(3) Improvement in productivity and human capital

As observed from the development of open-source, the advance of networks has the potential for facilitating knowledge accumulation and consequent collaborations, and for significantly improving knowledge productivity in the entire society.

In addition, a diverse labor supply is expected to become available in the labor market through flexible working environments including telework. Furthermore, in line with the increase of ICT use in businesses, emphasis will be placed on knowledge and human resources as the source of the competitive advantage, and labor demand will increase for specialists who can have originality and scarcity value. Such increased focuses on specialists will promote the concentration of management resources into the core operations and increase outsourcing.

Section 1

Trends of the ICT Industry

1 Trends of the ICT Industry

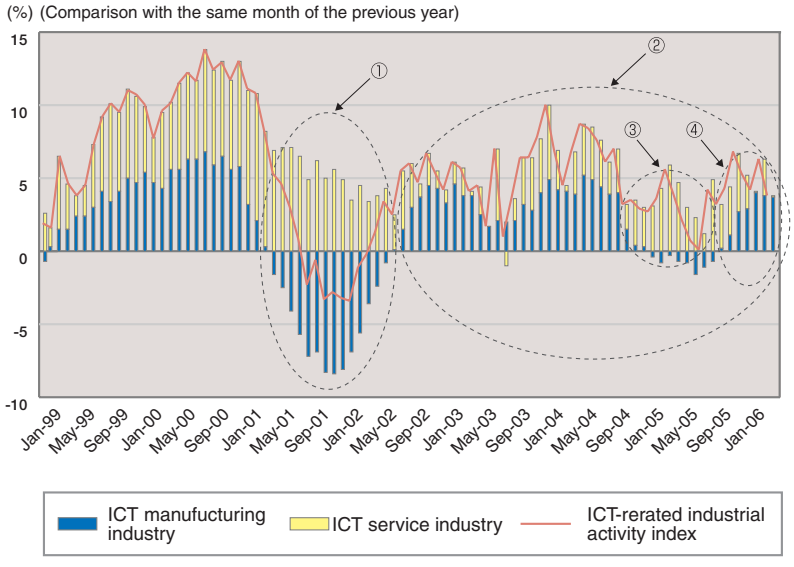
The Index of the ICT industry Activity indicates that, whereas the ICT manufacturing industry fell drastically by the economic recession starting in November 2000, the decline in the ICT industry as a whole was kept small, supported by the ICT service industry **(Figure 1-1-1 ①)**.

Since 2002, the Index of the ICT industry had been on a gradual rise caused by the recovery of the ICT manufacturing industry **(Figure 1-1-1 ②)**. From the second half of 2004 to the first half of 2005, the ICT industry saw a temporary slowdown in their overall recovery because the ICT manufacturing industry declined due to the global inventory adjustments of ICT–related goods **(Figure 1-1-1 ③)**. However, since mid-2005, when a round of adjustment was completed, the industry has been gaining its recovery power **(Figure 1-1-1 ④)**.

(1) ICT manufacturing industry

Since 2002, as influenced by demands overseas for semiconductors, the Index of ICT manufacturing industry Activity has been on a rise by mainly ICT-related production goods. Even though this industry saw a temporary stagnation in the second half of 2004 due to a domestic inventory increase after the Athens Olympics

Figure 1-1-1 Transition in the Index of ICT Industry Activity



Produced from METI, "Indices of All Industry Activity," "Indices of Industry Production," and "Indices of Tertiary Industry Activity"

and the global inventory adjustment of ICT-related goods, recovery began in the summer of 2005 when a round of this adjustment was completed **(Figure 1-1-2)**. This recent recovery has largely been caused by an increase of semiconductor production.

(2) ICT service industry

The ICT service industry has been consistently expanding at a slow pace, and growing firmly. Particularly, the growths are significant in the contracts of system-management and operation, leasing of ICT equipment, and mobile telecommunications **(Figure 1-1-3)**.

