Service enabled by IT must be designed around the citizen or business, not the provider, and provided through modern, co-ordinated delivery channels. This will improve the customer experience, achieving better policy outcomes, reduce paperwork burdens and improve efficiency by reducing duplication and routine processing, leveraging delivery capacity and streamlining processes.**
- (2) **Government must move to a shared services culture – in front-office, in back-office, in information and in infrastructure – and release efficiencies by standardisation, simplification and sharing.**
- (3) **There must be a broadening and deepening of government’s professionalism in terms of the planning, delivery, management, skills and governance of IT enabled change. This will result in more successful outcomes; fewer costly delivery failures; and increased confidence by citizens and politicians in the delivery of change by the public services.**

Varney programme of work to transform public services

5.36 The Transformational Government Strategy is an ambitious and challenging agenda of change to both how government delivers public services and how its own internal business processes are run. The Government is committed to delivering on this agenda. Ministerial leadership, to monitor and drive progress and ensure cross government coordination has been put in place.³³ Budget 2006 announced that the Chancellor has asked Sir David Varney, former Executive Chairman of HMRC and former Chairman of O2, to advise him on the opportunities for transforming the delivery of public services, in particular by looking at how the channels through which services are delivered can be made more responsive to the needs of citizens and businesses. Details of how the Government will ensure it seizes these opportunities in the 2007 CSR are set out in the final chapter of this document.

Transport**Transport is crucial to the UK**

5.37 Transport systems support mobility and the efficient functioning of the economy. Falling transport costs were an important factor in driving past phases of globalisation and are likely to remain critical in facilitating changes in patterns of consumption and production, and to benefit from new trade opportunities with emerging economies. An effective and efficient transport system also helps create sustainable communities, and is an important tool in promoting social cohesion and tacking exclusion. The Future of Transport White Paper set out the progress to date towards this goal.³⁴ This ranged from improvements in the road system, railways and public transport to measures to improve safety and security. In the decade to 2017, technological changes could provide opportunities to push this agenda forward while at the same time presenting challenges to government.

Demand on our road networks is growing

5.38 Transport can however have detrimental impacts on the environment, which, as concluded in the *Stern Review on the Economics of Climate Change*, (“the Stern Review”)³⁵ should be reflected in their true full costs to society. Trends in environmental technologies, including fuels and low carbon technologies can reduce those costs and are discussed in the section on energy at the end of this chapter. In addition to detrimental environmental impacts, congestion can create economic and social costs. Over the recent past, both road traffic and congestion have grown. Increased car ownership and the falling cost of motoring,

³² Extract from *Transformational Government: enabled by technology*, Cabinet Office, 2005.

³³ PSX(E) Cabinet Ministerial Committee on Public Services and Public Expenditure, subcommittee on electronic service delivery chaired by the Chief Secretary to the Treasury <http://www.cabinetoffice.gov.uk/secretariats/committees/psxe.asp>.

³⁴ *The Future of Transport*, White Paper, DfT, 2004.

³⁵ *Stern Review on the Economics of Climate Change*, www.sternreview.org.uk and CUP (forthcoming).

together with demographic changes, have contributed to these trends. Levels of congestion are predicted to increase by 40 per cent over 2000 figures by 2025.³⁶ Building more road space alone is not a viable option for addressing increased demand on the UK's road networks, and technology has the potential to play an important role.

Technology can help manage demand on our networks

5.39 Over the decade to 2017, advances in network interactions and sensor and tracking technologies will increase the feasibility of Intelligent Transport Systems (ITS) and road-pricing schemes – although the pace of development of these technologies is uncertain. Network operators from the Highways Agency to Network Rail already make good use of network status information to identify problems and take action before they develop into more serious incidents. ITS is also used to manage road networks abroad – for example, all major Australian cities are connected to the Sydney Coordinated Adaptive Traffic System where data from vehicle detectors and pedestrian push buttons, is fed into regional computers to coordinate traffic signal operation and optimise traffic flow. Artificial Intelligence has the potential to take ITS further by automatically responding to pressures or incidents as they are detected, for example by changing traffic light signals, implementing ramp metering to respond to incident-related congestion or by automatically opening up the hard shoulder in response to an incident on the inside lane of a motorway. These measures all have the potential to reduce congestion, maintain traffic speeds and improve reliability on the networks.

Box 5.7 What are Intelligent Transport Systems?³⁷

Combinations of information processing, maps, databases, communications and real-time data from a range of sensors, to produce solutions that enable:

- **infrastructure owners and operators to improve the quality, safety and management of transport networks;**
- **individual travellers, drivers, hauliers, transport operators and authorities to make better informed, more 'intelligent' journey decisions;**
- **network operators and 'third party' service providers to supply advanced information services, increasingly on a multi-modal basis, to all types of traveller; and**
- **road users to drive safer, 'smarter' vehicles.**

Significant potential benefits from ITS

5.40 Road pricing, by pricing the externality of congestion appropriately, can play an important role in helping achieve road transport policy outcomes – making more efficient use of the road network, by spreading or reducing demand on the busiest roads at congested times. Since the introduction of the congestion charge in London, congestion within the charging zone has fallen by 30 per cent.³⁸ Reduced congestion would result in economic, environmental and social benefits. The Road Pricing Feasibility Study found that in principle, a well-designed national road pricing scheme could cut urban congestion in the UK by nearly one half, realising economic benefits in the order of £12bn a year.³⁹ A carefully structured road-pricing scheme can also contribute to reduced vehicle emissions and noise pollution and improved air quality. After one year of operation, the London congestion charge was reported to have resulted in NOx and PM10 emissions reducing by 12 per cent and carbon dioxide by 20 per cent within the charging zone.⁴⁰

³⁶ *The Future of Transport*, White Paper, DfT, 2004.

³⁷ *ITS Policy Framework*, DfT, 2005.

³⁸ *Congestion Charging: Impacts Report: Third Annual Report*, Transport for London, 2005.

³⁹ *The Feasibility Study of Road Pricing in the UK*, DfT, 2004.

⁴⁰ *Congestion Charging: Impacts Report: Third Annual Report*, Transport for London, 2005.

5.41 The benefits of ITS and road pricing are being seen in London and worldwide. New technologies are already increasing the feasibility of more sophisticated road pricing schemes. “Tag-and-beacon” technologies are being used to support urban pricing schemes, for example in Singapore and Stockholm, and in the US, the state of Oregon has announced plans to trial GPS-based road pricing. In the UK, the Department for Transport recently issued an invitation to the market to participate in a series of demonstration projects of time-distance-place based road pricing. Ten local authorities have been awarded pump-priming funding from the Transport Innovation Fund to assess the benefits that road pricing could bring to their areas. The development and widespread uptake of GPS satellite tracking technology for applications such as pay-as-you-drive insurance continues to open up new possibilities for road pricing schemes.

Other technologies could also new open policy options **5.42** In addition to ITS and road pricing, other technologies will impact on transport policy options. Smart cards for example, by underpinning more sophisticated charging regimes will help to manage demand for public transport more effectively, offer opportunities to crack down on fraud, improve efficiencies⁴¹ and facilitate more flexible working patterns. Innovations over the next decade will not be limited to road management and charging possibilities. Opportunities may arise in other parts of the transport system. Gateway facilitation – technologies which, using Radio Frequency Identification tags, bring together technologies aimed at security checking, regulatory enforcement and operating efficiency improvements – continues to be developed. This has the potential to improve the efficiency of the freight industry and allow a more risk-based approach to regulation of it, in turn reducing barriers to trade in the UK.

Eddington Study **5.43** The Chancellor has asked Sir Rod Eddington to advise on the long-term impact of transport decisions on the UK’s productivity, stability and growth. As part of the CSR and informed by the Eddington Study, the Government will need to consider how to realise the potential benefits of existing and emerging transport technologies, and the implications that technology could have for long-term policy and investment decisions. In doing this it will need to consider various challenges. For example, ITS and gateway facilitation are predicated on accurate real time data being available, and on transport authorities and operators being capable of collecting, managing, and using this data to maximum effect. National road pricing also presents significant technological challenges and important equality considerations.

Management and use of data in public services have wide implications **5.44** In transport, in common with other areas of policy where management and use of data will be important – for example, citizen and business centric services facilitated by ICT, crime detection and prevention, sharing of information between teaching and children’s service professionals – there are important technical and cultural challenges and social, ethical and legal issues to consider.

⁴¹ Press Release, Transport for London, February 2005. http://www.london.gov.uk/view_press_release.jsp?releaseid=4869.

Education

Technology can change teaching and learning **5.45** Technology has the potential to impact on teaching and learning across the education sector. As set out in DfES's ICT Strategy,⁴² ICT:

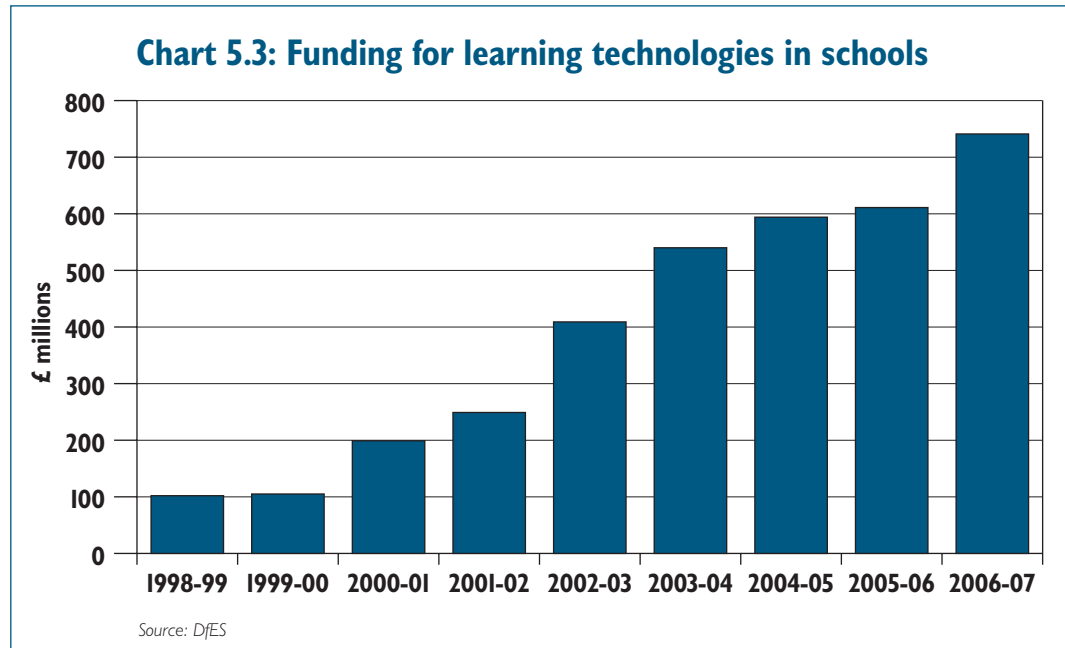
- allows teachers to increasingly personalise lessons to best meet the needs of all their pupils – for example through supporting assessment for learning and through supporting learning and teaching strategies;
- enables greater support for non traditional learners – including those who have already left school – by offering them greater support and choice in curriculum as well as where and when to study;
- helps teaching and children's service professionals share information, and best practice and procurement; and
- enables schools to operate as part of their community, offering more online information and services for parents, carers and other public services.

Technology will be a driver of change **5.46** In addition, as students and pupils become increasingly accustomed to using ICT outside the learning environment, it is important that the potential of ICT is harnessed in education to meet their expectations, remain immediately relevant to their lives, as well as help prepare young people for life and work in the digital age.

ICT can facilitate life long learning **5.47** Technology also facilitates training and lifelong learning outside schools. The higher education sector has been one of the most successful in developing e-learning and using technology to enhance students' experience. Technology for learning is not limited to universities. The University for Industry, which delivers the Learndirect service, was set up in 1998 to stimulate demand for life-long learning and focus on winning over new or reluctant learners – often those who had left school with few or no qualifications. It is now has the largest number of students of any educational organisation outside China. It is one of the largest e-learning networks in the world, using new technology to make it possible for people to learn at their own pace, and in convenient locations. There are no similar organisations – most other e-learning networks in the UK and elsewhere are associated with university education.

The Government has already taken action **5.48** As shown in Chart 5.3, the Government has invested record sums in ICT in schools: £741m in 2006/7, rising from £102m in 1998/1999. This has meant that there is now more than one computer for every 4 pupils in secondary schools, compared to one for every 9 in 1998. In addition to the benefits outlined above, this investment should facilitate more effective home-school engagement and enable parents to become more involved in their child's learning in the decade ahead.

⁴² *Harnessing Technology: Transforming Learning and Children's Services*, DfES, 2005.



Particular action has been taken for under-represented groups **5.49** Budget 2005 announced £25 million per annum in 2006-7 and 2007-8 for schools in deprived areas to invest in home access to ICT for the pupils with the greatest need. Given the increasing use by schools of online resources to support their pupils’ learning, Budget 2006 announced an additional £10million in 2006-7 and 2007-8 to ensure that pupils benefiting from this scheme have access to the Internet. There remains differential uptake in ICT by girls and boys in schools – for example, in 2006, 50,200 boys entered the IT GCSE, compared to 40,500 girls.⁴³ Research has also show women make up less than 15 per cent of those working in ITEC related jobs across all sectors.⁴⁴ The Government is therefore investing over £8 million into the Computer Clubs 4 Girls programme. This teaches ICT skills to girls aged between 10 and 14 through projects that support the Key Stage 3 curriculum, but also ensures girls develop the professional, business and interpersonal skills that the ICT industry is looking for. Many adults with low levels of skills, who failed to learn at school, are reluctant to engage with formal learning. Learndirect has been particularly successful at engaging with these learners – it now has over 1.7 million of which 65 per cent had not done any learning in the last three years.

Progress is being made **5.50** The Building Schools for the Future programme offers a unique opportunity to ensure that schools have suitable facilities to enable ICT to be used effectively across the school infrastructure. The Government has also announced the creation of a national information sharing index, which will enable practitioners delivering services to children to identify and contact one another easily and quickly, so they can share relevant information about children who need services, or about whose welfare they are concerned. Over the next two years, the Government has committed £224 million to design, trial and build the system, in consultation with local authorities, data providers, and children and young people. In addition, the Secretary of State for Education has asked Christine Gilbert to lead a Review to ensure that personalised learning is a reality in every classroom. This will consider how ICT use will develop between now and 2020.

⁴³ GCSE and Equivalent Results in England 2005-06 (Provisional), DfES, 2006.

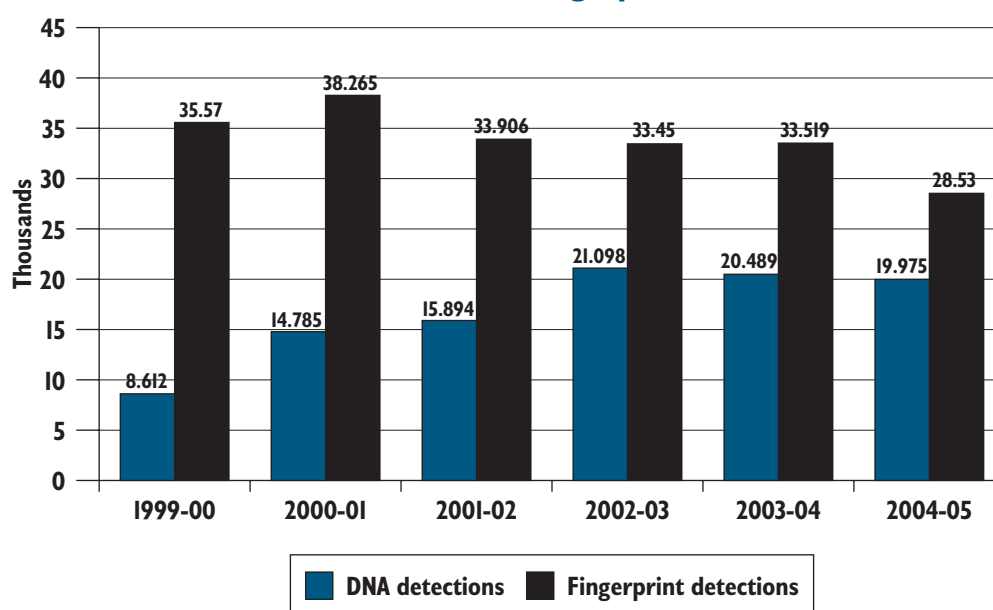
⁴⁴ Women in ITEC Courses and Careers, DfES, DTI, Women and Equality Unit Cabinet Office, 2001. Of the total employed in Information Technology Electronics and Communication (ITEC) related jobs across all sectors, 13 per cent were female.

More remains to be done **5.51** As technology advances over the coming decade, and as ICT becomes increasingly ubiquitous, more opportunities will be open to use of ICT in delivering education policies. The CSR offers an opportunity to consider how the Government can maximise the potential positive impact of technology across the education sector, including for disadvantaged groups. The Government will work to tackle concerns about internet safety for children and perceived loss of privacy through greater information sharing, building on the information sharing vision statement published earlier this year.⁴⁵

Security

Technology is a powerful tool in the fight against crime and terrorism **5.52** Security technologies help prevent and solve crimes. For example, since the compulsory fitting of electronic immobilisers,⁴⁶ car theft fell by 58 per cent between 1995 and 2005.⁴⁷ Detection of crime has been transformed by technological developments such as improvements in fingerprint technology and forensic DNA science. The UK leads the world in using DNA to identify criminals with the national DNA database producing around 3000 matches a month. Following the DNA Expansion Programme from 2000-2005, against a background of a 7 per cent fall in crime between 2003-2004 and 2004-2005, 19,873 direct DNA detections took place in 2004/2005 with a further 15,732 crimes detected as a result of additional investigations linked to cases in which DNA was recovered.⁴⁸

Chart 5.4: Record of DNA and fingerprint detections



Source: Home Office.

⁴⁵ Information sharing vision statement, DCA, 2006.

⁴⁶ At the point of manufacture for new cars produced in Europe – European Anti-Theft Directive (95/56/EC).

⁴⁷ Crime in England and Wales 2004/2005, Home Office Statistical Bulletin 11/05, Nicolas S., Povey D., Walker A. and Kershaw C. Home Office, 2005.

⁴⁸ DNA Expansion Programme 2000-2005: Reporting Achievement, Home Office, 2006.

5.53 As set out in the Government Counter-terrorism Strategy,⁴⁹ technological innovation plays a key role in protecting the UK from terrorist threats, and knowledge of science and technology that can enhance capabilities in this area is constantly updated. For example, the civilian chemical, biological, radiological & nuclear (CBRN) Science and Technology Programme aims to make sure that there is a firm scientific basis for planning the protection of the UK from a CBRN terrorism incident.⁵⁰ Innovation has also changed the face of warfare. The Defence White Paper⁵¹ outlined steps being taken to derive the full benefit of advancing technology, particularly in the collection, management and use of information through Network Enabled Capability⁵² and the widespread availability of precision weapons.

New opportunities in crime, defence and security

5.54 New technologies are expected to continue to provide new opportunities to tackle criminal behaviours. Advances in sensors and tracking technologies, smart materials, nanotechnologies and information handling will improve our capabilities – for example by leading to further developments in CCTV, Radio Frequency Identity tags and Automatic Number Plate Recognition. In counter-terrorism, there will be improvements in surveillance capabilities. In defence, new technologies will increase the agility, flexibility and deployability of our armed services.

As technologies develop new crimes will emerge

5.55 Future technological change will also present challenges for government and society. In terms of counter-terrorism, new crime opportunities facilitated by technology, in particular organised crime, can help raise funds for terrorists. The Defence White Paper also notes the risk of proliferation of nuclear, chemical and biological weapons and related technologies, and terrorist attempts at increasing sophistication.⁵³ In addition, the increased accessibility of the internet gives terrorists an effective method of spreading their ideology outside their normal locus or community. These issues are considered in more depth in the chapter on global uncertainty.

5.56 New technologies also provide new criminal opportunities and changes to the crime mix. For example, since achieving mass uptake in the late 1990s, mobile phones are now stolen in about half of all street crime, and in approximately a third of cases are the only property stolen.⁵⁴ Over the last decade, some of the biggest challenges for law enforcement agencies have resulted from increased uptake of the Internet. New crimes have emerged – for example, Internet child pornography, Internet fraud, junk email or ‘spam’, viruses and hacking – and the ease of committing other offences such as ID crime and organised financial crime has increased. The international nature of the Internet means that investigations into Internet crimes can be more difficult to complete.

Government action on security technologies

5.57 Government continues to take action to harness technology for its own operations and meet the challenges of emerging threats elsewhere.

- in counter-terrorism, since 9/11 the intelligence agencies, special branch and the Met have received sustained funding increases to allow significant expansion of counter-terrorist capabilities. Most recently, security and intelligence services have received an additional £39 million to modernise existing capabilities;

⁴⁹ <http://security.homeoffice.gov.uk/counter-terrorism-strategy/>.

⁵⁰ <http://security.homeoffice.gov.uk/counter-terrorism-strategy/science-and-technology/cbrn-science-and-technology/?version=1>.

⁵¹ *Delivering Security in a Changing World, Defence White Paper*, MoD, 2003.

⁵² *Ibid.* NEC link sensors, decision-makers and weapons systems to allow the effective integration of military capability. This allows the command structure to improve its responsiveness to events on the ground and have the flexibility to respond in near real-time to fleeting targets, even where higher-level decision making is required prior to engagement. For more information refer to the Defence White Paper 2003.

