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Dear Readers,

Full-scale electronic trading systems were for a long time considered to be expensive in implementation as well as operation and restricted to certain application areas, such as flight reservation and financial stock exchange. The implications of electronic commerce described by researchers were not realized intersectorally or for the whole economy. Times have changed now. Global value-added networks, cheap personal computers, advanced data communication facilities, international standardization, and flexible client/server-based information systems will provide a new technological infrastructure permitting the quick and inexpensive reallsation of concepts developed back in the early eighties.

The spreading of electronic commerce has been greatly fueled by those infrastructures and looking at companies on the World Wide Web, for example, highlights the 1985-argument of Millar/Porter that IT affects all information associated with products.

Our first article reflects the fact that the new infrastructural revolution is indeed being recognized by many decision-makers in companies and governments. The various efforts made to realize National Information Infrastructures (NII) and the Global Information Infrastructure (GII) are prominent and currently broadly discussed examples of these developments.

We hope you will find this issue of EM-Electronic Markets interesting and rewarding.

Sincerely

Rainer Alt *Stefan Zbornik*

Editors

The GII Initiative: Its Significance and the Challenges for Japan

Today's 'Information Revolution' consists of two key dimensions: super-industrialization (the third industrial revolution) and trans-industrialization (the 'netizen' revolution). The proposed global information infrastructure (GII) bears significance as an essential foundation for both. In America, pilot projects under the GII development initiative have been shaped and driven by a perspective that takes these two dimensions into account. Japan should strive to develop a clearer understanding of these critical features of the Information Revolution under way, and upon that improved awareness, work to foster the development and use of its own national information infrastructure (NII) while cooperating with efforts to realize the goals of the GII initiative at large.

** by Prof. Dr. Shumpei Kumon*
International University of Japan

Around 1992, America witnessed an emerging consensus on three specific points: namely, (i) that digitization is powering a trend toward the fusion of information-processing and communications; (ii) that the national information infrastructure will determine the pace of progress in that overall process; and (iii), that these developments in the digitization and NII arenas will form multimedia as the 'break-through industry'.

U.S. Trends

Nonetheless, despite the level of unity attained on these themes, views diverged widely over such issues as the actual architecture that the NII will assume, and the commercial fields that hold the most promise for the multimedia industry over the near term. Hence, 1993 proved to be a year of contention for an array of competing views and ideas. By early 1994, though, it had become generally accepted that (i) the architecture of the NII will ultimately be modeled on the Internet; and (ii) that business applications will be the best market for multimedia, followed by applications in education, health-care, and welfare services, with recreational applications further down the list in significance. Amid these developments, in late 1993 the Clinton administration unveiled five core principles for the drive to establish a national information infrastructure. Not long thereafter, at the ITU world development conference in Buenos Aires in March 1994, Vice-President Gore delivered what amounted to the 'Gore Doctrine' on the GII.

GII Infrastructure

First, he noted that the GII will be key to future economic growth at both the national and international levels. In essence, work to build advanced information infrastructure counts as one of the most pressing challenges developing countries now face. If they successfully address that challenge, Gore concludes, new gains in economic development will be within their reach.

Second, Gore maintained that the GII will also be instrumental in promoting constructive democracy. In effect, by vastly enhancing the public's participation in policy making and decision-making affairs, the GII can be expected to contribute significantly to the functioning of democratic processes as well as the ability of nations to cooperate with each other.

In setting forth these 'doctrinal' positions through his Buenos Aires address, Gore called on all nations to assume a cooperative role in the GII initiative, and identified that as a special challenge for the advanced industrial nations above all. He then added that the five guiding principles behind the U.S.'s own NII program could be applied to the GII drive in unaltered form. Those five principles are as follows:

1. Encourage private investment.
2. Promote building through private-sector competition.
3. Make the regulatory framework as flexible as possible.
4. Provide open access.
5. Ensure universal service.

The first two principles can be understood as having to do with the process of

super-industrialization, which I shall discuss later, while the last two can be interpreted as having to do with the trans-industrial dimension of the current Information Revolution. The Information Revolution has two key dimensions: Super-industrialization and Trans-industrialization.

Super-Industrialization

The Information Revolution has taken on two parallel dimensions. The first is 'super-industrialization', that is, the third industrial revolution. The GII will be an essential foundation for that ongoing process. The digitization of information has made it possible for computer networks to merge, process, and transmit text, sound, video, and other forms of expression as electronic data. This achievement has spawned dramatic and far-reaching increases in productivity in factory and office work environments alike. These productivity gains stretch across the entire industrial spectrum, including even the traditional 'low-productivity' sectors. Further, they have begun to appear in practically all domains of business activity, from administration to health care to education. Improved productivity translates into lower costs and cost/performance ratios. In effect, then, the computer industry's own model of the 'Moore Principle' seems poised to impact other fields of industrial and business endeavor. Should that prospect materialize, it can be expected to not only pave the way for lower-priced manufactured goods, but also bring reduced fees for public services, more affordable health care and education, and lower tax rates, all combining to usher in a new era of inflation-free economic growth.

