Incidental Paper

Communications and Information in the Post Cold War Era: Forces and Trends

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Harvard University

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NOTE

Over the years, the Program on Information Resources Policy has studied and influenced many of the issues covered in this review. For more detail, the reader's attention is called to the extensive bibliography of Program publications which is appended.

Global Context

Every so often, it becomes necessary to update the major overall forces and trends that are seen to be guiding the field of communications and information (C&I). The early 1990s is certainly such a time, for changes of a fundamental nature have taken place in the world community since the last years of the 1980s. By end 1991, the world had witnessed the sudden and unexpected release of the countries of Eastern Europe from the Soviet Union's domination and their turn from communism to capitalism, quickly followed by the disappearance of the Soviet Communist Party and the disintegration of the former Soviet Union. This change in political equilibrium, with its untold global effects, was triggered by the failure of economic policy under the centralized communist system. It was rapidly advanced by Gorbachev's radical shift away from decades of Soviet policy of tightly controlling information and the means of its communication. Such a change in C&I policy had been made necessary by shifts wrought by new communications and information technologies in the rest of the world, its consequences being hastened by global communications possibilities.

Although the fall of communism in the eastern part of Europe and a large part of Asia has been the cause of major Western rejoicing, the West – like the former Soviet Union – has been both beneficiary and victim of this change. The Cold War's end without a nuclear war means that the aim of 50 years of the one basic policy imperative – the containment of Soviet Communism – has been abruptly achieved. The West has thus been forced without warning to move into an era where economic, social, political and security behavior will be based on new premises, the nature of which is still largely unknown.

The cessation of one problem has been followed by a host of new problems. Instead of enjoying a time of peace, prosperity, and stability, the West is at best living through a major period of chaos. At worst, it is slipping into an era of new and very hot wars. The disintegration of the Communist system in the Eastern bloc has brought the shattering of republics and states into shortsighted enclaves of ethnic, religious, and nationalist interests. The re-emergence with a

vengeance of old hatreds has occurred. In the former Soviet Union, the West now faces 15 countries – with 15 sets of problems – instead of one. In a search for money, Russia is selling advanced weapons to all comers, including its old rival, China. There are presently several nuclear powers in the Eastern part of the world, and the Ukraine may insist on being one. Thus, despite a lowered threat of nuclear war with the decline of the Soviet superpower, there is a growing threat of nuclear proliferation as a direct consequence of that decline.

The instability which engulfed the former Soviet Union and Eastern Europe has spilled over into the West. Stresses due to shifts in Eastern Europe, and the reunification of Germany, have effectively halted the integration of Western Europe. It is probable that the accomplishments of "EC '92" are being rolled backward, at least in the short term. Coping with this post Cold War withdrawal syndrome is coming very hard, both to the U.S. and to Western Europe. The Japanese and other Asians are perhaps less directly affected, since they have been somewhat less involved in Cold War dominated behavior. But sooner or later they are bound to feel the fallout from such radical change. Part of the problem has been described this way:[1]

> "Two trends going in opposite directions have created a sharp strain in relations among states. Economies are being globalized; regardless of where decisions are made, they operate transnationally. But politics are being renationalized, turning inward, with a loss of awareness of the superseding common interest and the need for mutual reinforcement that the cold war imposed."

Despite the many problems that have come with the end of the Cold War, unprecedented opportunities have also emerged. New C&I infrastructures can now be extended into former Communist countries, while monies previously dedicated to Western defense could now be freed up to modernize aging Western infrastructures. There is recognition at the highest level of governments the world over of the critical

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[1]Flora Lewis, "It Isn't 'Yankee, Go Home' Anymore," *The New York Times*, February 13, 1993, A-21.

importance of the C&I industries, something which could only very recently be said.

