

A new economy brings also new problems, particularly in the sphere of employment and pay. Three-quarters of the American workforce is now employed in service but a substantial portion of these are in low-paying, dead-end jobs.

THE MISSION, GOALS, STRATEGY, AND ARCHITECTURE OF THE INFORMATION WAVE

The 19th century eliminated wilderness through railroads. The 20th century developed science and technology that improved the well-being of many and pushed the planet to its limit resources-wise. The 21st century perhaps will implement the Information Wave across all particular civilizations to improve knowledge-based critical decisions about social life in the situation of limited resources.

The *mission* of the Information Wave is:

To knowledgeably and wisely *control* development and operations of the Agricultural Wave, Industrial Wave, Global Wave, and other following ones (Figure 9-8).

The *goals* of the Information Wave are:

1. To *optimize* development and operations of the Agricultural Wave, Industrial Wave, Global Wave, and the other following ones in order to minimize the use of resources and ecology and to increase a citizen's choices and its quality of life.
2. To sustain the development of human *cognition* in order to make conscious and wise decisions about: the sense of human possibility, life, education, health, politics, defense, business, entertainment and leisure time.

The *strategy* of the Information Wave is:

To develop and apply information-communication technology in *control systems* in a rational and human manner.

These aims should be applied at all levels of civilization, including national and local governments, schools and colleges, business and other organizations, homes, and individuals.

The general architecture and control role of the Information Wave, shown in Figure 9-9, is composed of the following metaphoric elements:

- *Info-factories*, which generate information and seek new information, among them the following:
 - Virtual enterprises
 - Virtual schools and colleges
 - Virtual communities
 - Online governments
 - Electronic republic
- *Info-malls*, which provide the following services:
 - E-mail
 - E-education courses
 - E-commerce
 - E-business
 - E-banking
 - E-trading
 - E-job recruitment
 - E-information services (news, weather, sports)
 - E-research
 - E-publishing
 - E-entertainment
 - E-telephony
- *Info-highways*, which transmit information content through information-communication services, such as:
 - LAN – Local Area Networks
 - MAN – Metropolitan Area Networks

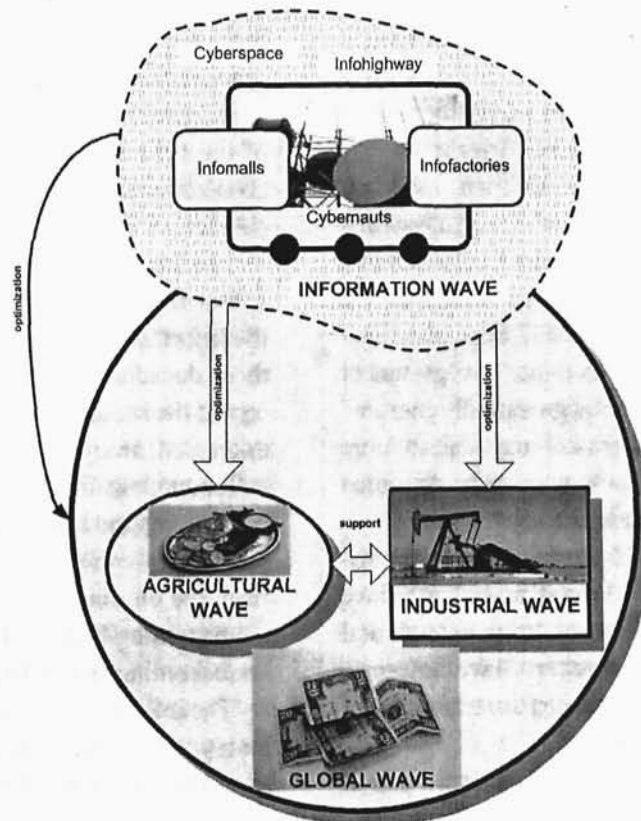
- WAN – Wide Area Networks
 - GAN – Global Area Networks
 - VAN – Value Area Networks
 - The Internet
 - TV and radio broadcasting
- *Cyberspace*, which is a digital information-based space, that is, a dispersed, infinite constellation of
 - digital files
 - databases
 - home pages
 - bulletin boards
 - directories
 - menus

where humans with a password interactively navigate in order to create, update, exchange, and retrieve information.

- *Cybernavts* (netizens), who are informed tele-computer users with a password to access billions of information tidbits and do everything online from shopping and learning to working and resting. Cybernavts can be “electronic immigrants” who telecommute to work over great distances.

