The ASEAN Information Technology Connection

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The past decade has witnessed the strengthening of economic relations among member nations of the Association of Southeast Asian Nations. The emergence of growth triangles, the flow of cross-country investments, and the opening of markets all indicate a subconscious will behind the trend of cooperation. With the economic boom of the Pacific rim and the protectionist wave in North America and Europe, this is not surprising. In essence, ASEAN is the southern portion of a natural global economic center that is rebuilding itself -- one that will serve as a counterweight to the Triad (Japan-US-EEC).

Geographical and cultural proximity and common historical experience are both plus factors in the natural fusion of the ASEAN Eco-Center (Economic Center). However, tools are necessary to hasten the fusion. Among the most critical is information technology (I.T.).

The Eco-Center today either possesses or has close access to information technology resources. I.T. production and education resources are readily available. The key is to exploit these resources to nurture a communications, computing, and research infrastructure that spans the whole Eco-Center.

Levels of Fusion:

There are basically three levels at which the Eco-Center can experience information technology-driven integration. This integration/fusion may be in varying degrees.

The highest degree of integration will be at the economic level. The economic imperative will necessitate the development of: cross-country markets; cross-country sourcing of goods and services; and cross-country resource management. All these are already happening and will intensify in the coming years. The consumer-producer will require real-time access to information that will save cost, increase profitability, or increase the value of goods and services he possesses, sells, or offers. This information must be accurate, available, and high in business value. The production and distribution of goods and services will be governed by intelligent information guided by cost-benefit criteria and will likewise be

monitored by intelligent systems that build the experience database which in turn provides fine-tuning feedback to the intelligent guidance systems.

The second level of integration, at a moderate degree, will be at the social level. People throughout the Eco-Center will socialize, exchange electronic love letters, search for friends and partners, and make electronic visits through multimedia, interactive video, and virtual reality systems linked by ASEAN-wide electronic highways and roads. People will actually meet in virtual places and attend virtual events. When the technology reaches a high degree of sophistication, it will be difficult to tell the difference between physically and virtually being in a place or with a person. Long-distance education will reach new dimensions with higher degrees of flexibility, accessibility, and quality through network-available schools. These schools will allow two-way interaction through interactive multimedia systems (including interactive video). Intelligent databases will provide region-wide libraries accessible from home.

The third level of integration, with probably the lowest degree, will be at the political level. Governments will have on-line discussions at each level. Eco-Center wide electronic mail will allow government agencies, departments, and institutions to communicate quickly. Person-to-person and broadcast memos will be transmitted instantaneously. Thus, governments will be able to act quickly on national and regional issues. Transparency and accountability to the public will be enhanced. Nevertheless, issues affecting national security will still be manageable using levels of Eco-Center network security.

Issues for Resolution:

In moving toward an I.T.-driven integration of the Eco-Center nations, three different but interrelated types of issues need to be addressed. First, issues relating to cultural nuances and differences will have to be properly managed. For instance, education broadcasts across the ASEAN network will have to address their content to people from various races, cultures, and religions. Care has to be taken in presenting education material sensitively so that these are assimilated/accepted.

A second issue is obviously language. Knowledge systems will be required to translate information across languages with minimal misrepresentation. This will probably mean that symbolic representation will have to be extensively used to supplement

verbal representation. This will come in the form of graphical user interfaces that have rich and intelligent libraries. For instance, where words do not exactly match between languages, individuals communicating will have to be able to negotiate meaning through easily-accessible symbols.

The third relevant issue is time-zoning. All computing and communication facilities must allow on-line interaction between users during practical windows or intervals where these are active based on programmed country-based activity schedules. Regional broadcasts should synchronize with these country schedules as well.

Forms of Data:

The strength of the Eco-Center will be critically dependent on the region-wide sharing of data. Data which will be shared will be of several forms. First is consumer/producer information on the cost and price of goods, services, and financial instruments at all significant geographical points. For instance, a manufacturer-exporter in Indonesia would benefit from information on loan rates and shipping costs region-wide to shape his target market and his financial decisions.

Educational information, sessions, broadcasts, and material will also exponentially grow in terms of electronic traffic as computer-based training facilities proliferate. It is in this area where multimedia and high-bandwidth (high-capacity) networks will be needed. Video, sound, and on-line interaction in a paperless mode will demand big electronic highways to transmit with minimal delay information across distributed users in their homes. This will revolutionize education in the region by the accelerated availability of educational material.

Though financial transactions are already being transmitted electronically today, this trend will further intensify. Paperless transactions will be fashionable with on-line signature-recognition systems (already available) coupled with security passwords. The use of electronic data interchange (EDI) to transmit all financial transactions will become common. Card-based transactions will short-cut the servicing queue.

Public and private discussion will use multimedia teleconferencing. This will reduce the need to travel and make organizations, public and private, more cost-effective.

Finally, social interaction will flow electronically. This is one area where the demand will grow very fast as facilities become available (just as the demand for telephones has far outstripped the requirement).

Evolutionary Stages:

The evolution of the ASEAN Eco-Center technology base will consist of several stages. The first stage is the "cross-trickle" stage. In this stage, information flows from one area to another in sporadic bursts or limited regular movements. Cross-region access is on a "need" basis. Cross-region transactions are regular but limited.