PART I. THE MAJOR CHANGES OF THE PAST DECADE

To more fully comprehend where we presently are, it is useful to look back at some of the significant C&I changes that have occurred during the past decade or so. Among the most important of these are:

a) A shift from near monopoly of high tech electronic industries by the U.S. to major worldwide competition.

b) The rise of Japan to the status of a major economic power, based largely on its activities in electronics.

c) The emergence of the Asian/Pacific Basin Newly Industrialized Countries (NICs) as strong C&I producers and competitive market forces.

d) The growth of the services sector to a position of importance in the world economy, with knowledge-based services in the forefront.

e) The breakup of American Telephone and Telegraph Company (AT&T), and the privatization of Nippon Telephone and Telegraph (NTT) and British Telecommunications (BT) monopolies, leading a global trend toward privatization of telecommunications.

f) The integration of personal and laptop computers and facsimile into office and home information systems.

g) The global proliferation of computer networks.

h) The takeoff of modernization in China, with C&I as an integral part of its basis.

i) The uses of global communications technologies by Chinese students and others to protest the policies of the PRC government.

j) The increasing importance of terrorism as a developing country alternative to classical military action.

k) The growing spread of electronic arms to volatile developing countries.

l) The decline of social contracts between governments and certain monopolistic industries (banks, telecommunications providers, defense industries) and hence the loss of old economic, defense, and political stabilizers.

Other important changes have been:

High Tech Concentration

For more than a decade, concentration of C&I industries has been occurring through an ever-accelerating tempo of cross border joint arrangements and mergers between the world's high tech companies. The U.S. innovative spirit has remained dynamic through start-up of many entrepreneurial companies. The U.S., the world's largest single market, increased as a magnet for foreign companies who believed economies of scale and offset of high research and development (R&D) expenditures could be attained only by a strong U.S. foothold. This, however, created negative balance of payments problems for the U.S.

Interdependence

Interdependence, mostly an empty catch phrase in the late 1970s and early 1980s, became uncomfortably real. By the end of the 1980s, it was impossible to deny the relationship between domestic situations and the economic policies of other nations. Foreign exchange rates, inflation, protectionism, agricultural subsidies, economic stimulation, electronic transport systems, and world products were dramatically affected. Interlocking security and defense relationships continued and increased, as did the global influences of the world's media.

Currency Changes

Currency values changed, best demonstrated by the shifting rates between the yen and the dollar. Direct investment by foreigners in the United States, partly due to the cheapened dollar, became a major U.S. trade and political issue. This is reminiscent of the 1950s and 1960s, when U.S. multinationals were having their heyday of heavy investments in Europe. Currency shifts also gave power to some of the Newly Industrialized Countries (NICs) in their quite successful bids for global C&I markets.

Trade Restrictions

The nations of the world, under the pressures of competition, attempted to impose various trade restraints. This situation threatened the institutions and processes which were put in place after World War II to buffer the sorts of mistakes that led to that war and to the 1930s worldwide depression.

Piracy

Piracy of intellectual property, both within the U.S. and globally, reached epidemic proportions, costing legitimate businesses billions of dollars annually. With little monetary risk or investment, pirates – mainly from developing countries – flooded the world with cheap copies of products for which advanced country industries had paid dearly in research and development. They could do this because relatively inexpensive sophisticated copying equipment for software, records, and video and music cassettes had become widely available. The knowledge-based framework of advanced country economies had in the past been protected by patents, copyrights, and trademarks to give risk-takers a chance to recoup their investments, and this framework was jeopardized. No legally enforceable system of controls has yet emerged.

C&I and Development

The C&I needs of the developing world continued to be widely ignored by the advanced nations and international financial institutions. Within the Less Developed Countries (LDCs) themselves, there was a slow recognition that an adequate telecommunications infrastructure is essential to development. A considerable investment in computer technology was made by some of these nations, with varying degrees of successful deployment. The rhetoric of the 1970s and early 1980s, centered around the concept of the New World Information and Communications Order (NWICO) had already markedly diminished when at mid-decade, the United States and Great Britain pulled out of UNESCO. But nothing constructive has really happened. Censorship was not

lifted, and journalists still encountered unnecessary danger in covering foreign news. While a few of the NICs moved rapidly forward, the LDCs as a whole became weighted down by debt. They have remained and grown as volatile political hotbeds, often heavily armed with information age weapons. Meanwhile their unpaid debts have caused the collapse of an untold number of banks in developed countries.

