OUT IN FRONT

U.S. firms dominate the global information industry

By Ralph T. King Jr.
Staff Reporter of The Wall Street Journal

LONDON — Imagine the reaction if the U.S. Internal Revenue Service turned over its computers, and access to the financial secrets of all its companies and citizens, to a foreign concern.

But in Great Britain, there was little choice. Britain's tax collector, the Inland Revenue, concluded in 1992 that its aging computer networks needed a total overhaul, so it accepted bids from four American companies — one of which was allied with an English concern — and two French companies. The prize was a $1.5 billion contract, the largest ever awarded outside the U.S.

Little Competition

In November 1993, the award went to Electronic Data Systems Corp., the computer-services unit of General Motors Corp. Based in Plano, Texas, EDS promised to install a system that will eventually allow Inland Revenue's work to be done in half the time at half the cost, with a fraction of the department's current 2,000 data-center employees.

American companies, at least for the time being, have little foreign competition either in the construction of sophisticated computer networks for others or, more important, in the ways they use networks themselves to slash costs and beat competitors.

Such networks have become information factories that speed innovation and compress product cycles. American companies are their undisputed masters, in the same way they were the masters of mass-assembly factory systems early in the century.

As in the earlier years, the phenomenon is creating a crucial competitive advantage, particularly for U.S. service companies, whose main product often is information itself.

According to a 1992 McKinsey & Co. study, American telecommunications, banking, retailing and airline industries are up to twice as productive as their competitors in Japan and Germany, and one of the main reasons is technology.

McKesson Corp., Boeing Co., Citicorp and Wal-Mart Stores Inc. have all reshaped their industries by deploying state-of-the-art computer networks as offensive weapons.

For years, the U.S. has run huge surpluses in the export of services and advanced technology, trends that have been little noted amid gloomy monthly reports of trade deficits caused by oil and auto imports.

Recently, two international organizations issued a report saying the U.S. has become the world's most competitive economy for the first time since 1985, citing, among other things, American strength in science and technology.

The New Factory System

"There is no question Americans are leaders in constructing and managing networks," says Thomas Hughes, a professor of history, science and technology at the University of Pennsylvania in Philadelphia. "And there is no question that extensive use of networks, like factory systems in the 1920s, will be a key to establishing leadership in many industries."

Foreigners say the idea that American companies have reasserted their dominance through technology isn't mere chauvinism.

British Aerospace PLC, whose U.S. rivals have relied on managed networks for years, recently found only two concerns qualified to run its information systems, both American.

"The big companies with big backing, with maturity and experience in handling far-flung projects, are in the U.S.," says Peter Harris, an information-technology director at British Aerospace. "We haven't been able to get that comprehensive approach in Europe."

Technology isn't the only reason. Management changes, to unleash the American bent toward innovation and creativity while copying the best Japanese practices, have allowed American manufacturers such as Hewlett-Packard Co. and Motorola Inc. to regain or take control of high-tech markets.

Those tactics often include a more ruthless pruning of work forces than in Japan and Europe. Macroeconomic factors, such as the weak dollar and recessions abroad, have also temporarily aided U.S. companies.

But the U.S. edge in software, computers and networks is apt to be durable, because the dominance in these fields arises from some uniquely American traditions, such as entrepreneurism, inventiveness, abundant risk capital, superior graduate-school education and an inflow of foreign brainpower.

There is also the fact that the U.S. military poured hundreds of millions of dollars into network technology, including the world's first large-scale network, Arpanet, which began operating in 1969 as the forerunner to the Internet.

The effect of high-powered computer networks on the internal operations of companies is poorly understood, partly because computers have been linked in meaningful ways for only a few years.

Stand-alone computers that acted as glorified typewriters or adding machines had little effect on productivity. Only by chaining together computers with instant access to vast databases, new market information and the work of colleagues have companies begun to reap the benefits of information factories.

These benefits include great increases in the metabolism of companies — the speed with which they can launch new products and businesses; the power to react to information before competitors; the ability to cut costs by replacing entire layers of managers and workers with databases, and the ability to eliminate the barriers of time and space with continual global communications.

Managing Data

EDS has erected more information factories than anyone, including an estimated 50,000 networks.

Sometimes EDS builds the factories from scratch, sometimes it just upgrades them with customized software or better linkages and sometimes it merely absorbs a customer's factory into its own global network.

Last year, EDS's overseas sales surged to 23% of its $8.6 billion in revenue, from 15% in 1989.

EDS does so well as a seller of networks partly because it brandishes its own corporate network as a weapon in contests with U.S. rivals, such as Andersen Consulting, a Chicago-based unit of Arthur Andersen & Co., International Business Machines Corp., Computer Sciences Corp. of El Segundo, Calif., and others.

EDSnet, as its information factory is called, is the world's largest corporate-data network and a $1 billion feat of engineering.

It links 400,000 desktop computers and terminals, 95 data centers housing 142 mainframes, and 15,000 satellite dishes in 30 countries. It handles 51.2 million transactions and data transfers per day and can store 49.7 trillion pieces of data — 45 times the contents of the Library of Congress.

Initially, EDSnet's function was to manage data centers for customers around the country from a single location. But after founder Ross Perot sold the company to GM in 1984, the network mushroomed and acquired new roles, helping EDS compete.

