

PASCN Discussion Paper No. 2002-09

**The Employment Impact of  
Business-to-Consumer E-Commerce  
on the Philippine Workers**

*Roberto E. de Vera*



The *PASCN Discussion Paper Series* constitutes studies that are preliminary and subject to further revisions and review. They are being circulated in a limited number of copies only for purposes of soliciting comments and suggestions for further refinements.

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September 2002

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## **Abstract**

Public policy- and private decision- makers who are promoting e-commerce need a study that measures the economic effects of e-commerce in the Philippines, particularly on employment growth and changes in the nature of jobs in the future. It is in this context that this study seeks to estimate the impact of e-commerce—specifically business-to-consumer or B-to-C e-commerce—on Philippine workers. Total e-commerce related revenues as of the year 2005 is projected to account for about 1% of (nominal) GDP, contributing up to 8% of GDP growth. Among the 11 industries studied, tour and travel agencies; electrical communication equipment; and forwarding, packing and crating are estimated to grow the most in terms of employment in the next five years, under the three formulated scenarios. However, employment attributed to e-commerce is greatest for tour and travel agencies. The effect on employment of individual industries can be considered insignificant. From 2000-2005, approximately 5,900 additional jobs will be generated for the 11 industries considering the changes in inter-industry relationships (of wholesale and retail trade) as a result of e-commerce. However, in terms of employment generated for the whole economy, there may be significant changes, given an increase in final demand of wholesale and retail trade, as there may be almost 29% additional jobs generated for the whole economy.

## Executive Summary

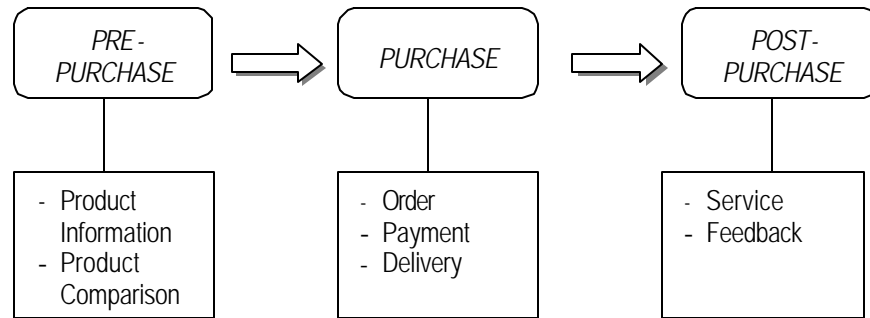
Philippine firms have yet to fully tap the potentials of e-commerce—short for electronic commerce—that will help them to compete in domestic and global markets. In the process of preparing themselves to conduct e-commerce, these firms will be changing the way they do business. These changes are expected to have an impact on the welfare of Philippine workers. Most efforts to measure the economic effects of e-commerce—including those on workers' welfare—have focused on the U.S. and Europe, who are considered to be the leaders in e-commerce. Public policy- and private decision- makers who are promoting e-commerce need a study that measures the economic effects of e-commerce in the Philippines, particularly on employment growth and changes in the nature of jobs in the future.

It is in this context that this study seeks to estimate the impact of e-commerce—specifically business-to-consumer or B-to-C e-commerce—on Philippine workers. Specifically, the objectives of this study are: (1) To formulate different scenarios describing how B-to-C e-commerce will influence purchase processes; (2) To estimate changes in employment levels, with Bto-C e-commerce, for selected industries; and (3) To assess the changes in the nature of future jobs with the coming of e-commerce. Inherent with the advent of any new technology are overly optimistic and pessimistic projections about employment – as was in the case of telephones, computers, automated teller machines, and the like. This study—which is a preliminary attempt to quantify the impact of e-commerce on employment—could provide the needed benchmarks with which to evaluate these various employment projections. It also provides a framework—albeit rendered in broad strokes—which could aid policy makers to formulate programs that will prepare Philippine workers for the changes that e-commerce will bring.

Revenue projections were used to estimate corresponding employment impacts for the 11 industries, as well as for the whole economy, using input-output (I-O) methodology. The projection period for the estimation of the impact of B-TO-C e-commerce on employment is from the year 2000 to 2005. Since actual data obtained was from the years 1990 to 1995, two sets of revenue and employment projections were made—first from 1996 to 2000, and then from 2001 to 2005.

The three scenarios formulated describe the extent as to how B-TO-C e-commerce would influence the purchase process. The use of the internet with traditional channels in different combinations in the purchase process forms the basis for the three scenarios formulated under B-TO-C e-commerce. But in applying the phases to the case of the Philippines, the components of the phases were modified to include the purchases processes (See Figure A). In Scenario 1, only the pre-purchase phase is done in the e-commerce (internet) channel. In Scenario 2, product information, product comparison, order and payment are done on-line, while delivery, service and feedback are done off-line. In Scenario 3, all the phases of purchasing are done through the e-commerce channel.

Figure A. Purchase Process in the Philippines



Total e-commerce related revenues as of the year 2005 is projected to account for about 1% of (nominal) GDP, contributing up to 8% of GDP growth. When compared with Asia and the U.S., these figures suggest that the Philippines has a rather slow pace of adoption of e-commerce. Nevertheless, the steady growth of revenues due to e-commerce, as well as the increase in contribution (in terms of percentage) of e-commerce to GDP growth, also suggest that e-commerce has the potential to have a big role in promoting overall Philippine growth and recovery in the long term.