Space Activities

In the satellite field, the basic INTELSAT agreement and INTELSAT's monopoly met several challenges. These challenges were offered by advances in lightwave-fiberoptic technology; by procompetitive policies of the U.S., the original INTELSAT sponsor; by resulting alternative services of non-INTELSAT satellite companies such as PanAmSat, and by regional systems such as Arabsat. The U.S. space shuttle program incurred temporary disaster, and the U.S. and much of the world subsequently suffered from restricted launch capability for the needs of civilians, the military, and intelligence agencies. The European Ariane began to compete with U.S. space activities. The Soviets and the Chinese also began to offer some launch services. The U.S. LANDSAT remote sensing program underwent bureaucratic, management, and aging problems. Meanwhile, the French SPOT (Systeme Probatoire d'Observation de la Terre) remote sensing satellite, in place since 1986, made high resolution information of military and security importance available commercially.

Warfare

The Falklands war between Great Britain and Argentina of 1982 was the first naval war in the information age. It demonstrated both strengths and weaknesses of current high-tech concepts of command and control, and of electronic weapons systems. Weaknesses, especially, were seen anew during the 1987 Persian Gulf oil tanker reflagging confrontations, where vintage mines stood off the most modern superpower weapons, and small speedboats armed with machine guns and rocket launchers challenged the U.S. Navy. The Gulf War of the early 1990s, in which the United States

and other countries opposed Iraq, was long on media-demonstrated high tech, but short on actual results. The ghost of the Vietnam war – which some say was lost on the U.S. television screen – hung over the British media in the Falklands, and over subsequent media coverage of U.S. military activities. In the U.S., extensive restrictions on wartime media participation were imposed, which continued through the 1991 Gulf War.

The Mass Media

There was an increasing tendency of the mass media to encroach upon the prerogatives of both domestic and international leaders by setting policy terms and agendas for politically important events or controversies. This was especially apparent during numerous incidents of terrorism and hostage taking during the 1980s. This trend was fed by such things as portable photographic and composition equipment; real time transmission by satellite or computer modem from remote and troubled regions; computer composition and fax transmission of whole newspapers over limitless distances; growing commercial access to highly advanced remote sensing information; the increasing attractiveness of U.S. television exposure to domestic and foreign lobbyists and other politically motivated people; the growing use of the mass media, such as talk show appearances and infomercials, by U.S. candidates for elected positions; and fierce competition among the various media.

The Mass Media and Remote Sensing

By making use of pictures from LANDSAT and especially from the then just launched French SPOT, the Western media successfully revealed the extent of the 1986 Russian Chernobyl nuclear plant disaster. Along with measurable radiation in Western Europe and Scandinavia, their disclosures forced Soviet admission and some discussion of the accident, and became part of the lore of Glasnost. Inspired by this success, the U.S. media considered acquiring their own "spy" satellite (Mediasat) with high resolution and timely delivery capability. Government officials were displeased with the idea, since they were uneasy about

the media's use of this intelligence capability. With the advent of SPOT, civilian access to possibly sensitive photographs was no longer in question, governments having been forced to forego their information monopolies in a highly sensitive area.

Personal Access to Media

Technological possibilities for political action became increasingly available to politically oriented small groups and individuals. Facsimile machines, personal laptop and desktop computers, cheaper satellite access within the price range of individuals, and public access to cable television joined forces with audio and videocassettes for underground uses. Groups and individuals regularly distributed their underground messages by means of computer networking, computer bulletin boards, computerized desktop publishing, and combinations of computers and facsimile. During the 1980s, the penetration of Western information through the Iron Curtain increased dramatically. Cross-border television pickup and increasing numbers of VCRs also helped to erode Communist government control over information. This was of no small significance in ending Soviet dominance over Eastern Europe and in the eventual Soviet breakup.

