Keynote Speech

By Taeho Park, San Jose State University

Good morning and thank you for the great privilege of addressing this conference, the spring 2006 conference of the Korea Society for Industrial Information Systems. The theme of this conference, "improvement of a company's competitiveness through information technology," is very important issue in the global market. IT is not only important for manufacturing sectors, but also crucial for service sectors. We have entered a digital age with information and communication technology (ICT) so that ICT becomes a dominant force of driving our life and culture. It is now becoming central to our society economically and socially. Furthermore, it is becoming so embedded in our everyday life.

The rapid advance of ICT has affected economic strengths of countries and productivity of companies in industry from consumer electronic goods manufacturing, to biotechnological research, to logistics services, and so on. Many people, nowadays, cannot image their lives without its applications, such as cellular phones, CD/DVD players, computers, MP3/MP4 players, PDA, iPods, and games. Companies cannot even think about their business operations without its applications, such as information systems and their security system, e-business systems, ERP, CRM, RFID, barcoding systems, and so on. Who has contributed to these enormous achievements in the improvement of people's life, company's productivity, and nation's economy and

competitiveness? Those are you, who are doing research on ICT and running ICT companies. You have to be proud of the achievements of your research and business.

Let me show you some statistics related to ICT. Gartner Dataquest in December 2003 estimated that the worldwide end-user's spending on IT in 2006 would be $2.7 trillion, that is 4.9% increase from 2005. The World Economic Forum published the Global Competitiveness Report which presented the assessment of growth competitiveness of 117 countries by Growth Competitiveness Index (GCI). The GCI is measured with three factors which are the quality of the macroeconomic environment, the state of the country's public institutions, and the level of technological readiness. Finland and the United States were ranked first and second, respectively. Their strong performance of competitiveness stemmed from technological supremacy and a pipeline of innovation. Their companies are aggressive in adopting new technologies, and spend heavily on research and development. Taiwan and Singapore were only Asian countries in top 10 ranks. Japan and Korea ranked at 12th and 17th places. These statistics implies very meaningful insight on company's and nation's competitiveness because ICT use is linked to national competitiveness and productivity. The Global Information and Technology Report 2004-2005 written by the World Economic Forum and the INSEAD business school showed a tight correlation between a country's 'Networked Readiness' and the country's global competitiveness. John Chambers, President and CEO of Cisco Systems in Silicon Valley also said, "There is a strong correlation between ICT spending and productivity." I would like to point out Singapore's efforts to improve national competitiveness using ICT. Its Networked Readiness index rose to 3rd place in

2003 and to 2nd place in 2004. So, they had accomplished a remarkable improvement in a short period of time in improving their competitiveness using ICT.

Why don't we think about how a company improves its competitiveness in the global marketplace using ICT? First of all, you need to know what your business activities are. And then, you should look for ICT's appropriate for proving the productivity of those activities. Understanding your supply chain network will help you study the entire business processes from purchasing of materials to delivering products to customers. So I want to spend a little bit time on supply chain management (SCM) and show implications of ICT in the supply chain network. SCM is a global operations strategy for achieving organizational competitiveness by integrating business processes from suppliers, manufacturing, distribution, to customer services, and to reverse logistics. Companies are attempting to find ways to improve their flexibility and responsiveness and in turn competitiveness by connecting their operations and then adapting their business to changes in the global market. Then, how can they connect their global operations? It's not easy task when they have more than one factory, more than one distribution center, many local and global suppliers, and many markets in the world. This is what companies are nowadays facing with their business. Unless their operations are connected electronically, they cannot have visibility of their real-time operations, inventory, and logistics, and cannot quickly and timely respond to the dynamical business environment, such as changes in orders, prices, and customer's taste.

Decentralizing company's value-adding activities by outsourcing and developing virtual enterprise have been getting important business strategies. All these require tight operational connections so that the importance of ICT has been highlighted in integrating suppliers and partnering firms in virtual enterprise and all processes in the supply chain network. One thing we have to remember is that it is impossible to achieve an effective supply chain network system without ICT. Without it, most business decisions may be hampered by uncertainty from lack of information, and companies may have limited knowledge of customers' needs and inaccurate or out-of-date information about the location of inventories and materials/products flows. In a global supply chain system, without ICT the situation will be worse because suppliers, customers, and distribution centers are scattered all over the world. Thus, it is essential to integrate the activities both inside and outside of an organization. This requires an integrated information system (IS) for sharing information on various value-adding activities along the supply chain. Sharing information throughout a supply chain will reduce bullwhip effects which create supply chain dynamics and are detriments to company's competitiveness. So, ICT is like a nerve system for the SCM which provides visibility of operational activities, inventory, and logistical movements, increase velocity of supply chain activities, and finally enhances responsiveness to customer and market requirements. Such ICTs include electronic data interchange (EDI) the Internet and World Wide Web (WWW), RFID, CRM, and so on.

Let me underscore the Wal-Mart's success of using SCM with ICT. Wal-Mart was a relative small company in early 1980. At that time Wal-Mart was a small niche retailer

with only slightly more than 200 stores. However, Wal-Mart grew rapidly and becomes the largest retail store in the world. As of January 2006, Wal-Mart has 6100 stores worldwide with 2285 stores in 15 countries outside of U.S., and purchases products from vendors in 70 countries. Their net sales rose 9.5% to a record $312.4 billion while comparative store sales in the U.S. rose a 3.4%. How could they accomplish the remarkable achievements and competitiveness? How can they communicate and manage all those stores and suppliers located worldwide. Without ICT, do you think they can do it? Wal-Mart is even extending their use of ICT with RFID. At present around 100 Wal-Mart suppliers are using RFID tags. The number will increase to 600 by the end of 2007. RFID will help them track goods throughout the supply chain and ultimately will help them get the right products in the right stores at the right time. It'll also help locate specific products anywhere in the supply chain.

ICT composed of hardware, software, and communications has been used in many industries other than computer industry. It has been applied to biotechnology and nanotechnologies. An advance in biotechnology with information technology is creating new opportunities in the emerging fields of bioinformatics, biomaterials, and biochips. And nanotechnology will revolutionize chip and computer manufacturing, which will provide a new foundation for further developments in information and biotechnology. Silicon Valley where I am located has many companies and universities where researchers and entrepreneurs are working in information technology, biotechnology, and nanotechnology. The core industry cluster in Silicon Valley, that is software industry, is rapidly growing with the increase in processing power predicted by Moore's

law. The convergence of bioscience and information technology has improved pharmaceuticals and medical devices and is extending their applications to biochips, bioinformatics, and biomaterials. Computer companies, such as IBM, HP, Intel, and Applied Materials have already developed substantial nanotechnology programs. Intel recently announced a breakthrough in the design of chips with nano-level technology with more than 1 billion transistors in its latest Pentium 4 chip. Applied Materials has built nanochips which are tiny computer chips to power mobile devices that can be used for high-speed wireless networks. The market potential of these converging technologies is substantial. McKinsey has shown that the market for converging info-, bio-, and nano-technologies could top $1 trillion in 2010.

In summary, ICT is central to our economy and to our society. It is an essential ingredient for business survival and improves the competitiveness of firms as well. It drives many of today's innovations and it offers enormous potential for further innovation in the coming decades. You, a group of IT researchers and practitioners, are pioneers of making companies in your country more competitive in the global market, and in turn your country more competitive in the world. So, you have to be very proud of yourselves. I wish that you enjoy this conference, share your ideas of research and practical experiences with others, continue to accomplish your successful research and business achievements. Thanks.