The Information Wave is not just a matter of technology and economics. It involves morality, culture and ideas as well as institutions and political structure. It implies, in short, a true transformation of human affairs (Toffler & Toffler, 1994).

Figure 9-9. The general architecture and control role of the information wave



On the other hand, the unwise application of the Information Wave may be harmful for humans. Let us pose the following questions for civilization decision-makers:

1. Is it wise to automate everything that is possible or is it better to leave some critical functions of technological systems for decision-making by wise, ethical and good people? For example, on October 31, 1994 a French-Italian airplane ART-72 in icy weather suddenly spiraled into the ground killing all 68 aboard. The airplane was on autopilot, which could not recognize the effects of the freezing weather on airplane control, and to maintain a smooth flight moved the flaps of the aircraft into such a position that a crash was inevitable. A human pilot could recognize that the aircraft is "fighting" the bad weather and would select the rough ride over the "smooth" one. The FAA concluded that there are some times when automation is not worth the risk. It set up a new rule for ATR-42 and ATR-74 planes that the autopilot should be turned off during freezing rain or drizzle.
2. Is it wise to design automation, robotization, and informatization in such a way that their operators only watch screens of many instruments but have little to say in the development of a product? Sooner or later society will be divided into two groups of people: "thinking" designers and "ignorant" users of such systems. It may lead to more productive solutions but also to degraded people, a bifurcated society.
3. Should the world apply automation, robotization, and informatization to reduce employment when population growth and the demands of workers have interests often directly in contrast to strategies of efficiency?
4. Should business and public administration apply automation, robotization, and informa-

tization to promote endless economic growth while the reserves of strategic resources are depleting and sooner or later civilization as we know it will literally run out of gas?

There are plenty of such questions which face civilization now. Most of the time, they are neglected, sometimes with catastrophic results. The potential of the Information Wave is in optimization of economic performance as well as, and even more in, wise control at the level of civilization.

THE IDEOLOGY OF THE INFORMATION WAVE

The Information Wave is an ongoing process of political (ideological), economic, social, and technical configurations and relations. The definitions and descriptions of the Information Wave are ideological because ideology inspires what the Information Wave is and how it is understood, practiced, and designed. It is the concept of the ideological position of a practitioner and designer of the Information Wave that conceptualizes a civilization's aims, structures, relationships, and characteristics.

Ideologies are people's maps for reality (Slack, 1987). In the 1980s and 1990s, the ideology of the Information Wave (as it was already called in those decades) became dominant over the ideology of the Industrial Wave. This dominance was expressed through the power of media, education, informed business, and institutions. However, by applying the Information Wave's systems and services, we would like to become emancipated from the domination of any ideology. Since we are becoming better informed and educated, we are becoming freer of an ideology's influence.

The Information Wave ideologists can describe their preferences as a choice within the following areas (Mowshowitz, 1981):

- A. *Information tools* can be selected from a palette of languages, databases, knowledge bases, model management software, system software, utility software, and dialogue management techniques, to design an information system as a filter or as a source of solutions.
- B. *Stimulation* of the Information Wave developers and operators as well as users can be defined in regulated directions and protections as information policies about: information privacy, censorship, properties, trade, crime, and national and international interest.
- C. *Positions* taken by systems designers and operators that will influence the Information Wave ideology can be as follows:
 - a. *Technicism* – using the computer as an instrument of progress, where success or failure depends on the system design and implementation, with social and political consequences being ignored.
 - b. *Progressive individualism* – humanizing the system with computers to achieve desirable change.
 - c. *Elitism* – informing and rescuing the society as the mission of the computer specialist; with sophisticated social engineering as the method of steering social change in the growing complexity of social issues.
 - d. *Pluralism* – representing interest groups affected by computer use with “fair information practices” together with a combination of legal, regulatory, and security measures to protect consumers and users.
 - e. *Radical criticism* – protesting the philosophy that computers should be allowed to have their own logic of independence and that mega-computer systems should be developed to operate automatically without human control.

- f. *Devolutionism* – gaining power over design but losing control over use.
- g. *Computer surveillance* – producing technocratic benefits.