Break-through Industries

Heavy and chemical industries were the 'break-through industries' during the first half of the second industrial revolution, which began around the end of the 19th century. These in turn supplied the engines (internal combustion engines and electric motors) and materials (plastics and other synthesized chemical products) for an array of entirely new industrial pursuits. In the U.S., such products led to immense productivity gains in the primary industrial sectors - agriculture in particular - thus freeing up a sizable portion of the labor force for work in other fields. Much of that labor was then assimilated by manufacturing ventures focused in the 'matured' industries that led the last half of the second industrial revolution: namely, passenger cars, consumer electronics, and other consumer durables.

In much the same fashion, multimedia now appears positioned to become the first 'break-through industry' of the third industrial revolution. As such, it can be expected to supply the 'engines' (computer networks for the processing and transmission of information) and 'materials' (information and information services) for a range of new industrial undertakings yet further down the road. Also, by assimilating and exploiting multimedia-inspired goods and services, existing sectors of the secondary and tertiary industries will likely witness their own leaps in productivity, again freeing a segment of the labor force for work in other fields. Though the prospects are still quite distant, that surplus of labor could ultimately wind up serving 'matured' industries focused in such futuristic areas as virtual reality and artificial life.

The First Stage

The first stage of the Information Revolution as the third industrial revolution arrived in the 1970s, driven by the 'economy of cumulation' or, as George Gilder has expressed it, 'technical innovation in the microcosm'. The second stage arrived in the 1990s, led by achievement of the 'economy of networking', or technical innovation in the 'telecosm'. In Gilder's view, a single computer in and of itself is not capable of spurring substantive gains in productivity. Only when networked with myriad other types of computers is it ready to demonstrate its real potential. From that perspective, the Information Revolution also bears description as the Communication Revolution. To be sure, it is this networking revolution - the wide-area linkage of computers through digital and wireless communications - that has become the nucleus of the innovation in the telecosm now under way. Wireless communications, especially, will likely fulfill an enormous role in the development of the GII.

The Second Revolution

The second industrial revolution prompted a shift to hierarchically and bureaucratically huge organizations: namely, giant corporations and conglomerates. The third industrial revolution shares that feature, in that it, too, is fostering an evolutionary transformation in organizational structure, as is already evident in the debut of horizontal, networked, and virtual corporations. For instance, top levels of management can now work together with their production lines in the arena of advanced data processing, drawing on raw data direct from the assembly line. This has drastically diminished the need for intensive data processing at intermediate levels, thus affording companies the potential to eliminate several layers of their management hierarchy in a single sweep. Reducing levels of vertical control and hierarchy and adopting a network-driven organizational structure have enabled com-

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panies to put together or reorganize project teams that have more flexibility in achieving their assigned mission. In addition, such steps have fostered heightened cross-industrial cooperation among a broadly diverse array of companies in different fields. Not least important, it has also become much easier to establish direct and permanent channels of communication with clientele and maintain a close and steady exchange of information with them. Now, employees can even conduct wide-area data communications or sophisticated data processing while off at a customer site or on-the-go. These capabilities are giving rise to the 'virtual corporation', an entity that effectively obviates the need for physically placing company headquarters or satellite branches in any specific locale.

The transformation under way in organizational structure also enables many firms to deal more effectively with the changing nature of their markets and products. For instance, in the electronics industry, the mainstream trend now is away from stand-alone products (e.g., television sets or video cameras) to composite products (such as workstations and LANs). In the process, the market has become increasingly horizontal in its composition. Many big companies have moved to shed operations outside those that support their core technologies and become system integrators for their own product lines. This has led to strategies aimed at supplying the market with customized, open-architecture solutions that combine the best technologies for any given application.

Headed up chiefly by developments in the U.S., the third industrial revolution has been demonstrating dramatic headway. This is one defining feature of the global economy today. Another, though, is the recent procession of East Asian economies that have successfully steered into the fast lane to industrialization. These economies are steadily growing as global sources of skilled labor and quality, low-cost industrial goods based on intermediate technologies. Assuming there is validity to the 'Gore doctrine' that utilizing advanced telecommunications systems will foster sustainable economic growth, it seems reasonable to expect that the economies of East Asia will be able to continue supplying the world with cheaper yet higher-quality industrial goods by importing and harnessing advanced telecommunications systems and information services. As long as the fast-paced advances of today's Information Revolution maintain firm momentum, chances are that the community of industrialized nations, led by the U.S., will continue exporting sophisticated information systems and services to East Asia on into the distant future. Since the mid-1980s, America has clearly been moving toward its long-stated goal of creating a global economic system. That presents the Asia-Pacific region with vastly stronger prospects for a new era of mutually complementary, inflation-free growth.