The growth of contracts in system-management and operation is considered to reflect the increased demand for management and security by the widespread use of intranets. In light of the recent increase in the needs for information security, it is expected to continue to grow.

Further, as companies shift their information-related investment to leasing, the lease of ICT-related equipment expands. Incidentally, the mobile communications industry which grew steadily with the spread of cell-phone use has flattened out since the last half of 2003.

2 Status of the ICT industry

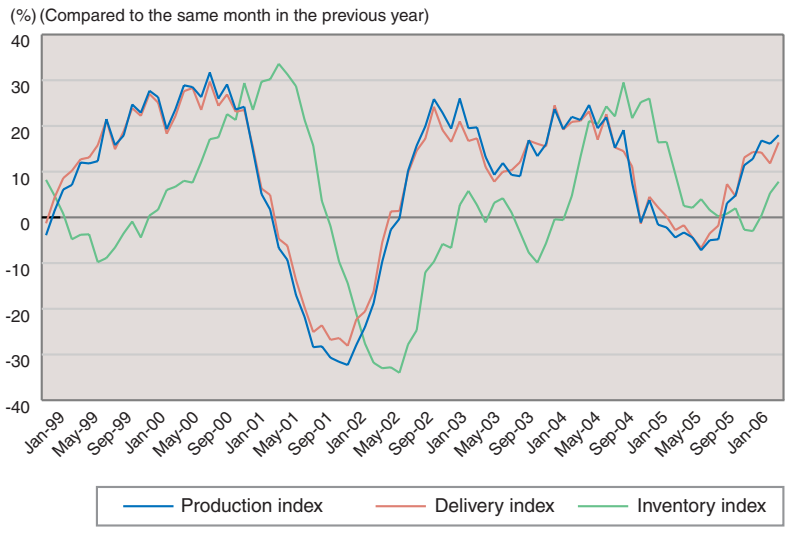
The real domestic product of the ICT industry in 2004 was 115 trillion yen, an increase of 3.8% over the previous year. It was 11.8% of all the industries, and the average annual growth rate between 1995 and 2004 was 5.5% **(Figure 1-1-4)**. As far as the rate of change over the previous year is concerned, particularly high rates were observed in ICT-related manufacturing (4.1% increase) and the ICT-related service industry (9.8% increase).

The real GDP (value added) of 2004 was 62 trillion yen, an increase of 9.2% over the previous year. It was 11.7% of all the industries, and the average annual growth rate between 1995 and 2004 was 7.3% **(Figure 1-1-5)**. As far as the rate of change over the previous year is concerned, particularly high rates were observed in ICT-related manufacturing (31.9% increase) and the ICT-related service industry (17.7% increase).

The number of employees in the ICT industry had been declining since 2001, but it rose in 2004, increasing by 0.9% over the previous year to 3.8 million which was 6.8% of all the industries. The average annual growth rate between 1995 and 2004 was 0.5% **(Figure 1-1-6)**.

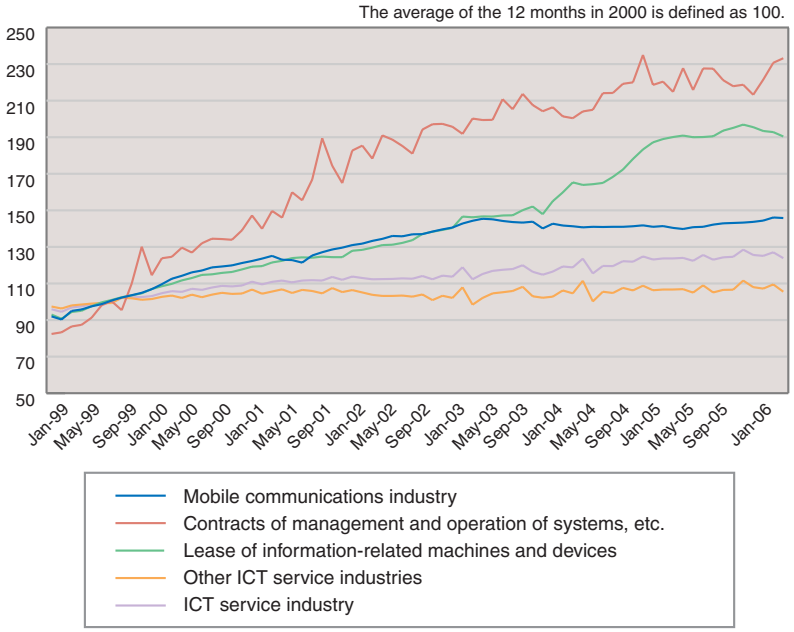
The rate of change over the previous year depends on the industry: ICT-related manufacturing industry (6.46% decrease), ICT-related service industry (2.26% decrease), broadcasting (5.92% decrease), and telecommunications (0.73% decrease) saw negative growth, whereas information service industry (5.64% increase), image/sound/text information production industry (5.26% increase), ICT-related construction industry (2.64% increase), and research (3.05% increase) were areas where the number of employees increased.

