

OECD INSIGHTS

BRIAN KEELEY

# HUMAN CAPITAL

How what you know shapes your life



## Foreword

*Economic success crucially relies on human capital – the knowledge, skills, competencies and attributes that allow people to contribute to their personal and social well-being, as well as that of their countries.*

*Education is the key factor in forming human capital. People with better education tend to enjoy higher incomes – a benefit that is also reflected in improved economic growth. But the impact of human capital goes beyond economics. Raising human capital raises health levels, community involvement and employment prospects. Indeed, as globalisation increases the need for technological skills and adaptation, the importance of human capital will only grow in the years to come.*

*Sadly, too many people today are not being given the opportunity to fully develop their abilities. Even in developed countries, as many as one-fifth of young people fail to finish secondary school, which severely limits their subsequent employment prospects. Such failure is frequently concentrated in particular communities, leading to their marginalisation from the economic and social mainstream.*

*Given its significance for economic and social development, human capital has long been a priority subject for the OECD, which is heavily involved in education; working to develop understandings of how teaching and learning can be improved in the classroom and helping education systems in member countries to learn from each other's successes and failures. Best known, perhaps, is the OECD's PISA programme, which measures the competencies of 15-year-old students in more than 40 countries around the world. But the OECD also deals with issues such as schooling for tomorrow, childcare, education, lifelong learning and higher education.*

*The OECD is also looking at health issues, trying to understand how this sector performs and how it can deliver the best service to our societies.*

*The OECD's research and findings often feature in newspapers, television reports and other media. But for some time we have felt that we should deliver our analysis and research to a wider audience. That is why we created this new series of books: OECD Insights.*

*Our aim is to generate an informed debate on some of the key issues that affect our societies and economies today. All too often, such debate generates more heat than light. For a truly meaningful dialogue, we need to go beyond exchanging opinions – no matter how fiercely they are held – and look at the facts and figures. With a long record of research and analysis, we feel that few bodies are better placed than the*

*OECD to report on these realities.*

*We hope that this new series of books will provide readers with the information and insights they need to understand the changes and challenges that will shape our economies, our societies, and ultimately, our lives, in the future.*

*Angel Gurría*

*Secretary-General of the OECD*

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## **Currency Note**

Currency references are in US dollars unless otherwise indicated.

# 1. Introduction: Investing for Change

Today's children are growing up in a changing world. Globalisation is opening up economies and creating opportunities. Economic foundations have shifted, too, with the rise of the knowledge economy. Coupled with major social change, such as the ageing of populations, societies must find solutions to new challenges.

## *By way of introduction...*

The Paris suburb of Villiers-le-Bel is an uninspiring place on a cold, winter afternoon. Blocks of look-alike apartments line up in long rows. A discount store stands deserted on a street corner. Groups of young men hang around the community centre.

Just a few months earlier, youths like these had taken to the streets of Paris's suburbs. Thousands of cars were burned in night after night of rioting that featured on the front pages of newspapers around the world. Some in France dismissed it as nothing more than mindless violence. Others saw it as a cry of anger from immigrant communities who believe they have suffered decades of social exclusion and economic marginalisation.

The riots are just a memory on this dreary afternoon at the community centre as the men sit about in thick padded jackets listening to rap music on a stereo. Upstairs, four local unemployed women are meeting with an employment advisor. Some of the women were born in France; others are immigrants; all come from different ethnic backgrounds. They talk about what they need to put in their résumés and how to approach employers, and then discuss – sometimes heatedly – the problems they face in finding jobs.

Some of the women argue that because their area relies on just one railway line, employers are reluctant to hire them for fear that transport delays and strikes will keep them from getting to work. Others believe the barriers are more insidious, a reflection of prejudice and discrimination. All agree that lack of education can be a major obstacle to finding a job.

Linda, who grew up in France in a traditionally minded North African family, regrets that her education was cut short. "I was a model student at school", she

explains, but she was pulled out before she could finish her schooling. “My father believed that women shouldn’t work and that they should stay at home until they got married. In our education, our culture, our religion, a woman just has to accept things as they are.”

Linda was married in her late teens, but her marriage didn’t last, leaving her to bring up her children on her own. That’s forced her family to reconsider its beliefs. “My father finally accepted my divorce. Now he understands my situation, he has changed his approach. Now he pushes me to find work.” But for Linda, that’s not easy: “No CV, no professional experience, never a trainee”. She has turned to France’s employment services for help with training and is hopeful that they can help her, but she knows it won’t be easy. “There are no guarantees”, she says.

To get on, to get a better job and to improve their incomes, the women know they need to have an education. That’s hardly a revolutionary idea. Parents the world over and in all social classes nag their children to study hard and get good grades in the hope that some day they’ll reap the rewards of all that work.

