



The Daily

Statistics Canada

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MAJOR RELEASES

- **Information and communication technology and the performance of manufacturing firms, 1988 to 1997** 2
Adopting advanced information and communication technologies is one of the keys to growth for manufacturing plants, according to a new research paper. Plants that adopted such technologies by the end of the 1990s had better productivity growth, and, consequently, greater market share.

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MAJOR RELEASES

Information and communication technology and the performance of manufacturing firms

1988 to 1997

The adoption of advanced information and communication technologies (ICTs) is one of the keys to growth for manufacturing plants, according to a new research paper. ICT adoption leads to growth in labour productivity, which in turn leads to growth in market share.

The research paper *Impact of the adoption of advanced information and communication technologies on firm performance in the Canadian manufacturing sector*, available today, examines the extent to which the adoption of advanced technologies is driving the growth in productivity at the plant level. The study found that manufacturing plants that adopted advanced technologies by 1998 had seen higher productivity growth and had gained market share over the previous decade—at the expense of firms that did not adopt such technologies.

These findings mirror results of an earlier study conducted for the 1980s (11F0019MIE95075, free; 11F0019MPE95075, \$5). Both papers reinforce the view that the use of ICTs is a key factor to growth in the manufacturing sector.

The study showed that economic growth is accompanied by change at the plant level, as some businesses wrest market share away from others. Between 1988 and 1997, 47% of market share in an average manufacturing industry changed hands, shifting from losers to gainers.

Driving these changes was productivity growth; plants that gained market share became relatively more productive than those that lost it. The study found that plants that gained market share over the decade also saw substantial productivity gains.

Plants that achieved higher levels of productivity used it in many ways—for example, to lower their prices, or to produce higher-quality products. Both led to growth in market share.

ICTs are built around the capabilities of computers. They cover technologies ranging from network communications systems, which allows for rapid transmission of information between different parts of a firm, or between a firm and its suppliers, to computer-operated robots that do repetitive jobs such as spot-welding on an automobile assembly line.

Note to readers

This release is based on a study, available today, that investigates the relationship between the productivity performance of plants in the manufacturing sector and the adoption of advanced technologies, specifically advanced information and communication technologies (ICTs).

The study uses data on the adoption of advanced technology from the 1998 Survey of Advanced Technology in Canadian Manufacturing, and was done jointly with Industry Canada.

Economic performance data used in the study came from a longitudinal file developed from the Annual Survey of Manufacturers, which includes data on employment, labour productivity (measured as value-added per worker), wages and salaries, and manufacturing and total shipments, between 1988 and 1997.

Twenty-three individual advanced technologies were used in the study, aggregated into three ICT groups: software, hardware, and network communications. Software includes such technologies as computer-aided design and engineering, and manufacturing resource planning. Hardware includes flexible manufacturing systems, robots and programmable logic controllers. Network communications includes both local-area and wide-area networks.

The results of research papers are sensitive to the type of analytical model chosen, the set of variables selected, and the quality of the data used. All research papers produced at Statistics Canada must go through a peer review process to ensure that they meet the highest professional standards. The purpose of the review process is twofold: to ensure that the content of the paper adheres to Statistics Canada's mandate; and that it adheres to the generally accepted norms of good professional practice.

The ICT revolution has enabled plants to deliver customized products in small quantities, and to change product lines quickly to meet changing consumer demands.

"Sophisticated" users of technology gained the most

Some types of technology have a greater impact on growth than others. Network communications technologies, either by themselves or in combination with the other two types of ICTs—software and hardware—played a key role in firm growth.

However, the largest impact came from using jointly or comprehensively all three types of ICTs—software, hardware and network communications. In other words, the sophisticated technology users gained the most.

The study divided manufacturing plants into two groups—those with high productivity growth and those with low productivity growth—based on

their performance from 1988 to 1997. It found that high-growth plants were more likely to have used ICTs than low-growth plants.

For example, 69% of the high-growth group had implemented advanced network communications technologies by the end of the 1990s, compared with 58% of the low-growth group. Similarly, 66% of high-growth plants had adopted advanced hardware technologies, compared with 54% of plants in the low-growth group.

Plant performance and information and communications technology use

| | Productivity growth | |
|------------------------|-----------------------------------|-------------|
| | Low growth | High growth |
| | Percentage of plants using an ICT | |
| Software | 63 | 73 |
| Hardware | 54 | 66 |
| Network communications | 58 | 69 |
| All three | 39 | 54 |

The greatest differences were found for plants that had adopted all three types of technologies. Of the manufacturing plants that had high growth

between 1988 and 1997, 54% had adopted all three types of technology. Of the plants that had low growth, only 39% had done so.

In addition to technology use, several other characteristics were related to higher productivity growth. Foreign control significantly increased the likelihood that a firm enjoyed higher productivity growth. Conducting research and development was found to contribute to higher levels of market share growth.

The research paper, *Impact of the adoption of advanced information and communication technologies on firm performance in the Canadian manufacturing sector* (11F0019MIE01174, free) is now available on Statistics Canada's Web site (www.statcan.ca). From the *Our products and services* page, choose *Research papers (free)*, then *Social conditions*. A paper version (11F0019MPE01174, \$5) is also available. See *How to order products*.