Among the 11 industries studied, tour and travel agencies; electrical communication equipment; and forwarding, packing and crating are estimated to grow the most in terms of employment in the next five years, under the three formulated scenarios. However, employment attributed to e-commerce is greatest for tour and travel agencies. This implies that from the 11 industries, the greatest impact of B-TO-C e-commerce in terms of employment generation may be felt on tour and travel agencies.

B-TO-C e-commerce is seen to provide an alternative distribution channel in the value chain of industries as the need for some intermediaries may be bypassed. Thus, the points on the value chain that might be affected are those involving distribution, particularly wholesale and retail trade. At the same time, B-TO-C e-commerce is also seen to create new points on the value chain with new kinds of intermediaries. This combination of disintermediation and re-intermediation, which may bring about job gains and losses, will be dependent on the shifting roles of business and further, on the purchase channels and processes that would be influenced by e-commerce.

Assuming partial substitution of traditional revenues by on-line revenues, the proportion of affected jobs in the industries performing intermediary services is somewhat insignificant. Although quantitatively, the impact on employment displacement may be minimal, the nature of work may nevertheless change. Displaced or possible affected employees of the intermediary services, as a result of increasing on-line activities and revenues, may be deployed as support staff, where applicable. For instance, travel and advertising agents, sales personnel from retail stores, and securities dealers and brokers may lose the importance of their jobs, as these may be replaced by the internet channel. However, agents, dealers, brokers, as

well as sales personnel may be deployed as customer service staff – attending to the needs of on-line customers or re-trained to monitor on-line orders and transactions. In other cases they may also be promoted to higher management or supervisory levels. Moreover, employment displacement effects may be overtaken by expansionary effects brought about by the projected increases in demand, and thus in revenues for all the industries. While it is true that some job descriptions may become obsolete in the coming years, it is also true that the new intermediaries and companies that are expected to arise with B-TO-C e-commerce will bring in new jobs. Thus, overall job creation may absorb possible job losses with substitution of traditional by on-line revenues.

The effect on employment of individual industries, considering the changes to be brought about by B-TO-C e-commerce on the industrial relationships between the wholesale and retail trade sector with the other sectors of the economy, can be considered insignificant. For example, from 2000-2005, approximately 5,900 additional jobs will be generated for the 11 industries considering the changes in inter-industry relationships (of wholesale and retail trade) as a result of e-commerce. However, in terms of employment generated for the whole economy, there may be significant changes, given an increase in final demand of wholesale and retail trade, as there may be almost 29% additional jobs generated for the whole economy. With partial substitution, and again considering the changes in industrial relationships of trade, significant changes in employment generated for the whole economy is seen only for office and school supplies retailing, and textile and wearing apparel retailing-affecting 29% more employees than if the industrial relationships as of 1994 were still followed.

Since the economy in general is projected to expand with e-commerce, this study suggests the need for more policies that will first, promote e-commerce, such as Republic Act 8792, or the E-commerce Act. Secondly, for the development of B-TO-C e-commerce, it is essential to have the proper infrastructure in place, such as adequate phone lines and PC's. Since most people cannot afford these types of media to be connected to the internet, the promotion of alternative means to PC's and the provision for affordable telecommunications services is thus required. An example is the deregulation of the telecommunications industry, particularly the cellular phone service sector, which was already started a few years ago. This has enabled a number of telephone companies to help in the provision of additional telephone lines, especially in the provinces. It has also made the cellular phone more affordable, as evidenced by the surge in subscribers in recent years. In the same light, encouragement of new entrants into internet-enabling businesses such as internet service providers (ISP's) and cyber-café business and the like, through, perhaps the removal of some barriers or granting of benefits, will also be beneficial to the promotion of e-commerce. Likewise, encouragement of investments in the information technology (IT) to provide the support for newly formed companies and joint ventures, is also important.

Sector-specific policies are also needed especially in the case of tour and travel agencies; electrical communication equipment; and forwarding, packing and crating – the top three sectors that are expected to have the largest percentages of employment increases in the next five years. There may be a need for more administrative staff, particularly for call support, for tour and travel agencies. For the

electrical communication equipment sector, additional production staff (factory workers) may be required, especially in the semiconductors industry, which is also classified under this sector, and provides the necessary infrastructure for e-commerce to flourish. Both computer proficient staff to manage transactions, and production workers are essential for the forwarding, packing, and crating sector as firms migrate their operations into the internet and as other industries, specifically the retail trade, may need more of its services. This would result from more intangible goods being delivered to various warehouses and homes, owing to the nature of fulfillment with e-commerce.

In general, we will see changes in the nature of work – from the front to back office is likely within the sectors performing intermediary services. These sectors are: newspaper/periodical publishing and printing; book, office and school supplies retailing, dry goods, textile and wearing apparel retailing; tour and travel agencies; mail and express; securities dealers/brokers; and advertising agencies. Employment demand for these industries, therefore, may be focused away from agents and blue-collared workers, toward higher-end management and administrative staff. Industries that are indispensable for the growth of e-commerce—electrical communication equipment; forwarding, packing and crating; telephone services; and engineering and technical services—may experience a steady or increasing demand of both production workers and managerial level personnel due to the expected increase in demand of their services in the coming years. All these imply the need for multi-skilled employees, as well as a re-training of existing employees.