A combination of these choices made by Information Wave developers and operators as well as users will generate social awareness of implemented solutions. This awareness can be analyzed in the terms presented by Mowshowitz's article “On Approaches to the Study of Social Issues in Computing” (Mowshowitz, 1981):

- I. *Biases* that will be influenced by the choice of information tools, for example, a technical bias advocates the belief that “technology can solve a problem,” while a non-technical bias supports the view that a “problem can be solved through managerial action such as leadership or improved market strategy.”
- II. *Beliefs* are usually affected by the choice of stimulation. For example, computers can be seen as a strength for the planning of a business or as a threat to an individual's privacy and autonomy.
- III. *Expectations* are the result of a position taken by the Information Wave developers and operators as well as users and are determined by: the information culture (a way of using information) in the scope of values (human and civil rights vs. totalitarian information slavery; creativity and electronic friendships vs. alienation); symbols (credit cards create a nearly cashless society, computer screens equate to a paperless society); competence standards (a lack of computer skills equates to illiteracy); knowledge centers (data, knowledge, wisdom bases); know-how (individual computer skills, social skills that control the information transformations), and futurology (“Star Wars”).

The relationships among the Information Wave's choices of developers, operators, and users,

and social awareness are shown on Figure 9-10, the Ideology Cycle of the Information Wave.

Let us examine some of these attributes. In respect to the choice of *information tools*, Marvin (1987) traced the history of information and found that all societies have had information exchange as a central element in their social make-up. What have changed are the forms of energy in which information is captured and exchanged. The application of mediated-digital information instead of analog information is the main shift in the way industrial society is transformed into the informative society (information-based).

In the area of a choice of stimulation to protect free speech, the U.S. Congress rejected any content censorship in the Internet, and rejected any special policy on it. In Somalia in 1993, the U.S. changed its policy, becoming a peace-keeper rather than a war-maker. This change was caused by televised images of war, when a warlord who could not be caught by America, the number one world power, imprisoned an American pilot. Apparently, information tools changed the power mechanism and policy.

As far as a choice of a *position* is concerned, some ideas of the early ideologists-theorists of the Information Wave, such as Daniel Bell (1973), Edwin Parker (1976), and Marc Porat (1977) claimed that information replaces industrial goods as the principal commodity and becomes an economic engine of the Information Wave. In an assumption taken from the *technicism* position, they observed the trend of a declining percentage of jobs in manufacturing and a rising percentage of jobs in the service-information sector. This does not mean that society has slowed down the consumption of goods and has begun to consume information instead. In reality, society consumes an even bigger variety of goods in the Information Wave.

From the *computer surveillance position*, Alvin Toffler (1980) optimistically predicts that the new information technology will lead to a new society, a "Third Wave" society which will

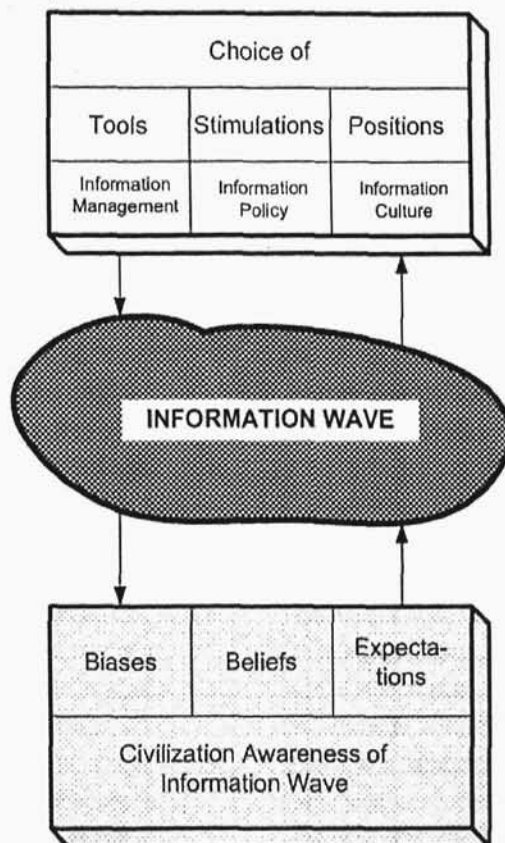
be characterized by local control and broader democracy. Young (1987) argues that Toffler's prediction is naive since the new information technology was created by a given power system, which will be reproduced again by its own tools. On the other hand, information tools which were new to Soviet society created the collapse of the Soviet Union in 1991, by using the openness (*glasnost*) position.

A future driven by information tools is perceived in popular literature to be one with increased democracy, social enlightenment, and individual freedom. From the *elitism position*, Quatroop (1987) warns society that these consequences will not occur. He claims that because information technology is dominated by private capital, the trend is already leaning toward the continued erosion of the public sphere in the creation of hierarchical social relations. In effect, the future will lead us toward social passivity, manipulated leisure time, and a decrease in individual autonomy. However, one can argue that it is up to the individual to decide whether to exercise these possibilities in an intellectual or a manual way. The new telematic technology empowers the individual, allowing him to choose between more options anytime and anywhere in the synchronism of events.

