How Pacific nations achieved technological success outlined at FJCC

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Links among research universities, industries, and government, as well as concentration on long-term ventures, have enabled countries in the western Pacific to dominate a technology and achieve long-term returns in technical development.

The nations, particularly Taiwan, Japan, Korea, Hong Kong, and Singapore, recognized that short-term ventures would result only in short-term returns because competitors could quickly enter the market and reduce profitability.

So stated Irving Ho of Taiwan’s Institute for Information Industry when he presented the opening address of the October 25-29 Fall Joint Computer Conference in Dallas. Ho delivered the speech for K.T. Li, who was scheduled to appear but was ill. Li is senior minister without portfolio from Taiwan.

Stephen Szygenda of the University of Texas at Austin was conference chair; with Raymond Yeh, Syscorp International, and C. V. Ramamoorthy, University of California at Berkeley, the program chairs; and Tony Shetler, TRW Federal Systems Group, the professional development chair.

Ho outlined the stages of economic development the western Pacific countries underwent to attain their strong present-day technological positions.

First, in the 1950s, government programs that fostered basic industries enabled a reduction in imports, a process Ho called “import substitution.” The second stage, characterized by Ho as “export promotion,” occurred during the 1960s. In it, further growth was made possible by foreign investment, and exports were promoted through the creation of export processing zones.

The third stage, “infrastructure improvement,” occurred during the 1970s. It featured improved transportation and communications facilities and evolved concurrently with the introduction and application of traditional science and technology programs throughout industry.

The fourth stage, the restructuring of industry to take advantage of the latest technology, is now occurring and has become necessary because the countries have lost the advantage of low labor costs, Ho said.

The last FJCC

Paid attendance at the 1987 Fall Joint Computer Conference was 700, barely 56 percent of the 1250 paid attendees budgeted. This marked the second year of the conference’s two-year lifespan, begun last year as a joint effort by the Computer Society and the ACM. Last year’s conference drew 1400 paid attendees, vs. 2000 budgeted. Exhibit booth sales reflected a similar pattern: This year’s conference was budgeted at 80 10-foot by 10-foot booths but in fact sold only 33. Last year booth sales were budgeted at 200, but actual sales were only 125. Following these two successive years of under-budget performance, the Computer Society Board of Governors and ACM Council voted in Dallas to cancel FJCC 88 and its successors.

The announcement in no way negates the basic agreement under which the conference was initiated, according to Computer Society Conferences Vice President Jim Aylor of the University of Virginia. Other events may well be launched under the agreement by the two societies, and in fact the presidents of both organizations are to meet during the coming months to review new potential ACM-CS joint ventures.

Keynote address. Max D. Hopper, senior vice president of information systems for American Airlines, delivered the conference’s keynote address: “Choices Faced in the Strategic Use of Computer Services.”

Hopper said he has been seeing “a system-error message flashing on screens across America.” He listed some of the reasons for his alarm, saying that (1) 30 percent of America’s high school seniors aren’t interested; (2) the scientific knowledge of American students has declined steadily since the 1960s; (3) industry is attracting science and engineering PhDs at twice the rate of academia; (4) the ratio of the US total population engaged in science and engineering has declined compared to the country’s key trading partners; (5) America’s key trading partners have been achieving productivity increases from five to nine times greater than it has; (6) the Japanese now have a higher average income than Americans; (7) if current trends continue, US workers entering the work force today will have a lower average income at retirement than their counterparts in Taiwan and Korea; and (8) nearly two-thirds of America’s record trade deficit is with the Pacific Rim countries (enumerated by Ho earlier) that are using technology developed in the US.

“We must do a much better job of connecting science and technology to our everyday world of education and business,” Hopper stated. “If we do not, we risk a future where growth is stunted and the gap widens between the US and other nations, where progress is driven by scientific advancement and technological innovation.”

He cited the work of Nobel Prize winner Robert Solow of MIT, which demonstrated how long-term economic growth depends on technological progress, and pointed out that knowledge, embodied in new machines and improved human skills, is the critical element accounting for more than half of all economic growth.