Behind that advice lies an interesting concept; namely, that the years we spend in education generate a form of capital that has the potential to produce a long-term return, just like forms of capital that we may be more familiar with, such as money in a bank or a piece of land. This idea has become highly influential among policy makers, and it has spread beyond just education. Good health, too, can be regarded as a form of capital that has the potential to pay returns to individuals in the form of increased lifetime earnings.

Indeed, even the relationships and shared values in societies can be seen as a form of capital that make it easier for people to work together and achieve economic success. Arguably, the absence of such capital explains some of the problems that affect places like Villiers-le-Bel.

This book is about these forms of capital.

▶ This chapter begins by briefly sketching out some key worldwide trends – changing demographics, globalisation and the rise of the knowledge economy – that are fuelling interest in these approaches to capital. It then looks at how those trends are being reflected in people’s daily lives, and the challenges they pose. Finally, it introduces the work of the Organisation for Economic Co-operation and Development (OECD) in studying and analysing the impact of global change and how societies and governments can respond.

## *What challenges face our societies?*

By the time you read these words, the Japanese village of Ogama may no longer exist. Concerned by their remoteness from medical facilities and daily amenities like shops, the village's dwindling and increasingly elderly population have decided to sell their land to a recycling plant. When they move to a bigger town, the villagers will bring the bones of their ancestors and their village shrine with them.

Ogama's disappearance is due in part to the decline of Japan's rural economy. It also results from a bigger issue in Japan and elsewhere in the developed world: societies are ageing. There are two main reasons: we're living longer and we're having fewer children. In years to come, this trend will have a real impact on developed countries. A few figures:

- At the turn of the millennium, about 15% of people in the OECD area were aged over 65; by 2030, that number is forecast to hit 25%.
- In the last half of the 20th century, the size of the working-age population of OECD countries rose by 76%; in the first half of this century, it's projected to grow by just 4%.
- Population changes will hit countries' potential for growth: Europe is currently reckoned to have a potential annual growth rate of 2.3%; by 2050 that is forecast to fall to 0.5%.

The result of all this is that the elderly will soon be depending for their welfare on falling numbers of active workers. In response, it's likely that more of us will have to go on working well past current retirement ages because there just won't be enough younger people to do the work. (Indeed, in Japan, as in some other countries the entire population, not just the workforce, is shrinking.)

**“... Population ageing is both a challenge and an opportunity. It will put upward pressure on public expenditures while dragging down economic growth. But it is also a tremendous opportunity for all of us to spend more rewarding years at work and in retirement.”**

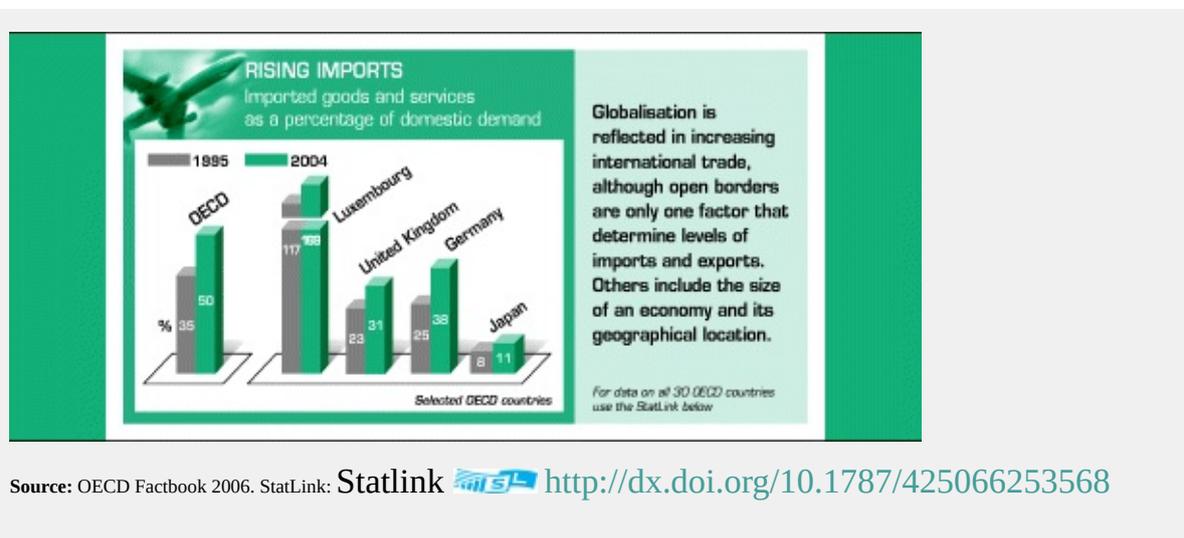
Live Longer, Work Longer

To go on working we'll need to continue updating our skills throughout our working lives. Why? Because the skills we need in the workplace are evolving, and the pace of that evolution is speeding up. Behind those developments are two major factors: the march of globalisation and the rise of the knowledge economy.