⁵³ *Ibid.*

⁵⁴ National Mobile Phone Crime Unit, <http://www.met.police.uk/mobilephone/>.

- in April, the Prime Minister launched the Serious and Organised Crime Agency – a newly co-ordinated and intelligence driven effort to reduce the harms from organised crime; and
- in policing, a National Mobile Phone Crime Unit was launched in 2003. The DNA database expansion programme continues. A new National Police Improvement Agency planned for launch in April 2007 will help ensure that the benefits from technological developments are fully realised. ID cards will make use of biometric data and will make it far more difficult to commit identity theft and fraud.

In addition, outputs from the Home Office Scientific Development Branch and the Science, Innovation and Technology section of the Ministry of Defence continue to assist and guide development of future security policies. Both the Home Office and Ministry of Defence horizon scanning units – the Central Intelligence Hub and the Development, Concepts and Doctrine Centre – will continue to improve the robustness of policy formation and government’s ability to adapt rapidly to changing threats and opportunities.

Government must stay ahead of criminals and terrorism

5.58 In crime, defence and counter-terrorism, the overarching implications of technological change for Government are threefold: to ensure that new technologies are used to greatest effect to fight crime and terrorism and target resources effectively; to ensure that the technological capabilities of law enforcement and secret intelligence agencies remain ahead of the evolving capabilities of criminals and terrorists; and to ensure that there is sufficient flexibility to respond quickly to future change and redeploy expertise and resources accordingly. In common with other policy areas set out in this chapter, for example transport, while technological progress will present Government with new policy options, they will bring with them important technical, social, ethical and legal and issues to consider, including citizen’s rights to privacy.

Health

Medical advances have had a major impact

5.59 During the past century, medical advances have had a major impact on the way in which medicine was practised and health outcomes achieved.⁵⁵ This period saw a series of medical breakthroughs including: the discovery of penicillin, the causal link between smoking and lung cancer, the use of open-heart surgery, and advances in the safety of anaesthetics. Life expectancy at birth increased from less than 50 years at the turn of the century to 77 years for men and 81 years for females by 2004.⁵⁶ There are no conclusive studies that unambiguously quantify the contribution of medicine to life expectancy.⁵⁷ However, the impact of technology on specific diseases has been marked – it has been estimated that around one third of improved survival from cardiovascular disease over the mid to late 1990s was a result of intensive medical procedures,⁵⁸ and the prescription of statins in the UK has been estimated to save up to 6,000 lives a year.⁵⁹

New medical interventions will become possible

5.60 Over decade ahead ongoing medical progress will change what it is possible for health care to achieve, with new medical interventions continuing to help prolong healthy life, as well as how treatment is carried out. Developments in smart materials, nanotechnologies, and body and mind sciences could lead to new and improved techniques

⁵⁵ *Securing our Future Health: Taking a Long Term View*, Interim Report, Derek Wanless, 2001.

⁵⁶ *Social Trends 36*, Office for National Statistics, 2006.

⁵⁷ *Spending on Health Care: How much is enough?*, Appleby, J & Harrison, A, King’s Fund, 2006. There is also some debate about whether increased life expectancy will mean longer healthier lives of more time in bad health – *Long-term public finance report: an analysis of fiscal sustainability*, HMT, 2005.

⁵⁸ *The Return to Biomedical Research: Treatment and Behavioural Effects*, Cutler, D. M. & Kadiyala, S, 2001.

⁵⁹ *Delivering Better Heart Services*, National Heart Director’s report, DoH, 2003.

for diagnosis and therapeutics. Progress, particularly in biotechnology, is expected to lead to the development of new drugs advancing our abilities to treat various conditions or make new medical interventions, for example, continuing advances in drugs to treat a range of chronic conditions, new vaccines, drugs to tackle newly defined diagnoses, and more. The development of such technologies could itself be accelerated by more advanced and better integrated NHS IT systems, which in addition to generating administrative efficiencies, could allow better information management which, as discussed in a recent Council for Science and Technology Report,⁶⁰ has potential benefits for using patient datasets for research into treatments.

5.61 Some new treatments will ask difficult questions of society and government. During the last decade, there has been substantial debate about the desirability of stem cell research. Over the next decade similar issues will arise. For example, should effective cognitive enhancers be further developed in the future, the desirability of approving these for general use would need careful consideration,⁶¹ as would the costs and cost effectiveness of the treatments involved.

The impact of medical advances **5.62** Future costs and cost-effectiveness of new treatments are uncertain. Over the next decade, pressures on healthcare spending will be driven by several factors including demographic change and rising citizen expectations. Technological change will have an important impact. Some technologies will be expenditure increasing and some may be expenditure reducing.⁶² In the past, medical advance has tended to focus on pushing forward medical frontiers – opening new areas of treatment, earlier and better diagnosis, and lowering of treatment thresholds – and hence increasing the number of people being treated. As discussed in Wanless's Interim Report,⁶³ the general consensus is that the overall impact of technology in medicine is cost driving.

5.63 Disaggregating the precise impact of technological change on health spending is complex and has not been widely attempted. In his interim report, Wanless discussed the methodologies that had been used, and noted the difficulties associated with such estimations. Wanless concluded that in the UK, technological change could have contributed 2 per cent annual health spending growth between 1990 and 2002.⁶⁴ The OECD make a similar estimate – that between 1981 and 2002 a combination of relative price increases and technological change resulted in around 1 per cent annual UK health spending growth per capita.⁶⁵

Energy

Energy in the decade ahead **5.64** As set out in the recent Energy Review,⁶⁶ the UK is now facing two major challenges in energy policy – energy security and climate change. Chapter 7 sets out the challenge of climate change in more detail, including the need for changes in future global energy use in the context of the projected increases in global energy demand described in chapter 4. Chapter 6 on global uncertainty, discusses how these trends, combined with the changing pattern of energy supply, also have potential implications for energy security. This section considers how technology could play a role in meeting these challenges.

⁶⁰ *Better use of personal information: opportunities and risks*, Council for Science and Technology, 2005.

⁶¹ See for example, *Better Humans: The Politics of Human Enhancement and Life Extension*, Miller, P & Wilsdon, J, Demos, 2006.

⁶² *Securing our Future Health: Taking a Long Term View*, Interim Report, Derek Wanless, 2001.

⁶³ *Ibid.*

⁶⁴ *Ibid.*

⁶⁵ *Projecting OECD Health and long term care expenditures: what are the main drivers?*, OECD, 2006.

⁶⁶ *The Energy Challenge: Energy Review Report*, DTI, 2006.

Role of technology in future energy policy **5.65** The Stern Review⁶⁷ identified climate change as a serious risk requiring an urgent global response. It set out that stabilisation of greenhouse gas concentrations in the atmosphere is feasible and consistent with continued economic growth due in part to innovation in energy technologies. It noted that there is significant potential to reduce emissions by increasing the efficiency of existing energy technologies, and in addition, that large-scale uptake of a range of clean power, heat and transport technologies is required for radical emission cuts in the medium to long term. The Stern Review concluded that a portfolio approach would be required for low cost abatement, as the scale of reductions required and constraints on individual technologies dictate that no single technology would be capable of delivering all the necessary emission savings.

5.66 There are a number of low carbon technologies in existence or in development, including a range of renewable energy technologies, such as wind power and solar generation, and carbon capture and storage. These will continue to be developed along with technologies to encourage the more efficient use of energy. The Energy Review concluded that new nuclear power stations would make a significant contribution to meeting the UK's energy policy goals.⁶⁸ Lower-carbon technologies in road transport are also being developed. In the short to medium term, carbon savings from transport are likely to come from improvements in the efficiency of conventional vehicles, switch to hybrid vehicles, and biofuels. In the decades to come, transport powered by electricity or hydrogen may have a role to play. Technological change may also play an important role in adaptation to the impacts of climate change.

Opportunities for growth from the transition to a low carbon economy **5.67** In addition to helping to deliver sustainable and secure energy sources, future growth of the energy technology sector has the potential to significantly benefit the economy. It has been estimated that following growth of 25 per cent in 2005, the current size of the market for renewable energy generation products is US\$38 billion, providing employment opportunities for around 1.7 million people worldwide.⁶⁹ The Stern Review concluded that the transition to a low-emissions global economy would open many new opportunities across a wide range of industries and services, with the global market for low energy products likely to be worth at least US\$500bn per year by 2050. To build on existing funding structures in order to better leverage the already substantial funding for energy research in the public research base, a new Energy Technologies Institute which will bring a new level of focus, ambition and industrial collaboration to the UK's work in this field was announced at Budget 2006. The new Institute will be a 50:50 public private partnership and the Government has already announced that it is prepared to provide £500 million in support, creating the potential for a £1 billion Institute over a lifetime of a minimum of 10 years.

A clear rationale for international action **5.68** The Stern Review described climate change as the greatest and widest ranging market failure ever seen. Markets alone will not bring forward the range of products and services at the scale and speed needed unless government intervenes to correct the externality of climate change. Governments will therefore have a key role in harnessing the full potential of new and existing technologies, including the related issue of encouraging behavioural change. The Stern Review concluded that an ambitious and sustained increase in the global scale of effort on technology development is required if technologies are to be delivered within the timescales required. This included a recommended increase of two to five-fold in worldwide deployment incentives and a doubling of global public energy R&D in order to support the scale of uptake required to drive reductions in the cost of low-carbon technologies and, with a carbon price, make them competitive with existing fossil fuel options.

⁶⁷ *Stern Review on the Economics of Climate Change*, www.sternreview.org.uk and CUP (forthcoming).

⁶⁸ *The Energy Challenge: Energy Review Report*, DTI, 2006.

⁶⁹ *Renewable Global Status Report 2006 Update*, Ren 21 Secretariat and Worldwatch Institute.

and continued domestic intervention **5.69** Domestically, to encourage innovation and to take account of the externalities of climate change and pollution, the Government already intervenes in energy markets, for example through the Renewables Obligation, the Climate Change Levy (and its exemptions for renewable technologies), membership of the EU Emissions Trading Scheme, Climate Change Agreements, various regulatory measures, and through direct investment targeted at research, development and deployment of new technologies through the DTI and the Carbon Trust. The Energy Review set out detailed measures to cut emissions by reducing demand and increasing efficiency, and set out how diverse energy sources – including clean coal, nuclear, and renewables – could contribute to our future security of supply. In responding to the recommendations of the Stern Review, the Government announced the aim of leveraging private and public contributions to the global energy investment framework with the aim of establishing a US\$20 billion loan and grant fund to increase energy efficiency and investment in low carbon technologies.⁷⁰ In addition, other measures, such as the foundations for a global carbon market and a Climate Change Bill, enshrining the Government's commitment to reduced greenhouse gas emissions in law should provide longer-term confidence and encourage developers to bring forward low carbon technologies.

CONCLUSION

5.70 While it is not possible to predict which technologies will emerge over the coming decade, it is not in doubt that technological change will remain a driver of economic growth and, contribute to increasing returns to skills. Government will therefore continue to play an important role in helping to maintain the world-class standard of the UK science base, and framing and communicating scientific issues and gauging public acceptability of new areas of science. It will also need to ensure opportunities to improve skills are open to all.

5.71 It is also not in doubt that technology already presents, and will continue to present significant, opportunities to improve the quality, scope and efficiency public services. By improved, more strategic use of IT, the Government can build on progress to date in delivery of public services designed around the user or business, while at the same time making substantial improvements, including efficiency savings, along the whole delivery chain.

5.72 In specific areas of public policy, most notably, transport, education, security, health and energy, technological change will also open up new possibilities as well as bring new challenges. For example, in transport, technological advances make the possibility of larger congestion charging schemes more feasible; in education, ITC continues to open up new possibilities in teaching and learning; in security, technology will improve capabilities in crime prevention and detection and in counter-terrorism, but will also open up new challenges; in health, new and improved treatments will continue to emerge with great benefits but possible costs; and in energy, new technologies could help meet the challenges of climate change and energy security.

⁷⁰ Remarks by the Chancellor of the Exchequer, the Rt Hon Gordon Brown MP, at the launch of the Stern Review on the economics of climate change, 30 Oct, 2006 http://www.hm-treasury.gov.uk/newsroom_and_speeches/speeches/chancellor/exchequer/speech_chx_301006.cfm.

5.73 Against this background, Government will need to ensure it seizes the opportunities from technology to improve delivery of public services and improve policy outcomes vital to achieving its wider goals. In using new and emerging technologies, the Government will need to exercise due care, taking into account legal, ethical, and social considerations, together with the concerns and views of the general public, including rising expectations of citizens and businesses. The final and concluding chapter of this document sets out how the Government will take steps to ensure it responds to this new context in the 2007 CSR, including through:

- ensuring the UK's continued success in wealth creation and scientific policy-making. The CSR will be informed by Lord Sainsbury of Turville's review of science and innovation policies across government.
- recognising the potential benefits of public service transformation, enabled by technology and that the need to achieve it will be reinforced as consumers experience better services enabled by technology in other sectors and their expectations of public services rise. The CSR will be informed by Sir David Varney's report on opportunities for transforming the delivery of public services, which is looking in particular at how the channels through which services are delivered can be made more responsive to the needs of citizens and businesses.
- ensuring it seizes the opportunities offered by technology and innovation as it invests in public services and infrastructure to equip the UK for sustainable growth and employment in the decades ahead. For example, an awareness of the opportunities presented by technology will help Government consider the options presented in Sir Rod Eddington's study of long-term transport options. The Eddington review will in turn inform the CSR.
- taking account of the role that technology can play, alongside global carbon pricing, and measures to encourage behavioural change in responding to the challenge of climate change. The *Stern Review of the Economics of Climate Change* will inform the CSR.

6

GLOBAL UNCERTAINTY

INTRODUCTION

6.1 This chapter considers the global changes that will affect international security and development and their impacts on the UK. These trends have been considered in a number of previous government publications including *Eliminating World Poverty: Making Governance Work for the Poor*, published by the Department for International Development in July 2006, *Countering International Terrorism: The United Kingdom's Strategy* also published in July 2006, *Active Diplomacy for a Changing World: The UK's International Priorities*, published by the Foreign and Commonwealth Office in March 2006, and *Delivering Security in a Changing World* published by the Ministry of Defence in December 2003. This chapter draws on those publications and others, and has been produced with the relevant government departments.

6.2 Today global security is being reshaped as the international community responds to ongoing threats of international terrorism, conflict, increasing human and resource pressures, the challenge of ending world poverty and changes to the international system.

Overview 6.3 The chapter begins by summarising the range of complex and interconnected international security risks that the world faces in the decade ahead. There are ongoing threats to global stability from international terrorism, WMD proliferation, and inter-state and intra-state conflict and instability. It then examines the challenges posed to stability by population growth, disease, increasing pressures on water and energy supplies and climate change. The third section looks at the imperative to address global poverty and the central importance of improving governance. Much progress on this challenge is expected but there are risks to development ahead from climate change and pressures on resources. The fourth section looks at how the international landscape creates new challenges for international institutions to reform in the decade ahead.

6.4 The final section sets out how these global trends might directly impact on the UK and have implications for its strategic objectives. In an increasingly interdependent world the UK's future security and prosperity, and its objectives of reducing tensions worldwide whilst eradicating world poverty, will be determined by the way the UK reacts to these global trends.

INTERNATIONAL SECURITY RISKS

International terrorism

6.5 From the early 1990s, Islamist terrorist groups began to escalate attacks against Western related targets in countries around the world. The attack on the World Trade Centre in 1993 was an early example. Throughout the 1990s, the threat from Islamist terrorists increased, as illustrated by attacks in France, Egypt, Kenya, Tanzania, Saudi Arabia and the Yemen.

6.6 The largest and most prominent attack came in September 2001, when Al-Qa'ida launched multiple coordinated attacks against targets in the USA, killing nearly 3,000 people including 67 British citizens. Since then, there have been many more attacks by Al-Qa'ida and other Islamist terrorists in Pakistan, Tunisia, Indonesia, Turkey, Egypt, the Yemen, and Saudi Arabia. The first post-9/11 attack on mainland Europe involved coordinated and near simultaneous bombs on the Madrid train network in March 2004. On 7 July 2005, bomb attacks on the Underground network and a bus in London took the lives of 52 victims.

6.7 The threat from terrorism is international, operating across borders. These terrorists can be members of mobile and disparate groups and networks, or operate as individuals. They are able to make use of the characteristics of a globalised world, including freer flows of information, capital and people, and modern communications such as the Internet. Terrorists have also demonstrated the ability to carry out successful attacks in a range of places over an extended period. They are essentially non-state actors although their effectiveness can be multiplied when given state support, as demonstrated in the case of the state sanctuary provided to the Al-Qa'ida network by the Taliban regime in Afghanistan. Those involved in these terrorist acts are driven by particular extremist beliefs. A detailed examination of the drivers of terrorism can be found in *Countering International Terrorism: The UK Strategy*.¹

Targets 6.8 In the decade ahead terrorists are likely to continue to operate using global networks and disparate leadership systems. Whilst these groups will continue to target governmental and economic targets (such as troops, embassies and financial centres), they also consider ordinary civilians to be legitimate targets. Al-Qa'ida-linked attacks are indiscriminate, aiming to cause mass casualties regardless of the age, nationality or religion of the victims. Terrorism will continue to endanger innocent people and civil society as a whole, and threaten economic and political stability in a wide variety of countries.

Weapons of mass destruction

6.9 Proliferation of technologies and communication may increase the risk of wider access to chemical, biological, radiological and nuclear weapons of mass destruction (WMD). Terrorists are known to want to obtain WMD, and the means to deliver them.² The failure or collapse of a WMD capable state may provide terrorist groups with an opportunity to acquire WMD, through the transfer, unintentional or otherwise, of material, technology or expertise from a proliferating state's programmes.

6.10 State proliferation of WMD is likely to continue to be a concern for many years to come. In addition to the five nuclear weapon states declared in the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (China, France, Russia, UK and the USA), others are suspected of possessing or seeking to possess deployable nuclear weapon capability. Further nuclear proliferation might stimulate more countries to seek nuclear weapons capabilities, and could seriously undermine global anti-proliferation regimes.

6.11 Despite these risks it should be noted that there has been some progress in this area in recent years. Some countries that were known to possess or be in the process of developing WMD, such as Libya, have publicly given up those programmes.³

International organised crime

6.12 The principal organised crime activities of drugs, illegal arms, human trafficking, and money laundering, are becoming increasingly prominent risks to international security. These activities pose a major threat to many countries, not only in terms of individual misery and community suffering, but also on account of the associated economic, health, policing and other social costs. Recent estimates put these as at least £20 billion per annum in the UK alone.⁴

¹ *Countering International Terrorism: The United Kingdom's Strategy*, HM Government, July 2006

² *Delivering Security in a Changing World*, Ministry of Defence, December 2003

³ *Foreign and Commonwealth Office Departmental Report, 1 April 2004 – 31 March 2005*, Foreign and Commonwealth Office, 2005

⁴ *New Powers Against Organised and Financial Crime*, Home Office, 2006

6.13 Much organised crime has an international and transnational dimension. For example, the majority of harmful drugs in Europe originate elsewhere, while organised criminal networks in south-eastern Europe remain a problem for the whole of Europe. Offences in one country may be planned in another or criminals may use foreign banks to launder their gains. Alongside the benefits they bring, globalisation and technological development also increase the opportunities for this sort of illegal activity.

Conflict and Organised Crime **6.14** Organised crime can also undermine international development, fuel conflict and affect political and economic stability. A study conducted by Stanford University into 128 conflicts, to determine why some lasted longer than others, discovered 17 in which insurgents relied heavily on contraband finances. These conflicts lasted over five times longer than the rest.⁵ Countries emerging from conflict are especially vulnerable to organised criminal networks.

Intra-state and inter-state instability

6.15 There are many different forms of instability. Violent conflict is the most extreme manifestation of instability. Instability, in countries or regions, can manifest itself through military coups, or other illegal means of political succession, such as economic crisis, breakdown of political, economic or social institutions; systemic corruption; widespread organised crime; loss of territorial control; large scale public unrest; involuntary mass population displacement or violations of human rights. This section examines trends in conflict and instability, the drivers and the costs.

6.16 The Cold War period saw a rise in the number of conflicts globally. Most were intra-state (i.e. civil wars), but the period also included a number of major inter-state conflicts – in the Middle East, Indo-China, Korea, and between India and Pakistan. Major powers were often involved in intra-state conflicts, linked to cold war politics and decolonisation. Chart 6.1 shows how levels of conflicts have changed regionally since 1945.