Figure 1-1-2 Production, Shipments, and inventory status in the ICT manufacturing industry



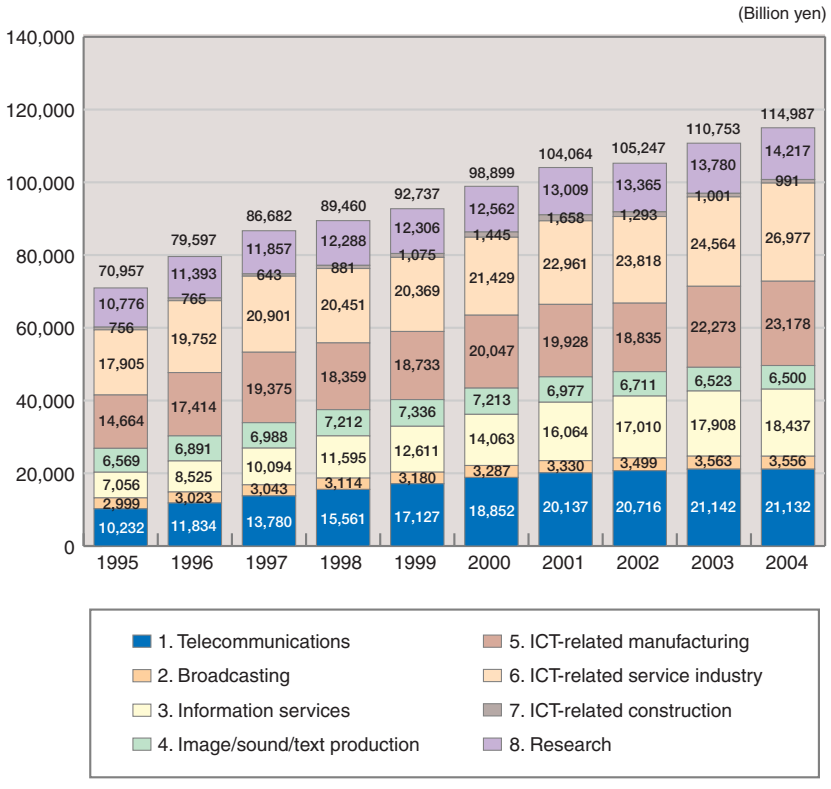
Produced from METI, "Indices of Industrial Production"

Figure 1-1-3 Activity status of the ICT service industry



Produced from METI, "Indices of Tertiary Industry Activity"

Figure 1-1-4 Transition of real domestic output in the ICT industry



(Source: "Survey on Economic Analysis of ICT")