Going global

Globalisation is a complex and controversial phenomenon that takes in a wide range of social, political, cultural and economic trends, but at its heart is a simple reality: national borders no longer matter as much as they used to. Signs of globalisation can be seen everywhere – from the rapid worldwide spread of technology to the increasing tendency of students and academics to go overseas to study and work.

Economically, globalisation means that national economies are increasingly plugged into each other and into the world economy. A succession of international deals has opened up trade and investment between countries; multinational firms now think nothing of shifting production around the world; and manufactured goods and some services cross borders effortlessly.

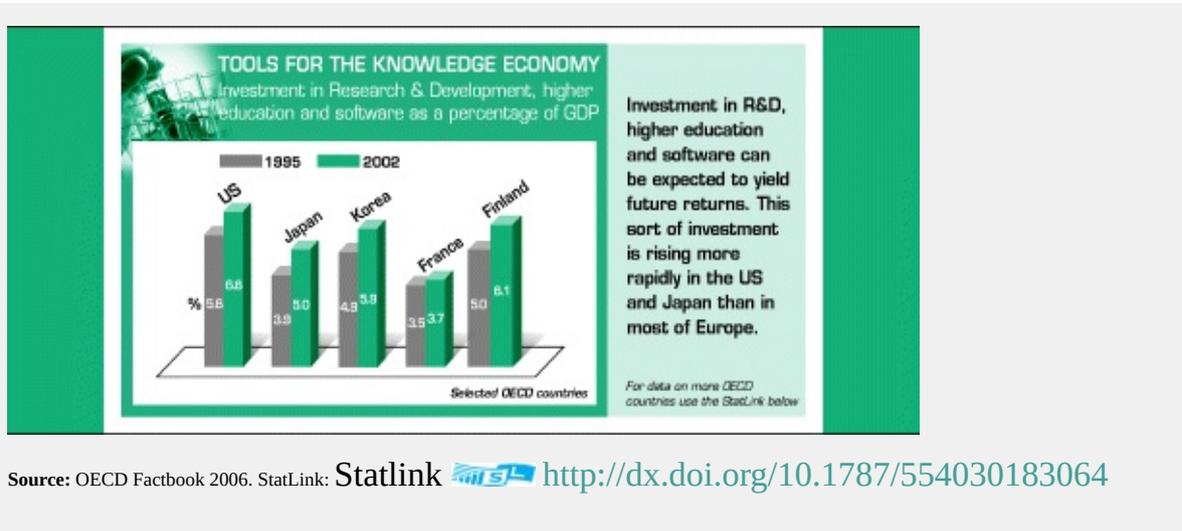


Proponents of globalisation argue that it has brought economic growth and vastly expanded opportunities for trade. But it has also to some extent put manufacturing and low-skilled and some-skilled jobs in developed countries under increasing pressure from places like China and India, where salary levels are much lower.

## The knowledge economy

There's similar pressure from the emergence of the so-called knowledge economy. In developed economies, the value of knowledge and information in all their forms is becoming ever more apparent, a trend that is being facilitated by the rapid spread of high-speed information technology. The upshot is that brains, not brawn, are increasingly valuable, which is helping to widen the gap in earnings between those who have high levels of education and those who don't.

The roots of that gap can often be traced back to our very earliest lives. Even in developed countries, children from poorer families are less likely than their wealthier counterparts to get a decent education, which will make it far harder for them to compete when they grow up.



Poverty doesn't just mean an absence of money; it means a lack of resources – education, health, useful social contacts – on which to build economic success. The impact goes beyond individuals. In many OECD countries, there are growing concerns about the emergence of marginalised social groups – communities that, because they lack links to mainstream society and have only relatively low levels of education are unable to take part fully in global and knowledge economies. In the eyes of many people, it's this marginalisation that led to the riots in the suburbs of Paris in 2005. France is far from alone in having communities that exist outside the mainstream. Many developed countries are worried about how they can maintain cohesion in societies that are home to ever-more disconnected communities.

**“A growing dichotomy between the elite and the rest of the population puts a question mark on the social cohesion inside many societies – a cohesion that has been and still is the foundation for stability.”**

Jørgen Ørstrøm Møller in *The Creative Society of the 21st Century*

*How are our societies responding?*

Economic trends like globalisation and the knowledge economy can feel like vast, slow-moving weather systems that float high up in the atmosphere and are beyond anyone's influence. It's true that today no one country can really determine the shape of global economic development, although some, clearly, have more influence than others. But what societies and governments can do, indeed, what they must do, is react to changing economic and social situations in ways that best safeguard the interests of their own people.