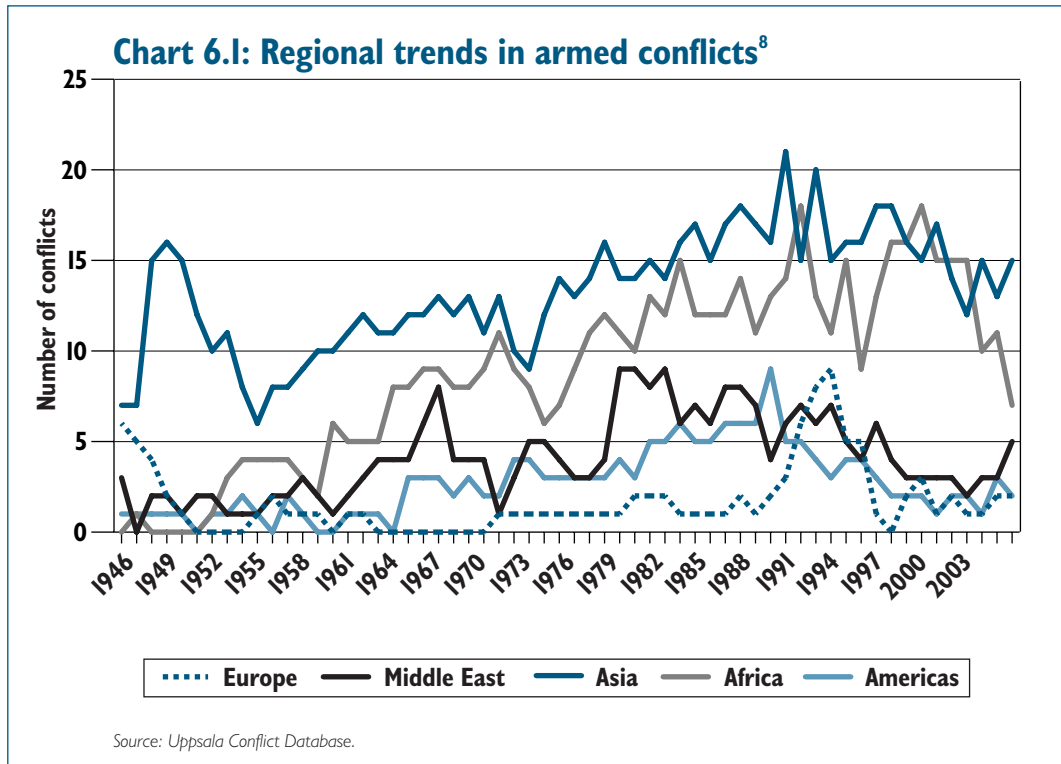
6.17 In the early 1990s the overall level of conflict continued to rise, peaking globally in 1992 as the end of the Cold War and the break-up of the former Soviet Union released previously suppressed ethnic and nationalist tensions in Yugoslavia, the South Caucasus and Central Asia.

6.18 In the years since 1992, levels of conflict, outside Africa, have generally reduced, and conflict within states remains the dominant trend. In 2005 there were 19 active conflicts in the world of which 16 were intra-state, and three were inter-state.⁶ However, there were a further 16 conflicts suspended under a ceasefire. Trends in other forms of instability are harder to track. The Human Security Report provides some data and analysis. For example, it notes that Sub-Saharan Africa experienced more cases of political violence than any other region in 2003, although Asia experienced more state-based conflict and greater use of armed force by governments against civilians.⁷

⁵ *Why Do Some Civil Wars Last So Much Longer Than Others*, Fearon, J. D., Stanford University, 2003

⁶ *The 2005 Chart of Conflict*, The International Institute for Strategic Studies, 2005

⁷ *Human security Report: War and Peace in the 21st Century*, University of Columbia, 2005



Drivers of Instability 6.19 The drivers of overall trends in instability and their relative importance are a source of considerable academic debate. They are difficult to disaggregate because of the complex interplay between drivers and because there are region and country specific causes. It is widely accepted that both structural and political factors are important. Conflict occurs when grievances and stresses can no longer be handled by existing political systems. It requires a political decision by some of the actors to make use of violence as a means to obtain advantage of some kind, such as political power or increased access to resources. The importance of these political drivers is as true of intra-state conflict as of inter-state conflict.

6.20 Structural factors often set the context in which people take up arms. They can increase pressures on political systems. However they are not always present or dominant when violent conflict arises and structural weaknesses can also exist without descent into violent conflict. Interlinked structural factors commonly cited as affecting the risk of conflict and instability include:

- previous conflicts – half of all ‘new’ conflicts break out in countries with a recent history of violent conflict.⁹
- availability of natural resources – an excess or a lack of resources can be a factor in instability. An abundance of mineral and fuel wealth can create conflict for control of that wealth, whilst insufficient or declining water and food availability can lead to (usually localised) conflicts over these. In low-income countries, the risk of conflict is greatly increased by the discovery of a new natural resource or of a higher endowment of a known resource.¹⁰ Factors of this nature could be increasingly important in the decade ahead and beyond, particularly in the developing world, because of an increase in demographic and environmental pressures. This is explored later in this chapter.

⁸ *Investing in Prevention: An International Strategy to Manage Risks of Instability and improve Crisis Response*, Prime Minister’s Strategy Unit, 2005

⁹ *The Challenge of Reducing the Global Incidence of Civil War*, Collier, P. & Hoeffler, A. Oxford University, 2004

¹⁰ *Natural Resources and Violent Conflict*, Bannon, I. & Collier, P (ed), The World Bank, 2003

- poverty – instability has a complex inter-relationship with poverty, and the underlying nature of this relationship is not always easy to understand. The economic impacts of conflict reinforce poverty and hinder development, as illustrated in Chart 6.2. A country with only US\$250 GDP per capita has an average 15 per cent risk of experiencing civil war in the next five years, whereas with a GDP per capita of US\$5,000 the risk of civil war is less than 1 per cent.¹¹ All other things being equal, the higher the per capita income of a country, the greater the capacity of its state institutions and the stronger its governance. So conflict is also associated with weak state capacity. More detailed analysis of the inter-relationship between poverty and instability is set out later in this chapter.
- weak state capacity – a fragile state is one where the government cannot or will not deliver core functions to the majority of its people, including the poor.¹² Key characteristics of a fragile state are weak systems of governance, which fail to provide citizens with basic security, adequate food and energy resources, and a lack of economic opportunities and political representation. The World Bank lists 46 fragile states, which account for 870 million people and include 14 per cent of the world's poor.¹³ Another study has said that as many as one third of the world's poor live in “fragile states”.¹⁴ Such states are vulnerable to conflict and instability and can export this vulnerability to neighbouring countries through refugees, increased availability of weapons, and the spread of disease. Fragile states are also less able to engage constructively in solving regional or global challenges. Indeed, state fragility can exacerbate many of these challenges, including organised crime, and, in some circumstances, international terrorism.¹⁵
- horizontal inequality – evidence suggests differences, whether they are material, political or those of status, between different ‘identity’ groups can lead to grievances and increase the risk of conflict. Government policies can often play a role by discriminating in favour of one group or another, leading to conflict, a role demonstrated to powerful effect in the Hutu massacre of the Tutsi in Rwanda.¹⁶ Formal and informal institutions that minimise social exclusion can reduce this risk.

¹¹ *Breaking the Conflict Trap: Civil War and Development Policy*, Collier, P. and Hoeffler, A. The World Bank, 2003

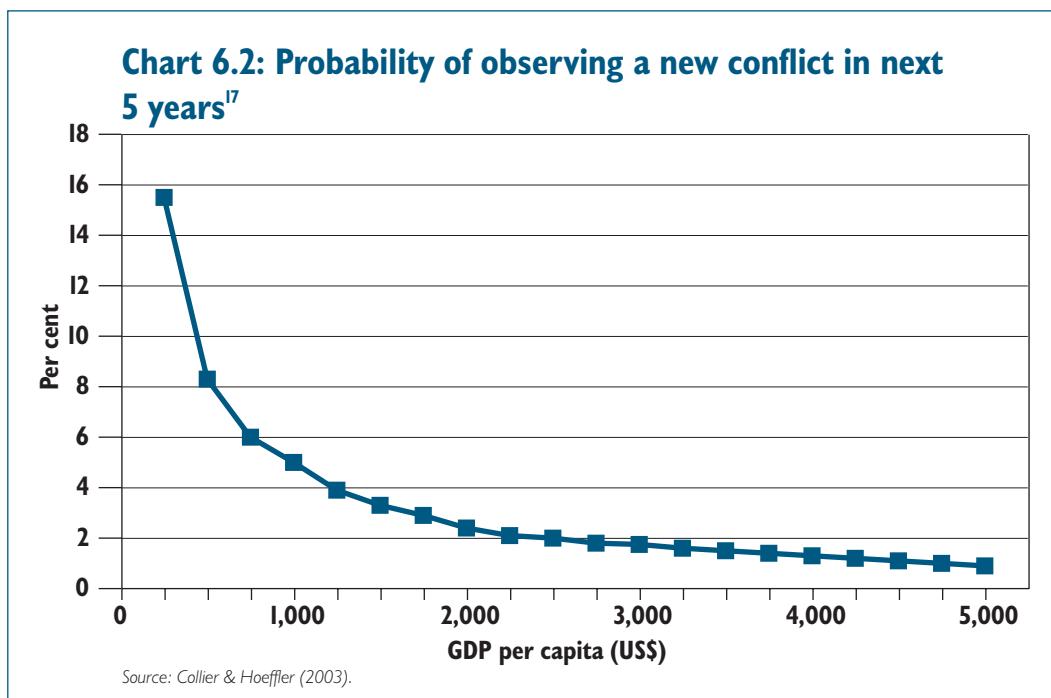
¹² The World Bank defines a fragile state as a Low Income Country Under Stress (LICUS). A Low Income Country is one with \$875 or less GNI per capita. This is calculated using the World Bank Atlas method.

¹³ *Why We Need To Work More Effectively In Fragile States*, Department for International Development, 2005

¹⁴ World Development Indicators used in: *Why We Need to Work More Effectively in Fragile States*, Department for International Development, 2005.

¹⁵ *Why We Need to Work More Effectively in Fragile States*, Department for International Development, 2005.

¹⁶ *Crisis prevention: tackling horizontal inequalities*, Stewart, F. Queen Elizabeth House Working Paper Series 33, Oxford, 2000



HUMAN AND RESOURCE PRESSURES

6.21 Chapter 7 explores how growth in the world population and economy will lead to increased pressure on the environment and global climate in the decade ahead and beyond. It also sets out that these trends and their impacts will be unevenly distributed, with the severest impacts in the developing world.

6.22 Pressures on key resources have implications for the political stability of countries and the global security environment. This section highlights demographic, socio-economic and environmental pressures including: population growth, human disease, trends in energy markets, climate change, and water scarcity.

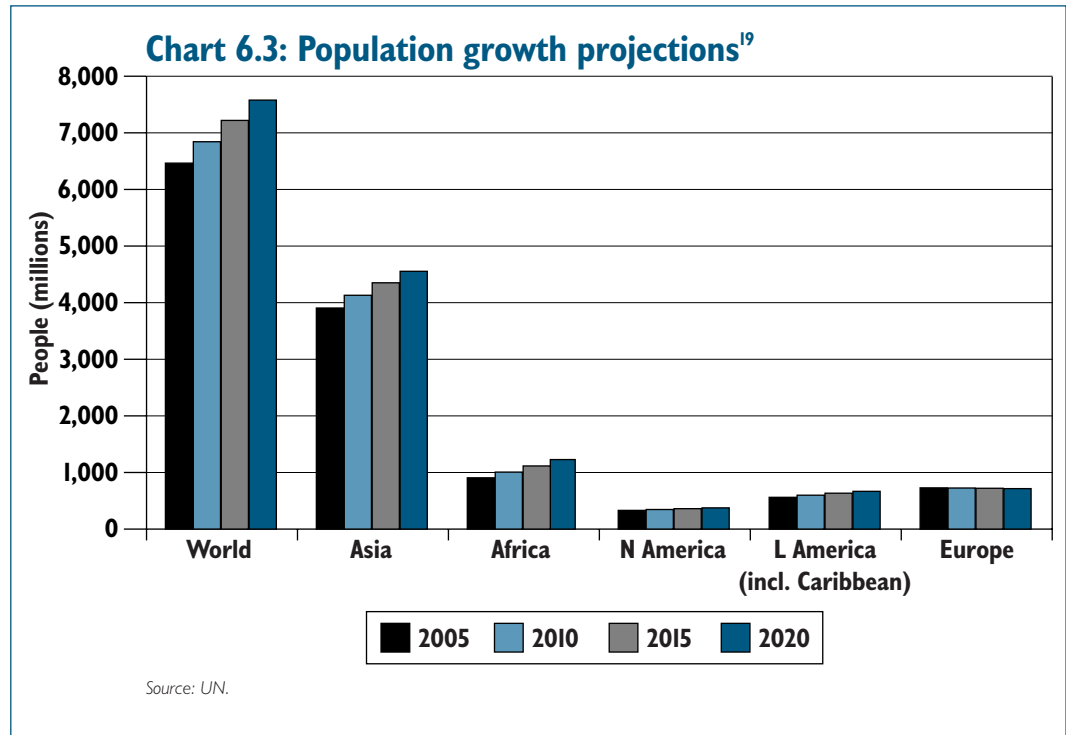
Population growth

Places new strain on stability and resources

6.23 In the decade ahead population growth may place new strains on stability and on resources. The world population is projected to rise by 17 per cent overall by 2020. Despite the impacts of disease, Africa will continue the rapid population growth it has seen in the recent past. Since 1990, it has seen a population increase of around 43 per cent, and urban populations in Africa have increased by some 77 per cent.¹⁸ Growth in Asia will also be significant. In contrast, Europe will face a slight overall decrease in the size of its population although not every country will see a decline in population. Where growth occurs it will require significant investment in infrastructure if larger populations are to be supported and provided with continued and developing access to services, housing, and jobs, particularly in urban areas. It will also be a driver of some of the other growing resource pressures set out below. Anticipated levels of population change by region are set out in Chart 6.3.

¹⁷ Data from *Breaking the Conflict Trap: Civil War and Development Policy*. Collier, P. and Hoeffler, A., World Bank, 2003. Used by *Economics and Violent Conflict*, Humphreys, M. Harvard University, 2003

¹⁸ *World Population prospects*, United Nations, 2004 (revision).



6.24 Population growth is not the only demographic change that can have an impact on stability. There is expected to be considerable migration within and between poor countries, and from poor countries to richer ones. The demographics in developing countries mean that, by 2010, 733 million more people will be of working age, compared with 50 million more in developed countries. Without better opportunities at home, many of these people will migrate – internally and abroad – in search of a better life. In addition, conflict can lead to large numbers of displaced people.

6.25 This has the potential to add to or mitigate pressures on many countries. Fragile societies and economies may not be able to cope with large migration inflows or outflows. In particular, migration will put pressure on the resources of already over crowded cities in the developing world. However, remittances from migrants might be an important source of income. They amounted to nearly US\$167 billion through formal banking channels in 2005.²⁰ There may also be positive economic and social impacts when successful migrants return to their home country.

6.26 Changes in age profiles in population could also be important. For example a number of developed countries will face fiscal challenges from population ageing considerably greater than that expected in the UK (and described in chapter 3).

Human disease

6.27 Globally, chronic disease is responsible for over 35 million deaths each year.²¹ The economic cost of chronic diseases is high, and will increase as they become increasingly prevalent due to changing trends in dietary, smoking and physical habits. This is particularly important when considering the impact of increased welfare and health care costs in developing countries. In China, over the next 10 years heart disease, stroke and diabetes will result in US\$558 billion of forgone national income.

¹⁹ *World Population prospects*, United Nations, 2004 (revision)

²⁰ *International Remittances and Migration*. Global Economic Prospects, The World Bank, 2006

²¹ *Preventing Chronic Disease*. World Health Organisation, 2005

HIV/AIDS 6.28 Unless checked, the spread of HIV/AIDS is likely to continue to undermine development activity, notably in southern and central Africa, and may also have serious consequences for growth and stability elsewhere. Without an effective cure, AIDS will be the single largest cause of adult death from infectious disease in the developing world. By 2020, it will cause 37 per cent of adult deaths from infectious disease.²² Outside Africa, infections are rising rapidly, including in Asia and parts of eastern Europe.

Malaria 6.29 It is estimated that every year there are between 300 and 500 million clinical cases of malaria, causing some one million deaths. In sub-Saharan Africa 3000 children are dying of malaria every day – around 20 per cent of all child deaths.²³ UNICEF estimates malaria costs Africa some US\$10 to 12 billion every year in lost GDP. It is both a disease of poverty and a cause of poverty. Multinational action to combat malaria in the years ahead is being taken forward through a number of inter-connected channels such as the Global Fund for AIDS, TB and Malaria (GFATM) and the Roll Back Malaria Partnership. However, as outlined in the next chapter, climate change could lead to upward pressure on the prevalence and distribution of water borne diseases, such as malaria. This is because flooding, warming, drought and small temperature and precipitation variations make transmission possible in previously unaffected areas.

Energy

6.30 Trends in energy markets could have important impacts on global security and development. The combination of projected increases in demand, the expected pattern of supply, the greater integration of energy markets and climate change that would occur if energy use does not become more sustainable, will all have effects.

6.31 As outlined in the Chapter 4, energy consumption has increased significantly over recent years and demand is expected to continue to grow in the decade ahead. Much of the increase in demand will come from developing countries. Significant investment is needed but, overall, supply itself is not expected to be a brake on global demand.²⁴

Reliance on oil and gas 6.32 Although much of the increased demand for energy is likely to be met by significant growth in coal-fired generation, augmented by further growth in nuclear and hydro generation, oil and gas will remain important sources of energy. As consumption rises over the next decade, reliance on oil and gas obtained from a limited number of countries and transited through a limited number of supply routes and regions, is likely to increase. For example four of the top five reserves of oil are likely to continue to be in the Middle East and most of the oil and gas exported from that region will continue to flow through just three channels. It is estimated that around 58 per cent of gas reserves are currently controlled by Russia, Iran and Qatar.²⁵ Importers will therefore continue to be vulnerable to disruption by instability or conflict affecting these supplies.

Competition for access to resources 6.33 The need for secure energy supplies, combined with the increasing integration of global markets, may lead to increased global competition for access to resources. This is expected to lead to new relationships that could increase or mitigate the risk of instability in countries that supply energy. For example, there will be a growing market for fuels from Africa, particularly as emerging markets seek sources of supply there. This could,

²² *Confronting AIDS. World Bank Policy Renewal Report*, The World Bank, Oxford University Press, 1997.

²³ *Malaria: A major cause of Child Death and Poverty in Africa*, the United Nations Children's Fund, 2004.

²⁴ The IEA estimates that \$20 trillion of investment is needed over the next 25 years if global energy demand is to be met, about this sum half in developing (non-OECD) countries, mostly in the electricity sector. Mobilising these investments in emerging economies will be a major challenge. *International Energy Outlook 2006*, Energy Information Administration, US Government, 2006.

²⁵ *International Energy Outlook 2006*, Energy Information Administration, US Government, 2006

counterintuitively, hinder development unless there is strong governance and a clear understanding of the inherent risks. On the other hand, Africa has seen its strongest period of sustained economic expansion since the early 1970s,²⁶ in part due to increasing trade in commodities with emerging markets. The new relationships could also lead to disruption of supply for importing nations, as suppliers with alternative sources of demand have greater freedom to choose to choose or disrupt supply to certain markets.

6.34 Whilst energy supply will remain sufficient for a continuation of current consumption trends, it is now clear, as set out in the next chapter, that such a path would lead to increasing risks of direct, serious, irreversible impacts from climate change across the world. The potential consequences of climate change for global stability are set out below.

6.35 The Energy Review examined the potential impacts of these trends in energy markets on the UK's energy security and set out the implications for UK Energy Policy.²⁷

Climate change

6.36 Climate change will affect the ability of the international community to tackle instability and encourage development activity. As set out in the next chapter, there is now strong evidence that climate change will affect the basic elements of life for millions of people – access to water, food production, health, and the environment. If no action is taken to reduce emissions of greenhouse gases then temperatures could rise over 2°C from pre-industrial levels by the middle of the century, with a possibility of an increase of 5°C in the longer term. In such a scenario, hundreds of millions of people could be affected by hunger, water shortages and coastal flooding. Developing regions, which are generally warmer than developed ones, and more dependent on agriculture, will suffer earliest and most severely.

6.37 The relationship between these impacts and global security is complex but it is clear that climate change will bring substantial risks of instability. If climate change reduces food production, increases water stress, and increases the number of droughts and floods, there are clear risks of creating or sustaining existing tensions which could lead to violent conflict within individual countries. These tensions and conflicts could spill over national borders, exacerbating damage further. The level of risk will depend upon a number of factors including existing levels of relative poverty, regional tensions, dependence on natural resources and the strength of state instruments in affected regions. Strong, collective, international action to identify and implement effective policies to reduce carbon emissions and stabilise greenhouse gas concentrations will be necessary if these impacts are to be avoided.²⁸

Water security

6.38 Water stress and its effects on land use, fodder availability and food will contribute to sources of instability. The UN define an area as experiencing water stress when annual water supplies drop below 1700 cubic metres per person. When annual water supplies drop below 1000 cubic metres, the population faces water scarcity.²⁹ Today about 700 million people in 43 countries live below the water stress threshold. China is already facing chronic water problems.³⁰ By 2025 it is estimated that 3 billion people could be living in water stressed countries, and 14 countries will move from a position of water stress to water scarcity. These people will be heavily concentrated geographically, with 85 per cent of the population in Sub-Saharan Africa living in water stressed countries in 2025.