For starters, the network accelerates the work process. Faced with having to weave GM's 110 free-standing networks into a unified web, EDS developed a highly automated method for the analysis, design and construction of networks. This allowed EDS to finish the GM project in 2½ years instead of the originally estimated 10.

The network also extends the company's manpower. Every time EDS decides to bid for business, it hastily assembles an ad hoc team of people with far-ranging skills and backgrounds. The deeper its analysis of a customer's operation, the more likely it is to win. In addition, EDSnet eliminates layers of management, so customers can get decisions fast.

Finally, the network helps train and inform a global work force quickly. For example, a few months ago, 800 EDS systems engineers in 125 satellite-linked, interactive classrooms sat in on a 3½-hour briefing by a Microsoft Corp. expert on a powerful software tool the company had just released. This kind of instruction could otherwise have taken weeks.

As business activity becomes increasingly dependent on, and defined by, easy access to relevant business information, this sort of connectedness — along with the responsiveness and flexibility that come with it — helps EDS win contracts at home and abroad. ◆

Reading the Information-Age Chart

Companies such as EDS profit from building outposts on the information highway. But the processing of information is hardly a new industry. Its roots, as shown in the chart below, date back nearly 200 years to the early days of the U.S.

The chart is an annotated road map of the events and inventions that set the stage for today's Information Age.

To follow the progress of the Information Age, the chart tracks the "Information Economy" by dividing the U.S. labor force into four sectors: agriculture (in green), industry (blue), information (red) and service (orange). (The data come from the U.S. census taken every 10 years.)

The vertical scale shows the percentage of the total labor force held by each sector. The horizontal scale is an annotated timeline. The grey bars represent wars and the Great Depression.

Agricultural jobs involve farming, fishing and forestry work. Industrial occupations include construction jobs and the manufacturing of various goods.

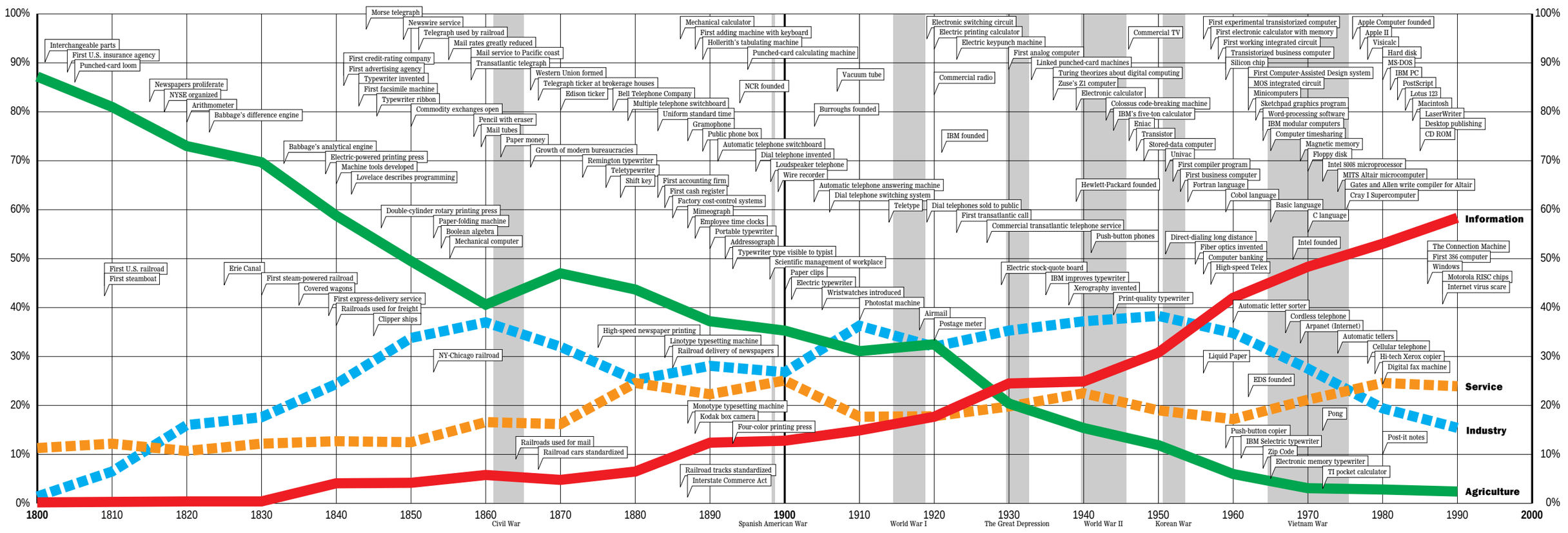
Information jobs primarily involve the production, distribution and use of data. Managerial, professional, technical, sales and administrative jobs fall in this category.

Service jobs differ from information jobs because they involve manually providing support services such as cleaning, maintenance, cooking, transportation and material handling.

From 1800 through 1900, agriculture was the dominant employer in the economy. By 1910, industrial jobs predominated. But by 1960, information was the primary sector of the labor force.

The flags located throughout the chart note important innovations that spurred the development of information technology.

They show milestones in computing, communications, office technology and transportation, as well as developments in the business world that helped to create the information economy.



Karl Hartig Sources: Bureau of the Census; Beniger, "The Control Revolution"; Osberg, Wolff and Baumol, "The Information Economy"; and other sources

INFORMATION AGE