Policy decisions can profoundly shape the development of national economies and the lives of their citizens. To see how that happens in the real world, imagine the life of a child called Jean as he grows up in a typical OECD country...

Years of economic growth have provided sufficient resources to build decent hospitals, so Jean has a very good chance of being born safely and surviving his first few weeks. That's not the case in much of the world: about 4 million of the roughly 60 million children born each year die within their first month, according to the charity Save the Children. Around 99% of these infant deaths are in the developing world.

**“While economic growth is not the only policy objective, it does provide the resources for tackling social exclusion, poverty and poor levels of health.”**

*The Well-being of Nations*

Just a few months after Jean is born his family must face its first dilemma. His mother must decide whether or not she's going to return to work. She's concerned that leaving her son with a childminder will harm his development. But she also feels that by going out to work she can boost the family finances and improve her own long-term career prospects.

In large part, her decision will be shaped by the actions of government. In some OECD countries, governments are willing to subsidise mothers so that they can stay at home; in others, they may believe it's more important to tackle family poverty by encouraging women to go out to work. So, although it will be years before Jean even has the right to vote, social trends and government policies are already profoundly affecting his life.

That process will continue at the next great milestone in his life, school. Educational systems vary greatly in their effectiveness, and the factors that shape them can be so deeply embedded in societies that they can blind people to schools' failings.

In some school systems, for examples, children from poorer backgrounds struggle to do well; in others, social background is less of a factor. Comparing the performances of school systems internationally can make these differences more apparent and help shape government responses.

If Jean comes from a less well-off background, he may be more likely to struggle throughout his school career to develop his potential. He may leave school as soon as possible and try to get a job, but without skills and training his options will be severely limited, especially as manufacturing jobs continue to migrate to less developed countries.

**“In the knowledge society access to opportunities to acquire needed knowledge, skills and competencies is essential for social progress and economic growth.”**

*Co-financing Lifelong Learning*

Assuming Jean finds a job, he may have the possibility of taking part in adult education, but his employer may not want to spend money on training an easily replaceable employee with low skill levels. Jean can only hope that the state will pay for adult education. Otherwise he risks slipping further and further behind in his attempts to earn a reasonable living.

## *What this book is about...*

What can governments and societies do throughout the life of someone like Jean to help him achieve his potential? That’s the sort of question, among many others, that the OECD tries to answer every day. The Organisation brings together 30 of the world’s leading market democracies, and provides analysis and insights on key policy issues that directly affect people’s lives. This book draws on that work to present a sense of how the concept of **human capital** can serve as a response to major social and economic challenges.

By necessity, a book of this size can only provide a brief introduction to the main issues and to the OECD’s extensive research and analysis. To give a sense of that work, the book includes graphics and charts from a number of OECD publications as well as direct quotations from their texts. At the end of each chapter, there’s a section with suggestions for further reading from the OECD.

What's in this book?

**Chapter 2** will explain what human capital is all about, and look at why knowledge and information technology are becoming ever more important to economic growth around the world.

**Chapter 3** looks at why the first years of a child's life are so important and at how family policy can play a major role in determining how children are cared for.

**Chapter 4** looks at the school years, and examines factors that make some educational systems more effective than others.

**Chapter 5** looks at learning beyond the years of formal education: as economies evolve and people work longer, continued training and education will become ever more important.

**Chapter 6** looks at some of the wider range of elements that help people to earn a living, such as good health. It also looks at the links between social relationships and education.

Finally, **Chapter 7** looks at ways of measuring things like a society's education levels, and draws some conclusions.

## *What is the OECD?*

The Organisation for Economic Co-operation and Development, or OECD, is a forum that brings together 30 market democracies to tackle key economic, social and governance challenges in the increasingly globalised world economy. Altogether, these 30 economies account for 75% of the world's trade.

The OECD traces its roots back to the Marshall Plan that rebuilt Europe after World War II. The mission then was to work towards sustainable economic growth and employment and to raise people's living standards. These remain core goals of the OECD. The Organisation also works to build sound economic growth, both for member countries and those in the developing world, and seeks to help the development of non-discriminatory global trade. With that in mind, the OECD has forged links with many of the world's emerging economies.

Numbers are at the heart of the OECD's work. It is one of the world's leading sources for comparable data on subjects ranging from economic indicators to

education and health. This data plays a key role in helping member countries to compare their policy experiences. The OECD also produces guidelines, recommendations and templates for international co-operation on areas such as taxation and technical issues that are essential for countries to make progress in the globalising economy.

