

# The weightless knowledge economy

by

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For the last fifty years, economists and development practitioners have viewed the accumulation of physical capital—machines, buildings, and highways—as central to economic growth. However, the evidence is that technological advance, reflecting the accumulation of knowledge, is more important. Today, new opportunities have emerged to use knowledge for more rapid development: outsourcing software construction and data entry to workers in emerging economies such as India is just one example.

In truth, economic progress has been knowledge-driven since at least the Industrial Revolution of the late 18th century. One might even argue that the ancient Sumerians started the process when they first carved financial records onto clay tablets, some 5,000 years ago. Similarly, the economic issues raised by and the policy concerns surrounding technological change in economic growth have been with us ever since. Indeed, many of today's worries—job destruction and rising inequality—were prominent when spinning jennies and steam engines first came into use.

## 1 The Weightless Economy

However, current developments in information and communications technology (ICT) does raise fresh questions. Today's weightless economy consists of ICT together with intellectual assets—patents together with copyrights, trademarks, images, and so on—as well as electronic libraries, databases, and biotechnologies. These industries

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are characterized not solely by the application of knowledge in their production but in their behaving as if they were themselves items of knowledge. Whether or not a video game, MP3-encoded music, or a database of entertaining images comes from a research scientist—the traditional knowledge-worker—might be debatable. However, that they all *behave* as if they were themselves items of knowledge is beyond controversy. As such items rise in importance, we are witnessing the emergence of an economy qualitatively different from the one that has dominated the 20th century and earlier.

Knowledge workers generate the technological base of a manufacturing economy. Intellectual property rights such as patents protect their ideas. In contrast, the new weightless economy is built on strings of information; those may exist on the hard disk of a PC or on an Internet server, they may consist of a paper blueprint, or even an idea in someone's mind. The form that they take is largely immaterial to their value. Hence, intellectual assets become more difficult to protect—at the same time they become easier to distribute—in the new weightless economy.

Moreover, these strings of information no longer simply plug into a production process as earlier. Instead, consumers deal with them directly: from your PC you download computer software, digital entertainment, or use the Web to purchase health consultations, financial instruments, and other items of value to you. The enjoyment of these products by one consumer does not preclude their consumption or use by anyone else. This differs qualitatively from how consumers interacted with the old manufacturing economy.

## 2 Policies for a Weightless Economy

Obviously, encouraging ongoing technological development is critical to the growth of a weightless economy. Less obviously, systems for managing intellectual assets must be changed—sometimes perhaps radically. Protecting intellectual assets (and thus the incentive to innovate) without at the same time creating socially harmful monopolies is a key issue in the weightless economy, whether those intellectual

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assets are software or the DNA profile of the Icelandic population.

Access is also critical: worldwide six billion potential users wait for the products of the weightless economy, but getting them hooked up to the new economy is not straightforward. Thus, governments and collective bodies need to contribute more to the fixed costs that would otherwise inhibit global access, and to encouraging the spread of knowledge about (and desire to use) these exciting, but sometimes complex, knowledge products.

But access alone is not enough. Participation matters too.

### **3 Lessons from Ancient China**

At the end of the Sung dynasty in the 14th century, China stood on the brink of an industrial revolution—400 years before the industrial revolution arrived in late-18th century Europe. China’s output of iron per capita was higher than that of Europe in the late 1700s—the result of its lead in blast-furnace technology. Yet, the next five centuries saw in China dismal economic decline, instead of sweeping economic progress. Why?

Fundamentally, China’s failure to accelerate its growth was a failure of demand. In 14th-century China, technological knowledge was tightly controlled—scholars and bureaucrats kept the secrets to themselves. It was said that the Emperor owned time itself.

A large customer base never developed, and technological development languished after its early and promising start. A European of the eighteenth century was, in contrast, eager to use the products of the new spinning jenny and steam engine. Strong consumer demand drove in turn greater technological progress. So, Europe took the lead, and China languished until the late twentieth century.

### **4 Protecting the Incentive to Innovate**

The weightless economy is a new form of the knowledge-based economy. Historically, societies developed intellectual property rights to

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protect the incentive to innovate. This almost invariably means lost efficiency, but the spur to innovation made it worthwhile.

As ICT and other technologies drive economies to become progressively weightless, so the twin goals of social efficiency on the one hand and protecting innovation incentives on the other become each ever more important. But old systems for achieving this are now less effective. The challenge is a crucial one if the weightless economy is to prosper.

Societies need also to develop the skills and attitudes that are necessary to consuming and appreciating complex technologies. Because participation matters—not just access—openness to new ideas is crucial to societies seeking to develop a weightless economy. China in the 14th century provides a dramatic case in point. It was insufficient scientific knowledge among the general population and within the governing elite about the benefits of science—not inadequate scientific knowledge itself—that crippled an entire nation's prospects for economic growth and development.