In terms of *biases*, there are some claims that information-communication technology (ICT) influences the mechanism of any power. Electronic mail with special information can reach almost everyone everywhere, whether it is the president of the United States, the CEO of the Apple Corporation, or a student at Western Michigan University.

As an example of some beliefs, there exists a statement that the progress of social computing from the level of an individual to upper levels of the societal strata indicates that these new information tools can change the mechanism of power from within. It is a widely recognized fact that mass media have become the fourth power (or "fourth

Figure 9-10. The ideology cycle of the information wave



estate” building on the three estates of the French ancient regime) of modern societies.

A case of *expectations* is exemplified by the communications revolution in the 1990s that led to the broader access to information and knowledge on a global scale. In the 1990s, both sides of a military conflict watched war scenes through CNN (e.g., the Persian Gulf conflict in 1991, the Somali conflict in 1993, the Haiti conflict in 1993, the recent invasion of Iraq).

The international perspective of the Information Wave can be stressed by a metaphor: Jihad versus McWorld. To Barber (1992), there are two possible political futures—tribalism and globalism. The first is a re-tribalization of large swaths

of mankind by war and bloodshed, a threatened Lebanonization of national states in which culture is pitted against culture, people against people, tribe against tribe—a Jihad in the name of a hundred narrowly conceived faiths against every kind of interdependence, artificial social cooperation, and civic mutuality. The second is borne by the onrush of economic and ecological forces that demand integration and uniformity. MTV, Macintosh, and McDonald’s will press nations into one commercially homogenous global network: one McWorld tied together by technology, ecology, communications, and commerce, mesmerized through fast music, fast computers, and fast food.

The planet is falling precipitately apart and coming reluctantly together at the very same moment. The forces of Jihad and McWorld operate with equal strength in opposite directions, one driven by parochial hatreds, the other by a global market. Yet they may share one characteristic: neither offers much hope to citizens looking for practical ways to govern themselves democratically.

The following doctrines of the Information Wave (as a result of the awareness of activists) promote the globalization of civilization progress, though they are not necessarily integrated through a common implementation:

- *The Global Economy doctrine*, which erodes national sovereignty and gives birth to stateless consortia, international banks, transnational lobbies (like OPEC and Greenpeace), and world news services (such as CNN and the BBC). The global market argues for global peace, a common language (English), common currency, common standards, and common cosmopolitan behavior (Barber, 1992). It leads towards global civilization, which is open, competitive, and dynamic, based on the new Economy: open, networked, information-based organization, flexible and virtual.
- *The techno-globalism doctrine*, which promotes the free trade of goods with no government policy of supporting national high-tech industries, attempting to avoid "market failure." This includes among the Western civilization nations the U.S., Canada, Western and Central Europe, Australia, and New Zealand. (Some nations practice the *Techno-Nationalism Doctrine*, supported by a governmental policy to protect the national markets.)
- *The information-communication technology doctrine*, which postulates the integration and sharing of information at the speed of light. The application of satellites leads

to a borderless world. Global culture is promoted through telematic conduits; MS Excel in English is more popular in some countries than software in the country's native language. This machine program is the management of a solution and perception anytime and anywhere in the synchronism of events.

- *The resource doctrine*, which enforces a commercial and peaceful exchange of resources because some nations like Japan, Switzerland, or Korea have almost nothing they need. (Japan and Korea are in drastic need of imported food and energy. This is why Japan started the "Great Pacific War.") It promotes the interdependence of nations through the globalization of economy.
- *The ecological doctrine*, which promotes global collaboration to keep the planet in balance and prevent ecological catastrophe. The climate, water, soil, diversity of planet and animal life, and our living space are threatened. Mitigating the crisis will require a planetary perspective (Gore, 1993).
- *The political doctrine*, which promotes the New World Order, based on an open, volatile, multi-polar world, which has been developing since the end of the Cold War in 1991 and is now being challenged by the Iraq war twelve years later.

Post-Cold War tribalism (nationalism, fundamentalism, and racism) generated about thirty wars in 1991. Some small nations (like Tamils, Catalans, Quebecois, Kurds, Serbs, Zulus, Basques, Croats, Bessarabians, Ossetians, and Abkhazians) would like to seal their own borders and protect themselves from modernity. The Jihad strategy of "struggle" is a very popular one in the revolt against the status quo and Western civilization (as demonstrated by the events of September 11, 2001). Among these tribes, there are about 5 billion people without a "password" to a computer and its networks.