[www.oecd.org](http://www.oecd.org)



Source: OECD Factbook 2006.

Source: Statlink  <http://dx.doi.org/10.1787/554030183064>

## 2. The Value of People

In the global knowledge economy, people's skills, learning, talents and attributes – their human capital – have become key to both their ability to earn a living and to wider economic growth. Education systems can do much to help people realise their potential, but when they fail it can lead to lifelong social and economic problems.

### *By way of introduction...*

In India, Vikrant Roberts is getting ready for another day at SAP, an international software firm with a base in Bangalore. The city is India's high-tech hub, and it's changing rapidly, says the 28-year-old software engineer. "Bangalore used to be a small town kind of place. You could go for nice long walks, it was quiet. Now, it's really getting crowded. The traffic's impossible, in fact."

On any given day, Vikrant can talk over the phone to clients in Germany, the United Kingdom or the United States. Sometimes a call is enough, but he may have to get more involved: "If there's a problem in their system and they want me to log on, I can request a connection and log on to their system", he explains. Distance doesn't matter: the client's server may as well be in New York as New Delhi. It's all the same to Vikrant.

Bangalore is home to an ever-growing number of global and Indian software and information-technology companies employing educated young people like Vikrant. Indeed, some predict that in a few years it will take the place of California's Silicon Valley. Vikrant is more cautious: "India has a lot of catching up to do", he says.

Whether he's right or wrong, there's no doubt that India and other developing countries are growing rapidly and have the potential to reshape the world's economy. One famous forecast by the US brokerage firm Goldman Sachs sees Brazil, Russia, India and China – the "BRICs" – joining the United States and Japan to make up the world's six biggest economies by the year 2050. Only time will tell if that happens. But what can't be denied is this: the global economy is evolving, just as it always has done and just as it always will do.

▣ A key trend in this latest phase of world economic change is the rise of the knowledge economy, and that's the topic this chapter will focus on first. It will then go

on to examine how the idea of investing in people has emerged as a response to economic change, and finally ask what all this means for education and how people learn throughout their lives.

## *How is the global economy changing?*

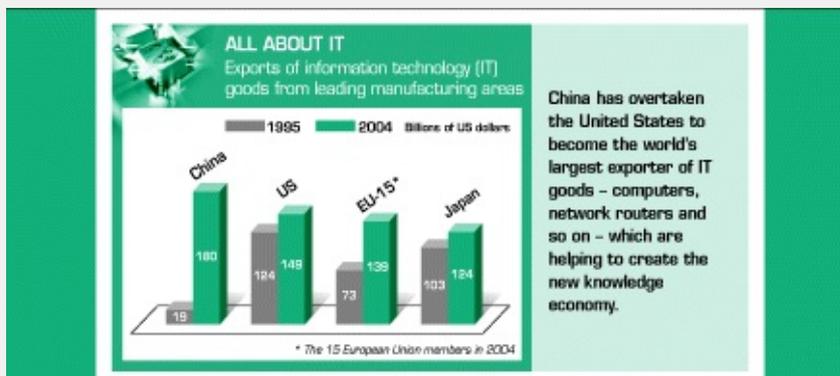
There was a time when economic strength was largely dependent on hard, physical assets: a better plough, a more efficient spinning wheel, a stronger tractor. The physical form these assets took really mattered: a plough did the work of a plough, a spinning wheel the work of a spinning wheel, and that was that.

These days, a major source of growth comes not from physical objects, but from something quite intangible: information. And the form of that information – whether it’s on a computer hard disk, an iPod or flying through the air in a satellite transmission – hardly matters. It’s all just ones and zeros.

**New technology “is transforming economic activity, as the steam engine, railways and electricity have done in the past.”**

*The New Economy: Beyond the Hype*

Equally, the location of an asset – be it Manchester, Detroit or Yokohama – was once crucial to success. A factory had to be in the right *place*, accessible by boats or trains and close to natural resources like coal. Today, location is less and less important. Providing the people are there to make use of the information, and the links are good, it doesn’t matter much whether they’re in Boston, Beijing or Bangalore.



Source: OECD ITS Database.

Let's not run away with ourselves. Of course, manufacturing still relies on raw materials – iron, cotton, oil – just as it always has. And a farmer still needs to plant seeds in the ground. Manufacturing and agriculture are not about to go away. Indeed, with growing world populations and the emergence of new middle classes in China and India, demand for their outputs is rising, not falling.

Equally, information is hardly new. When the dinosaurs still walked the earth, insects like bees were using elaborate dances to exchange information about the location of nectar-rich plants. In prehistoric times, our ancestors used shouts and gestures – that is, they exchanged information – to hunt animals that were bigger and faster than any human. And long before the silicon chip appeared, fortunes were made through the sale of information: in 1865, John Julius Reuter turned his fledgling wire agency into a household name by breaking the news in Europe that President Lincoln had been assassinated.