Having thus identified some of the sectors that might be significantly affected by B-TO-C e-commerce, it is essential for policy makers to be prepared with the possible consequences of this so-called new way of conducting business. By doing so, we would be able to reap the benefits of e-commerce, and in the process enable it to contribute to the growth of our economy.

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# **The Employment Impact of Business-to-Consumer E-Commerce on Philippine Workers**

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## **I. Introduction<sup>1</sup>**

Philippine firms have yet to fully tap the potentials of e-commerce—short for electronic commerce—that will help them to compete in domestic and global markets. In the process of preparing themselves to conduct e-commerce, these firms will be changing the way they do business. These changes are expected to have an impact on the welfare of Philippine workers. Most efforts to measure the economic effects of e-commerce—including those on workers' welfare—have focused on the U.S. and Europe, who are considered to be the leaders in e-commerce. Public policy- and private decision- makers who are promoting e-commerce need a study that measures the economic effects of e-commerce in the Philippines, particularly on employment growth and changes in the nature of jobs in the future.

It is in this context that this study seeks to estimate the impact of e-commerce—specifically business-to-consumer or B-to-C e-commerce—on Philippine workers. Specifically, the objectives of this study are: (1) To formulate different scenarios describing how B-to-C e-commerce will influence purchase processes; (2) To estimate changes in employment levels, with B-to-C e-commerce, for selected industries; and (3) To assess the changes in the nature of future jobs with the coming of e-commerce. Inherent with the advent of any new technology are overly optimistic and pessimistic projections about employment – as was in the case of telephones, computers, automated teller machines, and the like. This study—which is a preliminary attempt to quantify the impact of e-commerce on employment—could provide the needed benchmarks with which to evaluate these various employment projections. It also provides a framework—albeit rendered in broad strokes—which could aid policy makers to formulate programs that will prepare Philippine workers for the changes that e-commerce will bring.

## **II. Review of Related Literature**

We will adopt the definition of e-commerce to consist of “transactions where the Internet is used to gather information, to order goods or services, and to make payments (World Bank, 2000).” Here, transactions refer to “all activity that generates value both within a firm (internally) and with suppliers and customers (externally) (OECD, 1998a).” The latter transactions are called business-to-business (B-to-B) and business-to-consumer

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<sup>1</sup> We are grateful to the Philippine APEC Study Center Network for providing the funds to undertake this research project.

(B-to-C) e-commerce, respectively. The internet can be understood to be a network supported by non-proprietary communication and information technologies with open standards in order to support universal connectivity. We may say that e-commerce is just one application of the internet, and that the internet forms part of the broader information and communication technology (ICT) sector.

This review of related literature will cover the issues and relationships e-commerce and (a) economic rules and theory, (b) the way business is done, (c) its effect on industries and employment, and (d) its trends and prospects in the Philippines.

#### A. Economic Rules and the New Economy

Varian (1999) argues that the fundamental principles with regard to competition are very much relevant to the new economy considering the changes ushered in by e-commerce. These principles include marketing, interconnection and price matching. According to him, marketing is very much present in e-commerce since e-tailers use versioning<sup>2</sup>, loyalty programs and promotions to increase their market shares. Interconnection is also of the utmost importance, as consumers want to be connected to a large a network as possible. Finally, intense price competition would also prompt merchants to look for ways to increase customer loyalty and to adopt pricing strategies to reduce the intensity of the competition.

#### B. Changing the Way Business is Done

Whether or not the economic rules are applicable to the new economy, it is definite that e-commerce is affecting the conduct of business. An evidence of this is the changing cost structure of firms, as discussed by the OECD (1998a).<sup>3</sup> This involves the following: the cost of executing the sale; the procurement of production inputs; and making and delivering the product.

Cost reduction when executing a sale via e-commerce compared with that of a traditional bricks-and-mortar store, cover first, physical establishment. It is true that it can cost a lot to start a website. However, it is more expensive to maintain a physical store compared with a virtual store that is open 24 hours a day, seven days a week, and can be accessed by anybody, anywhere.

It also has few variable costs so that it can scale up to meet demand. By maintaining one virtual store, instead of a number of physical stores, duplicate inventory costs and other fixed costs are eliminated. Second, order placement costs are also lessened when operating under a clicks-and-bricks model. Electronic commerce merchants can transfer some of the transaction costs to the customer by placing the necessary information about a product on-line. For example, after a prospective customer searches for the product (together with its specifications) that he wants, and compares

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<sup>2</sup> Versioning, also called quality discrimination, consists of offering different versions/qualities of a good which sell at different prices with the view of sorting consumers according to their willingness to pay.

<sup>3</sup> Organization for Economic Cooperation and Development.

prices with other brands, the customer is now more likely to buy when he comes to the physical store. The efficiency of the sales process is thus increased. With the pure virtual store, costs are also minimized since advertising can be cheaper and more focused on a target market. Merchants can also easily track orders, receipts and delivery. Third, the need for customer support or after-sales services can be minimized. Apart from transaction costs, firms are also able to transfer customer support on-line so to make customers access databases or manuals directly, thereby significantly cutting after-sales service costs and improving the quality of service. Finally, the need for employees may decline as firms turn to e-commerce, as evidenced by the experiences of U.S. companies such as Amazon.com, Federal Express, CISCO and G.E. Nevertheless, the skills required from employees may be a little higher.