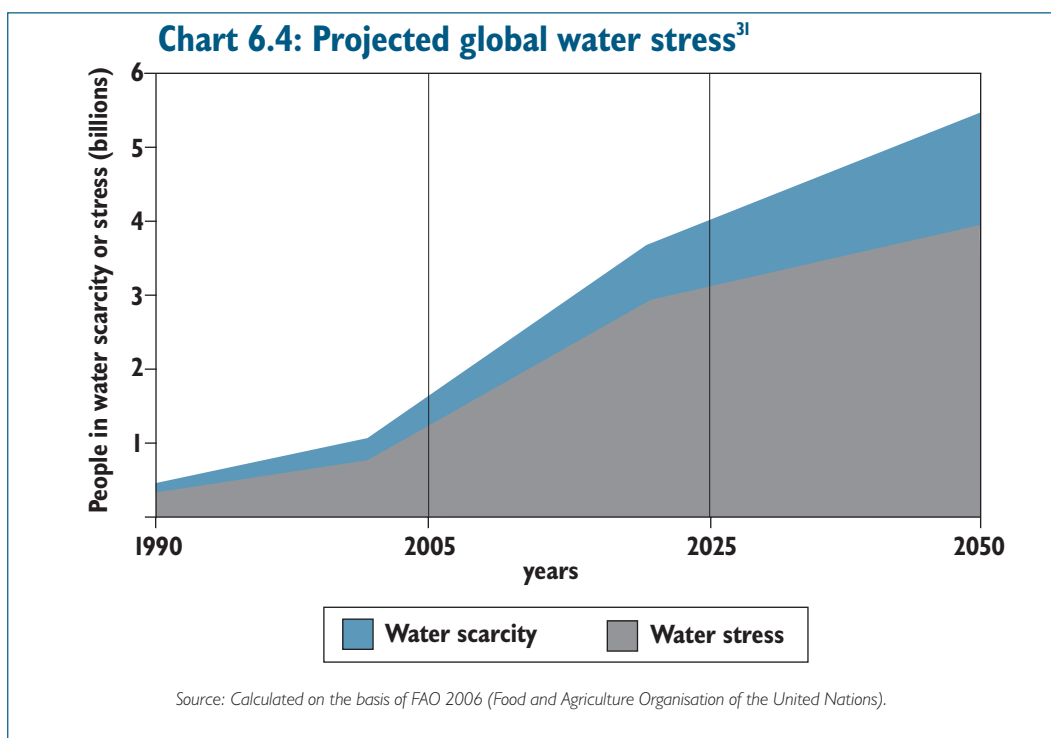
²⁶ *World Economic Outlook*, International Monetary Fund, September 2006

²⁷ *The Energy Challenge: Energy Review Report*, 2006, DTI, 2006.

²⁸ *Stern Review on the Economics of Climate Change*, www.sternreview.org.uk and CUP (forthcoming).

²⁹ UNPD, UNEP, World Bank, and WRI, 2000.

³⁰ *Solutions for a Water-Short World*, Hinrichsen, D., Robey, B. & Upadhyay, U.D, John Hopkins School of Public Health, Population Information Program, 1997.



Longer-term water issues 6.39 Over the longer-term it is likely this trend will continue. In the next two decades, population increases and growing demands are projected to push all the West Asian countries into water scarcity conditions. By 2050, with their combined population being around 5.5 billion people – just under 60 per cent of the projected global population of 9.4 billion – this may lead to inability to farm, food stress and ultimately displacement in specific areas.³² In areas already experiencing poverty, famine and drought, increasing water scarcity may exacerbate and worsen pre-existing conditions. In other areas excess water, through flooding and increases in sea levels, will achieve similar results with changes in land use and displacement e.g. Bangladesh. As discussed in the section above, climate change may exacerbate these problems, and climate change may also contribute to variability in weather conditions that increases the number and severity of droughts and floods, both between and within countries. In Africa, Central Asia, Middle East and the Americas, some countries are arguing fiercely over access to rivers and inland seas, and confrontations could arise as water shortages grow.³³ Drought and flooding would also have a direct impact on ability to manage sanitation, leading to an increased risk of the spread of disease.

³¹ *Human Development Report 2006, Beyond Scarcity: Power, Poverty and the Global Water Crisis*, UNDP, 2006.

³² *Sustaining Water, Easing Scarcity: A second Update*, Gardner-Outlaw T. & Engleman R. Population Action International, 1997.

³³ *Water: the Potential Consequences of Climate Variability and Change for the Water Resources of the United States*, US Global Change Research Program, 2000.

GLOBAL POVERTY

6.40 This section considers the outlook for global poverty in the decade ahead, its interaction with the other trends outlined in this chapter, and the imperative of continuing to tackle it. The development indicators considered here are those within the framework agreed by the international community in the Millennium Development Goals (MDGs). These include goals to significantly reduce poverty, hunger, both infant and maternal mortality, significantly address HIV/AIDS, increase education and promote a sustainable environment.

Security and development

Poverty and instability are interlinked

6.41 As described previously, poorer countries are more likely to suffer from conflict, and war and insecurity in turn undermine development. Of the 34 countries furthest from achieving the MDGs, 22 are in, or just coming out of conflict.³⁴ In Africa there are more than 12 million internally displaced people as a result of violence.³⁵ Violent conflict reverses economic growth, and reduces the capacity of basic services, leading to hunger and disease. Most of the 3.9 million people that have died in conflict in the Democratic Republic of Congo have died of disease.³⁶ Violent conflict and insecurity can spill over into neighbouring countries and provide cover for terrorists or organised criminal groups.³⁷ It can also act as a driver for migration from developing to developed countries, as set out earlier in this chapter.

6.42 The international community is therefore building the capacity of the UN and regional organisations such as the African Union so that they have adequate capacity to prevent and respond to conflict through mediation, early warning systems, and by increasing peacekeepers and rapid reaction forces. Evidence shows that helping countries to prevent war is far more cost effective than helping them rebuild afterwards.³⁸

6.43 Fighting poverty and social exclusion through better governance – contributes to security – locally and internationally – reducing the potential for political violence and instability. Whilst, as described in an earlier subsection, there is no evidence that poverty contributes directly to terrorism, or that terrorists come from poorer communities, they often justify their actions by claiming to be fighting against injustice, tapping into popular discontent. They can also take advantage of poorly governed fragile states, such as Somalia and Afghanistan in the 1990s, which provide a space to plan violence.³⁹ Countries with good governance are less likely to face these problems.

³⁵ *Investing in Development. A Practical Plan to Achieve the Millennium Development Goals.* UN Millennium Project, 2005.

³⁶ *Internal displacement, Global Overview of Trends and Developments in 2005.* Norwegian Refugee Council, The Internal Displacement Monitoring Centre, 2005.

³⁷ *Mortality in the Democratic Republic of Congo: a nationwide survey.* Coglan, B. and others *The Lancet*, Vol. 367, Issue 9504, 2006.

³⁸ *Building Poverty to Build a Safer World. A Strategy for Security and Development.* Department for International Development, 2005.

³⁹ *Spending to Save: Is Conflict Prevention Cost Effective?* Centre for International Co-operation and Security, Department of Peace Studies, University of Bradford, 2005.

Good governance

Governance is key **6.44** Effective states and better governance are essential to combat poverty. States which respect civil liberties and are accountable to their citizens are more stable, which in turn means they are more likely to attract investment and achieve long-term economic growth.⁴⁰ Corruption, both a cause and symptom of bad governance, undermines development. It damages economic growth by increasing the costs of doing business. It siphons off resources that could be invested in public services, and it reduces the accountability of political leaders and officials to their citizens.⁴¹ To achieve lasting improvements in living conditions for large numbers of people, the capacity and accountability of public institutions needs to be strengthened. Aid and technical advice has a key role to play in supporting country owned plans to build this capacity.⁴²

Risks to development

Natural resource will impact on development **6.45** In the decade ahead there will be important and interlinked risks to development from unsustainable use of resources and climate change. Without more sustainable development globally, long-term development, stability, and security will be undermined in many poor localities. Chapter 7 describes how natural resources are being used unsustainably across the globe. Much economic activity in developing countries depends on natural resources. Natural capital – which includes land, minerals, and forests, constitutes 5 per cent of the world's wealth but 26 per cent of the wealth of developing countries (excluding oil producing states).⁴³ Illegal trade in natural resources like diamonds or timber will often continue to pay for and prolong conflict, as has been the case in Sierra Leone and Liberia. Unregulated or inefficient exploitation of resources like oil, metals and timber could undermine future growth. As noted earlier, the impacts of climate change could exacerbate existing drivers of conflict and instability or create new ones. Climate change will also impact on development possibilities without action. The most vulnerable – the poorest countries and populations – will suffer earliest and most, even though they have contributed least to the causes of climate change. This is explained further in the next chapter.

The contribution of aid, debt relief and trade

6.46 Effective development policy, including aid and debt relief can mitigate these interrelated pressures on development and security. Aid and debt relief has played a key role in reducing poverty. DFID estimates that its aid alone lifts 2 million people permanently out of poverty each year. Donors have pledged more aid to accelerate progress towards meeting the MDGs. At the Gleneagles G8 summit in 2005 donors agreed to double aid to Africa by 2010 and give an extra US\$50 billion per annum globally. There was also agreement to cancel over US\$50 billion of debts owed by some of the world's poorest countries to the IMF and the World Bank.

6.47 Donors need to meet their pledges on debt and aid to support developing countries own strategies to make further progress in reducing poverty. The DFID 2006 White Paper sets out its future agenda for helping poor countries develop, focussing on: improving governance; supporting economic growth; delivering basic services to the poor; tackling the threat posed by climate change; and making the international system fit for the 21st century.⁴⁴

⁴⁰ *Eliminating World Poverty: Making Governance Work for the Poor*, Department for International Development, 2006

⁴¹ *Human Rights and Governance: The Empirical Challenge*. (Unpublished paper) Kaufmann, D, World Bank Institute, 2004

⁴² *Eliminating World Poverty: Making Governance Work for the Poor*, Department for International Development, 2006

⁴³ World Bank (2006) 'Where is the Wealth of Nations?' Measuring Capital for the XXI Century. Conference Edition. Washington DC: World Bank.

⁴⁴ *Making Governance Work for the Poor*, Department for International Development, 2006.

6.48 Progress in multilateral liberalisation through the WTO Doha Round of trade negotiations offers the best opportunity for driving economic growth and long-term prosperity for both the developed and the developing world. This is why the UK is pressing for the world trade talks, which stalled in the summer of 2006, to be revived and concluded as soon as possible. The world must ensure developing countries have the flexibility to design, plan and sequence trade reform in line with their country-led development and poverty reduction programmes.

6.49 In parallel, developing countries also need support in building the social, human and physical infrastructure necessary to benefit from more open global markets and the development of the private sector as the engine of growth and wealth creation. The UK has been a leader on this 'Aid for Trade' agenda and recently announced total support for aid for trade, including support for infrastructure, is expected to increase by 50 per cent by 2010-11. The Government is working to ensure that all donors deliver on their Aid for Trade commitments, particularly the G8 expectation of US\$4 billion a year by 2010. This means transforming commitments into concrete and credible financing, within the new WTO Aid for Trade framework, as well as making the Enhanced Integrated Framework operational as soon as possible. Within Aid for Trade, donors need to prioritise the investment in physical infrastructure – roads, ports, power and telecommunications – that countries need to get goods to global markets and generate higher economic growth. The Commission for Africa called for donor funding on infrastructure in Africa alone to increase by US\$10 billion a year up to 2010, and US\$20 billion thereafter.

Progress has been made **6.50** Progress has been made towards reducing poverty and achieving the MDGs. Over the past forty years the proportion of people in developing countries who can read and write has risen from under half to nearly three quarters. Average life expectancy has increased, and there are 300 million more children in school. Rates of extreme poverty have fallen rapidly in much of Asia. In 1990 more than 1.2 billion people – 28 per cent of the developing world's population – lived in extreme poverty. By 2002 the proportion had decreased to 19 per cent.

More is expected **6.51** Overall steady progress is expected in the decade ahead. Thanks to trade, aid, debt relief and rapid Asian economic growth, the number of people across the world living on less than US \$1 a day is expected to halve by 2015.⁴⁵

Further action is needed **6.52** However progress towards achieving the MDGs is likely to remain uneven without further action. Half a million women still die in pregnancy and childbirth each year and although death rates of children under the age of five have been dropping, every day around 30,000 children still die of preventable causes. Over 75 million children still do not go to primary school.⁴⁶ The biggest challenges are in sub Saharan Africa and South Asia – on current trends, by 2015 over 90 per cent of the world's poor will live in sub Saharan Africa and South East Asia.⁴⁷

⁴⁵ *Economic Implications of Remittances and Migration*. Global Economic Prospects, The World Bank, 2006.

⁴⁶ *Education for All: Global Monitoring Report 2007*, UNESCO, 2006.

⁴⁷ *Economic Implications of Remittances and Migration*. Global Economic Prospects, The World Bank, 2006.

THE CHANGING INTERNATIONAL LANDSCAPE

6.53 The past 20 years have seen a transformation in the international landscape. The Cold War and strategic bi-polarity ended, with consequent effects on the global political power balance. The pace of globalisation has increased. The relative weight of players in the global economy has shifted, with Asia a major beneficiary along with other emerging economies elsewhere. And as already shown in this chapter, new threats have emerged. All these have fed a renewed emphasis on multilateral institutions, both global and regional: as a means through which states direct and manage change, protect themselves from its consequences, project and protect their political power, and as a means of securing voice and influence in the global decision-making processes needed to tackle the major international challenges. The inter-relation of international institutions and the members of each is shown in Figure 6.1. Strengthening multilateral approaches will be an increasingly important part of an effective response to the challenges set out in this chapter.

Effective diplomacy 6.54 International institutions face the challenge of producing credible and efficient multilateral solutions for global problems, while also accommodating changing power relations between their members. Improved interaction between institutions will be needed. The most significant international institutions in meeting the challenges of global uncertainty are the UN, NATO, EU and the International Financial Institutions (IFIs).

United Nations 6.55 The United Nations is undergoing a period of significant change in facing the challenge of developing institutionally to reflect the changing geo-political landscape. Changes will be made: within the UN Security Council; in the way the UN addresses the global development, humanitarian and environmental challenges; in the methods of dealing with conflict, conflict prevention and peacekeeping; and, in taking forward counter-terrorism and non-proliferation strategies.

6.56 The UN Security Council contains many constituencies within its membership. They all need to see their interests realised within the UN in order for the organisation to succeed. The UN Security Council continues to use sanctions as a means of enforcing its decisions. While it has continued to refine its approach, preferring narrow measures, targeting individuals, groups and other entities, rather than whole populations, improvements to the Council's sanctions machinery and better enforcement of sanctions regimes (arms embargoes particularly) will need to continue.

6.57 The Secretary General's UN Panel for Systemwide Coherence has recently reported, making recommendations for reforming the UN so that it is fit for purpose to respond to the global development, environment and humanitarian challenges of the 21st century.⁴⁸ Overcoming the UN's systemic fragmentation is key to the panel's recommendations, which call for a more unified UN presence in each country, with one leader, programme and budget. The report makes clear that funding must follow performance and reward results both for UN country programmes and headquarters agencies. The panel also called for an independent task force to address overlapping mandates and failures of coordination at the headquarters level. It should make concrete recommendations for consolidations and mergers. This could release annual savings of 20 per cent for recycling to country programmes.

⁴⁸ The 15-strong panel was established in February 2006 and includes the Chancellor of the Exchequer. The work of the Panel can be viewed at www.un.org/events/panel

6.58 The UN's work on conflict prevention, conflict management and peacekeeping has continued to develop in the post-cold war period, as the UN learns from important successes and significant failures. The newly created Peace-Building Commission, linked to the UN Security Council and General Assembly, is intended to increase the international community's ability to address issues arising in states emerging from conflict. The challenge will be to make the organisation more effective so that it can better co-ordinate the international peace-building effort, and avoid being politically hamstrung.

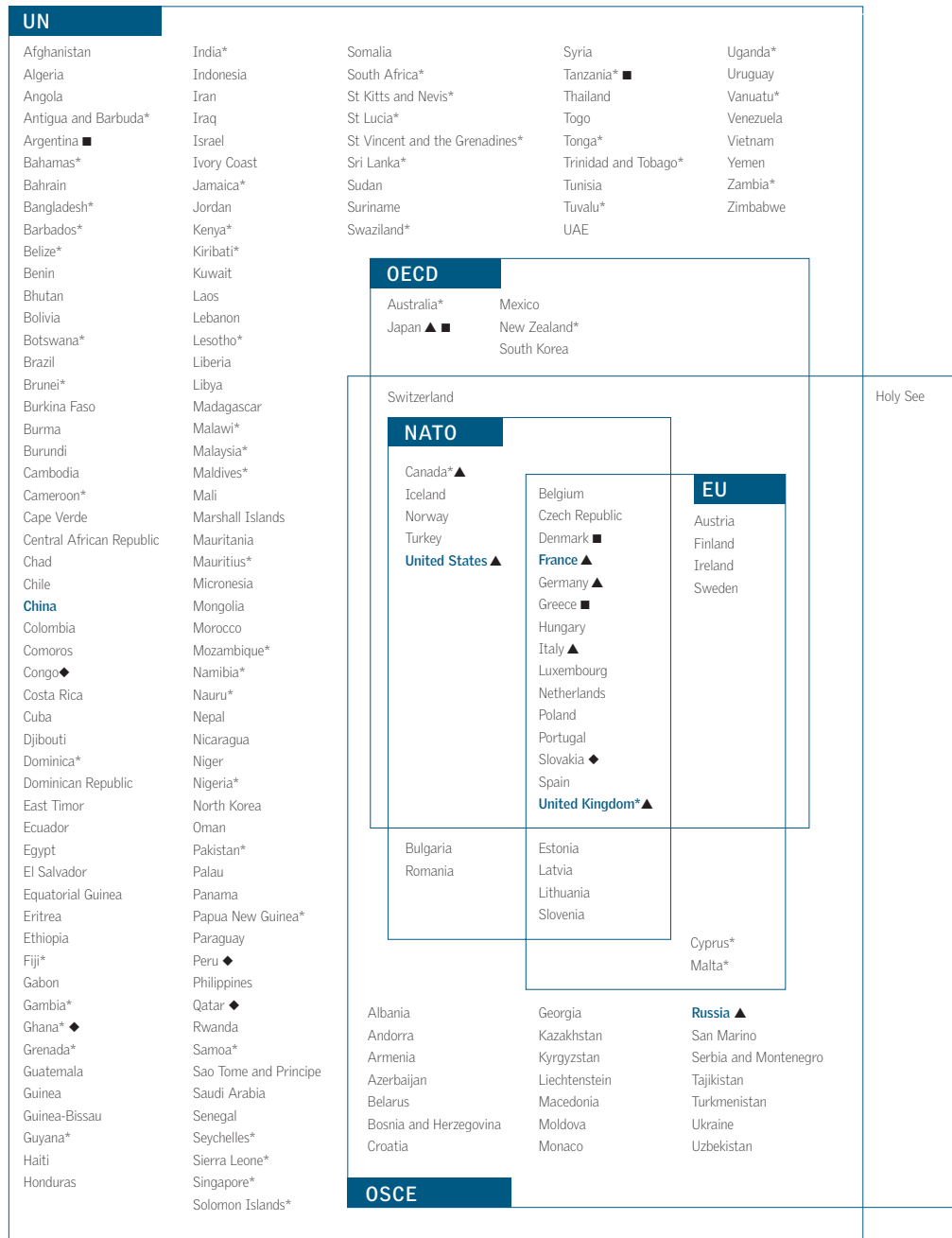
6.59 The 2005 World Summit agreed a new "responsibility to protect". This means each State has a responsibility to protect its population from genocide, war crimes, crimes against humanity and ethnic cleansing, and that where they fail to do so, the international community working through the Security Council should accept the responsibility. The challenge is to hold UN members to this agreement.

6.60 On counter-terrorism and non-proliferation the Security Council has developed new mechanisms, and the UN now has a counter-terrorism strategy. There will be a continuing requirement for partners to work collectively to ensure this strategy remains relevant to emerging and changing threats.

NATO 6.61 NATO has expanded in the past 10 years to include new members, including some from the old Warsaw Pact. While it remains a collective defence organisation, it has also expanded its role "out of area". It is now able and more willing to project itself politically and militarily outside its traditional sphere, as shown by its role since 1995 in the Balkans, since 2001 in Afghanistan and in 2005 in support of Pakistan's earthquake victims. Through the commitment to collective action by its members, the role of NATO may continue to evolve over the decade ahead. The decision about whether to extend NATO membership will be one of the main political questions facing the organisation in the coming years.

Figure 6.I: Membership of international organisations: March 2006⁵⁰

Membership of international organisations: March 2006



* = Commonwealth Country ▲ = G8 Country **Bold blue type** = Permanent Members of the UN Security Council
 ♦ = UN Security Council Membership Ends 31st Dec. 2006 ■ UN Security Council Membership Ends 31st Dec. 2007

European Union 6.62 The EU has continued to expand and stands as a major economic power with an aggregate GDP similar to that of the US. In the decade ahead Europe will need to consider how to adapt in response to the forces of globalisation and will have an important role to play in helping to address key challenges, including: stimulating growth and employment, and raising productivity; tackling unfairness and delivering social justice; ensuring sustainable, environmentally friendly development; ensuring peace, stability and security within the EU's borders; and creating a fairer and more stable world.

⁵⁰ *Active Diplomacy for a Changing World: The UK's International Priorities*, Foreign and Commonwealth Office, 2006

6.63 There will be pressures to retreat into protectionism and erect new barriers although the last century saw the negative consequences for peace and stability from following this path. Instead, Europe needs to remain a key force for the maintenance of open markets, both internally and beyond its own borders.

6.64 The role of the EU may alter to reflect the changing international landscape, although it will likely remain a force for stability through its work with new and aspirant members and their neighbours. As a partner of NATO, the EU is likely to retain a continued importance in peacekeeping and conflict resolution, and be a strong advocate of justice in the developing world.