Figure 1-1-5 Transition of real GDP in the ICT industry

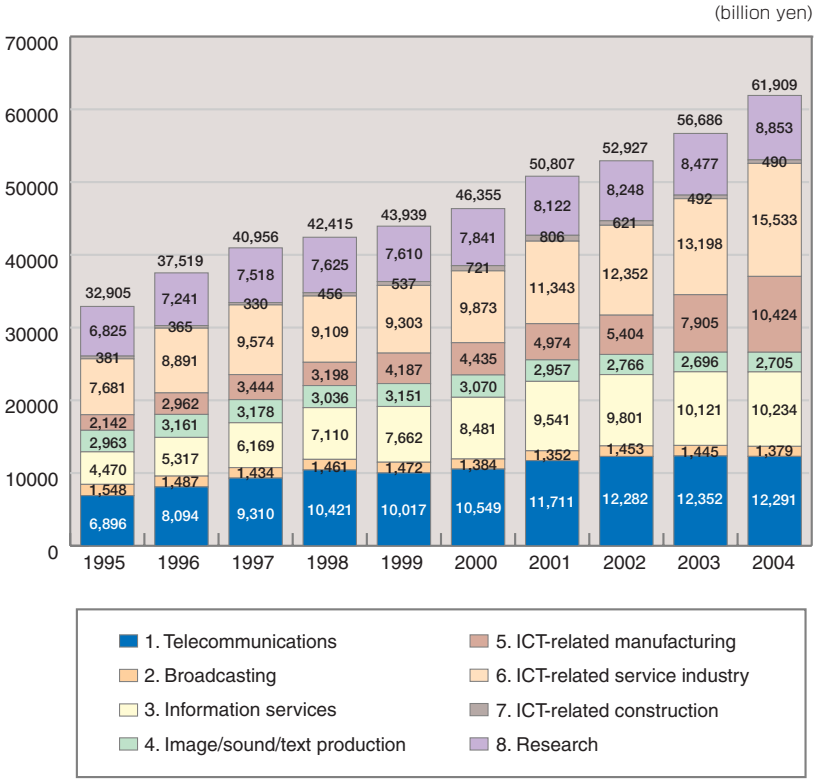
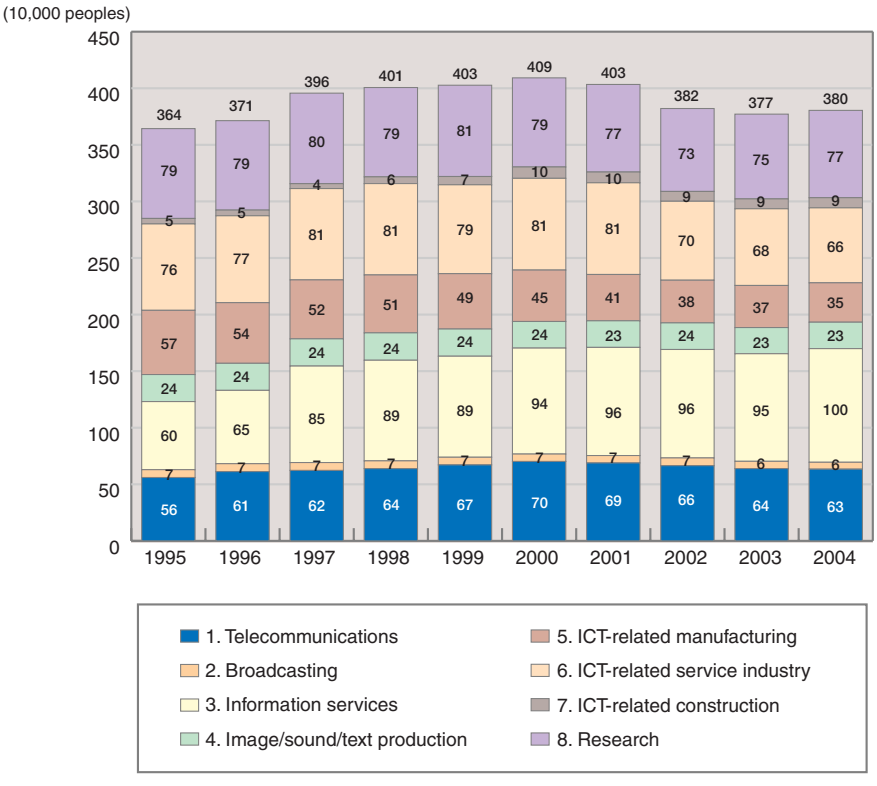


Figure 1-1-6 Number of employees in the ICT industry



(Source: "Survey on Economic Analysis of ICT")

3 Impact of ICT on economic growth

The following three aspects are pointed out as the effects of ICT on economic growth.