The cost reduction in the procurement of production inputs constitutes the need for less inventory. The faster an input can be ordered and delivered, the less the need for a large inventory. For instance, through orders from its website, Amazon.com need not stock up on books and videos. They merely order straight from the publishers and ship them to customers as soon as they receive the orders. But more importantly, e-commerce gives firms the ability to forecast demand more accurately. Consumers who customize their orders or select from different choices give merchants valuable information about their preferences, thereby improving the merchants' ability to forecast demand. Merchants can now attune their product lines with the preferences of their customers.

The costs of distributing the product are significantly reduced for digital products such as financial services, software and travel. Since these products can be downloaded into the customer's computer without incurring shipping costs, these are the sectors that are have migrated to e-commerce early on.

The U.S. Department of Commerce (1998), in describing how firms can benefit from e-commerce, also utilized the concept of the changing cost structure of firms. Apart from having lower purchasing costs, reduced inventory, efficient customer service, lower sales and marketing costs, their study adds that e-commerce gives new sales opportunities. Today, businesses on the web can reach new markets that they could not previously reach effectively with its sales force or advertising campaigns. Since e-commerce provides no bounds in terms of time, space and distance, firms are thus able to expand their target markets. In fact, the study reveals that companies using the internet to sell their products are attracting new customers, as in the case of Dell Computers where almost 80% of the consumers who purchased from their website have never purchased from them before.

On the end of consumers, e-commerce is affecting business through consumer empowerment. The U.S. Department of Commerce (1998) notes that with e-commerce, there is an increase in customer choice, convenience, complete information, lower prices, and customization. With various websites to choose from, consumers are not anymore limited to the physical stores that are near their homes or offices. Customers can shop even from stores in different countries. For instance, with most newspapers publishing on-line, readers can now access information from newspapers around the world.

The number one reason cited by consumers for making a purchase on-line is that of convenience. Indeed, shopping on the internet can save time. In traditional commerce, a consumer would go to stores to look for a particular item he is interested in buying and then compare the prices from different stores. But with the internet, this whole exercise can be done in a matter of minutes. Through search sites and shopping agents, consumers can easily compare prices of products from different merchants.

Consumers also obtain better and more complete information by shopping on the web. For instance, pertinent information when buying a car (such as the make and model, performance, accessories, financing and insurance options) are now made available through websites of car dealers, thus serving as a one-stop-shop for consumers to ease in the time and process of their decision-making.

It is true that some internet retailers offer discounts, despite the infancy stage of e-commerce. One reason for this could be the decline in the firms' cost structure when selling over the web. Another source of price discounts is the stiff price competition on the internet brought about by transparency as a result of the use of search engines and shopping agents. The U.S. Department of Commerce (1998) study also comments that if retailing would continue to grow in the internet, the nature of competition and favorable economics in the internet could translate into lower prices for the average consumer.

Finally, e-commerce offers the potential for increased customization. Several businesses over the web already offer this to consumers, particularly the media businesses. Readers may select the type of news they want delivered via e-mail. Buyers of computers may also customize what they will be buying to suit their needs and preferences. This is made possible through the concept of one-to-one marketing. While this seems to be an advantage for the consumer, firms are also benefited since they can now seek to establish close relationships with customers, in order to develop customer loyalty.

The foregoing proves that the consumer is greatly empowered with e-commerce. Forrester Research, Inc. (1998a) agrees with this, as it sees the internet develop into another channel (aside from traditional, catalog and telephone) for purchasing products, and as it increases its influence on consumers. The study particularly describes that power will be shifted from producer to consumer. Aside from giving consumers a new tool to gather information and purchase easily, compared with traditional channels, the use of the internet for pre-purchase and post-sale is presently exploding, regardless of where the product was bought. This implies increased involvement and, thus, empowerment for the consumer in the purchase process.

### C. Effect on Industries and Employment

Apart from changing the cost structure of firms, e-commerce is also changing the cost structure that is formed by a firm's relationship with other businesses – known as the

value-added chain.<sup>4</sup> At every stage of product processing, an intermediary often performs a service, facilitating the flow, but also adding both value and cost. The main argument of the OECD (1998a) is that e-commerce may reduce the involvement of intermediaries in the value-chain (disintermediation) and thus lower costs, especially for the intangible goods. Their study outlines two types of intermediaries – margins and services.<sup>5</sup> Margins typically perform three services—transportation, wholesaling, and retailing. The OECD proposes that the largest effect would be the elimination of the services provided by wholesale and retail trade. It was then found out that the impact of disintermediation was relatively modest—about a 6% decrease in wholesale trade margins and a 9.6% decrease for retail trade margins.<sup>6</sup> The study further explains that this slight impact of disintermediation may be due to the fact that many of the consumers' product expenditures are allocated for products that are already sold directly to consumers.

Moreover, a number of the sectors identified to be currently involved in e-commerce such as banking, education, and health, use relatively few intermediaries. In the case of tangible goods like books and CD's, the study notes that the new e-commerce merchants are merely competing with existing intermediaries for the retail role, and not replacing them. In the near term, many firms will sell their products in both distribution channels, as they experiment with e-commerce. The foregoing analysis somehow reveals the complementarity of traditional commerce with that of e-commerce. The OECD (1998a) thus concludes that disintermediation due to the elimination of the wholesale and retail sectors as an intermediary is likely to be important for some sectors, but relatively small in the overall.