Changed Global Equilibrium

Economic activities shifted dramatically from the Atlantic to the Pacific Basin. More importantly, with the rise of Japan to the status of a major economic power, and the emergence of other Pacific Rim country competition, it became impossible to deny a profound upset in global economic equilibrium. For an extraordinarily short period – from World War II until the end of the 1960s – the United States had been the one free world superpower in a world reduced to shambles. But as some countries recovered and others developed – both with U.S. help – this period could not last. It was simply an historical anomaly. This is useful to keep in mind when considering the "loss" of U.S. competitiveness in the world arena.

PART II. THE CLIMATE FOR C&I TO THE YEAR 2000

Some of the major worldwide C&I trends and forces with which business and political leaders may have to deal between now and the turn of the century have been discussed at the beginning of this paper. Some others will now be briefly sketched.

Changing Emphasis in U.S. Decision-Making

Following the end of the Cold War, the equilibrium between national security issues and economic and political issues is changing all over the West, but nowhere more so than in the U.S. For more than fifty years, geopolitical, defense, and national security factors have tended to win out in U.S. policy debates. It is now being indicated that economic factors will carry more weight in future debates, although this remains to be seen.[2] Should this prove to be true, it will have its effect in myriad areas. As just one example, Japan has been given special consideration because it has been seen as an essential part of the U.S. defense structure in Asia. With the Cold War gone, this attitude could shift, if economic concerns sufficiently replace national security issues. There is a new administration in Washington – capital of the only remaining superpower – which is philosophically inclined toward state intervention, which could complicate matters. Washington is also professing to consider C&I a key factor in national strength and global infrastructure.

Financial Services

The growth and development of a whole range of new financial services during the past few decades has depended in large part on the adoption of continuously evolving electronic means of doing business. These new

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[2]Mickey Kantor, in his confirmation hearings as U.S. Trade Representative before the Senate Finance Committee on January 19, 1993, commented that "the days when we could afford to subordinate our economic interests to foreign policy or defense concerns are long past." (Transcript from Federal Information Systems Corporation).

means have permitted the fragmentation of financial institutions, which has placed major capital reserves with insurance companies, pension funds, mutual funds, and other nonbank groups. Enormous amounts of money, involving relatively few transactions, now flow from place to place every day, both nationally and internationally. At the same time, major new profit centers, such as credit card and foreign exchange operations, involving huge numbers of daily transactions, have been created and are rapidly growing. Large shifts are occurring in the way stock exchanges handle their business, and there is tremendous growth in the trade of securities outside established stock exchanges. More and more sophisticated means of communications have also speeded up international financial integration. All these changes make for potential risks, which include: breakdowns in the telephone and computer component; breakdowns in the financial industry infrastructure; the emergence of processes that reduce the intermediary role of traditional financial institutions; pressures on the "clearing and settlement" process; and the reduced capability of banks to fulfill their traditional "social contract" obligations as stabilizer, the worst risk being the lack of recognition of such risks.

Technological Changes

Major improvements are emerging that make present technologies more compact, more efficient, faster, and cheaper. There is a major move away from mainframes and mini computers to the use of increasingly more powerful PCs and work stations, and this could be both good and bad for the health of the industry. Giants like IBM, who have placed their bets mainly on the big machines, are being hurt. The Japanese, who for 20 years have imitated and emulated IBM, may now be following their role model over the edge of the precipice. Dominance of various technologies could well pass from one country to another. More likely than major technological breakthroughs are further pressures for important institutional changes pushed by changed technological applications. The emergence of High Definition Television (HDTV) continues to be a subject of concern and contention. Multimedia may possibly become a reality soon – although this may still be an engineer's dream.