Hopper said that most of the productivity gains and US manufacturing in the 1980s have resulted from closing inefficient plants and applying technology to the assembly line, but that industry
Another development effortive engineering.

Artificial intelligence, object-oriented speciations of the 1980s have been recorded only in tens of a percent, and part of the problem has resulted from business looking at technology as a support tool rather than a strategic asset.

He quoted Solow as saying, "If someone landed from Mars or, more to the point, from Tokyo, he'd conclude that the computer has had essentially no impact on our white-collar productivity."

If changes are not made, international competition will take over the US service sector just as it has taken over large parts of the country's manufacturing sector, Hopper said.

He proposed a new model, characterized by decentralization and increased connectivity, for the information-based organization of the future. For universities, this will mean greater accessibility to information for students and a strong emphasis on teaching students to understand technology. For businesses, it will mean increased use of interconnected data networks and greater consumer interaction with business technology. As a consequence, business problem-solvers will have to be technicians and managers rolled into one.

Hopper predicted the volume of knowledge will quadruple and, due to today's low population growth rates, the US work force will be much smaller by the year 2000. Thus, the proper use of technology is becoming critically important, he said.

Technical program. The technical sessions were sparsely attended (see box on facing page) despite the fact that, at most, only five of the eight tracks had sessions in progress at the same time.

The papers presented in the software track sessions dealt with topics such as automatic programming, very high level specification languages, software reuse, object-oriented programming, prototyping, difficulties with large software development efforts, and the use of artificial intelligence in software engineering.

The sessions devoted to the difficulties associated with large software development efforts outlined problems related to the Strategic Defense Initiative and the modernization of the FAA's Air Traffic Control System. Another topic that came up several times involved difficulties in verifying and validating knowledge-based soft-

John Cocke receives ACM Turing Award

John Cocke, an IBM fellow at the Thomas J. Watson Research Center and the inventor of reduced instruction set computer (RISC) technology, received the Turing Award October 29 in Dallas. Abraham Peled accepted the award for Cocke, who was ill. The award, presented during the Fall Joint Computer Conference, is ACM's highest honor for technical contributions in computing. It is given annually in commemoration of A.M. Turing, an English mathematician who was a major influence in the early development of computing.

During FJCC, ACM also presented the Distinguished Service Award to Frederick P. Brooks, Jr., the Outstanding Contributions Award to Edward G. Coffman, Jr., the Grace Murray Hopper Award to John K. Osterhout, the President's Award to Kent K. Curtis, and the Software System Award to Adele Goldberg, Daniel H.H. Ingalls, Jr., and Alan C. Kay.

Cocke was cited by the Turing Award Selection Committee for significant contributions to three areas of computer science: RISC development, compiler design and theory, and large-system architecture.

Cocke's other honors include selection last year as a fellow of the American Academy of Arts and Sciences and, in 1985, receipt of the ACM/Computer Society Eckert-Mauchly Award.
Computer Society's Seaborn presented first Hayman award as 46 are honored

H. True Seaborn, editor and publisher of the Computer Society and its six magazines, was presented the first Harry Hayman Award for Distinguished Staff Service October 27, during FJCC in Dallas. In addition, the society presented awards to 45 other men and women for the valuable contributions they've made toward its progress.

The highest honor a Computer Society staff member can receive, the Hayman award was established in 1985 to honor the retirement of its distinguished first executive secretary whose career exemplified the highest ideals of society staff service.

The plaque honoring Seaborn recognizes "his many years of excellent, dedicated, and innovative leadership and service" and bears the signatures of the society's president, Roy Russo, and its executive director, T. Michael Elliott. They're key members of the Executive Committee, the unit that voted to honor Seaborn with the first Hayman award.

Seaborn has been a leader in the society's emergence from an organization with 16,000 members in 1973, when he became editor and publisher, to one with more than 90,000 this year.