As e-commerce might bring about disintermediation, one implication is that there might be enhanced dependency on some intermediaries, and a creation of entirely new intermediary functions (reintermediation). The OECD (1998a) also names three intermediary services that have the largest potential in the future – advertising, secure online payment, and delivery.

Advertising is essential, even in e-commerce, since it is responsible for creating brands. The trend nowadays is the development of a system of affiliates, wherein e-commerce merchants pay for referrals, direct link from portals, or techniques that drive traffic towards their site. For example, e-Toys pays 25% of the sale price of a product to the referring affiliate. Meanwhile, Amazon.com has around 30,000 affiliates that share from 5% to 15% of the sale.

With regard to secure on-line payment, credit card is considered to be the dominant on-line payment method so far. Morgan Stanley (1999) foresees a limited threat from alternative payment systems, since consumers are reluctant to adopt a payment method that is not widely accepted and is relatively inconvenient. Furthermore, the report

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<sup>4</sup> The value-added chain traces the stages that a product travels – from the raw materials to the final state.

<sup>5</sup> Margins are those located between the producer of tangible goods and consumers such as wholesalers and retailers, while services are those that act as intermediaries for other services, such as travel agents, etc.

<sup>6</sup> Sensitivity tests were done on the 1992 U.S. consumer expenditures, so as to know the impact of e-commerce on distribution margins (wholesale and retail trade).

predicts that credit card issuers will rely on the internet for distribution and services, following the present declining trend of direct mail response. In effect, e-commerce would rely heavily on the credit card industry as an intermediary in the fulfillment of payment, but at the same time, the industry would also depend on e-commerce for its marketing.

Delivery/logistics also plays an important role since it completes the transaction process, especially with regard to intangible products. This is also a main factor of convenience on the part of consumers, since goods may be delivered right at their doorsteps, and software and services downloaded in their computers.

How disintermediation and re-intermediation play out will set the tone for the demand of jobs in the future. According to the OECD (1998a) report, assessing the impact of e-commerce on employment would depend on the understanding of which industries it will generate new demand and growth, which type of jobs will be destroyed, and what the overall needs are in terms of skills. The report outlines two effects on employment—the direct effect, which is anchored on activities that have replaced existing ones, and the indirect effect, which depends on the multiplier effect of e-commerce related industries on the other industries of the economy.

The U.S. Department of Commerce (1998) foresees that an increase in the share of web-related revenues of industries will bring about a change in the percentage required for production and delivery. A follow-up study (U.S. Department of Commerce, 1999a) emphasizes the increasing employment demand in Information Technology (IT) industries for the U.S., as these industries are aiding in the development of e-commerce and at the same time, are playing an important role in the growth process. The study also describes the churning effect of employment gains and losses in the IT industries. Technological breakthroughs are causing job losses, for instance in the hardware sector where processes have become automated, but at the same time, are also creating jobs in some sectors. As jobs are currently being re-defined, the study sees that e-commerce will pave the way for workforce flexibility, where workers have the ability to do other jobs than their present job descriptions. There is also the expectation of the increase in the demand for IT-jobs, together with the minimum skill requirement prompting a decline in the demand for less-educated workers. Jobs identified to have greater demand are those related to shipping and delivery services, on-line content, and desktop publishing. On the other hand, those perceived to have less demand include travel agents, stockbrokers, bank tellers, and communications equipment operators.

Databank Consulting (1998a) made a preliminary estimate to calculate the multiplier effects of e-commerce on employment in France, Germany, Italy and the U.K. By utilizing input-output framework and methodology, three types of economic effects were obtained – direct effects produced by e-commerce revenues in the industries directly involved, indirect effects generated by inter-industry linkages, and second order effects determined through the basic Keynesian income-consumption circuit from the value-added generated in the first-order round. The results reveal that indirect and second-order effects for employment requirements are large enough to counterbalance the direct losses

of jobs (assuming a 100% substitution rate of e-commerce with traditional industries), with the exception of the case of Germany. This also confirms the potential of e-commerce to create jobs in the future. Their estimates also show that e-commerce businesses that rely on labor-intensive intermediaries (like those belonging to the consumer products segment) will directly eliminate a larger share of direct jobs. This proves that the pace of adoption of e-commerce in the different segments will impact the overall employment scenario.

#### D. Recent Trends and Prospects for Philippine E-commerce

Although the Asia-Pacific holds much promise with regard to e-commerce, estimates for the Philippines reveal that it has one of the lowest number of personal computers (PC's) within Asia (Merrill Lynch, 2000). There were only 1.1 million estimated PC users out of 75 million as of year-end 1998, accounting for a meager 1.5% PC penetration. Merrill Lynch (2000) estimates that there are 420,000 on-line users in the Philippines – less than one-tenth of on-line users in South Korea. This figure for the Philippines also implies that only 0.5% of the population is on-line, compared to Singapore's 24.5%. In addition, only 0.9% of Filipino internet users shop on-line—a stark contrast to 40% in Singapore. These figures, thus, suggest a modest PC infrastructure. Furthermore, the drop in teledensity from 9.08 lines per 100 persons in 1998 to 9.04 in 1999, also implies a poor telecom infrastructure. Merrill Lynch considers our present PC and telecom infrastructure as the obstacles to growth of the internet industry in our country.