Trans-industrialization

Trans-industrialization is the second key dimension of the Information Revolution. That is to say, the modern civilization is properly turning from militarization and industrialization to the third phase of its evolution, namely, the 'informatization' or formation of the 'information society'. The GII will be essential to this facet of the evolving informatization as well. 'Modernization' has been described as a process in which humans or human groups compete in acquiring and amassing the means to better pursue their own interests and, in particular, the means to control others. Given that interpretation, modernization can be divided into three phases, depending on the means of control sought the most. Since ancient times, three categories of action have comprised the means utilized to control others: (i) threat and coercion, (ii) trade and exploitation, and (iii) persuasion and inducement.

Phases of Modernization

According to this classification, the first phase of modernization was one of militarization and state-formation, beginning with the feudalization of the late middle ages and moving into its heyday around the end of the 15th century. During this period, the sovereign states, which had championed their national sovereignty through innovations in military technology, engaged in militaristic nation-building, i.e., competitive power games on an international level and under a set of common rules for the abstract, generalized means of threat and force, namely, state prestige.

The second phase of modernization is thought to have begun with the 'revival of commerce' in the 11th and 12th centuries and hit its peak around the end of the 18th century. This was the age of capitalism. In effect, the private enterprises, who had championed their right to the ownership of property through the advances of the Industrial Revolution, engaged in 'industrialization and enterprise-building' i.e., competitive power games within global markets and under a set of common rules for the abstract, generalized means of trade and exploitation, namely, wealth.

Now, in the waning years of this 20th century, we find ourselves nearing the crest of the third phase of modernization, a phase that had its origin in developments of the 14th to 16th centuries, namely, the Renaissance, the invention of the printing press, and the Reformation. This is the age of information, of reason, of 'wisdom games' (or the cult of information and knowledge), and the key players are emerging as a suitably adapted grouping of innovative organizations perhaps best described collectively as 'intelprises'. These organizations, which are now championing their newfound, socially ordained right to information through societal changes powered by the Information Revolution, are gearing up to compete within the arena of the global 'intelplace', and under a set of common rules, for the abstract, generalized means of persuasion and inducement, namely, wisdom. At present, though, these competitive games for the acquisition of wisdom are still in their infancy. Indeed, the tasks of establishing the 'information rights' and properly balancing or reconciling them with the interests of national sovereignty, private property ownership, and other rights, not to mention the task of drawing up a set of common game rules, are all challenges that lie ahead.

As it happens, the second phase of modernization created an urban citizen bourgeois that was engaged primarily in commerce and industry. This emerging middle class became the driving force not only for popular democratization movements in the modern sovereign states, but also for the industrial revolution itself. In like manner, the third phase of modernization would appear to have created a class of 'netizens', individuals or groups who dwell within the virtual world of the computer-networks (cyberspace) and engage themselves in the task of sharing information and knowledge. From that standpoint, 'netizen' rather than 'citizens' group' might be a more fitting moniker for some of the non-governmental and/or non-profit organizations (NGOs and/or NPOs) and advocacy groups that have amassed such enormous influence in just the past few years. The percentage of groups who readily utilize computer networks to conduct their activities on a global scale is growing by the day.

Ultimately, this new netizen class could become a leading voice for direct, participatory 'electronic democratization', as well as the vanguard force for the Information Revolution. Actually, it might even be possible to maintain that the Clinton-Gore duo, themselves active users of modern communications and networking gear, have already made the netizen-backed drive for credibility a success, at least in America. Indeed, from that angle, the fourth and fifth principles Gore outlined as guidelines for the GII-NII initiative would seem to be goals relevant to this dimension. The fourth principle - open access - appears aimed at ensur-

ing members of the netizen caste freedom in their information-related activities. The fifth principle - universal service - can be construed as a position designed to help pre-empt any new rifts along class lines, namely, between the 'information-rich' and the 'information-poor'.

The Current Scene in Japan and Some of the Challenges Ahead

Cast against the controversies and developments I have outlined in my remarks to this point, it can be seen that Japan quite simply lags far behind America in terms of either dimension of the modern Information Revolution, as well as in its efforts to address issues of importance in either theoretical or practical terms. In the 1960s, Japan actually led the world in coming up with such concepts as 'informatization' and the 'information society'. It is thus all the more disheartening to see it fall so far behind, especially since the late 1980s.