International Financial Institutions **6.65** In the decade ahead, the International Monetary Fund (IMF) the World Bank and other international economic institutions will have an increasing part to play in monitoring economic developments at the global, systemic level as well as on a country-by-country basis. The IMF is likely to remain central to maintaining global economic stability although its focus, instruments, and governance structure will have to keep pace with its changing role and the rapid growth of emerging market economies. The World Bank will continue to focus on reducing poverty in the poorest countries of the world. The G7 and G8 are likely to try to strengthen their partnerships with the emerging economies to encourage a more inclusive approach to global economic governance. However, there is a risk that the 'exclusive' nature of these bodies could lead to rejection by the growing nations.

6.66 The IFIs and their memberships are committed to reform to meet the challenges of the next decade. The IMF is implementing reforms to its governance structure to strengthen its legitimacy and effectiveness and modifying its central surveillance function to strengthen its ability to prevent crisis and promote global prosperity through multilateral as well as country-by-country work. In parallel, the World Bank (the Bank) will take further measures to enhance the voice and participation of its members, building on the progress it has already made. In its function, the Bank will continue to innovate and refine its financial instruments to address the changing needs of all its clients and to support the provision of global public goods, including meeting the challenge of climate change. As international problems become more complex, the IFIs must continue to reform the way they work together to maximise their joint effectiveness.

Informal institutions **6.67** Amongst the informal 'institutions' the G7 and G8 will for now remain an important component of the international economic system. However, to maintain their effectiveness, both groupings will need to adopt a collaborative approach on a range of issues to strengthen their partnerships with the increasingly important non-member economies. The G20 is likely to become a natural and increasingly important complement to the work of the G7 and G8 on economic issues.

GLOBAL UNCERTAINTY AND ITS IMPACT ON THE UNITED KINGDOM

6.68 The previous sections have highlighted the potential global uncertainties and trends in areas of international security, natural resources, poverty reduction and development, and international institutions. This section looks at the impacts of those trends on the UK in turn.

6.69 The impacts of global trends on the UK will be felt domestically and in the actions the UK takes internationally, both alone and with international partners. The UK will need to respond to the challenges of international terrorism and security risks and maintain and promote security at home. The damaging effect of conflict and instability will need to be addressed if the UK's development objectives are to be met. Likewise, if the UK is to promote

and sustain reductions in conflict, it must maximise the effectiveness of its international development activities. Many of these challenges can be addressed more effectively within an international framework, and the UK will have a key role to play in reform of the international institutions.

Changing security issues **6.70** Today, the UK's security risks are markedly different to its risks during the Cold War. The principal risks to Britain's security were from Soviet communism and, from the late 1960s, from Irish-related terrorism. This context changed dramatically with the break up of the Soviet Union, political developments in Northern Ireland, and the emergence of international Islamist terrorism. The significant conventional military threat faced by the UK and its overseas territories during the Cold War has not been replaced. The threat of an attack to any western democracy from another state is low. The threat from Irish-related terrorism has reduced. These changes have been so profound they have required a fundamental re-examination of the UK's international aims and its security capabilities, including through the 1998 Strategic Defence Review.⁵⁰

6.71 The UK, its citizens and its interests worldwide are likely to remain a target for terrorists, including those facilitated through global networks. WMD proliferation will continue to present risks for the UK. International organised crime will generate significant economic and social costs.

Importance of stability elsewhere **6.72** Conflict and instability elsewhere have the potential to enhance these risks. They can create conditions in which terrorism, WMD proliferation and organised crime can thrive and consequently threaten the security of the UK and its citizens. In addition, conflict and instability may affect the UK's ability to deliver its international development objectives.

6.73 Recent history shows that conflict elsewhere can also lead to direct UK engagement. Since the end of the Cold War, the UK has been increasingly involved in helping to resolve intra-state and inter-state instability and its humanitarian consequences, such as the operations in the Balkans since the 1990s and Sierra Leone in 2000. The UK played a significant part in the Gulf War of 1991 as part of the international coalition to expel Saddam Hussain's Iraq from Kuwait.

6.74 Today, the UK is playing a significant role in Afghanistan – initially to help defeat the Taliban regime and now as part of an international presence to assist the Afghan people rebuild and develop their state – and in Iraq – as part of the coalition that removed Saddam Hussain and is now helping the Iraqi people to create stable democratic government and rebuild the domestic capacity of Iraqi authorities. The UK also maintains troops in the Balkans and other places worldwide.

Sustainable prosperity **6.75** The effects of climate change and pressures on natural resources set out in previous sections will impact on the UK's ability to sustain its security and prosperity. These challenges are shared global challenges. The future of the UK economy depends on secure and sustainable access to energy supplies. The UK will need to consider its policies in relation to wider international energy markets, the diversification of energy sources and its broader engagement with producers and consumers. The UK has a key role playing in efforts to agree international action on climate change.

⁵⁰ *The Strategic Defence Review*, Ministry of Defence, July 1998.

Fighting world poverty 6.76 The UK has a strong commitment to the global fight against poverty. International development has had an increasingly high profile for the Government since 1997, with DFID's budget rising faster than any other department. Since the establishment of the DFID, in 1997, the UK's overseas development budget has doubled. The UK is improving the effectiveness of its interventions and programmes (diplomatic, military and development) in fragile states, as these are among the most unstable areas of the world, and, as more stable areas develop, these fragile states will contain an increasing proportion of the world's poor.

Role within the international community 6.77 In an age of increasing interdependence, the UK's strategic relationships with other key actors will play an important role in successfully managing these issues. An international system based on effective multilateral institutions and shared values has long been a cornerstone of British foreign policy. The roles of the UN, the EU, NATO and other groups are likely to remain central to achieving the UK's global priorities. Multilateral economic institutions will be key to the UK's international economic and development objectives. The UK will play a key role in efforts to reform these institutions to meet the uncertain challenges ahead.

CONCLUSION

6.78 This chapter has set out a number of issues are likely to affect and drive the levels of security that global citizens can expect to face in the next ten years and beyond. International terrorism must be defeated and other risks to global security must be addressed including proliferation of WMD, and inter-state and inter-state instability. Population growth, disease, climate change and pressures on energy and water are likely to be important factors impacting the global security environment. Tackling poverty can contribute to security but this presents multiple challenges ahead, despite the progress made to date. International institutions will need to reform for a new international landscape if they are to be effective guarantors of world stability.

6.79 In an interdependent world the UK will not be immune from these global trends. They will have direct impacts on the security UK citizens can expect and also have implications for the UK's strategic security objectives and its goals for development as it seeks further progress on its long-established priority to build a more secure and fair world.

6.80 The challenges presented by terrorism, instability and continuing global poverty cannot be tackled by the UK alone. Achieving focused UK engagement in multilateral efforts and the most effective use of security, defence, diplomacy and development budgets will therefore be a key part of the Government's response. The final chapter provides further detail on steps to take this forward within the 2007 CSR, including:

- reviewing the effectiveness of delivery of counter-terrorism and security strategies, as part of the response to the unprecedented threat from international terrorism;
- considering how the Government can improve the effectiveness of the UK's role in the world, recognising that global security in the decade ahead will depend on global responses to instability, conflict and poverty; and
- being informed by the Stern Review. The impact of climate change on stability and global poverty reinforces the case for action both on climate change and development.

INTRODUCTION

International and domestic trends **7.1** This chapter highlights some of the main environmental trends facing the world and the UK, including climate change.

7.2 Today, natural resources and the global climate are under pressure as the world economy grows and populations increase. The evidence is clearer than ever before that environmental damage has the potential to undermine long-term prosperity in the UK and in all countries. Changes to the global climate and environment are happening at a historically high rate, and are becoming an issue of growing public concern. In the UK, many aspects of the domestic environment, such as the quality of the air and water, are on a steadily improving trend. However, population and economic growth are creating pressures on the local and national environment in the UK.

Overview 7.3 The first section of this chapter examines future trends relating to climate change and natural resources internationally. It sets out the importance of a functioning environment to economic activity, and the way that relationship is being eroded. In particular, it describes how, if left unchecked, the burning of fossil fuels and land use changes will lead to dangerous climate change and the possible impacts this might have, based on *The Stern Review of the Economics of Climate Change* ('the Stern Review').¹ It also points to other examples worldwide of the overuse of the environment, from collapses in fishing stocks to pollution of water sources. Growth in global populations and economies could exacerbate these problems if not well-managed.

7.4 The second section looks at how global climate changes have been and could be felt in the UK, exploring a number of possible scenarios. There are significant uncertainties about the effects, which will be mainly mediated through water, with more possible increases in the number of both flood and drought incidents. It also reviews potential UK trends in more localised environmental issues, highlighting waste and water as crucial issues to be managed in the coming decades and emphasising the importance of biodiversity and the efficient use of land.

GLOBAL TRENDS

Economies depend on the environment 7.5 The ability of economies to grow over the long term will depend on the healthy functioning of the environment. People derive a wide range of economic and other benefits from the environment, both directly and indirectly. Some of these benefits carry a price in the market due to private ownership and/or government intervention, whereas others do not and are therefore likely to be undervalued. Box 7.1 sets out a framework for thinking about the relationship between economic activity and the environment in which it takes place.

7.6 Growing trends in the global population and economic activity have been associated with increasing demands on the environment. Between 1960 and 2000 the world population doubled from 3 to 6 billion people, and global GDP increased more than six times over. This was facilitated by increased use of the natural environment, with a 150 per cent increase in food production, a doubling of water use, a trebling of wood harvests for pulp and paper and a doubling of hydropower capacity over the same forty-year period. Food production per capita has increased, and the real price of food has fallen globally.

¹ *The Stern Review of the Economics of Climate Change*, www.sternreview.org.uk and CUP (forthcoming).

Box 7.1: A framework for analysis

A range of frameworks exists when considering the pressures on the world's natural resources. The UN adopted a framework of "ecosystems services" when undertaking the Millennium Ecosystem Assessments. This used the idea of an ecosystem as a functional unit made up from the interaction between plants, animals, micro-organisms and the non-living environment, with human activity dependent on ecosystems, and in particular on a range of benefits, or ecosystem services, derived from them. Widening this concept, it is possible to identify a range of functions of the environment on which human activity depends. These can be broken down into four categories:

- **Resource provision:** such as fresh water, food, fibres and materials for building and manufacture;
- **Assimilation of wastes:** by-products such as solid waste and air pollutants are disposed of into the environment which has a certain capacity for assimilating them through biogeochemical processes;
- **Regulatory and protective mechanisms:** regulation of key conditions such as the climate, UV protection and genetic resilience; and
- **Amenity and cultural services:** the recreational, aesthetic and spiritual contribution that the environment can make to people's lives, for example through the appreciation of nature or the existence value of species.

Thinking about the environment in this way can improve established cost-benefit techniques for policy appraisal and evaluation, aiding understanding of the ongoing relationship between economies and the environment, in particular by recognising that changes to the environment may reduce or enhance its ability to perform these functions in future.

**Worldwide
examples of
environmental
damage**

7.7 An increase in the benefits derived from the environment does not in itself imply that damage is being done, or that the use of the environment is unsustainable in the long run. Innovation can bring, and has brought, significant improvements in the efficiency with which the environment is used, as seen in sustainable farming practices and energy efficiency. However, the UN's Millennium Ecosystem Assessment, which looked at the functions of the environment that operate through ecosystems, found that 60 per cent of the "ecosystem services" it evaluated were being degraded or used unsustainably. In addition to climate change, which is discussed later in the chapter, the UN paper and other literature provide numerous international examples of environmental functions being under pressure:²

Resource provision:

- **Fisheries:** At least a quarter of commercial fish stocks are being over-harvested: global fish catches have declined after peaking in the late 1980s, and catches now have to be taken in deeper water, relying on fish lower down the food chain with lower economic value. Industrialised fishing has reduced the biomass of some targeted species by around 90 per cent;
- **Fresh water:** around a third of global freshwater is taken from sources such as non-renewable ("fossil") groundwater that are not replenished through the water cycle. In the Middle East and North Africa, for example, around 30 per cent of the freshwater used comes from such non-renewable sources.

²The following examples are drawn from *Ecosystems and Human Well-being: Synthesis*, UN Millennium Ecosystem Assessment, 2005, except where otherwise stated.

Assimilation of wastes:

- Water quality: an estimated 2.2 million deaths each year are caused by biological pollution of water by human activity;³
- Air quality: worldwide, an estimated 6.4 million years of healthy life are lost annually due to long-term exposure to ambient particulate matter.⁴

Regulatory/protective mechanisms:

- Local climate regulation: deforestation and desertification in some tropical areas have reduced local rainfall; this creates a vicious circle, as reduced rainfall leads to further depletion of the forests that depend on high levels of precipitation;
- Natural flood protection: 35 per cent of mangroves were lost in the period 1950-2000, increasing the vulnerability of coastal areas to flooding.

Amenity and cultural services:

- Coral: 20 per cent of corals lost 1950-2000, with a further 20 per cent degraded;
- Wildlife: between 10 per cent and 30 per cent of mammal, bird and amphibian species are currently threatened with extinction, and some estimates place the rate of extinction as high as 1,000 times the typical historical background rate.⁵

Importance of biological diversity for a functioning environment 7.8 These last two examples both reflect changes in international biodiversity. This type of biodiversity has an amenity or cultural value, as people place importance on the existence of certain living species and their appreciation of them. Species such as coral also have an important function underpinning ecosystems which play a crucial role in the continued provision of environmental services. Although the science is not currently precise, owing to the complexity of the interaction between different species, it is clear that ecosystems with greater biological diversity are more adaptable and resilient to external shocks and changes.⁶ Biodiversity is therefore important for regulatory and protective mechanisms, such as pest and disease control and recovery from natural disasters.

Increased pressure on natural resources ahead 7.9 By 2050, the global population is expected to increase to 8-10 billion people, concentrated in developing countries, and per capita income is projected to increase by two to four times over the same period. This could imply patterns of significantly higher aggregate and average consumption. For example, demand for crops is projected to grow by 70-85 per cent in this period.⁷

³ *Environment and Human Well-Being: A Practical Strategy*, UN Millennium Project Task Force on Environmental Sustainability, 2005.

⁴ *Health Aspects of Air Pollution with Particulate Matter, Ozone and Nitrogen Dioxide*, World Health Organisation, 2003.

⁵ There is some dispute around these figures, but widespread acceptance that the world is witnessing a very high level of species extinction. *Global Biodiversity Outlook 2*, Secretariat of the Convention on Biological Diversity, 2006 noted that a third of the world's 6,500 domesticated animal breeds are threatened with extinction.

⁶ *The economic, social and ecological value of Ecosystem Services: A Literature Review*, Eftec, 2005.

⁷ *Ecosystems and Human Well-being: Synthesis*, UN Millennium Ecosystem Assessment, 2005.

7.10 For global production to increase at a rate that satisfies such an increase in demand would require an ongoing combination of technological innovation and expansion of human activity in the world, as has historically happened. However, this may prove challenging. In contrast to rising crop demand, for example, agricultural productivity risks being reduced in tropical and sub-tropical regions affected by climate change and desertification caused by over intensive practices. Water scarcity in Africa is expected to double by 2025.⁸

Climate change

7.11 Globally, the starkest and most serious example of the impact that human activity can have on the environment is climate change. There is now an overwhelming body of scientific evidence to show that human activity is increasing the concentrations of greenhouse gases in the atmosphere and causing global warming. The underlying science of climate change has been understood for more than a century.⁹ Climate models now show with a very high degree of confidence that human-induced increases in carbon dioxide and other greenhouse gases are responsible for much of the warming in the last 50 years.¹⁰

The science shows the climate is already changing

7.12 Recent global warming has been historically significant and the world is seeing increasing evidence of continuing change.¹¹ The Earth has warmed on average by 0.7°C globally since around 1900, and the rate and scale of 20th century warming has been unprecedented for at least the past 1,000 years.¹² Data from thousands of weather stations around the world support the picture of continuing warming.

7.13 Amongst other factors, the concentration of carbon dioxide and other greenhouse gases in the atmosphere is responsible for regulating the climate, particularly temperature. If emissions of these gases are higher than the environment's capacity to absorb them (in carbon "sinks", such as soil, oceans and forest), the concentration rises, which will in turn increase global temperatures.

Possible future temperature scenarios

7.14 Concentrations of carbon dioxide and other greenhouse gases in the atmosphere have increased substantially since industrialisation began. Carbon dioxide concentrations have risen by 30 per cent. In total, the warming effect due to all greenhouse gases emitted by human activities is now equivalent to around 430 parts per million (ppm) of carbon dioxide (known as the CO₂ equivalent).¹³ Concentrations of greenhouse gases are higher now than at any time in at least the past 650,000 years.¹⁴ Rising concentrations of greenhouse gases in the atmosphere will continue to increase warming of the Earth (Table 7.1). In a plausible 'business as usual' scenario, atmospheric concentrations of greenhouse gases will continue to rise, reaching 550 ppm CO₂ equivalent by the middle of this century – double pre-industrial levels. According to the latest Hadley Centre estimates, if concentrations stabilise at that level at that time, the world would be committed to a temperature rise of 2.2-3.6°C above pre-

⁸ DFID's approach to the environment, DFID, February 2006.

⁹ *The science of climate change: adapt, mitigate or ignore?* Sir David King, Ninth Zuckerman Lecture, http://www.foundation.org.uk/801/311002_2.pdf, 2002.

¹⁰ *Climate change 2001: summary for policymakers*, Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, <http://www.ipcc.ch>, 2001.

¹¹ See, for instance, *Climate change 2001: summary for policymakers*, Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, <http://www.ipcc.ch>, 2001; *Avoiding dangerous climate change*, Schellnhuber HJ (ed.), Cambridge University Press, Cambridge, 2006.

¹² *Detecting and attributing external influences on the climate system: a review of recent advances*, International ad hoc detection group, *Journal of Climate* 18:1291-1314, 2005.

¹³ Greenhouse gas concentrations are expressed in parts per million in the atmosphere of carbon dioxide equivalent, reflecting the relative warming characteristics of the full range of greenhouse gases.

¹⁴ *Stern Review on the Economics of Climate Change*, www.sternreview.org.uk and CUP (forthcoming).

industrial levels by 2100 and an eventual rise of 2.4-5.3°C above pre-industrial levels.¹⁴ Even if all emissions stopped today, the inertia in the climate system could lead to a further rise of 0.5-1°C. If emissions continue to increase as currently projected, global temperatures could increase by up to 6°C by the end of the century.¹⁵

A global challenge 7.15 Climate change is global in both its causes and its consequences: greenhouse gases have the same effect wherever in the world they are emitted. It arises as an externality, as those who create greenhouse gas emissions do not always pay for the costs associated with climate change. This means that attempts to tackle climate change will face collective action problems, with the possibility of free-riding and sub-optimal behaviour. The global nature of climate change means it requires a coordinated multilateral response. As the Stern Review estimates, if the world does not act the overall costs and risks of climate change will be equivalent to losing at least 5 per cent of global GDP each year and could cost up to 20 per cent of GDP, whereas the costs of action can be limited to around 1 per cent of global GDP each year, if there is an international response. There is a need for stabilisation of the concentration of greenhouse gas levels in the atmosphere, with a decision of what this global limit should be based on the scientific and economic evidence.¹⁶

Contribution of fossil fuels 7.16 The largest contributor to past and current emissions is the use of fossil fuels (currently accounting for over half of greenhouse gas emissions). As outlined in the chapter on globalisation, demand for fossil fuels is projected to increase by 2.2 per cent per year, with an increasing proportion of demand from non-OECD economies. By 2015 these economies will account for over half of all demand. Significant investment is needed but overall supply is likely to be sufficient to meet this demand. The International Energy Agency project that proven energy reserves are adequate to meet global energy demand until at least 2030, with proven gas and coal reserves exceeding consumption estimates over this period. Global oil production is not expected to peak before 2030, although additional oil reserves from new discoveries and confirmation of probable reserves will be needed to renew reserves.¹⁷ Together with non-conventional reserves such as oil shales and improvements in technology, there is the potential for oil reserves to last even longer. The Stern Review found that, if all world fossil fuel stocks were used, in the absence of carbon capture and storage technology, greenhouse gas concentrations would rise beyond 750ppm carbon dioxide equivalent.¹⁸

Table 7.1: Equilibrium temperature projections from various sources for different CO₂ concentrations

Stabilisation level (ppm CO ₂ equivalent)	Temperature increase at equilibrium relative to pre-industrial (°C)		
	IPCC TAR 2001 (Wigley and Raper)	Hadley Centre Ensemble	Eleven Studies
400	0.8 – 2.4	1.3 – 2.8	0.6 – 4.9
450	1.0 – 3.1	1.7 – 3.7	0.8 – 6.4
500	1.3 – 3.8	2.0 – 4.5	1.0 – 7.9
550	1.5 – 4.4	2.4 – 5.3	1.2 – 9.1
650	1.8 – 5.5	2.9 – 6.6	1.5 – 11.4
750	2.2 – 6.4	3.4 – 7.7	1.7 – 13.3
1,000	2.8 – 8.3	4.4 – 9.9	2.2 – 17.1

¹⁵Based on *Meeting the EU 2°C climate target: global and regional emissions implications*, den Elzen, MGJ and Meinshausen, M, 2005., Netherlands Environmental Assessment Agency (MNP), Bilthoven, the Netherlands, MNP-report 72800103; with 90% confidence intervals using probability distribution from: *Quantification of modelling uncertainties in a large ensemble of climate change simulations*, Murphy JM, Sexton DMH, Barnett DN, et al., Nature 430: 768-772, 2004.

¹⁶*Climate change: the scientific basis. Contribution from Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change*, IPCC, 2001.

¹⁷*World Energy Outlook 2006*, International Energy Agency, 2006.