But as these factors may be considered to be the barriers to the growth of the Philippine internet industry, the underdeveloped infrastructure of the multi-media also suggests that the Philippine market offers substantial long-term growth. The report by Merrill Lynch highlights that the Philippine internet industry is at the critical take off stage, wherein it could become a major center for e-commerce given the country's large English speaking population and its affinity for Western culture. Recent trends seem to support this claim.

A study done by an Australian company ([www.consult.com](http://www.consult.com)) revealed that Filipinos are avid cybershoppers, spending hundreds of dollars each time they ordered something from the net.<sup>7</sup> Moreover, Visa International reports that there is a sales boom in the Philippines in terms of credit card purchases, as Filipinos are becoming more inclined to use plastic than cash for their purchases.<sup>8</sup> Although this pertains to off-line purchases, it nevertheless implies a willingness of Filipinos to pay in credit, which is the dominant on-line payment method in e-commerce. Already, e-commerce is slowly starting to make its presence felt in the country. In Metro Manila, internet users can plan vacations, book airline tickets, purchase clothing, furniture and movie tickets, conduct international phone calls, bank and have pizza delivered to their homes and offices via

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<sup>7</sup> "Many Asians Are Nervous About Cybershopping, But Not Pinoy," *Philippine Daily Inquirer* (June 26, 2000).

<sup>8</sup> Elena R. Torrijos, "More Filipinos Now Use Plastic Than Cold Cash," *Philippine Daily Inquirer* (June 4, 2000).



the worldwide web. But there remains the skepticism on the response of Filipinos to all these hype on e-commerce, given that only a fraction of the population has computers and access to phone lines. The answer to this is that maybe Filipinos won't need computers and phone lines to conduct e-commerce.

Portable wireless devices, with the mobile phone at the forefront, can and will connect users to cyberspace, bypassing the need for PC's and telephone landlines. Results of a study done by Mckinsey & Co. find that mobile phones will become the primary means by which Asians will access the internet in the near future. This follows from the fact that mobile phones have a far higher penetration rate than personal computers and that Asian consumers are showing tremendous demand for access to the wireless web.<sup>9</sup> As of 1998, Philippine cellular phone penetration was estimated at 2.4%, while PC penetration was only at 1.5%. Overall subscribers in the cellular market also grew by 64% from 1998 to 1999.<sup>10</sup> Estimates by Merrill Lynch place wireless application penetration for the Philippines at 4.5% as of December 2000. Presently, Filipinos are using their cellular phones to transact various businesses and gather data. This is evident from the mobile banking services provided by banks such as BPI, Equitable, DBS Bank and TA Bank. Smart and Globe also offer bill payment through mobile phones, while Smart recently launched its on-line trading service. Furthermore, the trend of convergence of technologies is evident in Smart's recent joint venture with Mastercard—Smart Money. With the Smart Money card, subscribers of Smart may load up on airtime and text credits, transfer funds to their card, purchase and even order goods from stores. Thus, banking and purchasing are combined with the services of the cellular phone to provide convenience for the consumers.

In addition, the past two years has seen the emergence of cyber cafes—where an individual who does not own a PC can gain access to the internet. It is in a sense, a variation to just merely renting computers for use, and together with wireless devices such as cellular phones, is a possible solution to the low PC penetration in the country.

Hence, even without a high PC penetration, we can sense a proliferation of e-commerce activities through the creation of B-TO-C websites such as infinitymalls.com, Divisoria.com, Pinoymall.com, PhilShop, and myayala.com. The recent signing of the E-Commerce Bill provides the legal framework for e-commerce, whereas the formation of an on-line purchasing firm<sup>11</sup> would enable firms to purchase supplies and heavy equipment on-line. Although on-line purchases may still be minimal at the moment, these developments prove that the Philippines is slowly feeling the presence of e-commerce.

Based on the recent trends for the Philippines, it can be said that e-commerce is definitely here to stay and there is no escaping it. As the experience of the U.S. and Europe show, the effects of e-commerce are expected to be felt by all—firms, consumers

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<sup>9</sup> "On the Wireless Web Frontier, Asia is the Pioneer," *Philippine Daily Inquirer* (May 29, 2000).

<sup>10</sup> Data from the National Telecommunications Commission published by the Philippine Daily Inquirer in its special project section (July 12, 2000).

<sup>11</sup> The on-line purchasing firm was formed by six companies namely: Aboitiz Equity Ventures, Inc., Ayala Corp., JG Summit Holdings Inc., PLDT, and United Laboratories Inc.

and workers. But as of now, we are still in the dark as to how e-commerce will impact our lives. It is evident from the discussions above that presently, there are no e-commerce studies centered on forecasting or estimating as to how e-commerce will affect businesses in the Philippines. There is also no existing Philippine framework as to how to analyze the possible effects of e-commerce to our economy. The OECD (1998a) notes that first and foremost, methodologies for measuring e-commerce, its growth and possible effects, need to be developed.

Moreover, sector-specific impacts of disintermediation and re-intermediation were also suggested as key areas for future research. Since e-commerce is only beginning here in our country, the formulation of different scenarios as to how e-commerce will affect consumer purchase would be key in not only measuring e-commerce, but also analyzing its possible effects on several industries, especially with regard to employment. Although there are statistics to show the underdeveloped stage of e-commerce infrastructure in the Philippines, the pace of e-commerce adoption by Filipinos still seems unclear at present. Different scenarios would therefore describe the different ways as to how e-commerce may be used and adopted in the future. From here, knowledge can be gained on the possible ranges of effects it would have on various industries, and the whole economy as well.