McWorld, according to Barber (1992), promotes “free trade,” “free press,” and “free love.” McWorld does not look attractive to the Jihad part of the world, which, however, promotes solidarity among tribe members. Jihad is also attractive for many people alienated in McWorld.

Both ideologies are perhaps anti-democratic, since manipulation is very probable in such circumstances. The former is steering toward corporate-managed efficiency in the stateless globe; the latter is geared toward the *fuhrerprinzip*, in which a leader is governing for the sake of all pariahs⁶. At first glance, McWorld looks better than Jihad; however, it does require a careful check-and-balance mechanism. Through its telematic (computers + telecommunications + television) networks, it may lead to small regional entities, self-managed from the bottom up, with access to the global market and some sort of government run by a small state or group of states. This solution should satisfy the Greenpeace slogan—“think globally, act locally,” as well as the statements “work apart and together” and “small is beautiful.” There is nothing wrong with promoting managed efficiency, but it must be aimed at the policy of keeping the Earth in balance, rather than allowing it to promote corporate, stateless, short-term profit and thus support the apparent collapse of the planet’s healthy life.

From the *progressive individualist position*, it can be assumed that the educated world will not follow the Jihad strategy; rather, it is McWorld, with its humane strategy that will prevail. In the process of building McWorld, we shall probably follow the history of the Industrial Revolution, which has prevailed through the last 200 years despite protests by the Mexican and Bolshevik revolutions. In effect, both revolutions ended up in the industrial world, driven by profit rather than by “social justice.” Perhaps the better-educated citizens of McWorld, the members of universal civilization who are aware of the planet’s possible collapse, may find some feasible solutions. At the very least, humans should strive to find it. New

tools, particularly of the Information Wave, may bring in some positive results.

CONCLUSION

1. The Information Wave is a great civilization leap in accelerating the development of knowledge and tools for eventual better control of life on the Earth.
2. The Information Wave requires a motivated engagement of the societies to apply new information-communication tools in a wise and good manner.

A. Further Research Directions

- Investigate how the Information Wave optimizes the Agricultural Wave.
- Investigate how the Information Wave optimizes the Industrial Wave.
- Investigate a concept of New Economy, driven by information and its impact on the rise of the global civilization and society in the 21st century and the future.

B. Research Opportunities

- The research opportunity is in the integrated evaluation of relationships between information, economy and society within a whole civilization.

C. Additional Ideas

- The Information Wave does not replace other civilization waves; it only optimizes them. We should provide more examples and explain the mechanism better.

D. Rationale

- Alvin Toffler’s book *The Third Wave* (the subject of which was later called by other

writers the Information Wave), published in 1980, used a historical perspective to argue that the transition from an industrial society (the Second Wave, later called the Industrial Wave) to an information society (the Third Wave) can best be understood by looking back in time to the transition from the agricultural society (the First Wave, later called the Agricultural Wave) to the industrial society. This book was pioneering, but some futurists soon predicted that the Third Wave or the Information Wave will replace others, and that, for example, all Americans should know how to program computers. It did not happen, because we cannot replace bread by newspapers or cars by telephones. It is apparent that the Information Wave is intellectually supporting (including software and hardware) other waves by providing better control and cognition. The Information Wave is always about other waves. Without it the Information Wave has no right to exist.

- It is a wave which empowers humans in their cognition and controls the civilization processes and systems. Therefore, it is important to promote the role of the Information Wave in civilization, and in it all facets of human activities. The Information Wave makes humans more human. Even more, due to its information potential, perhaps humans can create a new civilization (A., & H. Toffler, 1994).

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ENDNOTES

¹ One must mention that woodblock printing of written characters was known in China by 350 A.D. Ceramic movable type was in use in China about 1,040 A.D. The Koreans invented printing in the 5th century; however, it was not applied widely and remained unknown for others outside of Korea.

² Andrew Targowski learned about the technical solutions of the ARPANET from Dr. L. Roberts during the Diebold Research Program Conference in Madrid in June 1971. The INFOSTRADA project besides of the Polish funds also was sponsored by \$1 million from the Singer Corporation, which wanted to apply tested solutions in its business in the U.S.

³ The 19th century lists of these inventions were compiled from Beniger (1986).

⁴ The U.S. Bureau of the Census.

⁵ or INFOSTRADA in Poland-1972.

⁶ Hitler's basic principle was the concentration of power in a single leader the *fuhrer*, himself. His politics were partly aimed at the proletariat, but that was among others and his principle was not based on them.