The first is the effect by the growth of the ICT industry: as a result of technological innovation in the ICT field, the demand for the ICT industry grows, which in turn leads to further growth of the ICT industry and the economic growth.

The second is the effect by deepening the ICT capital stock, i.e. an increase in the rate of labor's ICT capital reserve and the consequent rise in labor productivity will lead to the economic growth.

The third is the effect by improving productivity in the respective industry through the increase of ICT use in industry and business. For example, the increase of ICT use could improve order systems and inventory management in the transactions between customers and companies. Various fields in our society and economy will see ICT use, which will result in the long-term changes in the socio-economic structure and improve productivity and promote economic growth.

Hereinafter, we will analyze the impact of ICT on the economic growth, taking into account these three aspects. We will ultimately reach the conclusion that the impact of the first two aspects above can be recognized at the present, whereas the impact of the third aspect is not completely clear at the moment.

(1) ICT industry and economic growth

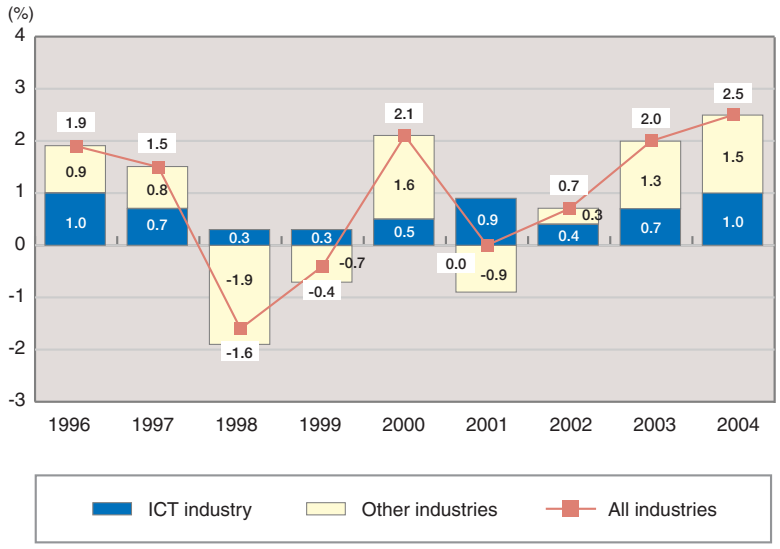
The percentage of the ICT industry in all the industries has been growing every year. As of 2004, the ICT industry occupies 11.8% of the real domestic product and 11.7% of the real GDP.

According to the rate of change in real GDP for each industry between 2003 and 2004, the ICT industry and electric equipment (excluding ICT equipment) showed a significant increase, and the contribution of ICT industry to the changes in real GDP was 40% **(Figure 1-1-7)**. The impact that the performance of the ICT industry has on the growth of the national economy is significant compared to other industries.

(2) ICT capital stock and economic growth

The contribution of ICT capital stock in economic growth from 1990 to 1995 was 0.21% to the economic growth rate of 1.51%; the percentage from 1995 to 2000 was 0.54% to the rate of 0.97%; and the same from 2000 to 2004 was 0.21% to the rate of 1.15% **(Figure 1-1-8)**. From these, the ICT stock was contributed to the overall economic growth: 13.9%, 55.7%, and 18.3%, respectively, for each of these periods. Considering that ICT capital stock occupied only about 2 to 3% of all private capital stocks, these percentages show its significant impact on the economic growth.