¹⁸*Stern Review on the Economics of Climate Change*, www.sternreview.org.uk and CUP (forthcoming).

7.17 As with other resource and environmental issues, government and societal action could substantially change this picture. The International Energy Agency suggests that a combination of environmental and energy security policies and faster deployment of energy efficient technologies could reduce the growth in global energy demand by 10 per cent by 2030 and emissions from fossil fuels by 16 per cent. Longer term a more fundamental shift to low carbon sources of energy may be possible. As the Stern Review discusses, the power sector around the world would need to be at least 60 per cent decarbonised by 2050 for atmospheric concentrations to stabilise at or below 550ppm CO₂. The review made the case that this could be achieved in an affordable way, if there is international action, through a combination of carbon pricing, technology and measures to encourage behavioural change.

7.18 In the absence of climate policy, changes in land use and the growth of energy consumption around the world could drive concentrations of CO₂ far higher than current levels, e.g. close to 1000 ppm by the end of the century under high emissions scenarios, leading to eventual global temperature increases of 4.4-9.9°C from pre-industrial levels, according to the latest Hadley Centre model.¹⁸

**Geophysical
impacts of
climate change**

7.19 Increasing global temperatures will intensify the water cycle and be accompanied by changing patterns of rainfall, rising sea levels and more extreme weather events (heatwaves, droughts, floods). The precise nature of these changes at a regional level is harder to predict, but it is clear that there could be severe impacts on water availability, flood risk and agricultural productivity in many regions.

7.20 For 1-2°C of warming from pre-industrial levels (the world is already 0.7°C of the way there) some sectors in some parts of the world may see a net benefit. Higher latitudes (e.g. Canada, Russia) may become more suitable for agriculture because of a lengthening of the growing season. In Europe and North America, carbon dioxide levels could have a direct fertilisation effect on agricultural yields, although there is still debate about the size of this phenomenon.

7.21 However even low levels of warming from today could lead to serious problems in vulnerable parts of the world – particularly the developing world and sensitive ecosystems, such as coral reefs and the Arctic. If temperatures increase 1-2°C above pre-industrial levels, 10-30 per cent of species could be committed to extinction, over 90 per cent of the world's coral reefs could be bleached, and Arctic ecosystems could be significantly damaged. In Africa, crop yields could decline significantly.¹⁹

**Risk of abrupt
and major
irreversible
changes**

7.22 In addition, climate change could bring about abrupt and profound changes in atmospheric processes and interactions with the land and ocean systems. Many of the impacts could accelerate warming in ways that would be entirely beyond control.²⁰ Forests could start to absorb less carbon from the atmosphere, as increasing temperatures stimulate the release of more carbon from the soil.²¹ Melting of the permafrost and warming of tropical wetlands would release quantities of methane. The current store is greater than all historical emissions of greenhouse gases – although there is uncertainty about how much would

¹⁸Based on *Meeting the EU 2°C climate target: global and regional emissions implications*, den Elzen, MGJ and Meinshausen, M, 2005, Netherlands Environmental Assessment Agency (MNP), Bilthoven, the Netherlands, MNP-report 72800103; with 90% confidence intervals using probability distribution from: *Quantification of modelling uncertainties in a large ensemble of climate change simulations*, Murphy JM, Sexton DMH, Barnett DN, et al., Nature 430: 768-772, 2004.

¹⁹*Impacts of global climate change at different annual mean global temperature increases*, Warren R, 2006, in *Avoiding dangerous climate change*, Schellnhuber HJ (ed.), Cambridge University Press, Cambridge, pp. 93–132, 2006.

²⁰*Stabilising climate to avoid dangerous climate change*, Hadley Centre, 2005

http://www.metoffice.com/research/hadleycentre/pubs/brochures/2005/CLIMATE_CHANGE_JOURNAL_150.pdf.

²¹*Climate-carbon cycle feedback analysis: results from C4MIP model intercomparison*, Friedlingstein P, Cox P, Betts R et al., Journal of Climate, 2006, in press. Temperature range modified to represent a climate sensitivity of 3.5°C.

actually be released. Loss of both the Greenland and West Antarctic Ice Sheets could add 1-5 mm to sea level rise each year and commit the world to 7-12 metres rise over centuries to millennia. There remain uncertainties about how much warming is needed to trigger such changes.

Worst impacts in developing countries **7.23** As the Stern Review highlights, developing countries will be most vulnerable to the effects of climate change, and this could have a significant impact on poverty reduction. Climate change threatens the basic elements for development around the world – including access to water, food, health, and the use of land and the environment. Health and agricultural incomes will be under particular threat, through falling agricultural incomes, increased risk of flooding, malnutrition, water related disease and vector borne diseases. People living in developing countries tend to be more directly dependent on the environment for their livelihoods, food intake and health, all of which may be affected by climate change and greater weather variability. For example, some studies suggest that changes in precipitation and temperature brought about by climate change could contribute to falls in cereal yields ranging from 10 per cent to 30 per cent in Africa by the 2050s.²²

7.24 Many studies also indicate that the prevalence and distribution of vector and water-borne diseases such as malaria and cholera will increase with climate change because of flooding, warming, drought and small temperature and precipitation variations that make transmission possible in previously unaffected areas. One study suggests there might be substantial expansions in the geographical distribution of the population at risk from dengue fever in Africa by 2085 as a consequence of climate change (dengue fever is caused by the world's most prevalent mosquito-borne virus).²³

7.25 The world already knows what devastating effects natural disasters and extreme weather events such as droughts and floods can have. The floods in Mozambique in 2000 killed 700 people, displaced/trapped 650,000 people and affected 4.5 million – one quarter of the population. A massive national and international relief operation avoided greater loss of life.²⁴ In North-Eastern Ethiopia, drought induced losses in crop and livestock between 1998-2000 were estimated at \$266 per household, greater than the annual average cash income for more than 75 per cent of households in the study region.²⁵

Coordinated global action can reduce the risks **7.26** It is clear from this analysis that climate change would have potentially catastrophic implications if the world failed to act, but that the right international action can limit its effects and can be achieved at a manageable cost. Although these outcomes are uncertain, it will be important to use the economics of risk and uncertainty in considering the costs of action and of inaction. The key challenge will therefore be in securing collective international action to reduce carbon emissions globally in the most cost-effective way, to stabilise CO₂ concentrations in the atmosphere.

²² *Effects of Climate Change on Global Food Production under SRES emissions and Socio-economic Scenarios*, Parry, M.L., C. Rosenzweig, A. Iglesias, M. Livermore and G. Fischer, *Global Environmental Change* Volume 14, Number 1, April 2004; and *Climate Change, Global Food Supply and Risk of Hunger, Food Crops in a Changing Climate*, Parry, M., C. Rosenzweig and M. Livermore, Volume 360, Number 1463, 2005.

²³ *Potential effect of population and climate changes on global distribution of dengue fever: an empirical model*, Hales S, de Wet N, Maindonald J, Woodward A., *Lancet*; 360 (9336):830-4, 2002.

²⁴ *Learning lessons from disaster recovery: the case of Mozambique*, World Bank, Disaster risk management series working paper series no. 12, 2005.

²⁵ *Stern Review on the Economics of Climate Change*, www.sternreview.org.uk and CUP (forthcoming).

UK TRENDS

7.27 This subsection examines what the implications of global climate change will be for the UK, and what will be the key pressures on the domestic environment. It considers the important linkages between different aspects of the environment, for example, the impact climate change will have on water availability and flood risk management.

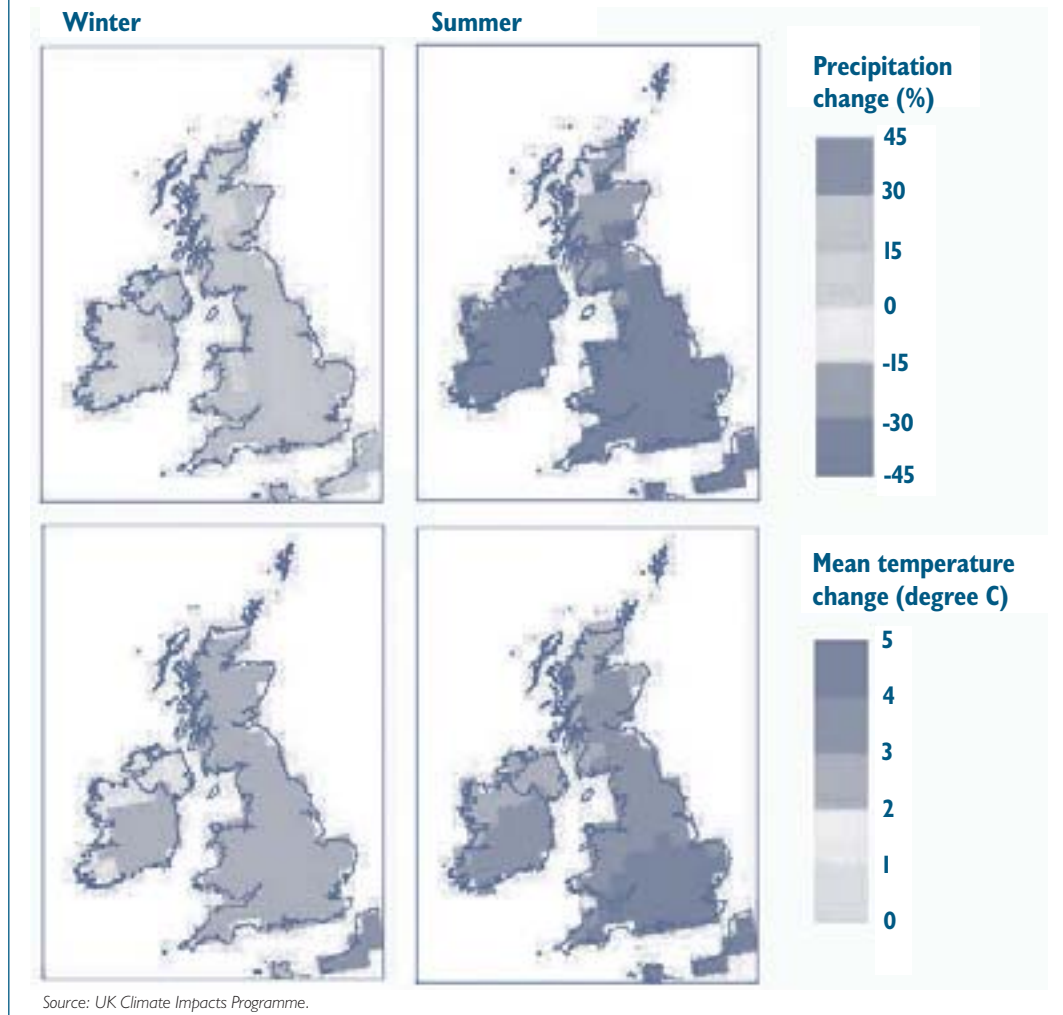
Impacts of climate change

Climate change will affect the UK **7.28** Climate change will directly affect the UK in a number of ways. Although many of these effects will have limited impact in the decade from the start of the 2007 CSR, the UK will need to be part of a multilateral solution to avoid dangerous climate change, and some action may be needed now to prepare for the more serious potential consequences in the future.

7.29 Climate change will have mixed effects on the UK. The UK will experience hotter drier summers and warmer wetter winters (Figure 7.1 – Climate change effects in UK by 2080s), which could lead to increased frequency of flooding. Sea levels will continue to rise around the coast and frequency of storm surges could increase. There is more confidence about impacts driven by temperature than those mediated by rainfall, where predictions still differ between climate models. The annual costs of flooding to homes, businesses and infrastructure could increase. The Government's Foresight programme identified a range of costs from 2 to 27 times current spending levels by the 2080s,²⁶ depending on emissions trajectories and the choices made about the balance between defences to mitigate flooding and the costs of dealing with floods when they do happen. Water availability will also be affected, as discussed later in the chapter.

²⁶ *Future flooding*. UK Government Foresight Programme, 2004
http://www.foresight.gov.uk/Previous_Projects/Flood_and_Coastal_Defence.

Figure 7.1: Climate changes by 2080 from a medium high emissions scenario



Impacts on public health 7.30 Climate change could affect public health and comfort in the UK. Heatwaves like the summer of 2003, which led to 2,000 extra deaths, could be commonplace by the 2050s,²⁷ although excess cold-related deaths could decline from 80,000 cases per year to 60,000 cases per year.²⁸ Peak summer temperatures in UK urban centres could be up to 7°C warmer than today by the 2080s. In London, research has suggested that without changes in building design, summer temperatures are projected to be outside comfort levels for people at work for almost one-quarter of the time.²⁹

7.31 These projections of UK impacts do not allow for abrupt and irreversible impacts that could occur under severe climate change. In the event of such climate change impacts, there could potentially be much more serious impacts in the UK, such as widespread coastal flooding from significant sea level rise.

²⁷ *Human contribution to the European heatwave of 2003*, Stott PA, Stone DA, Allen MR, *Nature* 432: 610-614, 2004.

²⁸ *Health effects of climate change in the UK*, Department of Health, 2003
<http://www.dh.gov.uk/assetRoot/04/10/80/61/04108061.pdf>.

²⁹ *London's warming*, London Climate Change Partnership, 2002
http://www.london.gov.uk/gla/publications/environment/londons_warming02.pdf.

NATURAL RESOURCE PRESSURES

Developing environmental awareness and policies

7.32 The UK has been able to respond to pressures on the environment in the past. Through the 19th and early 20th centuries, the industrial revolution, increases in urban populations and technological advancement all had an environmental impact. For example, London developed a smog problem, with one incident in 1952 causing 4,000 deaths in the capital. In response the Government enacted the Clean Air Act 1956, regulating smoke, grit and dust levels from domestic, commercial and industrial combustion. Since then a range of further measures have been taken, so that “pea souper” smogs are now a distant memory.

7.33 Since that time, responses have become much more comprehensive and effective. Starting in the 1970s, a less reactive and more integrated approach to environmental control was adopted, under the principle of pursuing the “Best Practicable Environmental Option”.³⁰ In 1990, the UK established its first set of integrated pollution control measures through the Environmental Protection Act, an approach that would later be adopted by the European Union in the Integrated Pollution Prevention and Control Directive of 1996, which sought to address the range of environmental impacts from large point sources of pollution.

7.34 In recent times, there have been a number of other examples of positive and effective responses to environmental pressures. Very serious challenges such as heavy industrial smog, chlorofluorocarbon (CFC) emissions, beach quality and acid rain, all of which were once prominent in the public consciousness, have been effectively addressed. And these improvements have been achieved without compromising economic goals, with the UK today experiencing an unprecedented period of continued economic growth.

Likely pressures over the coming decades

7.35 However, in the decade ahead and beyond, all other things being equal, changes in the size and location of the UK’s population (described in the chapter on demographic change) and economy could be expected to increase some of the pressures on the UK’s environment in particular areas, and climate change could exacerbate some issues, posing new challenges. As described in the demography chapter, it is also likely that as the UK becomes more prosperous its citizens will place greater value on environmental goods. The rest of this section looks at the major challenges to the UK’s environment, grouped around the types of function the environment performs, as outlined earlier in the chapter: resource provision, assimilation of wastes, regulatory and protective mechanisms, and amenity and cultural services.

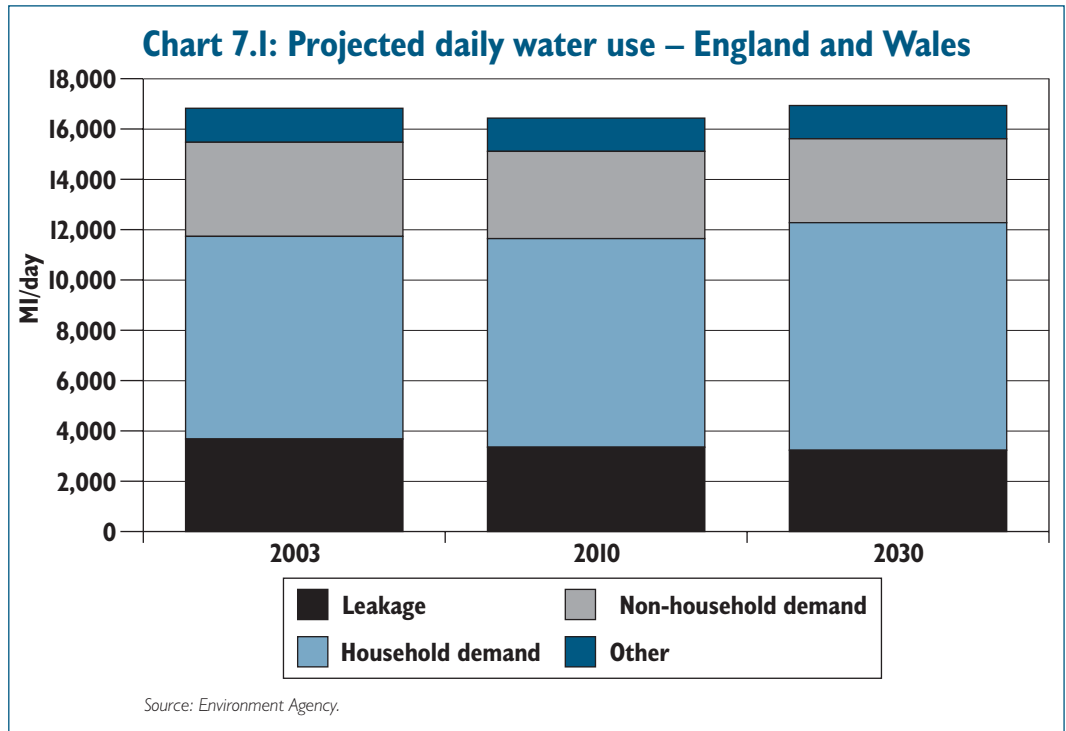
Resource provision

Water is a key natural resource

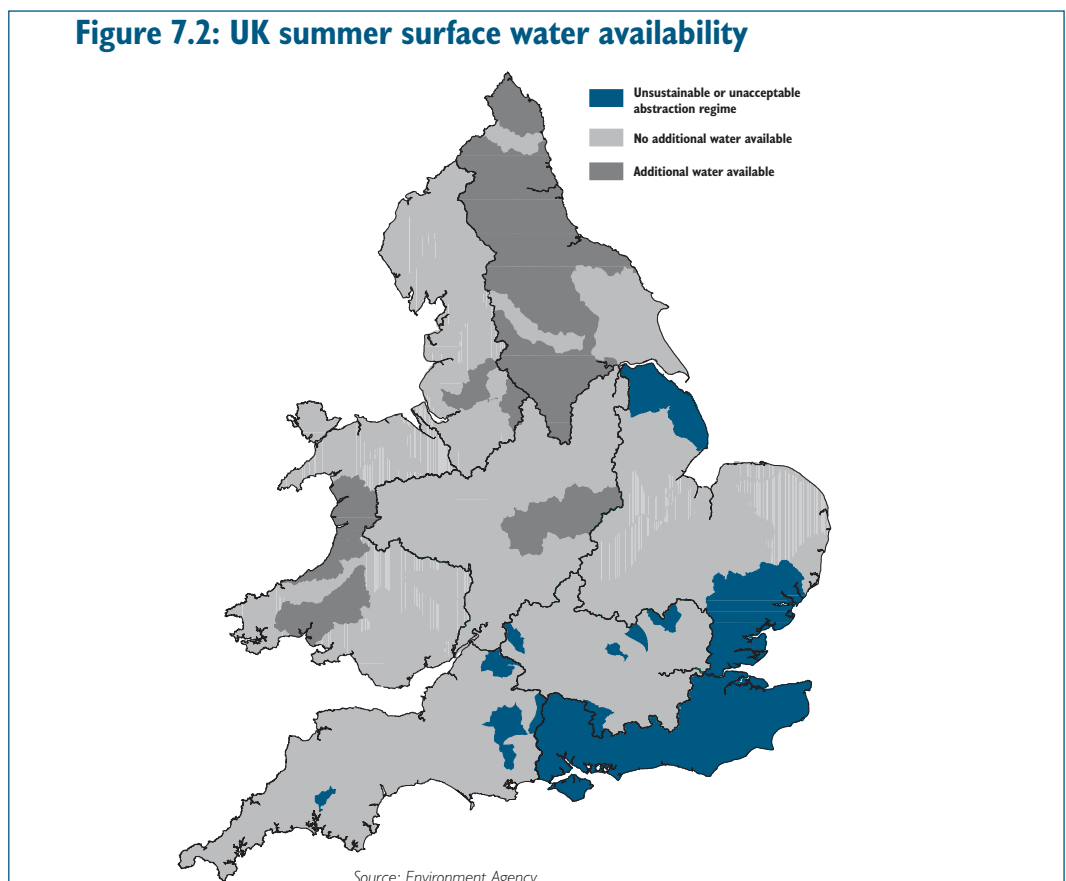
7.36 One of the most important pressures on the resources provided by the environment over the coming decades is likely to come from changing patterns of water use and supply. Household demand for water in England and Wales is expected to increase over the next 25 years (Chart 7.1), and this will be most true in the South East, given demographic changes and plans for housebuilding. The UK will start from a position where water consumption, at around 150 litres per person per day, is higher than in comparable European countries such as Belgium, the Netherlands and Germany, where it is between 116 and 130 litres.³¹ Policy measures such as metering, price structures and demand management programmes will all have an effect on the level of household water demand, potentially mitigating the pressure. Meanwhile leakage levels are expected to fall from current levels in some areas, but remain relatively high. Overall, the pressure on water supplies is expected to increase.

