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Effects of Information and Communication Technologies on Service Industries in the Asia Pacific Region

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I. Executive Summary

Major historical technological innovations, like steam engines, have provided major incremental benefits to the production and transportation of physical products. But the latest technological developments based on computing technology and information and communication technologies ("ICT") can bring significant benefits to the marketing and provision of services. The combination of computers and ICT can overcome some of the inherent limiting characteristics of service marketing. Some services can now be standardized and customized concurrently to entice demand. However, Asia Pacific region has its own set of cultural and environmental factors that might make ICT application difficult. We propose areas for further research on the effects of computing and ICT on the service industries within the cultural and economic context of the Asia Pacific region.

II. New Technology Enabled Periods of Accelerated Growth in Business

As new technologies are developed, they bring incremental benefits to the business environment by facilitating certain aspect of the business process. Generally it takes a few generations of evolutionary changes to the original concepts for a technology to mature and to become user-friendly for significant diffusion (Simon 1996). As the new technologies evolve, their benefits spill over to other business activities and led to periods of accelerated growth in the economy. The improvements to the steam engine design by James Watt, the making of coke smelted pig iron by Abraham Darby, and the design of an improved steam locomotive by George Stephenson in the 18th and 19th century led to the development of the train and railroad systems being used in Europe and North America (Montagna 1981). The improved and more reliable transportation system provided firms an expanded base of demand and supply that fostered the specialization of production and job functions and

industrialization in general (Microsoft 2002). The railroad infrastructure was one of the driving forces behind the Industrial Revolution that Europe had experienced in the 18th and 19th century.

Subsequent derivation and application of the technologies to other uses extended the usefulness of these tools. Jacques Perrier invented the steam-powered vessels in 1775 (Bellis Eighteenth century inventions: 1700 to 1799 2000) based on James Watt's steam engine design. The steam-powered vessels further enlarged the economic base by opening up new market opportunities in other continents. Using steam-powered ocean-going vessels, traders from Europe were able to travel to North and South America, Asia, and even Australia to increased their scope of supply and demand and their economic base. The design break-through of the gasoline-powered internal combustion engine by Gottlieb Daimler in 1885 (Bellis Nineteenth century inventions: 1800 to 1899 2000) led to automobiles today that greatly enhanced our mobility in a local basis.

The steam engine, the railroad system, and the internal combustion engine were all technological developments that eventually led to improved transportation infrastructure for the physical movements of products and persons. Another major technological development of a different form was the invention of telegraph by Samuel Morse in 1837 (Bellis Nineteenth century inventions: 1800 to 1899 2000). The invention of telegraph allowed information to be exchanged in a timely manner in a non-physical medium. These historical technological breakthroughs provided a foundation from which other tools are developed the benefits of which we are still enjoying today.

One of the more recent technological developments that facilitated accelerated business growth was the development and the wide diffusion of computing technology. The permeation of computing technology has been termed as the second Industrial Revolution by

some (Simon 1996). In the 1995 Universal Pictures movie *Apollo 13*, three astronauts were stranded in space. With the captain's courage and resourcefulness, the astronauts were able to return to earth by utilizing the moon's gravitational force. The movie depicts the ground support staff in Houston using a computer the size of a room but having less computing power than a regular desktop computer of today. The ground crew also supplemented the computing power by using slide rulers as they make last minute calculations and adjustments on behalf of the space crew. The setting of the movie was in April 1970. In today's space shuttle command center in Houston, there are thousands of computers with processors each making calculations at billions of cycles per second. Computers today can perform routine and predefined calculations at very high speed. By performing the repetitive routine tasks, human are freed up to perform jobs that require human interactions, experience or judgment. Advancements in computing technology allow performance of extrapolations that were impossible previously due to their complexity. For example, advanced computing technologies are used to forecast weather conditions and predict tornadoes and earthquakes. Because of their usefulness, computer systems now permeate all levels of business and personal environment; there is seldom any part of the economy that is not touched and benefited by its use. However, because of its transparency nature and high acceptance, we might at times forget or fail to appreciate how computing technologies have improved our daily lives. For example, computer systems provide access to cash in our bank account from most global locations through the automatic teller machines (ATMs) networks. The computer power being sold today is very cheap for its performance, and most computers can perform tasks that are required by most companies and individuals. From the development of computing technologies, we have all experienced first hand how this innovation have shaped the business environment and enhanced economic growth over the last thirty years.