For now, Japan should devote all its energy to the task of closing this gap. Toward that end, first of all, it is imperative that Japan develop a clear understanding of the implications behind the GII initiative, and in particular, of the insights and strategies behind America's actions in that undertaking. Viewing America as a country bent on imposing its own standards on the rest of the world in a bid to dominate global markets is one interpretation that is probably mistaken. Washington's apparent reluctance to commit itself to international regimes to reign the telecommunications that have existed up to now should be seen not as a manifestation of American 'unilateralism', but rather as an acknowledgment that the dynamics of the Information Revolution are prompting qualitative changes in the very mechanisms for the cultivation of global standards, not to mention the nature of cooperation itself.

Second, Japan must on the above awareness move swiftly to build a national information infrastructure of its own that is open to the world at large. In parallel with that effort, moreover, it should study effective methods of putting its infrastructure to work. Over the longer term, we should seriously contemplate changes in our models of society and language and experiment with educational and administrative strategies that could conceivably pave the way to innovative new breakthroughs in technology.

Third, Japan has to be determined about how it is going to involve itself in efforts to establish the GII. Ultimately, this will demand that it be definitive about its role in the Asia-Pacific, a region destined to be a key global center of growth on into the century ahead. In other words, while the time for these decisions does not as yet appear ripe, Japan will be compelled to more clearly identify its stance relative to America in regional and world affairs. ■

References

[1] *Committee for the Promotion of Advanced Information and Communications Infrastructure (Cabinet Office Affiliate):* Fundamental Policies for the Creation of an Advanced Information-intensive Society, unofficial translation, INFORUM report of February 21, 1995.

[2] *Aizu, I.:* Community Networking in Japan.

[3] *MITI:* Program for Advanced Information Infrastructure.

[4] *Telecommunication Council:* Reforms toward the Intellectually Creative Society of the 21st Century.

[5] *Kumon, S.:* A Japanese Perspective on the Significance of the Information Revolution (http://www.glocom.ac.jp).

** Prof. Dr. Shumpei Kumon (shumpei@glocom.ac.jp) is Professor and Executive Director at the Center for Global Communications of the International University of Japan, Tokyo.*

Corporate Handling of IT Applications - Selection Procedures and Controlling Tools

In dealing with the corporate handling of IT applications, selection procedures and subsequent controlling constitute a major challenge for users. The study presented here the present situation regarding these topics in Switzerland and the Principality of Liechtenstein. It aims at contributing to the awareness of the necessity of decision-making. Feedback information to the survey disclosed that theory is expected to provide appropriate and operable instruments to enable greater sophistication in complex decision-making situations.

** by Markus Gertsch*
Fu Jen University

The benefit assessment of extensive IT applications is generally difficult and limited to a certain extent. According to a study conducted by the Institute of Technology in Darmstadt/Germany roughly two thirds to three fourths of the benefits generated by CIM implementations are intangible [1].

Furthermore, prospective users must deal with a myriad of new and altered questions during the decision-making process regarding the implementation or modification of such applications. Some of these questions are:

- *Leadership/Management:* New critical success factors, interorganizational and new strategic success positions..?
- *Form of external organization:* Clan, strategic network, enterprise system..?
- *Make or buy:* Customer service, information logistics, commissioning..?
- *Standards/Initiatives:* UN/EDIFACT, STEP, ACIS kernel, etc., CALS (Continuous Acquisition and Life-cycle Support), IMS (Intelligent Manufacturing Systems).. ?
- *Financial topics:* Use of EDI-generated data for consolidated financial statements, cross-border leasing, factoring..?
- *Enhanced functionality:* Computer-based marketing, online recording/use of operational data..?

First of all, the analysis of the survey was to provide data to outline the users' handling and remain subjective to interpretation according to different needs. Hence, no effort was made to comment on the outcome in general terms.

Statistical Returns

About 520 companies, public services and educational establishments in Switzerland and the Principality of Liechtenstein were asked to submit a statement describing their currently applied selection methods and controlling tools concerning IT applications (Tables 1 and 2). From August through December 1994, more than 100 questionnaires were returned, out of which 79 fit the requirements for analysis. The spot check covers all relevant branches of industry except banking which was removed due to modest participation. Companies' sizes were measured by the number of employees, ranging from 1 to 36,000. The analysis of selection methods and controlling tools shows the number of times a specific item was mentioned. Multiple answers were allowed and should be taken into consideration while interpreting the results.

Fifty users specified themselves explicitly as VANS and/or EDI users, either with or without additional CIM-related applications. The following statements