Evolution of Information Technology and the Problems and Opportunities it Presents to Business

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Information Technology is having a profound and lasting effect on business and commerce at all levels. The changes brought to commerce and business organizations are of two types: first order change (when one changes how a task is performed) has accounted for most of the changes in business to date, and second order change (when one changes what it is what we do - business reingineering) will account for much, if not most, of the changes in business now and in the future.

The only thing that one can be sure of the Information Systems (IS) field is change. Change will occur in our key enabling technologies at an ever increasing rate into the foreseeable future. Each of the enabling technologies - computing, telecommunication, and video are described in the context of the changes occurring within them. Then the applied technology that they enable - Information technology (IT) is described in terms of its most critical component technologies: software applications (including expert systems, executive systems and group decision support systems), video communications, and the Internet/WWW. The state-of-the-art of each of these technologies is examined individually as emerging technologies, and collectively as merging technologies. This discussion will provide a context within which several of the major problems and opportunities facing business and commerce now and in the immediate future will be examined.

Among the opportunities to be examined are: spin-off turbo business, embedded intelligence, infomediaries, and low cost entry into the global markets.

Spin-off turbo-businesses are not new. An early example of this phenomenon is American Airline SABRE systems. This airline reservation systems first created a competitive advantage in booking customers, then created a new business leasing reservation systems and finally created a turbo-business-mining the data in/through the system. TRW is growing a new generation of information businesses form within the older generation industrial firm Information Services Group (ISG) with less than 10% of sales accounts for over 25% of TRW's total profit. ISG's main unit, Credit Services Division is rapidly growing in several directions. Dow Jones & Company acquired Telerate Inc. to capture the capabilities of a turbo-based information organization for the company. Telerate collects, processes, and sells critical information generated but unappreciated by Dow Jones. Future Health established a group to mine this information and market it to their already existing customer base.

Embedding intelligence in traditional products is not a new idea. But the kinds of products (mature industries) benefiting from embedded intelligence are expanding rapidly. Information businesses locate their information at the customers' fingertips inside telephones, televisions, computers, cars, etc. Telephones have become more than communications systems, they are now truly business systems. Elevators, where little profit exists in building the "box", attain their competitive advantage by building in service, maintenance and repair capability. Television is rapidly becoming a two way communications system supporting a wide array of services. Automobiles today are built containing hundreds of computers to regulate everything from the proper air-gas mix to contacting a satellite to get emergency road service. Perhaps the best examples of embedded intelligence are the "smart" toilet/bidets that are now common in Japan. These devices seem to expand the services they provide each year, from their simple "paperless" start to ongoing medical checkup incorporated in each use. It appears that embedded intelligence will continue to be a major source of revitalized products.

Infomediaries are those enterprises that use the various forms and functions of information to link

buyers and sellers electronically. The proliferation of information channels, currently being developed, will provide opportunities for most businesses to informationalize— exploit the value of information inherent in the process of conducting business. Reuters is a good example of the new generation of financial infomediaries. By exploiting its 200.000 terminals worldwide, it has become the most aggressive participant in financial information services and electronic trading. Besides its news services, it has ventures in satellite communications, trading room screens, data networks for foreign exchange and equity trading. Telerate, discussed earlier, dominates the electronic bond-info-business serving 100.000 terminals around the world. Bloomberg Financial Markets, Inc., specializes in offering sophisticated analytical capabilities with its information product. More traditional service businesses, such as insurance, real estate, etc., will dramatically change as participants informatize. The traditional roles of "agents" will vanish and will be placed with a variety of information based specialists and, in some cases, entirely new business organizations.

Perhaps the greatest opportunity for existing business offered by the information age is low-cost entry into global markets. The development of EDI and its associated technologies and infrastructures has removed most of the barriers to "computer to computer" communication. Standards have facilitated most business transactions. The Internet is rapidly becoming the highway (not the super highway) for business commerce. Coupled with the World Wide Web, business organizations have the ability to not only conduct business worldwide, but also to market their products and enter electronic markets at very low cost. Electronic catalogs are rapidly becoming big business and are changing the shape of what some still consider new market places like TV-based home shopping. The small business organization with a competitive product or service to sell, has more affordable options today than ever before. And it is only going to get better.

Among the problems to be examined are the risks of obsolescence, the need for building an infrastructure, the dominance of global markets, and a host of problems and emergencies generated by the information technology. How can a business organization avoid being the "buggy whip industry" of the twenty first century? As the impact for technology on commerce and society continues to grow, what products and services will disappear from the marketplaces of the next century? What functions will migrate from one business to another? Professions at risk include: programmers, stock brokers, real estate salespersons, etc. Any product vendor who doesn't support customization - from automobiles, to insurance - will cease to exist.

Infrastructure's importance is becoming critical to business organizations and nations. Take Japan, for example, where new cities, "technopolis" sites, are currently under construction to provide the technology base for Japan's post industrial economy. New economies don't just happen, they are built by visionaries. High-tech initiatives are evident around the world. In Europe, EUREKA projects foster inter-governmental cooperation. ESPRIT is another major public section initiative sponsored by European community.

Global markets will soon be the only markets. Therefore, if you cannot compete in these markets, you can't compete. Location of business enterprise is no longer a constraint or limiting factor on the businesses' customer base. In the information technology industry in the United States, when outsourcing of programming and programming maintenance occurred, it was oursourced to India, Philippines, Hong Kong, etc.

More immediate problems of somewhat smaller magnitude include: the Year 2000 2-digit problem, the evershrinking product life cycle in computing and telecommunication hardware, coming to grips with data ownership and management in your business organization and finding qualified employees to support the information need of employees and management of information resources.

These will continue to be challenges to all business organizations as we progress into the middle age of the Information Age. (It began in the mid-1950's and will end about 2020). If you don't recognize and react to this new world, you simply will not be an actor in it. In managing your organization in today's world, your biggest problem will not be information technology. It will be, as it has been, people and organizations.

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