The information and communications technology ("ICT") is the current technological development that is enabling a substantial growth in the business environment. ICT is the set of high-speed high-capacity connections between locations that enables communications and exchange of information. ICT can take numerous physical forms. In additions to the more traditional underground and undersea fiber-optic cables, ICT also encompasses wireless network setup on a local basis and satellite communications. ICT allows the exchange of and access to large amount of information between locations via physical connections with computer systems, wireless systems, and access to the internet. The high transmission capacity of the ICT allows meaningful data transfer that can include sound, high-resolution graphics, and extensive informational contents like files and databases. Before ICT, data, information and knowledge are stored in isolation around the globe. ICT enhances the power of the computing technology and our knowledge base by consolidating isolated pockets of information, knowledge, and data network into useable information for value creation. The power to access, share, and utilize information, data, and knowledge without regards to geographical, physical, and time constraints has synergistic effects that greatly increases the utilities that the information provide.

There are also views that ICT, and internet in particular, are just extensions and variations to doing business under the existing framework (Porter 2001). According to Porter, internet can enhanced the operational effectiveness of firms. However, it is not a sustainable competitive advantage because it can be replicated easily. As operational advantages such as ICT are more difficult to sustain, the strategic positioning and planning becomes even more important. Regardless of the perspective and interpretations, it is a safe conclusion that ICT has brought about substantial benefits to our economic growth.

III. ICT Enables Accelerated Growth in Service Industry

While previous technological developments, from steam engines to internal combustion engines, have benefited the economy and business in general, production and distribution of physical products have benefited the most from these changes. The development of steam engines, railroad systems, ocean going vessels, and internal combustion engines have provided an efficient way for assets and humans to move geographically.

With computing and ICT, immense benefits can be derived to the production and distribution process through the use of electronic data interchange ("EDI"), enterprise resource planning ("ERP") and global supply chain management systems. However, computing and ICT also show great potential to bring major benefits and improvements for the service industries. Using computer technology, some of the more mundane service tasks can be performed by a computer. For example, computerized time and job tracking can be linked to personnel data and external payment systems to fully automate the payroll process. In additions to the more repetitive service tasks, numerous other types of services can benefit from computing and ICT. A more comprehensive service package can supplement the sale of a product. For example, a customer can access Amazon's website, browse product information and availability, review feedback from other readers, search for related books of interest, place an order, receive the order, and obtain after-sales services through the internet anywhere anytime that is convenient for the customer.

IV. What is Service Industry?

Service is the provision of activities that provides added value to a customer. Service can take two forms: service can be part of a total product package that includes physical goods; and service can be a end product by itself. In the former case, service includes sales service at

point of purchase and warranty and after sales services; in the latter case, service includes medical service, warehousing, dry-cleaning and banking services. In reality, all business transactions, regardless of whether physical goods are involved, have different levels of service components to it, and we will define service in this paper to include both forms of services.

In the academic environment, the service industry has been the topic of many research studies under various classification schemes. One of the earlier study describes service as having four characteristics: intangibility, simultaneity, heterogeneity, and perishability (Sasser 1978). Services are intangible in that they cannot be seen, touched, or hold (intangibility). Services are also consumed as they are produced (simultaneity) and unused services cannot be inventorized (perishability). In addition, the quality level and details might change each time a service is provided (heterogeneity).

Another research study looks at the core services from an operational perspective and classified services into three broad categories – people-processing services, possession-processing services, and information-based services (Lovelock 1996). People-processing services, like hospitalization, transportation, and food and lodging services, involve the performance of tangible actions to the customer in person. The customers are part of the production process itself and consumption is simultaneous. Because people-processing services are simultaneous and perishable, the service provider must have geographically diverse locations so that customers can visit physically to consume the service. Possession-processing services, like warehousing, automobile repair, and laundry services, involve the performance of tangible actions to customer-owned physical objects. Although the service is being done to the customers' object, the service provider must have convenient physical locations at which customers can drop off their objects. However, the actual service can be

