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MANUFACTURING—A STRATEGIC COMPETITIVE ADVANTAGE

International Competition

Competition for manufacturing exists on an international level, as countries with high labor costs experience a loss of manufacturing operations to others with low labor costs. Should the emigration of United States manufacturing operations continue, product and process design and development activities will follow.

Survival of domestic manufacturing requires that we apply our technology and our highly trained and skilled workforce to achieve new levels of manufacturing productivity.

More and more companies—AT&T included—have realized this and are dedicating an increasing portion of their capital and research and development resources to renewing domestic manufacturing capabilities. We can hardly pick up a business journal these days without reading an article about manufacturing as a "strategic competitive advantage."

The AT&T R&D community is applying an increasing portion of its resources to improving manufacturing operations, which is the subject of this edition of the *AT&T Technical Journal*.

To better understand the improvement programs, it is useful to examine them in segments. The three segments we are currently using for planning purposes are: manufacturing systems engineering, information automation (or computer integrated manufacturing), and physical automation.

In addition to giving us the telephone, Alexander Graham Bell initiated the concept of systems engineering. This discipline has served us well over the years and is a major reason for the United States having the world's finest telephone network.

We in the R&D community are applying systems engineering techniques to assist our manufacturing engineers with the design and improvement of our manufacturing operations. Today's computing technology is also allowing us to characterize, simulate, and predict performance of our process designs during the design process rather than after we have deployed capital facilities. The first two articles in this issue describe the nature and benefits of some of this work.

Computing technology has reached a point where the real-time processing necessary for controlled high-speed manufacturing processes is available.

Productive manufacturing processes require a level of discipline, control, metrology, and feedback that goes beyond what humans are capable of doing manually. Process design principles and operating discipline can be embodied in computing technology. When this technology is coupled with the emerging power of expert systems (or artificial intelligence, if you prefer), entirely new capabilities will be possible.

One article in this issue discusses the Manufacturing Process Control System. This is the first of a number of systems developed by the AT&T R&D community for our factories as part of the PRISM (Product Improvement Systems for Manufacturing) family of systems.

The physical automation segment includes two categories:

- Suprahuman capabilities, through materials and machinery technology coupled with real-time computing, that are simply not possible manually.
- Productivity—technologies to perform functions either faster or with more repeatability and accuracy than is possible manually.

The last five articles in this issue relate to the application of new technology for the purpose of advancing the state of manufacturing processing and production systems.

We are in a renaissance period in American manufacturing, fueled in the main by the application of technology, and in this issue of the *AT&T Technical Journal* we explore ways in which our company is contributing to the rebirth.

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