### **III. Conceptual Framework**

#### **A. Disintermediation**

As with any new technology that a country adopts, there may be potential impacts on employment. With regard to e-commerce, the most visible concern is that some of the efficiencies associated with it may result in widespread dislocation of jobs because most of the intermediary functions in traditional commerce can be eliminated (disintermediation), as e-commerce is expected to change the structure of the value-chain of industries.

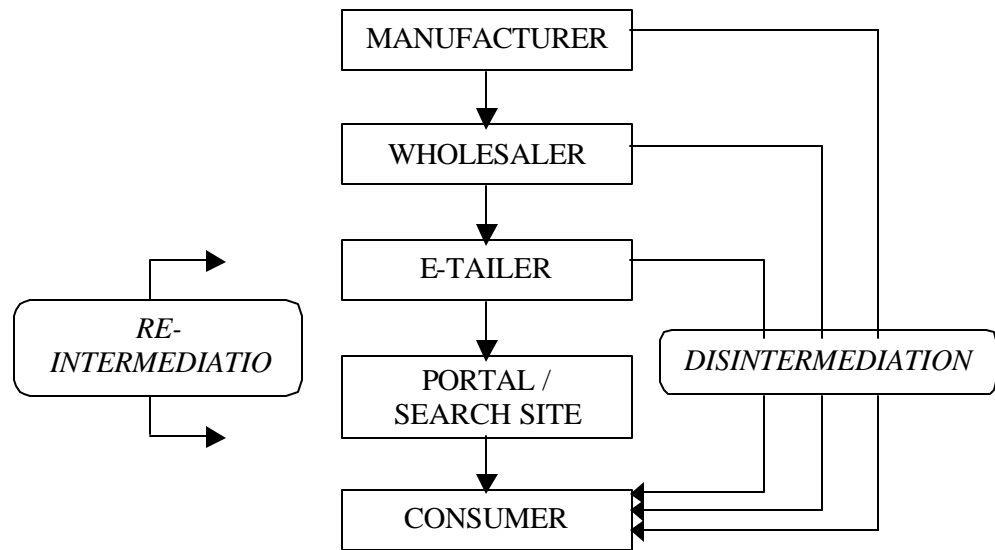
With the entry of e-commerce, manufacturers will be able to sell directly, and sellers may become intermediaries themselves. For instance, in the U.S., Dell Computers sells directly through its website, while some airline companies, offering tickets through their websites, act as their own travel agencies.

With the assumption that intermediaries make the transfer of goods and services inefficient, merely adding business costs to both seller and buyer, e-commerce is seen to facilitate the removal of these processes that intervene between buyers and sellers in traditional commerce. Disintermediation through e-commerce is viewed as a way to make the transaction structure more efficient by centralizing and automating routine business processes, thereby eliminating the traditional middleman.

## B. Re-intermediation

Apart from the disintermediation caused by direct sales by manufacturers or wholesalers to consumers, e-commerce can also create new points on the value-chain such as portals that act as shopping malls, and e-tailers (on-line retailers) that sell products in websites (See Figure 1). For instance, a buyer of an airline ticket may purchase a ticket from the airline company directly, or through an on-line travel agent, which he may find through a search site (Yahoo, Excite, etc.).

Figure 1. Rebuilding the Value Chain



Source: The Economist (2000a)

Early on, disintermediation brought about by e-commerce was thought to be a good thing since it would bring savings to both manufacturers and consumers at the expense of those in-between. But what e-commerce is doing is changing the role and function of intermediaries, not eliminating them.<sup>12</sup> In the long-term and in the extreme case, as e-commerce gains popularity, we may see physical storefronts closing down. But this does not mean the demise of wholesaling and retailing. Rather, we may see physical stores moving to the internet to become virtual stores – from bookstores, banks, securities/stock brokers, travel agencies, advertising agencies, etc. These types of firms may be regarded as those with re-defined roles and functions, since they now act as middlemen over the web – not only selling goods and services, but also providing information about these goods and services. These firms may either have an existing physical establishment and would branch out into the web to expand its services (the ‘clicks-and-bricks’ type), or they may be start-up companies purely engaged in business

<sup>12</sup>“Shopping Around the Web,” *The Economist* (February 26-March 3, 2000), Vol. 354, no. 8159, B15.

over the internet ('pure play' types). The former would include Barnesandnoble.com, Toysrus.com, JCPenny.com, and the like, while Amazon.com, Ebay.com, Etoys.com and Buy.com belong to the latter. Still, there are entirely new types of intermediaries such as search sites, shopping agents and market places. The principal service provided by many of these new intermediaries is convenience for the consumer – a primary reason why consumers purchase on-line.