³⁰ Defined by the Royal Commission on Environmental Pollution as “the option that provides the most benefit and the least damage to the environment as a whole, at acceptable cost, in the long term as well as in the short term.”

³¹ *The Price of Water – Trends in OECD Countries*, OECD, 1999.



7.37 Climate change could add to these challenges. Short droughts could occur more regularly – possibly two or three times a decade by the 2050s, and up to four times a decade by the 2080s (under medium-high emissions), compared to once a decade currently. Coupled with already high levels of water abstraction in some areas (Figure 7.2), it is clear that it will become more difficult to provide water supplies, particularly in the South East.



7.38 These pressures, if not addressed, would have an economic cost. NERA, working for Thames Water, estimate the costs of hosepipe and non-essential use bans at £48 per business customer per day, and the cost of rota-cuts or standpipes being employed at £850 per business customer per day. It is therefore important that plans for water management assess the different options on the supply and demand sides for ensuring water supply is maintained.

Importance of efficient land use **7.39** Land is another crucial natural resource that will be affected by population and demographic changes, as described in chapter 3. Household numbers in England are expected to grow from 20.9 million in 2003 to 24.8 million by 2021,³² with increased concentration in the South East of England. Rising land and property prices would tend to suggest scarcity in the availability of suitable land for development, and this is supported by the fact that England has one of Europe's highest population densities.³³ However, the differential between values of different types of land (up to 300:1 for residential and agricultural land)³⁴ suggests that the regulatory regime may lead to an overvaluation of certain land uses. For the rise in population and household numbers to be accommodated efficiently, the land-use planning regime will need to reflect the genuine costs and benefits of different land uses in different locations.

Assimilation of wastes

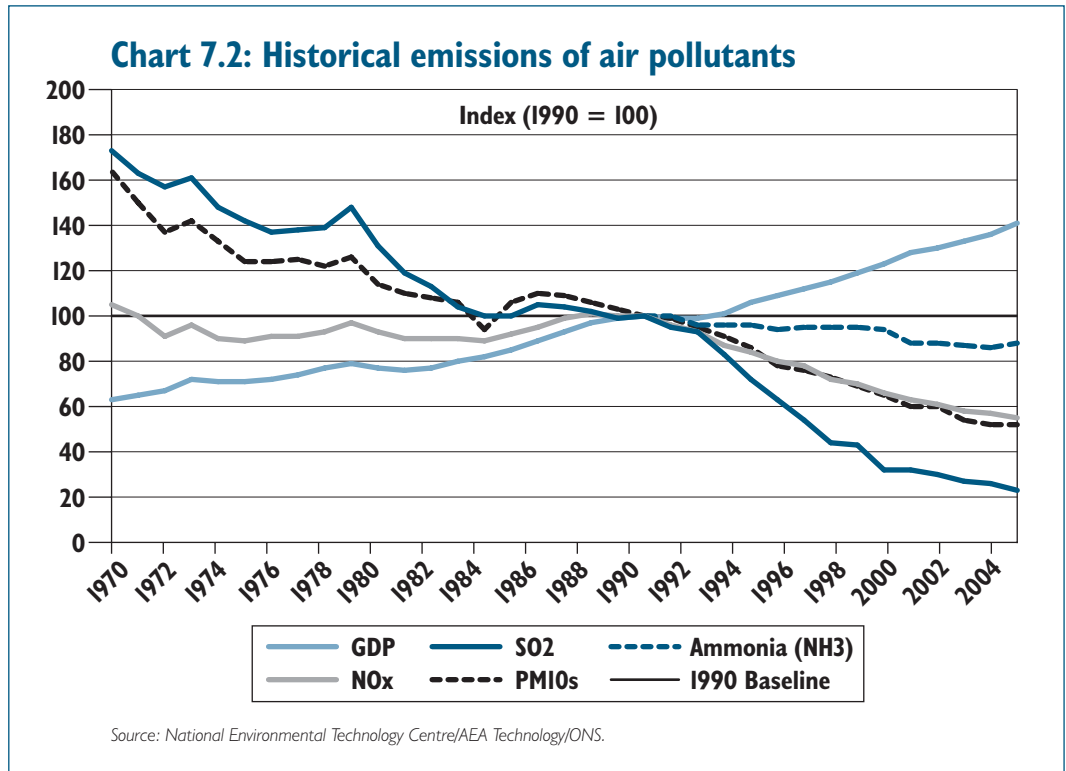
Air and water quality improved but facing pressures **7.40** The capacity of the air around us to assimilate waste will also be under strain. There have been significant reductions in emissions of a number of air pollutants since 1990 (Chart 7.2). However, there has been little change in the frequency of "summer smogs", caused largely by ground-level ozone. Particularly intense episodes occurred in 2003 and 2006 when some 220-570 and 520-1,420 deaths respectively were estimated to have been brought forward by the pollution levels. The effects of climate change are likely to increase the frequency of these summer smog episodes to the extent that they may become the norm rather than a more infrequent event.³⁵

³² *Communities and Local Government Statistical Release 2006/0042*, DCLG, 2006.

³³ *Review of Land-Use Planning: Interim Report – Analysis*, Barker, K, 2006.

³⁴ *Review of Housing Supply: final report – recommendations*, Barker, K, 2004.

³⁵ *Air Quality and Climate Change: a UK perspective*, Air Quality Expert Group, published for consultation, Defra 2005.



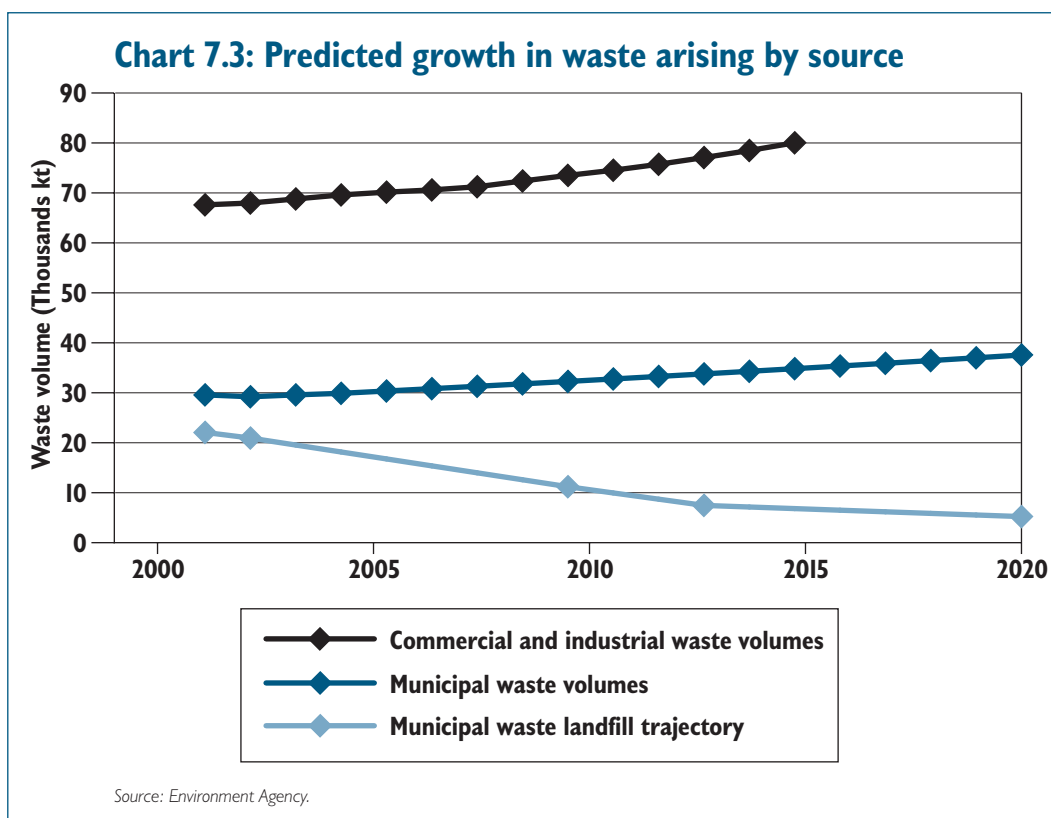
7.41 Water quality will also continue to be an important challenge. Although the quality of water in the UK's rivers and lakes is at its best recorded level, the Environment Agency report that there remains environmental damage caused by water pollution and abstraction, from a combination of major point sources and diffuse water pollution, especially from agriculture and urban run-off. Although the precise extent of action required is not yet clear, the 2000 EU Water Framework Directive will require that all inland and coastal waters reach the requisite "good" status by 2015. The majority of water bodies are currently considered at risk of not meeting the standard.

Waste levels rising 7.42 Over the coming decades the UK is likely to need to manage a continued increase in levels of waste, from both households and businesses, as the economy and population grow. While waste is an inevitable consequence of economic and human activity, an efficient economy will utilise resources in such a way as to minimise the waste it produces. Policies and culture can have a strong effect on the levels of waste produced in a country, as shown in the variation in per capita and per unit GDP waste arisings for OECD countries.³⁶

7.43 It may make economic and environmental sense to increase the amount of waste that is recycled and used for energy generation. Waste disposal in landfill sites has an impact on the immediate surroundings, and when biodegradable waste decomposes in a landfill site, it emits methane, a greenhouse gas 23 times more potent than carbon dioxide. Landfill may also involve materials being lost that could otherwise be recycled, reused or used as a source of energy. Reuse and recycling of materials can avoid primary resource extraction and processing, which is often energy-intensive; and the use of waste as a fuel can represent a less carbon-intensive alternative source of energy to fossil fuels. The case will differ depending on the materials that are thrown away.

³⁶ *Environment at a Glance: OECD Environmental Indicators*, OECD, 2005.

7.44 Certainly over the next ten to twenty years, there will be a major challenge to the UK if it is to reduce the amount of waste being sent to landfill, in line with European obligations, particularly in the context of rising waste production. Because of the ready presence of landfill sites produced by minerals extraction activity, the UK has traditionally landfilled much more waste than many European counterparts. Chart 7.3 shows anticipated increases in England's municipal and commercial and industrial waste sectors, as well as a trajectory for reductions in the amount of municipal waste that is landfilled, based on current activities and the EU's Landfill Directive.

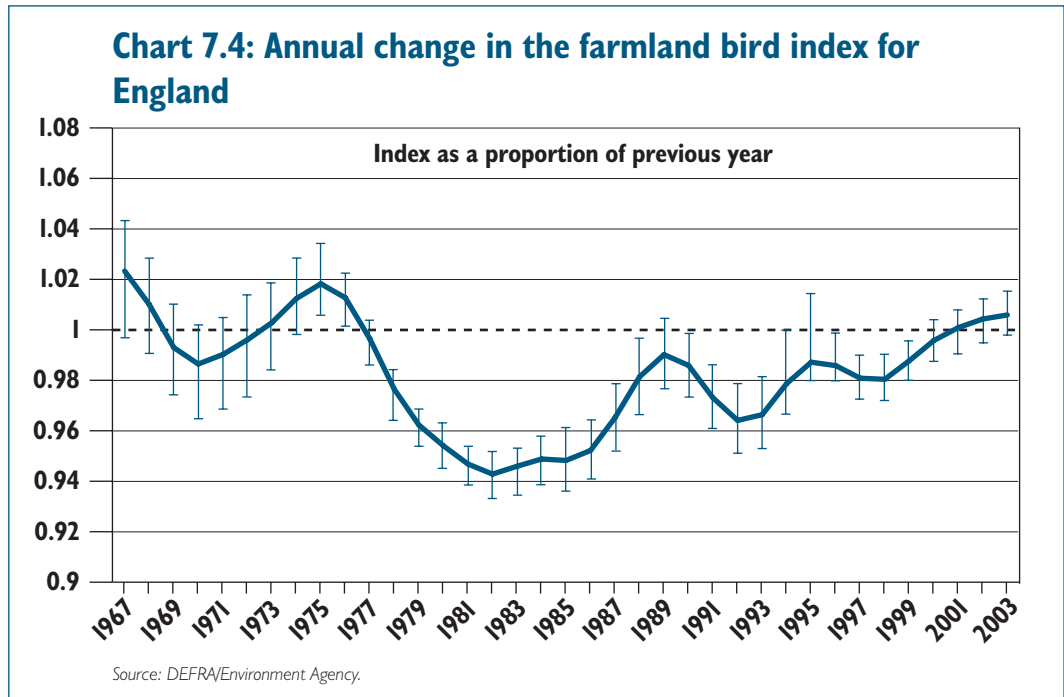


Regulatory and protective mechanisms

Negative biodiversity trends slowing, but still significant

7.45 As at the international level, there will be significant challenges ahead for key aspects of UK biodiversity. Biodiversity in the UK plays an important regulatory role, underpinning the healthy functioning of the environment. The UK Biodiversity Action Plan, the Government's response to the signing of the Convention on Biological Diversity, sets out priority habitats and species for UK biodiversity at the Rio Earth Summit. Of these, 22 per cent of habitats and 11 per cent of species were thought to be increasing in 2005, and 39 per cent of habitats and 25 per cent of habitats were in decline. For the majority of habitats and species in decline, the trend was slowing though not yet reversed. This trend seemed to show some improvement compared with data from 2002, but some significant remaining challenges.³⁷ Populations of farmland birds are sometimes used as a proxy for the state of biodiversity in farmland, since they sit at the top of the food chain. Their populations have experienced a long period of decline since the 1970s, but recent trends show their numbers stabilising, albeit at a historically diminished level, as shown in Chart 7.4.

³⁷ *The UK Biodiversity Action Plan: Highlights from the 2005 reporting round*, Defra, 2005
www.ukbap.org.uk/library/reporting2005/UKBAPReport05.pdf.



Amenity and cultural services

7.46 In addition to trends in biodiversity, which affect its amenity and cultural value, as well as its function in underpinning ecosystems, there are other challenges to the less tangible benefits people derive from the environment.

Tensions between conservation and development

7.47 The UK has a history of conservation and enhancement of the parts of the environment that are most highly valued for their amenity and cultural functions. The first ten National Parks were established in 1951, and this number has been extended to a network of 14 parks, so that the nine English Parks (including the Broads Authority) now cover 8 per cent of England's total land area. In addition, 41 parts of England and Wales are designated as Areas of Outstanding Natural Beauty, and the most important scientific and geological sites are also identified. Designations such as these provide increased protection to over 5 million hectares of land in England, through planning controls and conservation activities.

7.48 The challenge in future will be in balancing the value of these designations against other priorities, such as pressure for housing and other development³⁸ and increased use of onshore wind turbines.³⁹ In particular, it will be important for areas that are kept free of development to be located in the places where they provide the most value to people. The Barker review of land-use planning, for example, suggests that open space can have a value ranging from £20,000 to £10.8m per hectare, depending on its location.⁴⁰

³⁸ See, for example, *Review of Housing Supply: final report – recommendations*, Barker, K, 2004.

³⁹ See, for example, *The Energy Challenge: Energy Review Report 2006*, Department of Trade and Industry, 2006.

⁴⁰ *Review of Land-Use Planning: Interim Report – Analysis*, Barker, K, 2006.

CONCLUSION

7.49 This chapter has explained how long-term economic prosperity, both in the UK and globally, will depend on the healthy functioning of the environment. Patterns of economic and population growth have degraded the environment in a range of ways, and as a result the international community faces problems such as diminishing supplies of some foods, polluted water supplies and, crucially, changes to the global climate.

7.50 Climate change is the most widespread market failure the world has faced. While some impacts are inevitable, action to mitigate climate change can limit its further effects. As the Stern Review highlights, the costs of tackling climate change will be manageable only if there is coordinated multilateral action, with flexibility of policy response.

7.51 There will be pressures locally on the environment in the UK. Climate change could have direct impacts in the UK in the long term. These will be mediated through water with increases in flooding risks and drought expected. There will be increased pressures on water and waste, and a continued need to improve the effectiveness of land use and take care of biodiversity.

7.52 Significant success in the UK and elsewhere over recent decades in tackling environmental pressures and combining this with sustained economic growth gives cause for optimism that these significant pressures can be managed. The challenges ahead are to find an effective global solution to avoid dangerous climate change, to prepare for the changes that are already highly likely to occur, and ensure environmental costs are more accurately reflected in domestic policy making more generally.

7.53 The final chapter provides further detail of how the 2007 CSR will take account of these challenges including through:

- ensuring the Stern Review forms the basis of relevant considerations in the 2007 CSR together with wider government action over the decade ahead to tackle climate change; and
- seeking further progress against the Government's established long-term priority of sustainable growth and employment recognising that the key challenges ahead include ensuring appropriate environmental care, alongside maintaining macroeconomic stability and seizing the benefits of globalisation. A number of reviews on key priorities of economic policy reform will inform the 2007 CSR including: Sir Rod Eddington's study on the long-term impact of transport decisions taking account of the environmental costs of transport choices; and Kate Barker's review of land use planning which is examining how planning policy can deliver economic growth and prosperity alongside sustainable development goals.

8.1 This document has explored the key opportunities and challenges for the United Kingdom in the decade ahead. This final chapter summarises the conclusions it has made, and explains how, in this new context, the Government will use the 2007 Comprehensive Spending Review (CSR) to ensure further progress against its established long-term goals of sustainable growth and employment; fairness and opportunity; a secure and fair world; and modern and efficient public services. The 2007 CSR will be an important milestone in delivering the reform, investment and prioritisation necessary to ensure the UK seizes the opportunities and meets the challenges of the next decade and beyond.

Trends in the next decade and beyond

8.2 The chapter on **demographic and socio-economic change** explained how the UK faces continued population growth, driven by increased life expectancy and migration; and a large increase in the number of older people with a deterioration of the dependency ratio in future decades. The working age population will rise, while there is likely to be a small decline in the number of young people and a continued fall in the average household size. Labour market participation among women and older workers will continue to rise. Changes in preferences and attitudes will probably lead to more demand for many goods offered by public services, and higher expectations of service providers, with lifestyle choices posing new challenges for society. The Government remains committed to its target to eradicate child poverty by 2020, and continuing to tackle pensioner poverty.

8.3 The chapter on globalisation considered the expected **intensification of cross-border economic competition**. The global economy will be transformed by a changing global balance of economic activity; greater competition for investment flows; increasing international specialisation; greater rewards from innovation; higher levels of demand for skills; and increasing pressure on energy resources and the environment. These economic changes have the potential to increase prosperity in many countries, both developed and developing, but as an open, flexible economy, the UK particularly stands to benefit. There are risks to the continuation of globalisation, especially from protectionist pressures. Care needs to be taken to manage these and mitigate potential insecurity experienced by individuals as a result of increased international competition.

8.4 The third chapter explored **innovation and technological diffusion**. The rapid technological change of the recent past is expected to continue, underpinning economic growth and globalisation. Significant uncertainties are associated with predictions of technological change but “Horizon Scanning” work has identified that developments in the following areas are likely to have significant impacts on society over the next decade: information and knowledge handling systems, sensors and tracking, network interactions, security technologies, advanced materials and robotics, nanotechnologies, body and mind sciences, and energy technologies. These technological changes will offer new possibilities to transform how public services are delivered and present new opportunities for transport, education, health, security and energy policy.

8.5 The document then explored potential **global uncertainty with ongoing threats from terrorism and the continued imperative to tackle global poverty**. Terrorism, proliferation of weapons of mass destruction, organised crime and inter-state and intra-state instability represent specific risks to international security in the decade ahead. Human and resource pressures will also be important, including population growth, demands placed on water and energy supplies, and climate change. Significant progress on the fight against poverty is

expected to be made, contributing to stability and security. This can be enhanced further if governance can be improved, and if momentum is maintained for international development efforts including debt relief, aid, and freer, fairer trade. The success of international institutions in reforming adequately for a changing international system will be critical to their effectiveness as guarantors of stability and security in the face of these issues. A number of these global trends and challenges will impact directly on the UK and determine its strategic priorities in an interdependent world.

8.6 The final chapter explored the major challenge of **increasing pressures on natural resources and the global climate**. Globally, the environment will continue to be under pressure as populations and economies grow. There will be a range of stresses on resource provision and existing regulatory and protective mechanisms. Climate change is the largest and most serious of these. Some climate change is now inevitable but if carbon emissions continue to increase as projected it could be increasingly difficult to avoid severe global temperature rises by the end of the century. The most serious impacts of climate change will be in the developing world but the UK will be affected directly too. There will also be wider pressures locally in the UK, particularly on water supply and waste management, and a need to enhance biodiversity and improve the effectiveness of land use. However the possibilities for achieving the necessary global reductions in carbon emissions identified by the Stern Review, and past domestic success in responding to environmental challenges, give cause for optimism that pressures can be managed if sufficient will for action can be found.

8.7 These developments will have significant implications for the UK in the coming decades. Many of them will bring considerable opportunities, including the potential for greater prosperity, more efficient public services, enhanced fairness and justice and a more secure and sustainable world. But they will also bring considerable challenges and entail adjustments for individuals, businesses, communities and government.

Trends can be mitigated

8.8 Society will therefore need to be ready to respond flexibly and collectively to seize the new opportunities and meet the challenges ahead. In many cases action to mitigate potentially damaging trends and encourage positive ones will be the most effective response. For example, households and businesses can change environmental trends by reducing the waste they produce. Individuals shape demographic and socio-economic patterns, for example through decisions on how long they work and whether they live healthily. As is the case in both of these examples, the Government has a key role in shaping the incentives for individual actors. The Government also has a powerful role in influencing international trends and developments through the trade, aid and environmental policies it pursues.