Figure 1-1-7 Contribution of ICT Industry to the Changes in Real GDP



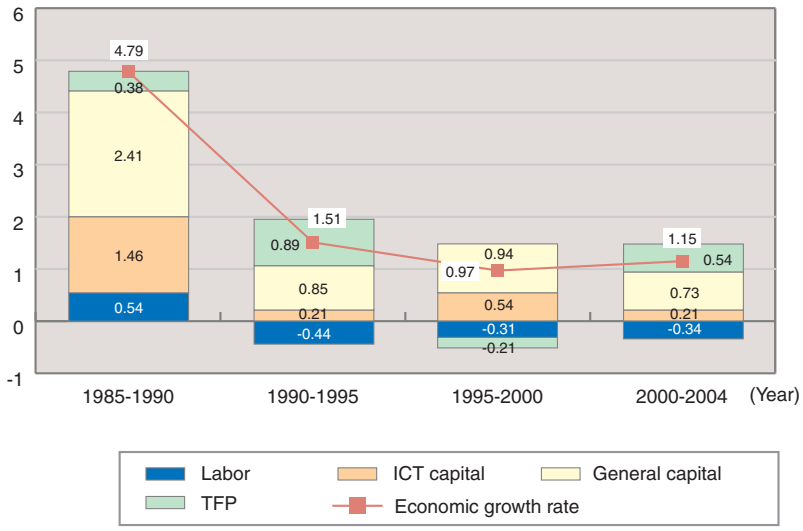
(Source; "Survey on Economic Analysis of ICT")

(3) Progress of ICT and economic growth

An improvement in the productivity of industries and companies due to the progress of ICT appears in the form of the improvement of TFP (Total Factor Productivity) which is a variable factor and not explained in terms of changes in the input of factors of production such as capital and labor.

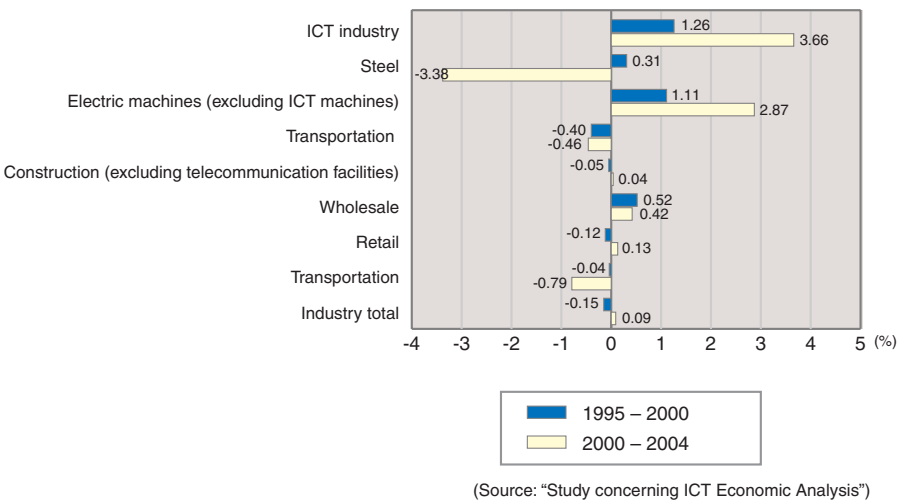
Between 2000 and 2004, the contribution of the TFP to the economic growth and labor productivity increased **(Figure 1-1-9)**. The percentage of the contribution was high in the ICT-related fields such as 3.7% in the ICT industry and 2.9% in electric equipment, whereas, the percentages in other industries are not necessarily high. In other words, the growth of the TFP in Japan is currently supported by the ICT industry which leads a technological innovation; the growth is not so apparent in all industries.

Figure 1-1-8 Contribution of ICT Capital to the Economic Growth Rate



(Source; "Survey on Economic Analysis of ICT")

Figure 1-1-9 Increase in TFP by Industry



(Source: "Study concerning ICT Economic Analysis")