Telecommunications Developments

Varying pressures and changing technologies have led to the entry of new players, more globalization, more flexible regulations and competition, and the entry of world trade considerations into the field of telecommunications. There appears to be enough momentum for this trend to continue for the foreseeable future, so long as opportunities persistently increase, the industry remains highly innovative, and new and varied users see telecommunications as vital. Heightened competitive tensions can be expected to accompany increased financial opportunities. If governments continue to look to C&I as a driving force for economic growth and development and nation building, this could result in growing C&I politicization. A major trend toward privatization is occurring in both developed and developing countries, which in some instances permits massive foreign investment in national telecommunications systems. Wireless/mobile telephony is creating major new opportunities and in some countries may even provide an alternative to fixed networks. Established telephone institutions are being bypassed, or are in deep competition with smaller, unregulated groups using new technologies. The special aspects of telecommunications are disappearing in favor of smaller entrepreneurs and risk takers, who tend to follow the ordinary rules of business, rather than the exceptional rules of traditional telecommunications.

Trade in Communications and Information

The issue of trade in the C&I area is here to stay, and will continue to demand attention. Unfortunately, "trade" in the U.S., including C&I trade, has been a buzzword connoting U.S./Japanese rivalry, and this has tended to obscure trade's real importance. Competition has now generalized far beyond Japan. The economic well being that comes with trade is fundamental to national security and a basic factor in the conduct of foreign policy. Even seemingly narrow trade issues may therefore have broader implications. The extent to which member countries of GATT (General Agreement on Tariffs and Trade) decide to make that organization a forum of choice on trade in information

services and telecommunications matters will influence the situation. So will GATT's ability to develop acceptable concepts and processes to deal with new global C&I requirements. Since services only recently became a subject for GATT and for international negotiations, it is likely that the issues sparking present power struggles will continue to be with us.

The worldwide market for telecommunications equipment has digital switches as a key item. The market for large central office switches is likely to level off in the next few years, at least in the advanced developed countries. Both in telecommunications and in the closely related computer/component field, the rest of the century can be expected to be accompanied by harsh international competition.

The EC 1992 Initiative

The EC reached most of its 1992 goals, including its C&I goals, on time, at least on paper. This major effort to create a common market and free movement of goods, capital, services, and people, had been expected to present formidable global challenges by combining the resources of some 325 million well educated, well-to-do people with a highly sophisticated industrial base and rich raw materials resources. Still missing from the goals of the 1992 initiative was joint decision making in a democratic environment and greater political, foreign policy, and defense integration. The Maastricht treaty was an attempt to move in that direction, as the next step following EC '92, but unexpected difficulties in a number of member countries have delayed ratification. Uncertainties and no-risk attitudes since German reunification, and the difficulties with the Maastricht treaty, have severely hampered further liberalization efforts in the C&I area, at least in the immediate and medium term.

Following the unification of Germany and the events in Eastern Europe and the former Soviet Union, an extra impetus for that movement toward European integration might have been expected, with energies released from the Cold War available to be devoted to this effort. But the

contrary has, in fact, happened. Germany, which greatly underestimated the difficulties involved in integrating the East and West, has turned inward. It and the rest of Europe are experiencing the re-emergence of old animosities and nationalistic tendencies, the combined result of which is renewed loss of self confidence. The influence of Western Europe in the next decade will largely depend on whether it can resolve its relationships with at least Eastern Europe, and, as it has done so many times in recent decades, once again overcome its nationalistic tendencies. C&I policy is not immune to these more general political forces and trends.

The Future and China

The countries of Eastern Asia are becoming increasingly preoccupied with concerns regarding their giant neighbor, China. Economic capitalism is progressing in China, and there is a continued openness to the outside world in the realm of economics. China's economic plans include substantial investments in C&I modernization. But politically, Communism is alive and well, and attempts to strictly enforce dogmatic behavior based on socialist ideology continues. However new information technologies useful to the Chinese people are slipping in. Says a writer for the *Financial Times*:[3]

> "Satellites have put millions of Chinese in touch with developments outside, and no matter how hard the government might strive to contain the information virus, the authorities are fighting a losing battle."

He added that there has also been "an explosion in the number and variety of new local publications." And commenting on the lack of international direct-dial phones in the early 1980s, he says, "Now there are IDD calls, packet switching arrangements and computer links."