For more information, or to enquire about the concepts, methods or data quality of this release, contact John Baldwin (613-951-8588, baldjoh@statcan.ca), or David Sabourin (613-951-3735, sabodav@statcan.ca), Micro-Economic Studies and Analysis Division. ■

OTHER RELEASES

Fixed assets

2001

By the end of 2001, there will be close to \$2.4 trillion in structures and equipment being used to produce goods and services in the economy. This represents an increase of 75% (in real terms) over the last 20 years. The growth in machinery and equipment assets has been particularly strong; the 140% increase in these assets is an indication that the economy has been rapidly incorporating the latest technical innovations.

Fixed assets

2001

| | Building and engineering structures | Machinery and equipment | Total |
|---|--|-------------------------------|----------------|
| | \$ billions constant 1997 | | |
| Total | 1,597.8 | 778.3 | 2,376.1 |
| Agriculture, forestry, fishing and hunting | 40.3 | 26.2 | 66.5 |
| Mining and oil and gas extraction | 221.1 | 26.6 | 247.7 |
| Utilities | 249.6 | 95.0 | 344.6 |
| Construction | 7.7 | 23.7 | 31.4 |
| Manufacturing | 100.6 | 207.9 | 308.5 |
| Wholesale trade | 12.7 | 21.2 | 33.9 |
| Retail trade | 31.1 | 22.1 | 53.2 |
| Transportation and warehousing | 131.6 | 69.5 | 201.1 |
| Information and cultural industries | 59.4 | 71.3 | 130.7 |
| Finance and insurance | 29.0 | 80.8 | 109.8 |
| Real estate and rental and leasing | 145.2 | 35.3 | 180.5 |
| Professional, scientific and technical services | 3.4 | 20.9 | 24.3 |
| Management of companies and enterprises | 0.3 | 1.0 | 1.3 |
| Administrative and support, waste management and remediation services | 2.4 | 4.8 | 7.2 |
| Educational services | 93.3 | 11.1 | 104.4 |
| Health care and social assistance | 50.1 | 13.0 | 63.1 |
| Arts, entertainment and recreation | 10.4 | 3.9 | 14.3 |
| Accommodation and food services | 24.7 | 3.6 | 28.3 |
| Other services (except public administration) | 11.4 | 6.4 | 17.8 |
| Public administration | 373.5 | 34.0 | 407.5 |

These series are presented on the basis of the North American Industry Classification System (NAICS Canada 1997). The estimates have been revised back to 1981 to take into account expenditures on

software, which are now treated as capital spending. The estimates are valued at 1997 prices.

Available on CANSIM: table 310002.

To order data, contact Flo Magmanlac (613-951-2765). For more information, or to enquire about the concepts, methods or data quality of this release, contact Richard Landry (613-951-2579), Investment and Capital Stock Division. ■

Light bulbs and tubes

August 2001

Light bulb and tube manufacturers sold 20.9 million light bulbs and tubes in August, down 3.5% from 21.7 million in August 2000.

Year-to-date sales to the end of August totalled 228.1 million light bulbs and tubes, down 1.1% from 230.4 million in the same period of 2000.

The August 2001 issue of *Electric lamps, light bulbs and tubes*, Vol. 30, no. 8 (43-009-XIB, \$5/\$47) is now available. See *How to order products*.

For general information or to order data, contact the dissemination officer (1-866-873-8789; 613-951-9497; manufact@statcan.ca). To enquire about the concepts, methods or data quality of this release, contact Gregory Sannes (613-951-7205; sanngre@statcan.ca), Manufacturing, Construction and Energy Division. ■

Postal area profiles

1999

The 1999 *Postal area profiles*, a databank profiling more than 5,000 communities across Canada, are now available.

The profiles consist of data in five tables, which contain information on demographics, selected sources of income, economic dependency on government transfers, labour force participation, and family characteristics. Data on each community can be compared with provincial and national figures. The profiles provide data for a four-year period.

To order *Postal area profiles* (89C0021, various prices), for more information, or to enquire about the concepts, methods or data quality of this release, contact Client Services (613-951-9720; fax 613-951-4745; saadinfo@statcan.ca), Small Area Administrative Data Division. ■

NEW PRODUCTS

Impact of the adoption of advanced information and communication technologies on firm performance in the Canadian manufacturing sector
Catalogue number 11F0019MIE01174
(free).

Impact of the adoption of advanced information and communication technologies on firm performance in the Canadian manufacturing sector
Catalogue number 11F0019MPE01174 (\$5).

Electric lamps, light bulbs and tubes, Vol. 30, no. 8,
August 2001
Catalogue number 43-009-XIB (\$5/\$47).

Natural gas transportation and distribution, Vol. 43,
no. 6, June 2001
Catalogue number 55-002-XIB (\$13/\$125).

Canada's international transactions in securities,
Vol. 67, no. 7, July 2001
Catalogue number 67-002-XIB (\$14/\$132).

Canada's international transactions in securities,
Vol. 67, no. 7, July 2001
Catalogue number 67-002-XPB (\$18/\$176).

General Social Survey: An overview,
September 2001
Catalogue number 89F0115XIE
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MAJOR RELEASES

- **Urban Inequality, 1996** 2
Shows the differences in living conditions between the large and small cities. In 1996, each Canadian city in average (4 million or more) had a population of about 140,000. The 1996 level is the first 25 years.
- **Productivity, hourly compensation and cost labour 1996, 1996** 4
Growth in productivity among Canadian businesses was relatively weak since in 1996 accompanied by sluggish gains in employment and job openings, growth among the 1996.

OTHER RELEASES

- **Map-based Index May 1997** 3
- **Statistical Exchange Guide** 3
- **State of the World, main ending May 31, 1997** 13
- **Key indicators April 1997** 13

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