During his tenure, Computer magazine has gained an international reputation for excellence and has experienced a five-fold expansion in circulation, and five new society magazines have been launched. They are IEEE Computer Graphics & Applications, IEEE Micro, IEEE Design & Test, IEEE Software, and IEEE Expert.

Seaborn has also been a major contributor to many other successful society programs, including numerous professional conferences and initiation of the Computer Society Press.

Following a number of years of volunteer service to the then-Computer Group of the IEEE, Harry Hayman was asked to join the staff as executive secretary on a full-time basis in 1972. He applied the kind of management techniques he learned during his professional career, which included a term as one of the leading computer experts on the US Apollo project, and thus guided the CS through 12 years of growth.

The IEEE developed into the world's largest professional organization during his CS tenure, and the Computer Society evolved as the IEEE's largest unit.

Additional awards. The presentation of eight Distinguished Service Certificates topped the remaining CS honors handed out at FJCC. Recipients of the certificates were:

- Kenneth R. Anderson of Siemens Research & Technology, for continued and outstanding leadership in technical committee activities and for providing inspiration and guidance in public policy and human resources activities. James H. Aylor of the University of Virginia, for continued and outstanding leadership and as vice president of conferences and tutorials in 1986-87.
- J. Tom Cain of the University of Pittsburgh, for continued and outstanding leadership, for service as vice president of publications in 1986-87, and for serving as acting president of the society during the fourth quarter of 1986.
- Ronald G. Hoelzeman of the University of Pittsburgh, for continued and outstanding leadership in publications, financial planning, and educational activities in the society and the computer profession.
- Michael C. Mulder of the University of Portland, for continued and outstanding leadership in the quality of the society's educational activities and its Computer magazine, and for dedicated service on the Board of Governors in 1986-87.
- Dick B. Simmons of Texas A&M University, for continuous and outstanding leadership on intersociety activities.
- Joseph Urban of the University of Miami, for outstanding leadership in founding the Technical Committee on Computer Languages and its conference, and for excellence in guiding the society's financial program as treasurer in 1986-87.
- Stanley Winkler, for outstanding and continued leadership on intersociety activities, including chairing the first Fall Joint Computer Conference in 1986.
- Mary Ellen Curto, Roger Fujii, Sallie V. Sheppard, Bruce D. Shriver, Merlin G. Smith, and Harold S. Stone were presented Outstanding Contributions Certificates.


Barry Boehm, Violet S. Doan, Susan L. Rosenbaum, Sallie V. Sheppard, Wil N. Toy, Gio Wiederhold, and Akihiko Yamada were presented Certificates of Appreciation.
Compcon Spring 88 promises to provide a broad-based update of important areas of computer research and development and a focus for the computing specialist as well.

The oldest of the Computer Society's conferences, the event is scheduled March 1-3 in San Francisco, with tutorials the day before and the day after, February 29 and March 4.

The track topics and featured speakers will include "RISC (Reduced Instruction Set Computer) Architectures" by John Hennessy of Stanford University; "Advances in Device Technology," Michael Callahan, AMD; "Computer Augmentation and Workstations," C. Gordon Bell, National Science Foundation; "Neural Networks," Federico Faggin, Synaptics; and "Implications of Superconductivity." The speaker on the final topic has not yet been determined.

Each of the tracks will be initiated in the morning by its featured speaker.

In addition, the neural network track will include three sessions. The opening session will present an "Introduction to Biological Nervous Systems," "Introduction to Neural Models," and "Introduction to Neural Network Models."

"Implementations of Neural Networks" will be the theme of the second session, which will consist of presentations on software simulations systems, VLSI implementations, and simulations of systems of neural networks.

The third session will feature a panel discussion titled "Perspectives on Neural Networks." It will provide a comprehensive and realistic view of neural nets by panelists ranging from "skeptics to true believers," according to the session chair, Fred Coury. The panelists will have a broad spectrum of interests and will include a neural physiologist, a philosopher, a mathematician, a journalist, and an engineer.
Talks on second-generation LANs stir interest at 12th Local Computer Networks Conference

Discussion of what constitutes second-generation local area networks generated a great deal of interest at the 12th Conference on Local Computer Networks October 5-7 in Minneapolis, Minn.