What's different about information today is the sheer volume and pervasiveness of it and the speed at which it can be transmitted and processed. Rapid improvements in computing power and communication technologies, like the Internet, are making it ever cheaper to handle and process data. Moore's law – the prediction that the number of transistors on a silicon chip (and, by extension, computer performance) will double every 18 to 24 months – has essentially held good now for more than 40 years. Today, computers run ever faster and hold ever more information. Internet speeds, too, have risen rapidly since the days when waiting a minute or two for a new page to slowly reveal itself didn't seem unreasonable.

**“ The value of knowledge ... has continued to rise. It is fundamentally different from other forms of capital. As it becomes abundant, it may be further expanded more easily and cheaply, in turn creating especially lucrative returns. ”**

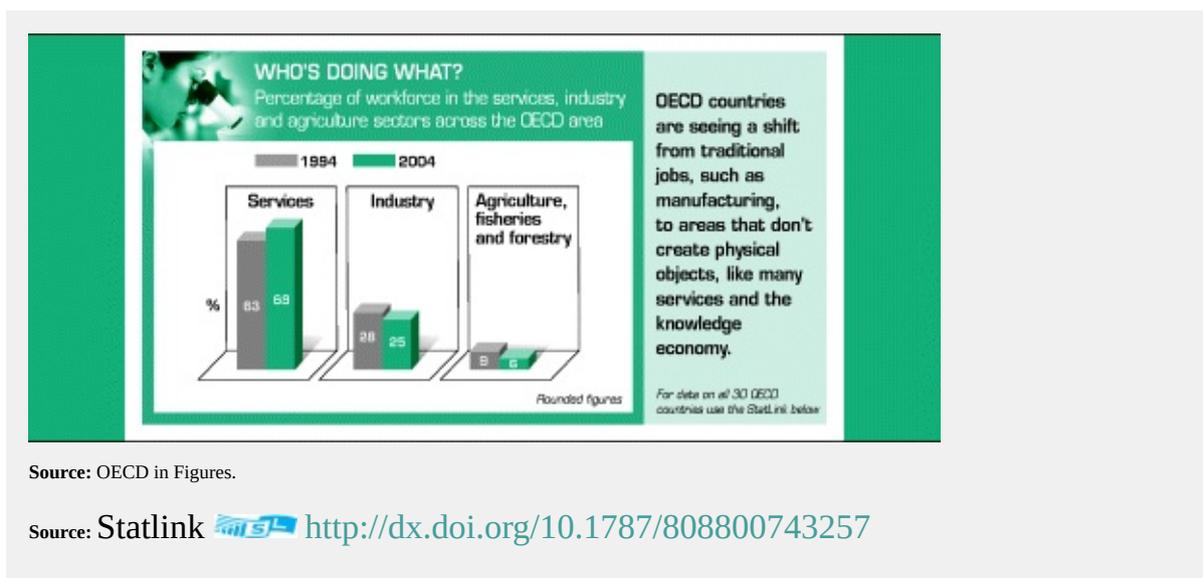
*David Bloom, The Creative Society of the 21st Century*

What's also different is that information-based activities are becoming ever more important both to national economies and individual businesses. Today, improvements in information technologies are felt in every aspect of business life, from managing warehouse supplies to monitoring sales. The pervasiveness of information technologies is reflected in company balance sheets. By some estimates, traditional book assets – essentially, the physical assets of a company that could be sold if it went bankrupt – now account for just one-fifth of US companies' value. Much of the rest

lies in intangible things like knowledge and information.

The knowledge economy isn't just changing existing businesses; it's creating them, too. Think of text alerts to cell phones and search engines from Google, a company whose turnover rose 17-fold in just four years to \$1.5 billion in 2005. And then there's the more obscure new businesses: in China, young people nicknamed "gold farmers" spend their days playing video games to earn virtual gold coins, which players normally use to "buy" other virtual objects, like weapons and fortresses. But the gold farmers aren't keeping this virtual gold for themselves. They're selling it for real money to players in the West who want the rewards of video-game success without making the effort.

All these activities involve the sale or exchange of knowledge and information. To make it all happen takes powerful computers and connections. But, more importantly, it takes people – people with the skills and knowledge to make it work and transform it into economic growth.