consolidated and performed at a central location to gain economies of scale. For example, while a dry cleaning chain store might have outlets in many parts of the city, it can perform the cleaning service in a central facility that services all its outlets. Information-based services, like banking, legal services and news services, involve the collection, manipulation, interpretation, and transmission of data to the end users. Because the information is the main source of value, customers can access the information from a remote location. The availability and reliability of high speed communications channels and access equipment is of paramount importance for information-based services. In additions to the three broad classifications of services, the study also discussed eight categories of supplementary services. These supplementary services are used to augment the service characteristics and their application depends on the market positioning, nature of the service, customer requirements, and competitive practices. These supplementary services are information, consultation, order-taking, hospitality, caretaking, exceptions, billing, and payment.

V. How ICT Leads To Accelerated Growth in Service Industry

Due to the nature of the service industry, in particular for information-based services, ICT can provide many opportunities to leap benefits from its application and use. The ICT technology enabled the firm to overcome some of the limitations for marketing services on a global basis. The coupling of computing and ICT has provided service firms with an opportunity to bridge the geographical and time gap that previously existed in their market space. For example, a bank can provide its services to its customers 24 hours a day through the internet. The services can include access to account balances, previous transactions and account information, payments, answers to inquires, and even application for loans, credit card or new account. It is a win-win situation in that bank customers get easier access to their

account information and the bank can reduce its on-going operating costs by automating part of the process. The bank's structured but comprehensive approach to process can provide both standardization of product offering and customization to suit customer requirements at the same time (Berthon 1999). Another example would be potential customers downloading a sample MP3 song from the internet prior to purchase to lesson the effects of the intangibility factor. For a more risk avoiding customer, the sample provides an opportunity to test the product prior to actual purchase. ICT can also reduce the personnel requirements by automating part of the process. For example, travel agents and airlines allow travelers to check schedules and book their travel arrangements themselves through the internet (Berthon 1999). Courier companies like UPS and FedEx allow customers to check the status of their packages through the internet or mobile phones. Hence, ICT not only helps firms overcome some of the limitations of service provision, it can also enhance the convenience access to services by customers and provide cost savings in the firm.

Numerous research studies have been done on this topic. Some focused on the definition and the relationships; some tried to establish and determine the extent and outcome of the interactions. Earlier research has shown cost reduction benefits for marketing activities and communication requirements for knowledge based firms (Poon 1997). One study indicated benefits for small firms in their use of internet for reaching potential global customers where it was impossible to do before (Lituchy 2000). Another transaction cost based study predicted that electronic intermediaries, called cybermediaries, will proliferate as firms found their low usage cost attractive and more cost effective when compared to their own forward integration into the cybermediaries marketplace (Sarkar 1998). One study reviewed the locational pattern of foreign exchange trading banks before and after the implementation of a global online dealing system used as a proxy for a global business-to-business electronic exchange (Zaheer

2001). The study found that although location ceased to become a determining factor for knowledge based industries, firms still tend to agglomerate in clusters because of localized knowledge and information spillovers that are beneficial to firms within the clusters. For example, high tech firms agglomerate in Silicon Valley to facilitate information flow within the cluster. Overall, the benefits of using ICT or e-commerce have proved to outweigh any potential problems that this medium will bring along to the business process (Strader 1997). Most research studies point to societal benefits in general from ICT albeit at different forms and levels.

VI. Industries in the Asia Pacific

Asia Pacific is made up of many countries with diverse political, economic, and cultural background. Their stage of economic development is vastly different, with Japan and Korea in a developed economic stage while Vietnam and Laos are in a much less developed economic stage. The diverse stage of economic development means different comparative advantages. Less developed countries, like Vietnam, Indonesia and China, are more manufacturing oriented with their abundance low cost labor and land. The more economically advanced countries, like Japan, Korea, Singapore and Hong Kong, are migrating to more information, knowledge, and service based industries as that is where their competitive advantages lie. The industries include logistics, technology development, tourism, software design and implementation, and advanced manufacturing techniques.