The two major views expressed were that LANs are either very high-performance interconnection hardware composed of 100-megabit fiber optics, or extended network facilities that include network management and scalability tools.

As individual LANs grow to include more and more nodes, the performance of the network becomes an important issue. The high-performance fiber optic networks and the network management tools both attempt to provide the necessary performance by either increasing the performance envelope or optimizing network resource utilization.

The growth of individual networks has affected many disciplines, fostering network hierarchical structures, interconnectivity of networks, management and testing of networks, coexistence of networks and nodes, and a growing number of gateway, bridge, and routing products.

A panel session entitled "Second Generation LAN Issues" was devoted to trends toward hierarchically structured networks with very high performance fiber optic "backbones" to which either Ethernet or token-ring type networks are connected. An important supporting device for these hierarchical connections is the gateway or protocol converter. Although the gateway is an important device, the current market is providing more products of network router and bridge type, which connect networks of the same type and protocol. The session was chaired by Harvey Freeman of Lanworks, the conference's standing committee chair.

In a pragmatic panel session, "How to Really Wire Your Building," the issues and problems of design and installation were addressed from the viewpoint of both the product user and the supplier. It seems that, even in new construction, twisted-pair wiring is often used instead of potentially higher performance optical fiber or coaxial cable. There appears to be some hesitancy among building architects to design and specify the newer optical fiber technology over twisted pair, which they have used extensively for other functions such as telephone systems.

The keynote address, entitled "Digital's Strategic Network Vision" and delivered by Robert Murray of Digital Equipment Corporation, indicated that DEC's strong position in the network area is based on the ability to interconnect a wide range of computer systems. DEC has 15,000 Ethernet and 100,000 Decnet installations and expects these numbers to double by next year.

Parallel architectures and algorithms were the focus at CAPAMI 87

New parallel architectures and parallel algorithms for problems in computer vision, image processing, and related areas of artificial intelligence were the prime topics of interest at the Computer Architecture for Pattern Analysis and Machine Intelligence Workshop (CAPAMI 87) in Seattle October 5-7.

Three invited speakers presented their perspectives on current work and new directions for the field.

Masa Kidode of Toshiba reported on image processing architecture research and development in Japan. Up-to-date surveys of Japanese research and development in this field are uncommon.

Participants got a glimpse of several new systems from Japan, including a programmable-window-based multiprocessor for visual analysis, a 256 x 256 parallel-cellular array processor, and several personal-computer-based systems.

George Reeko of the Neurosciences Institute at Rockefeller University described his work with Gerald Edelman on neural networks for recognition, categorization, generalization, and visual tracking. This work emphasized the perspective of building computational models that integrate multiple networks responding to various environmental stimuli and maintain spatiotemporal continuity by feedback from interactions of the system with the environment.

Tom Knight of MIT and Symbolics gave his perspective on trends in architectures for vision and AI.

The technical program included 27 refereed papers that comprise the 227-page proceedings, available through the Computer Society Press.

IEEE Expert is seeking materials for publication. Submit articles on technology and AI applications to David Peseel, Editor-in-Chief, BP America, 4440 Warrensville Center Rd., Cleveland, OH 44128; reports on conferences, short subjects and papers on PCs, products, and resources to Henry Ayling, Managing Editor, IEEE Expert, 10662 Los Vaqueros Cir., Los Alamitos, CA 90720; and book reviews to K.S. Shankar, Associate Editor, Federal Systems Division, IBM Corp., 3700 Bay Area Blvd., Houston, TX 77058.

Technical Committee on Computer Education, Computer Society of the IEEE: Contributions are welcomed for the TCCE newsletter, a forum for the exchange of ideas among persons interested in computer education or computers in education. News items, short articles, and correspondence should be sent to Helen Hays, Dept. of Computer Science, Southeast Missouri State University, Cape Girardeau, MO 63701; (314) 651-2244.

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