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[3]Tony Walker, "Hats Off to the Revolution," *Financial Times*, March 30, 1993, 21.

China is rapidly arming itself with purchases from both East and West, and is less and less reluctant to use its growing strength to protect its interests. A C&I-based, industrialized China can be counted on to upset the delicate balance of power in the Pacific and to raise formidable global issues of both an economic and a military nature. With modernization efforts still underway, notwithstanding the political upheavals of the late 1980s, China's potential is great. But so are its problems. To succeed, China must keep its ideology under control while it modifies the operations of its government. It must master its overpopulation and underdevelopment while switching from an agrarian-based economy and a rural society to industrialization and urbanization.

The Former Soviet Union

Western telecommunications companies are now operating in force in many of the fifteen republics of the Former Soviet Union, assisting in the update of totally antiquated telecommunications systems. Russia, separated from the other 14 Soviet republics, is a formidable power, despite its economic weaknesses. With its still huge military, its nuclear forces, and its innate resources, it remains a strong global player. Economic collapse coupled with unstable governments makes the future course of countries of the former Soviet Union unpredictable, promising many dangers, as well as opportunities previously undreamed of.

Telecommunications in the Developing World[4]

The availability of newer technologies and the desperate need for modern communications systems are both leading toward deregulation of at least some aspects of telecommunications in many highly regulated countries, and aiding developing nations in leapfrogging more traditional communications systems. These include cellular, synchronized fiber optic transmission systems, and VSAT satellite networks. Cellular phone service uptake is growing 50 percent a year in

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[4]This discussion is based on *Telecommunications Development Report*, Volume 8, Number 1, Pyramid Research, Inc., January 1993.

developing countries. Corporate networks and International Value Added Network service platforms are providing new types of unregulated data communications in the developing world. VSAT satellite networks, many of which are privately run, are growing rapidly, most notably in such countries as Brazil, Mexico, Poland and China. Meanwhile, basic switched voice networks are expanding at more than 10 percent a year in China, Indonesia, Iran, and Pakistan, and slightly less rapidly in a large number of other developing countries. Several of these countries, and the countries of the former Soviet Union, are experimenting with alternatives methods of combining public and private resources to provide expanded telecommunications facilities. Privatization of common carriers in many developing countries, including several in Africa, while fraught with many political and organizational difficulties, is being pushed by the availability of new technologies and foreign capital. Russia's long-line and international public monopoly, Intertelcom, is being challenged both by a consortium of state companies called Aerocom Ltd., and by many types of bypass carriers which are being set up by foreign investors.

Economic Recession, Job Loss, and Demographic Shifts

All the advanced countries of the world are presently involved in economic recession and/or other economic difficulties. There is a question in the U.S. and Western Europe of whether this recession may be different from others, in that shrinkage may be occurring in national economic pies. Over the past several years, GNP has barely changed, with the result that both new and old claimants must share reduced resources. While industry is becoming more productive and growth is occurring, millions of jobs, including hosts of middle management jobs, are simultaneously being lost. While economic pressures have been the direct cause of many changes, such changes have been made possible by upgrades in communications and information. Such C&I improvements now permit the removal of layering in organizations; outsourcing of certain services; automation in manufacturing; and conduct of manufacturing and even R&D in other countries. Because of a perception that their positions are uncompetitive, Americans and others worldwide have cut

jobs. The Japanese may be in serious economic trouble as well, since their much lauded financial system is now experiencing deep strain. Japanese problems include layoffs, for instance, which is happening at NTT.

As key C&I trends advance, demographic shifts will undoubtedly bring political and power changes. Some problems that will need to be dealt with in the U.S. and other developed countries are: an aging population; fewer young people entering the labor force; fewer people engaged in manufacturing and farming; more people employed in service occupations; more women in the workforce; and more two-employed-parent and single parent families. Mass migrations are overwhelming government services in many countries. In developing countries, trends are toward continued population growth; massive movement to the urban areas; and an inability to educate the rapidly expanding groups of volatile young, especially for jobs needed in information intensive economies.