VII. Effects of ICT on Service Industries in the Asia Pacific

The effect of ICT in Asia Pacific will be different. For less developed countries that are manufacturing based, the effect of ICT will be more focused on integrating the manufacturing

process as part of a global supply chain management system. The production process might be divided into smaller parts with each part going to the lowest cost production location, while the overall process is controlled by a sophisticated control system. Hence, computing and ICT allows cost reduction by increased segmentation of production tasks while maintaining tight integration of all these segmented tasks. For more advanced countries, ICT will enhance the development of both manufacturing and service industries. For example, Li & Fung of Hong Kong is using technology to maximize its supply chain and logistic management process that spans the globe (Magretta 1998). Singapore has implemented a nationwide online trading system for trading firms (Teo 1997) and an e-commerce platform (Ehrhart 1998) both of which enhances its competitive advantage as a business and commerce center of Asia when compared to Hong Kong (Ko 2000). Indian software firms like Infosys used to act as a service provider and write programs for outsourcing firms from the US. Today, technology companies in India (Kripalani 2002) and China (Einhorn 2002) are vying for a slide of the world's software programming and outsourcing market, competing directly against US industry heavyweights like IBM, EDS, and Accenture. There are many potential developments, especially in the area of information-based services, which ICT can bring to the region because of the region's geographical diversity and high levels of inter-country business activities. For example, there has been a large growth in online banking and brokerage services within most of the Asian countries. ICT may also reduce country-specific risks associated with the development of new products and services due to increased information exchange. Countries that are investing heavily in ICT infrastructures, like India and China, are more likely to become leaders in technological developments in the future (Rao 2001). There is a large potential pool of consumers in Asia that can use ICT or the internet to perform some of their physical shopping. As internet becomes more accepted

and accessible in the future, more Asian consumers will use this avenue for their shopping (Javalgi 2000). All these production and service developments would be impossible without ICT.

There are many potential opportunities that can be seized with increasing diffusion of computing and ICT in the Asia Pacific region:

- Logistic management. How to effectively manage an advanced global supply chain system despite geographical distance, different cultural and work ethics issues, and political and economical differences between countries.
- Software, hardware or other types of computer designs. China and some Asian countries produce many top notch scientists and computer programmers that can become a comparative advantage for Asia. However, they need to gain valuable real life experience in working through some ICT projects.
- Design focused services like fashion design, industrial design, engineering projects, and architectural designs. Designers in Asia need to gain international exposure through participation in overseas projects. ICT makes this process easier; and there is a general global trend of outsourcing these services.
- Information-based services like banking and brokerage. Investments in technology by local banks and brokerage has lag behind their counterparts in the US, mainly due to a resource allocation issues. However, as these services are becoming global in nature, there is a risk that foreign global banks and brokerages will dominate these sectors in the future due to their current technology investments.
- Learning network that focuses on language or higher education. There are many Australian universities that are offering online degree programs. Hong Kong's CyberU is also offering various online degree programs. ICT can further promote and establish this sector to increase the general education level of the local population.
- Channel length reduction by manufacturers selling direct to US retailers or consumers. Asia is home to many manufacturing capacity because of the low labor cost. Products can be sold directly to the end consumers or to the foreign retailers using ICT, thereby shortening the channel length and reduce the pressure of price escalation.

- Tourism promotion. Informational and booking services can benefit from ICT. ICT also allows more elaborate and interactive promotional programs that can reach potential tourist.

Despite these obvious and diverse benefits from the use of ICT in Asia Pacific in the service and production industries, ICT derived advantages are still a US phenomenal. When applied to Asia Pacific, the results might not be as well-substantiated due to different cultural factors (Lynch 2001), economic factors (Mooij 2000), and research methodology and data collection constraints (Walters 2001). Given the potential for value creation within Asia Pacific from the use of ICT, further research are needed to find the most effective and efficient way to explore this opportunity. Although ICT is one of the critical elements that can make the abovementioned industries successful, many political, economical and cultural issues must be resolved first (Zou 1997). Politically, some governments might be sensitive about foreign companies encroaching on industries that they think are key to their economic success. Hence, while they welcome foreign investments, the governments might receive pressures from local firms to protect the industry. Economically, each country has their own technology agenda with varying budget amounts and pace of development. Culturally, each country has its own set of values that the application of ICT must straddle and absorb on a regional basis.

VIII. Conclusion

Based on research studies performed to date, computing and ICT have shown to bring significant benefits to the marketing and provision of services. In the Asia Pacific region, the service industry base straddles many countries in varying stages of economic development. These countries also have different political, economical, and cultural backgrounds. Hence,

we proposed further research studies to isolate pertinent success factors that can maximize the benefits of ICT applications for selected service industries in this region.