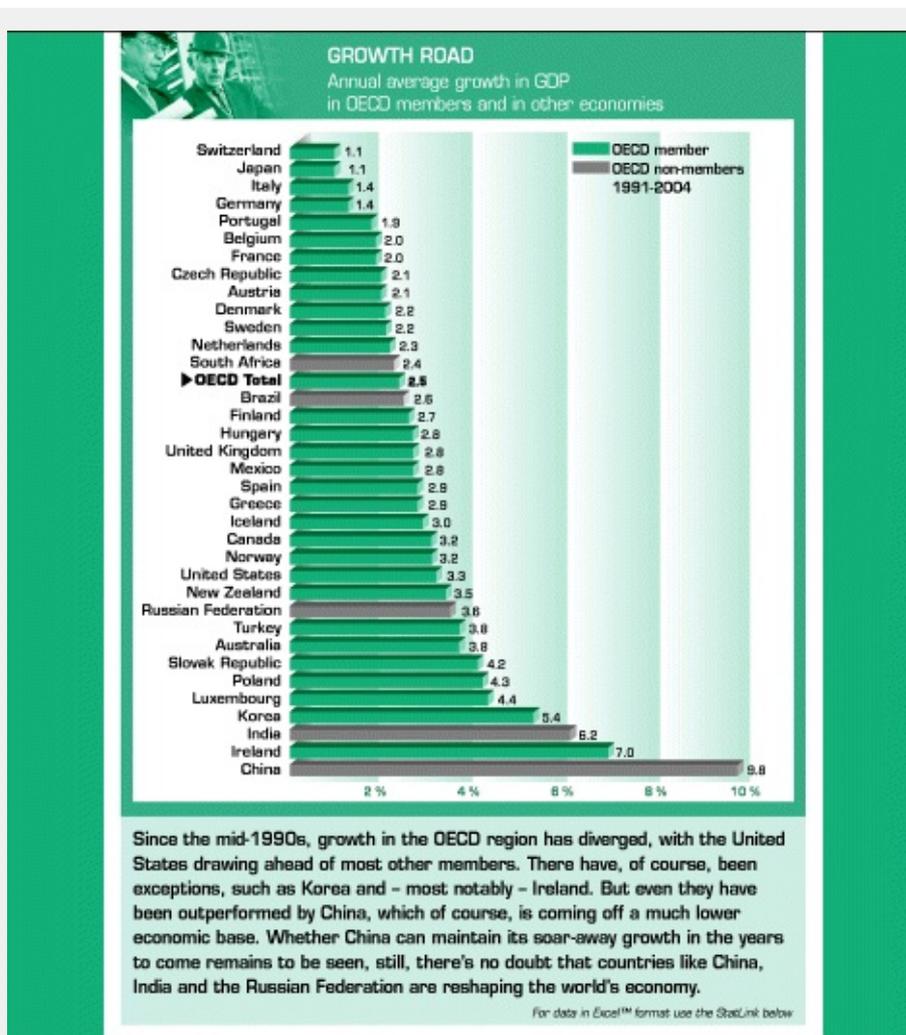


## The elements of growth

Why do economies grow? If the problem's never struck you before, you're probably not alone. While we have all lived through periodic recessions and economic slowdowns, few people in developed countries today have ever known a time when the economy hasn't been growing over the long term. Translated into our own lives, that means most of us are earning more than our parents did, and that we expect our children to earn more than we do. Economic growth, it sometimes seems, is inexorable, if a little mysterious.

And yet there's no law that says economies have to grow. They can stand still, and even contract, for decades or centuries at a time. In recent times, the pace of growth has varied enormously from country to country and from decade to decade. For about 30 years after the end of World War II, western Europe came close to narrowing the economic gap with the United States. That process halted in the early 1980s, when Europe began to slip behind the United States again. These days, China's economy is growing rapidly, by about 8% a year. But there are huge differences between the economies of the gleaming, modern cities on the coasts, and those of the dusty, remote towns of western China.

Why? Why do some economies grow faster than others? That question is at the core of economics, and it's the reason why economics is at the core of modern life. Whether it's because of human greed for material goods or our desire to create a better world with good schools and hospitals for all, most of us want to see our countries – and ourselves – become wealthier.



Source: Source: OECD Factbook 2006.

Source: Statlink  <http://dx.doi.org/10.1787/511708367123>

## What is human capital?

To understand why economies grow, we need first to look at why economic activity happens in the first place. Traditionally, many economists believed four things – “the four factors of production” – were needed. The first is obvious: land. Without land, there would be nowhere to grow crops or to lay the foundations for a factory or a farm. The second is equally clear: labour, or workers. Then there’s capital: that’s the assets, usually money, needed to supply the bricks for a factory and the machines to fill it. And finally there’s enterprise, or what the economist John Maynard Keynes called “animal spirits”. In other words, the initiative that turns a bare patch of land into a factory.