Society & government must also adapt

8.9 However, in many cases society will also need to be ready to adapt to the trends it helps create. Individuals may seek to develop new skills to be able to seize the opportunities of globalisation and may choose to save more to provide for their longer retirement. Businesses will want to take action to exploit the benefits of technological advances and expanding global markets. In addition to establishing the conditions that allow society to make the right long-term decisions for the future, the Government must also reassess its own priorities and pursue innovative policy responses.

8.10 The rapid pace of change in the coming years means that the UK must start preparing now. The 2007 CSR will mark an important milestone in the Government's response. This concluding chapter sets out how the Government is preparing for the 2007 CSR through a range of studies and reviews that will identify what investments and reforms must be made in order to equip the UK for the challenges ahead.

The 2007 Comprehensive Spending Review

8.11 The 1998 CSR and subsequent spending reviews articulated the Government's four overarching priorities for the long term: sustainable growth and employment; fairness and opportunity; modern and effective public services; and a secure and fair world. Over the past decade the Government has shown how it is possible to deliver a strong economy, record levels of employment and sound public finances alongside sustained increases in resources for public services. By matching this investment with ambitious reforms to support the efficiency, delivery and accountability of public services, the Government has secured major improvements in outcomes, including virtually abolishing waiting lists of over six months in the NHS, substantially improving performance at every key stage of schooling, and cutting crime year on year.

New challenges for meeting long-term goals

8.12 The Government is determined to build on these firm foundations and make further progress against its established long-term goals over the next decade, in accordance with the principles of sustainable development. However, as this document has shown, the challenges of today are different from those of a decade ago. Therefore, alongside work to release resources to meet these new challenges, the Government's priorities must also evolve if it is to achieve its goals:

- **sustainable growth and employment** – while the priority in 1997 was to secure macroeconomic stability with low and stable inflation alongside growth, low unemployment and sound public finances, the key challenges now are to maintain and build on those foundations, seize the opportunities of globalisation, ensuring every business and individual is equipped to prosper in an increasingly competitive global economy, and ensure appropriate environmental care for the long term;
- **fairness and opportunity** – a decade ago the priority was to halt the rapid rises in child poverty of the 1980s and 1990s and to address pensioner poverty, through reforms to the tax and benefit system, the introduction of the minimum wage and widening access to key public services. Today the challenge is to make further progress in achieving social justice, including eradicating child poverty by 2020, and to empower individuals and communities to fulfil their rising aspirations so that all individuals can share in the gains from global economic change;
- **a secure and fair world** – in 1997 the challenge was to raise international development up the public agenda and to restructure defence and security forces following the end of the Cold War. The major challenges now are to confront the threat of international terrorism, to develop a long-term international consensus on actions to tackle climate change and to continue to tackle global poverty; and
- **modern and effective public services** – the priority for successive spending reviews since the 1998 CSR has been to address the legacy of underinvestment in public services and deal with areas of unacceptable performance. Despite the progress made, this remains a long-term challenge, although the priority now is to step up reform of public services to meet new demands from an older population with higher expectations, engaging the public on their rights and responsibilities as service users, and harnessing technology to improve efficiency and responsiveness.

8.13 To inform the reassessment of priorities and the delivery of further policy reform in the 2007 CSR and to ensure progress against each of its goals in a changed context, the Government has announced a series of policy reviews.

SUSTAINABLE GROWTH AND EMPLOYMENT

Maintaining macroeconomic stability & growth

8.14 The last decade has seen unprecedented low and stable inflation and interest rates alongside sustained growth and low unemployment. These achievements have been built upon the foundation of a robust macroeconomic framework, based on the principles of transparency, responsibility and accountability. The UK's approach to monetary policy, which gives operational independence to the Bank of England in setting interest rates to meet the Government's inflation target, has delivered consistently low and stable inflation since 1997. Alongside this, the fiscal rules provide the foundation of the Government's public spending framework, which facilitates long-term planning and provides departments with the flexibility and incentives they need to increase the quality of public services and deliver agreed outcomes.

8.15 Entrenching economic stability in the decade ahead is vital if the UK is to seize the potential opportunities of globalisation set out in chapter 4, and prosper in a more integrated global economy where shocks from one part of the world can be rapidly transferred to other regions. It will also be important to maintain fiscal sustainability in the face of the demographic changes set out in chapter 3, and to manage the pressures on the environment described in chapter 7, so that they do not undermine long-term prosperity. Individuals, businesses and public services need the confidence to invest for the future. The UK's robust macroeconomic framework provides a strong platform for meeting these challenges and the 2007 CSR will reinforce the Government's commitment to the fiscal rules within that framework.

8.16 In addition the 2007 CSR will be informed by a number of reviews on key priorities of economic policy reform including skills, transport and infrastructure, science and innovation, planning, and the framework to support regional economic growth.

Leitch Review of skills for the future

8.17 With increasing international competitiveness, and a greater reliance on technology, chapter 4 outlined the premium on improving the skills profile of the labour force to meet the future needs of the economy. Improved skill levels, of both high level and transferable skills, will increase the UK's ability to harness technological improvements and meet competitive challenges. Moreover, skills will enable individuals to adapt to and benefit from change, moving into new areas of work, which will be important in a changing global economy.

8.18 The UK has invested heavily in education and has seen standards rise at all levels. However, the UK skills mix currently compares less favourably with some other developed countries. Although it has comparable levels of high-skilled workers, it has lower proportions of intermediate skills. The rapidly rising skill levels in emerging economies reinforce the need for a highly skilled workforce in the UK. The challenge over the next ten years is to ensure the UK has the right skills mix – by opening up the acquisition of skills to all, through addressing the existing skills inequalities, and continuing to invest in the education and training of both those entering and those already participating in the workforce.

8.19 In 2004, the Government commissioned Lord Leitch, the former Chief Executive of Zurich Financial Services and the Chairman of the National Employment Panel, to lead an independent review to consider the skills base that the UK should aim to achieve in 2020 in order to maximise growth, productivity and social justice, and to consider the policy implications for achieving the level of change required. The review published its interim

report *Skills in the UK: The long-term challenge* in December 2005 and will present its conclusions and recommendations to the Government alongside the Pre-Budget Report, to inform decisions in the 2007 CSR.

Eddington study 8.20 Transport infrastructure and services will play a vital role in equipping the UK to respond to the opportunities and challenges of globalisation outlined in chapter 4. It will enable businesses based here to react quickly and efficiently to changing markets, and will be an important consideration for those considering investing in the UK. The population trends described in chapter 3 will alter and add to the demands on transport, while the UK's transport choices will also be central to responding to the environmental challenges set out in chapter 7. As outlined in chapter 5, technological change should bring significant opportunities in meeting these new challenges. Sir Rod Eddington, former CEO of British Airways, has been asked to advise on the economic impact of long-term transport decisions on the UK's economic growth, productivity and stability. The Eddington Study will inform investment decisions in the 2007 CSR by setting out the criteria for ensuring that transport projects deliver maximum long-term benefit for the country. It will report for the Pre-Budget Report.

Sainsbury Review 8.21 As described in chapters 4 and 5, technological change will remain a key driver of economic growth and prosperity. The Government will therefore continue to play an important role in helping maintain the world-class standard of the UK science base, framing and communicating scientific issues and gauging public acceptability of new areas of science. Lord Sainsbury of Turville, has been asked to carry out a review of science and innovation policies across Government which will take a forward look at what needs to be done to ensure the UK's continued success in wealth creation and scientific policy-making. The review will inform the 2007 CSR.

Supporting housing growth 8.22 As described in chapter 3, over the next decade, growth in household formation in the UK is expected to increase, with particularly marked growth in the South and East of England. An increase in housing supply is necessary to address this demographic change and improve affordability, and is essential to the UK's future economic and social success in the context of global economic change. In her Review of Housing Supply, Kate Barker argued that a constrained housing supply can restrict labour mobility, impact on the flexibility of the UK economy and public services and translate into wider economic instability. Increasing housing supply requires investment in supporting infrastructure. Therefore, in response to the Barker Review the Government announced a policy review for the 2007 CSR into supporting housing growth. This will determine the social, transport and environmental infrastructure implications of growth in different spatial forms and locations, establish a framework for sustainable and cost effective patterns of growth and ensure that departmental resources are targeted appropriately to support this growth.

Barker review of land use planning 8.23 An effective planning system is also crucial to underpin both public and private sector infrastructure to meet the needs of a growing population and economy and do so in a way that ensures land use reflects economic, social and environmental considerations, responding to the trends set out in chapters 3, 4 and 7. A review of land use planning, also led by Kate Barker, is therefore examining how planning policy can better deliver economic growth and prosperity alongside other sustainable development goals. The review will report for the Pre-Budget Report.

Supporting sub-national growth 8.24 Increased global economic competition, as described in chapter 4, means that economic activity can more easily be transferred between locations. Business location decisions are becoming increasingly complex. In order to ensure that all regions, localities and countries prosper in this context, and in response to the population shifts projected in chapter 3, the UK must ensure the right frameworks are in place to support sub-national

growth. As part of the 2007 CSR, the Government is therefore reviewing the effectiveness of sub-national interventions on economic development and the regeneration and renewal of deprived areas.

FAIRNESS AND OPPORTUNITY

8.25 As set out in chapter 4, the increasingly competitive global economy, while bringing great potential benefits in terms of overall prosperity and lifting people out of poverty, will also create insecurity for some individuals and communities in the decade ahead. This increases the importance of equipping individuals with the skills, support, and opportunity to share in the gains from growth.

8.26 In this context the Government remains committed to making further progress on tackling social exclusion and increasing fairness and social justice, including eradicating child poverty by 2020, and moving towards a long-term aspiration of labour force participation equal to 80 per cent of the working age population. To achieve these goals further action is required on the part of government, business, and individuals to equip those of working age with the skills and flexibility they need to adapt and thrive within a changing labour market, to give them greater flexibility and choice in balancing work and family commitments and to enable all groups to participate fully in the labour market, focusing support on those sections of society who face the greatest barriers to work, are economically inactive, or are most vulnerable.

8.27 To ensure that all people have the best possible start in life and the opportunity to fully contribute to and benefit from participation in the UK economy, in addition to the Leitch review mentioned above, the 2007 CSR will be informed by policy reviews on children and young people and on mental health and employment outcomes.

Opportunities for children and young people

8.28 The Government is committed to improving the life chances of children and young people and delivering equality of opportunity. Support for children and young people is an investment in a skilled and productive workforce and a more cohesive society in the future. The Review of Children and Young People, which will inform the 2007 CSR is reflecting on the future challenges and opportunities for their life chances and how the Government should respond, building on the progress made since 1997. In particular, a stronger preventative approach will be necessary to ensure that in the future the cycle of disadvantage across generations is not perpetuated.

Mental Health and employment

8.29 Too many people of working age with a mental health condition are excluded from work when, with proper help and support, it should be possible for them to find or remain in work, benefiting both their health and the wider economy. Nearly 40 per cent of all Incapacity Benefit (IB) claimants report a mental health condition as their main health issue and remain on IB longer than almost any other health condition. A policy review of mental health and employment outcomes will feed into the 2007 CSR and inform Government's next steps in seeking to increase workforce participation to 80 per cent. The review is looking at what further measures can reduce and remove the barriers that can prevent people with mental health conditions from finding, remaining and progressing in work and how best to support the development of effective evidence-based interventions that individuals with mental health conditions need to achieve their full potential.

A SECURE AND FAIR WORLD

8.30 Many of the challenges presented by future trends, including instability and terrorism, international poverty and climate change described in chapters 6 and 7, cannot be tackled by the UK alone. Similarly, realising the opportunities for prosperity from globalisation requires maintaining an international consensus about it in the face of protectionist pressures. Achieving focused UK engagement in multilateral efforts and the most effective use of the UK's security, defence and development budgets will therefore be a key part of the Government's response.

Policy Review of Counter Terrorism and Security

8.31 Whilst the UK has faced terrorist threats in the past, chapter 6 makes clear that the global reach, capability and sophistication of international terrorist groups places the current threat on a scale not previously encountered. More broadly, global security in the decade ahead will be shaped by a range of factors, including international responses to poverty, future conflict and areas of instability. As part of its response to these challenges, the Government is reviewing the delivery of its counter-terrorism and security strategies to inform the 2007 CSR.

Stern Review on economics of climate change

8.32 Undoubtedly, one of the biggest challenges the world faces is climate change. The *Stern Review of the Economics of Climate Change*, published in October, examined the consequences of climate change in both developed and developing countries, and the specific implications for the UK. The Review concludes that climate change is the greatest market failure the world has seen: the costs of unabated climate change could be between 5 and 20 per cent of global GDP. In contrast, the costs of action to reduce greenhouse gases to avoid the worst impacts of climate change can be limited to around 1 per cent of global GDP. The review will form the basis of relevant considerations in the 2007 CSR together with wider government action over the decade ahead to tackle climate change.

MODERN AND EFFICIENT PUBLIC SERVICES

8.33 As this document has highlighted, public services face new opportunities and challenges in the decade ahead. Chapter 5 identified a range of opportunities to harness technology in transforming the delivery of public services, making them more responsive to the needs of service users and new tools for improving policy outcomes. The importance of seizing these opportunities is reinforced by new demands from an older population with higher expectations. There is also a need to engage the public on their rights and responsibilities as service users due to trends in lifestyles. Public services will also have a central role to play in equipping the UK for the economic opportunities of the decade ahead highlighted in chapter 4. A modern and responsive health service, high quality education and training, effective, intelligence-led policing and security services and a fast and reliable transport network provide the essential foundations for a society in which economic prosperity is underpinned by fairness, safety and social justice.

8.34 More broadly, responding to many of the challenges highlighted in this document will require a combination of individual responsibility and community action supported by more responsive and empowering local and national government. Individuals can show responsibility in taking steps to ensure their own fitness and well-being, upgrading skills, and acting with greater environmental care. Communities can be involved in or help run services: for example in ensuring their children get the best start at school as they have done in childrens' centres established under the Sure Start programme. The state can play a key enabling role, providing investment and acting as catalyst and coordinator.

8.35 The 2007 Comprehensive Spending Review will therefore continue reform of public services based on three key principles:

- **embedding value for money** across the public sector, to ensure that record levels of investment are translated into continued improvements in outcomes and service quality, and to release the resources needed to meet new priorities in the decade ahead;
- **focussing on key cross-government priorities**, through a strengthened performance management framework which galvanises departments to work together in tackling long-term challenges; and
- **responding to the needs of users**, by shifting accountability of services to the communities and citizens they serve, and by exploiting new technologies and delivery mechanisms to make services more accessible and convenient for consumers.

Embedding value for money

Value for money in 2007 CSR **8.36** By building on the reforms to date and pursuing even more ambitious value for money improvements in the 2007 CSR, the Government will seize new opportunities to transform public services and meet new challenges, including rising user expectations, within a prudent fiscal framework which locks in the macroeconomic stability established since 1997.

8.37 The Government is placing a comprehensive and far-reaching value for money programme at the centre of its preparations, involving the following elements:

- **deepening the government-wide efficiency programme in the operational areas established by the Gershon Review**, by harnessing the benefits of greater collaboration across organisations and engaging with frontline professionals to identify opportunities for service improvements;
- **conducting a series of zero-based reviews of departments' baseline expenditure**, in order to renew and refocus spending to reflect changing priorities a decade on from the first CSR;
- **establishing pay and workforce plans for each department**, to maintain the pace of workforce modernisation across the public sector and ensure pay growth is put on a sustainable footing in line with the Government's inflation target of 2 per cent; and
- **delivering a step-change improvement in the management of the public sector asset base**, taking forward the recommendations of the Lyons Review of Asset Management.

8.38 In July the Government set out the initial findings of this work, **announcing that it had already identified scope to deliver savings of at least 2.5 per cent per year over the CSR07 period, together with nominal reductions in departments' administration budgets and plans for asset disposals worth a total of £30 billion by 2010-11**. The forthcoming Pre-Budget Report will set out the latest progress in the 2007 CSR value for money programme.

Focussing on key cross-government priorities

8.39 The Government will use the opportunity of the 2007 CSR to further strengthen its approach to performance management and public service delivery – ensuring that it remains focussed on meeting the core needs of citizens and businesses in the face of the changes described in this document. Since their introduction in 1998, Public Service Agreements

(PSAs) have played a vital role in galvanising public services to deliver ambitious outcomes, eliminating unacceptable performance, building capacity and providing unprecedented levels of transparency. The service improvements achieved over the last decade have provided the impetus for a more devolved approach, and in successive spending reviews the Performance Management Framework has evolved away from a centrally driven focus on inputs and the prescription of processes, to giving frontline professionals increasing flexibility to deliver the outcomes that really matter to the public. With 90 per cent of existing PSA targets due to come to an end in the forthcoming spending period, a new set of PSAs in the 2007 CSR, informed by systematic engagement and collaboration with public service professionals, will express a more focussed list of key cross-government priority outcomes. Further details of this will be set out in the Pre-Budget Report.

Responding to the needs of users

Empowering communities and citizens to engage **8.40** The Government recognises that the solution to many problems in the future will be found in individuals and communities working in partnership with local and national government. Each will need to face up to its responsibilities. The Government must improve the delivery of services so that they are shaped around the needs and preferences of the user and are more efficient and responsive at the local and national level.

Performance management **8.41** Reforms to the performance management framework will be directed to increasing the responsiveness of public services and embedding a focus on engaging the communities and citizens they serve, for example by ensuring that plans for delivery of PSAs drive systematic use of mechanisms that enable citizens to hold public services more directly to account (e.g. community calls for action, petitions). The Government is also exploring options for giving citizens greater access to timely data on the performance of local services, providing a ‘bottom-up’ pressure to improve services and giving users a greater basis on which to exercise choice.

Varney review of service transformation **8.42** Budget 2006 announced that the Chancellor had asked Sir David Varney, former Executive Chairman of HMRC and Chairman of O2, to advise him on the opportunities for transforming the delivery of public services, in particular by looking at how the channels through which services are delivered can be made more responsive to the needs of citizens and businesses through cross-government collaboration. For example, by harnessing the benefits of new information and data management technologies, citizens and businesses could have better and simpler access to government, rather than the multiple interactions that are currently required. Sir David’s report will inform the 2007 CSR.

Lyons Inquiry **8.43** The Government is committed to enabling all regions, cities and local communities to enhance their own economic performance, with decision-making taking place at the most appropriate level, and considering where devolution and decentralisation might enable communities to address their unique needs and priorities. The Local Government White Paper, the review of the Greater London Authority, the Lyons Inquiry into the role of local government, and of sub-national economic development and regeneration will all inform the 2007 CSR to ensure it delivers the right balance of local, regional and national interventions.

Review of the role of the third sector **8.44** Third sector organisations have a vital role to play in equipping communities to meet the challenges ahead, both as deliverers of local services and as facilitators of local action and cooperation. To inform the 2007 CSR the Government is therefore engaging in the largest ever consultation with the third sector as part of a review of the third sector’s future role in social and economic regeneration. Interim findings will be published at the Pre-Budget Report.

FACING UP TO THE ISSUES AND CHOICES AHEAD

8.45 Every citizen, business, and community has a major stake in the outcomes of the 2007 Comprehensive Spending Review. The Government therefore wants to ensure that it is fully informed by widespread public engagement on the long-term challenges facing the UK. Through its analysis of these challenges, the Government has already undertaken extensive consultation with third sector organisations, businesses, think-tanks, unions and academics amongst others.

8.46 The Government has now begun the process of assessing the long-term policy choices it will have to confront in the 2007 CSR and beyond to deliver on its ambitions in this changing environment. As part of this, the Cabinet has set up Ministerial working groups on six key areas of policy: economic dynamism; public services; crime, justice and cohesion; energy and environment; the role of the state; and Britain in the world. These discussions are ongoing and will be informed by the analysis set out in this paper in the months ahead.

8.47 Through the policy reviews, Ministerial working groups, and the development of delivery agreements, the Government seeks to stimulate public discussion and listen to people's views on the key challenges for the UK and how the Government, citizens, businesses and communities should be responding to them. Details of how to submit views to the Government are set out in Annex A.

CONCLUSION

8.48 This document has described how the UK faces profound change in the decade ahead at home and abroad. There will be significant demographic and social change. The global economy will undergo a radical transformation. Technology will open up new possibilities in public services. Global trends will reshape the context in which the UK pursues its security and development objectives. There will be increasing pressures on the environment, including the risk of severe and costly climate change, requiring the world to act.

8.49 Many of these changes present great opportunities but there will be significant challenges. For example, countries that are open and flexible can prosper in the rapidly changing global economy, where there are new opportunities for trade and investment, large and growing new markets such as China and India, and new possibilities presented by rapid technological advance. Seizing these opportunities will require entrenching economic stability and promoting flexibility to react to new opportunities quickly, enhancing the skills of the workforce, delivering world-class infrastructure and encouraging a culture of innovation and enterprise. Public services will have a central role to play in this changed context, providing the essential foundation for a society in which economic prosperity is combined with fairness and social justice. The UK will also need to play a leading role in global efforts aimed at meeting the global challenges of poverty, climate change and continued security threats.

8.50 The Government is determined take the steps required to make further progress against its established long-term goals of sustainable growth and employment; fairness and opportunity; a secure and fair world; and modern and efficient public services in this new context. The 2007 CSR will be an important milestone in delivering the reform and investment required to seize the opportunities and meet the challenges of the decade ahead. Recognising that every citizen, business and community has a stake in the outcome of the CSR the Government has already undertaken extensive consultation on the issues and choices it faces and this dialogue will continue in the coming months.

A

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