Growing Economic Interdependence

The U.S. and Japan have long engaged in internal debates over whether it is better to have a service or a manufacturing economy, which may significantly influence government trade and "industrial" policies. It is not a question of either/or, but of what mix to aim for. Major issues for U.S. and other world leaders will continue to be: should or can a country do it all? at what cost or limit? which country will produce what? and at what level of efficiency? Among the most important questions which have been and continue to be raised are those concerning the consequences of dependency on foreign suppliers. Policy implications in terms of economics and of national security will vary widely depending on the nature of the product. But if developments in communications and information continue on their present course, it is certain that the old "comparative advantage" argument will sooner or later have to be redefined to suit future reality. Similar issues can be expected to develop in all spheres – the political, social, and security, as well as the economic – as the line continues to erode between what is international and what is domestic.

Defense and Security

The involvement of the U.S. in low intensity warfare activities like those that have occurred in Central America, in Grenada, in Libya, and in Panama can be expected to become more numerous. But hot wars, like that with Iraq in 1991, may also become more frequent. The situation in the former Yugoslavia holds the promise of becoming a bigger quagmire than Vietnam for anyone risking military involvement. Various forms of terroristic activities and wars waged with varying levels of new electronic weaponry, new means of communications, new means of intelligence gathering, and new means of news reporting, lobbying, and propaganda, are likely to be the reality between now and the end of the century. Future warfare, with different and changing partners as allies, possibly under a U.N. flag, can be expected to create major difficulties in command, control, communications, and intelligence.

The Media

The constantly expanding influence of the mass media on both domestic and international political events continues. Long term, low intensity forms of warfare, underground efforts to obtain national liberation and/or overcome government information suppression, and an increasing and highly publicized interest in direct action, have also combined to proliferate political activities by small groups and individuals using privately available C&I technologies. Such activities by the mass media and by private groups and individuals are already becoming intertwined, and will undoubtedly raise future policy issues. One example is the provision of videocameras to amateurs by the mass media for the purpose of taking politically sensitive footage, and the use of this and other politically significant amateur videotape footage by the mass media.

Old C&I Problems on the New Agenda

Added to these new problems, the future must also cope with the C&I problems of major policy concern that have long been with us, and will now find themselves affecting and being affected by the climate of Post

Cold War change. These include: the increasing value of and problems involved with the C&I market sector; worries of other nations about being overrun with American information materials; concerns of countries about threats to their sovereignty and cultural identity by C&I advances; threats posed to protection of information assets; the growing need for sophisticated international communications; C&I changes affecting currency markets; the need for C&I resources to support intelligence services, defense needs, and diplomatic activities; C&I needs for the production of defense hardware; threats to U.S. C&I leadership by other country competition; export control-related C&I problems; the vulnerability of computer/communications networks to sabotage and breakdown; tensions created by the real time transmission of news from troubled areas, or restrictions thereon; problems related to the free flow of information; threats to privacy created by rapid information flow across borders; the rights to broadcast across borders vs. the right to preserve national integrity; problems of allocation of the electromagnetic spectrum; and the question of the adequacy of multinational organizations for coping with the new needs brought about by information intensification.

The outcome of events surrounding all of the above problems can be expected to be determined by the dynamic, constantly changing balances of the many accelerating forces and trends which contribute to both C&I problems and C&I opportunities.

PART III. BIBLIOGRAPHY OF PROGRAM ON INFORMATION RESOURCES POLICY PUBLICATIONS

CATEGORIES

1. Communications and Information
2. Trade
3. Developing Countries
4. Currency Charges and Financial Services
5. Information Assets: Uses, Misuses and Protection
6. Media and Publishing
7. Personal Access to Media
8. Space, Spectrum, and Satellites
9. Technological Change, Information Industry, and Computing
10. Telecommunications
11. Warfare, Defense, and Security
12. China
13. Former Soviet Union and Central and Eastern Europe
14. Western Europe
15. Demographic Shifts

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