The second stage is the "guided distribution" stage. This stage is marked by the emergence of facilities targeted to serving specific transactional and information needs of specific information and business markets. These facilities are in the form of education broadcast centers, region-wide EDI switches, multimedia teleconferencing services, etc..

Currently, the ASEAN region is in transition from the first stage to the second stage.

The third stage is the mass distribution stage. This is reached when facilities for mass broadcast and mass interaction emerge from the interconnection or expansion of "guided distribution" facilities from the previous stage. This stage will require political will since the liberal and rapid distribution of information across the region will restructure the social, economic, and political power balance. Upheavals will be common during this period as the distribution and use of information assets will shift socio-economic and political power and create new power centers.

The last stage, the "integration" stage, will establish the dynamic equilibrium of information-based power. In this stage, the individual and organization will find his geographical location less relevant. Of greater importance will be the individual's/organization's "knowledge location"—proximity to knowledge centers and access to knowledge services and broadcast facilities. The ability to produce and acquire will be critically contingent on this "knowledge location". The ability to fulfill personal/organizational needs and expectations will likewise be heavily dependent on this.

Infrastructure:

The infrastructure required to realize the evolution from Stage 1 to Stage 4 for the ASEAN Eco-Center will consist of three major components: computing; communications; and research.

The computing component will gravitate to powerful client-server applications using distributed databases. Client-server technology will allow the optimization of the various interconnected platforms from PC's to midrange computers up to mainframes. Powerful servers will outnumber midrange and mainframe computers. The value in this is that computing resources at each "knowledge center" (a facility that gathers and provides information to users across the region) will not be strained even if the processing demand grows very quickly since processing load is distributed to each "knowledge center" or accessing node. Distributed databases will reduce storage costs and will improve overall reliability since failure of any "knowledge center" will not render all of the information inaccessible -- other "knowledge centers" and even user access points will retain part of the data. In other words, the data is distributed to several centers and user access points (although this will be transparent to anyone attempting to secure information). All these will reflect the evolutionary trend from the centralized information bureaus of Stage 2 to the distributed "knowledge centers" of Stage 4.

Computing applications in Stage 4 will be multimedia and highly interactive through virtual reality. They will allow use of all the senses and will be supplemented by powerful symbolic tools to enhance cross-cultural communication. They will be highly efficient through appropriate use of technology type for each particular need. For instance, intelligent systems will exchange financial transactions as formatted data (EDI) while cross-country product design sessions will use symbolic multimedia frames.

The communications component of the infrastructure, in order to meet the demands for access to the computing applications with quality response times, will have to be networks of enterprise networks. As such, hunger for transmission capacity or bandwidth will require high-speed links (T3 at least) using powerful switches. These switches will become "knowledge switches" -- powerful and intelligent transit points that do not merely route information but also store and analyze information for related "knowledge centers". For instance, a "knowledge switch" that routes "buy" and "sell" transactions for commercial outlets will also

store and analyze part of the transactional information "passing thru" for use by consumer "knowledge centers" intended for pricing-dependent operational planning.

Finally, the research component of the infrastructure will increasingly use symbolic tools. There will still be a need for traditional systems and applications programmers and analyst/designers. However, there will be a rise in demand for developers strong in symbolic logic. Symbolic tools (language-independent) are the tools of the future. Deep abstract reasoning skills and strong information-correlation abilities will be required to optimize the use of these tools. Overall, the cost of research and development will be lower in the ASEAN Eco-Center than anywhere else due to traditionally low labor costs in the region and the increasing intensity and proliferation of low-cost information technology education.

Role of Governments:

With the accelerated pace of regional commercial, social, and political communication and interaction in the ASEAN Eco-Center, the role of each national government will be transformed. With on-line real-time access to information, people, and issues anywhere in the region, the ASEAN population will gradually develop a regional meta-culture. Governments will metamorphose from "arbiters of knowledge" (as they are today) to "counselors on knowledge". Issues will be raised instantly and regional responses will be available immediately. Thus, public institutions will conform to higher standards of accountability, transparency, and responsibility. And just as the population will have these expectations, the national governments will possess the means to meet these expectations through better policy- and decision-making as a result of accurate, timely, readily-available, and relevant information and knowledge.

Conclusion:

The economic growth and fusion of ASEAN into an Eco-Center (Economic Center) and the consequent development of a regional culture will strengthen its global position economically and politically. The role of information technology will be very, very critical. At this point, the ASEAN nations should at the very least be at the point where each has established a department- or ministry-level function exclusively for managing information technology at the national level. The next step is to have working groups among these public institutions and private

information technology organizations. The role of national governments is critical since big technology vendors often come from the West and carry the Western economic agenda either subconsciously or consciously. Private sector participation is critical since professional organizations in each country possess the experience and sophistication in managing information technology effectively.

The future for ASEAN will be an information technology-intensive future. This will complement the richness of ASEAN culture. Culture will enjoy a greater degree of protection since it can be easier disseminated. The values that make the ASEAN people strong will be highlighted even more by instant communication to the regional population. In the final analysis, ASEAN will be the winner riding the technology horse!