IX. References

Bellis, M. 2000. Eighteenth century inventions: 1700 to 1799. *http://www.about.com*.
_____. 2000. Nineteenth century inventions: 1800 to 1899. *http://www.about.com*.
Berthon, P., Pitt, L., Datsikeas, C.S., Berthon, J.P.,. 1999. Executive insights: Virtual services go international: International services in the marketplace. *Journal of International Marketing* 7, no. 3: 84-105.
Ehrhart, J.M., Siong, S.C., Sinha, A.,. 1998. Singapore electronic commerce framework.
Einhorn, B., Elgin, B., Edwards, C., Himelstein, L., Port, O.,. 2002. High tech in china. *Business Week*.
Javalgi, R., Ramsey, R.,. 2000. Strategic issues of e-commerce as an alternative global distribution system. *International Marketing Review* 18, no. 4: 376-391.
Ko, S., Cho, V.,. 2000. Anatomy of electronic commerce infrastructure in two "asian dragons" : Hong kong and singapore using a generic framework periscope.
Kripalani, M., Engardio, P.,. 2002. Wipro: The live wire in indian high tech. *Business Week*.
Lituchy, T.R., Rail, A.,. 2000. Bed and breakfasts, small inns, and the internet: The impact of technology on the globalization of small business. *Journal of International Marketing* 8, no. 2: 86-97.
Lovelock, C.H., Yip, G.S.,. 1996. Developing global strategies for service businesses. *California Management Review* 38, no. 2: 64-86.
Lynch, P.D., Beck, J.C.,. 2001. Profiles of internet buyers in 20 countries: Evidence for region-specific strategies. *Journal of International Business Studies* 32, no. 4: 725-748.
Magretta, J. 1998. Fast, global, and entrepreneural: Supply chain management, hong kong style - an interview with victor fung. *Harvard Business Review*, no. September-October 1998: 103-114.
Microsoft. 2002. Industrial revolution. *Microsoft Encarta Online Encyclopedia 2002* http://encarta.msn.com 1997-2002 Microsoft Corporation.
Montagna, J.A. 1981. The industrial revolution. *Yale-New Haven Teachers Institute*.
Mooij, M. 2000. The future is predictable for international marketers: Converging incomes lead to diverging consumer behaviour. *International Marketing Review* 17, no. 2: 103-113.
Poon, S., Swatman, P.M.C.,. 1997. Small business use of the internet: Findings from australian case studies. *International Marketing Review* 15, no. 5: 385-402.
Porter, M. 2001. Strategy and the internet. *Harvard Business Review*, no. March 2001: 63-78.
Rao, P.M. 2001. The ict revolution, internationalization of technological activity, and the emerging economies: Implications for global marketing. *International Business Review* 10: 571-596.
Sarkar, M., Butler, B., Steinfield, C.,. 1998. Cybermediaries in electronic marketspace: Toward theory building. *Journal of Business Research* 41: 215-221.

Sasser, W.E., Olsen, R.P., Wyckoff, D.D.,. 1978. Management of service operations: Text, cases, and readings. *Allyn & Bacon*.

Simon, H.A. 1996. What makes technology revolutionary. *Educause Review*: 28-39.

Strader, T.J., Shaw, M.J.,. 1997. Characteristics of electronic markets. *Decision Support Systems* 21: 185-198.

Teo, H.H., Tan, B.C.Y., Wei, K.K.,. 1997. Organizational transformation using electronic data interchange: The case of tradenet in singapore. *Journal of Management Information Systems* 13, no. 4: 139-165.

Walters, P. 2001. Research at the "margin" - challenges for scholars working outside the "american-european" domain. *International Marketing Review* 18, no. 5: 468-473.

Zaheer, S., Manrakhan, S.,. 2001. Concentration and dispersion in global industries: Remote electronic access and the location of economic activities. *Journal of International Business Studies* 32, no. 4: 667-686.

Zou, S., Andrus, D.M., Norvell, D.W.,. 1997. Standardization of international marketing strategy by firms from a developing country. *International Marketing Review* 14, no. 2: 107-123.