Let’s go back to the second of those factors of production, labour. With a few exceptions, economists originally tended to see workers as a mass. Provided they were willing and able to do physical work, it didn’t really matter very much what they knew or what their -abilities were. An exception to this way of thinking was the 18th century Scottish economist Adam Smith. He believed that economic activity was fuelled not by workers as a collective mass but by “the acquired and useful abilities of all the inhabitants or members of the society”. An individual had to pay a price to gain such talents and abilities, added Smith, but once attained they stood as “a capital fixed and realised, as it were, in his person”.

Smith’s writings still influence the world we live in today. (His support for free trade makes him a bogeyman for those opposed to global trade deals. Ironically, Smith himself earned a comfortable living collecting customs payments on behalf of the British treasury.) However his belief that workers’ individual capabilities were a kind of **capital** – an asset just like a spinning wheel or a flour mill that could yield returns – took a while to catch on. Although it showed up from time to time in the earlier years of the 20th century, it wasn’t really until the 1960s that economists began systematically to incorporate such ideas into their work.

## Explaining growth

That happened because they were trying to answer our original puzzle, why do economies grow? Classical economists, influenced by Smith, believed the answer lay in “the invisible hand”. In a free market, Smith believed, people acting out of self-interest would use the factors of production and goods and services in such a way as to give each of them the best possible return. Spread across an economy, the effort of all these individuals acted as a giant invisible hand, pushing economic resources towards their most productive use.

Later economists, such as Robert Solow in the 1950s, came up with more refined, if less intriguing, solutions to the growth question, explaining the relationships between various factors of growth – labour and physical capital, for instance – through “economic models”. Initially, these didn’t take much account of the impact of differing levels of education, or the quality of labour, on economic growth. But that gradually changed, and since the early 1960s, there’s been increasing agreement on one key part of the growth puzzle, namely, the importance of people – their abilities, their knowledge, and their competences – to economic growth. Or, in other words, **human capital**.

Like many influential ideas, human capital is hard to pin on just one person. But one of the early important exponents was the American economist Theodore Schultz. In a paper that appeared in 1961, he observed that “economists have long known that people are an important part of the wealth of nations”. No one could argue with that: after all, economists had always included labour as a factor in creating economic output.

What economists were less willing to acknowledge, Schultz pointed out, is that individuals consciously invest in themselves to improve their own, personal economic returns. A student studies medicine to heal people, but also because doctors earn more than street-sweepers; a manager trains to learn a new inventory system so she can keep up to date at work but also in the expectation of gaining a promotion and a pay rise.

**Human capital** is defined by the OECD as the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being.

Those examples aren’t Schultz’s, but the idea behind them is. Namely, that investment by individuals in themselves – most commonly through improving their education – yields real improvements in personal income and well-being. Not only that, said Schultz, but across an economy, the quality of human capital – levels of education, standards of health – can be linked to economic growth. Essentially, what he and other economists were saying was this: a modern economy can’t grow without an educated workforce.

## Rising education

Human capital – the quality of the workforce – is only one factor determining

economic growth. Countries can have broadly similar educational levels, but show wide variations in their pace of growth. Other factors can include demography (especially, the ratio of young to old in a population), technological innovation, openness to foreign trade, and the state of a nation's political and legal systems.

But human capital does play an important role in economic growth, and it is one that can be traced back to the 19th century and the rise of mass education. Like most relationships it isn't straightforward. Instead, there's always been something of a push-me, pull-you effect. Education creates a workforce capable of taking on more complex and better-paying jobs. At the same time, the existence of such jobs makes it worthwhile for students to stay on in school; eventually, all those unpaid hours in the classroom will translate into a job that compensates workers for when they were learning and not earning.

**“ Does education spur growth, or does growth spur individuals to consume more education? In practice, it is likely that causality operates in both directions. ”**

*Education at a Glance 2005*

Equally, countries with high levels of education tend to become wealthier, so there's more money to spend on further expanding education. That might sound like a chicken-and-egg situation but it's probably not. Historical evidence from countries like Germany and the United States indicates that the advent of mass education around the end of the 19th century predated large-scale economic growth. (Ironically, the goal of boosting economic growth scarcely figured among the many factors that initially drove the rise of mass schooling.) In more recent years, Asia's "tiger economies" – Singapore and Korea among others – all had relatively high literacy levels before embarking on ferocious growth spurts in the 1980s and early 1990s.

Indeed, just as a good supply of well-educated workers can help an economy to grow, its absence can be a bottleneck. Despite a population of around a billion people, India is suffering from a shortage of well-qualified graduates, according to managers in information-technology businesses. A national employers' association predicts that the industry, which currently employs around 350 000 people in India, will have a shortfall of 206 000 workers by 2009. The lack of suitably qualified staff is crimping growth and pushing up salaries of existing workers.

**Viewpoint – Gary Becker**