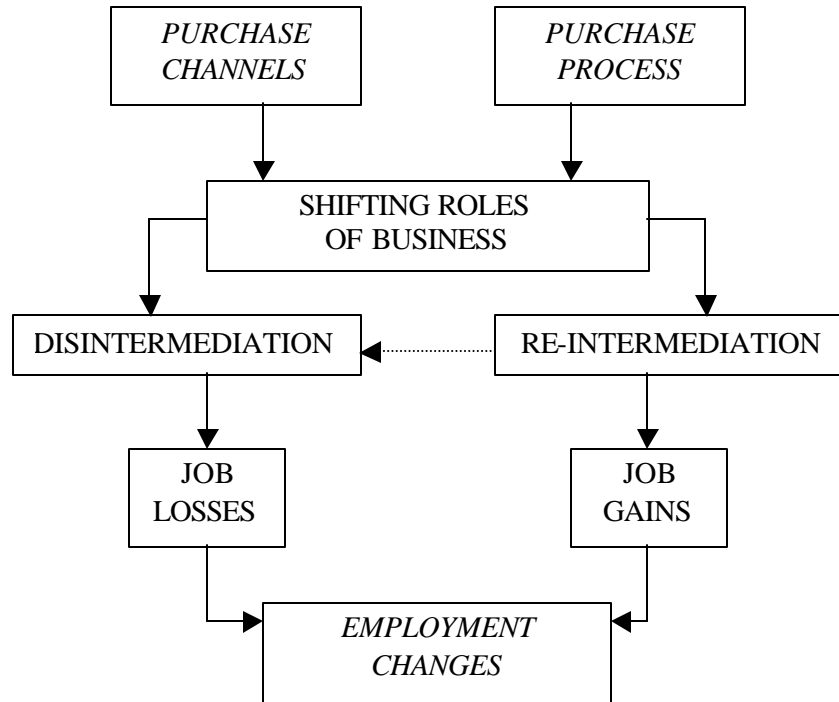
## B. Purchase Channels and Purchase Process

Traditionally, there are three purchase channels—face-to-face, catalog and phone. The internet is seen as another channel, and its development as a fourth channel will result in an increased influence for consumers.<sup>13</sup> The face-to-face purchase is considered as the traditional way of selling to consumers, wherein buyers visit the physical stores, order and pay for their desired good/service, and receive the said good/service. Catalog and phone purchase are add-ons to the traditional face-to-face, and are more popular in North America. Basically, these channels add convenience for the consumers since with them, shopping can now be done in their homes or offices. Under these channels, orders are placed by mail, in the case of catalog, and by phone in the case of the phone channel. Payments can be made by check or by credit card, while the goods are delivered to the consumers' doorstep. There are also different ways of advertising products to buyers. In the catalog channel, buyers are made known of the products in magazines, while in the phone channel, it is through TV or also through magazines. From here, it is already evident which industries will play a substantial role in each channel. For instance, the printing and publishing industries are essential in the catalog channel, wherein the telecommunications and advertising have greater roles in the phone channel. But delivery services are needed in both catalog and phone. In the traditional channel, delivery service would have a weaker role since consumers themselves receive the goods in the stores.

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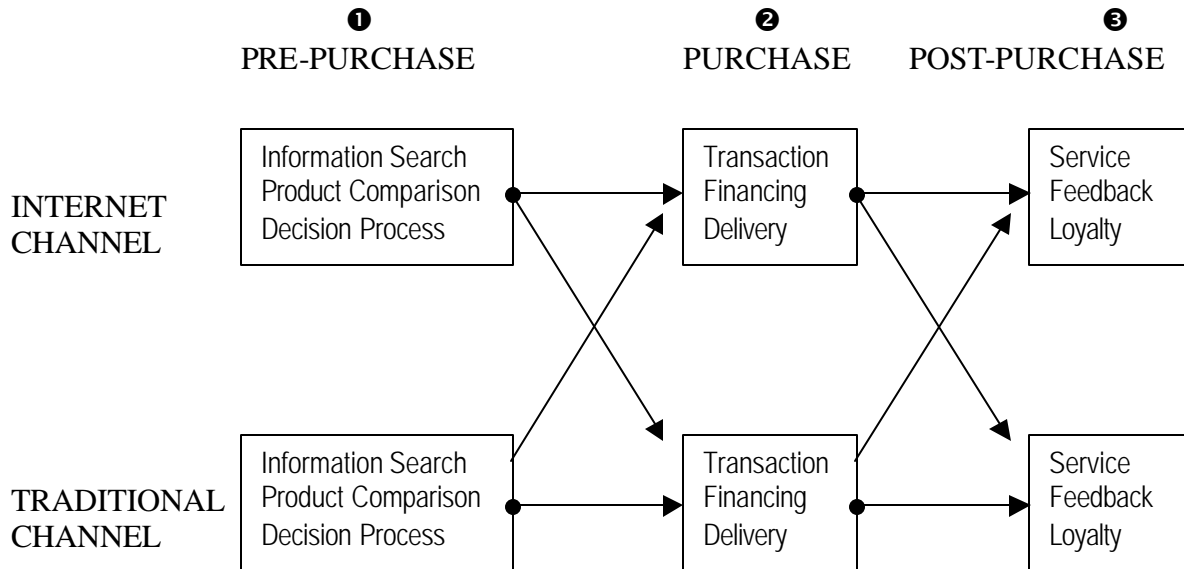
<sup>13</sup> Forrester Research, Inc., "Retail Power Shift," *The Forrester Report* (April, 1998), <<http://www.forrester.com>>, 5.

Figure 2. Determinants of Employment Changes



With the traditional channel, all phases of the purchase process are done in the physical storefront—pre-purchase, purchase and post purchase phases. The pre-purchase phase consists of information search, product comparison and decision process. This is essentially what transpires in shopping—when consumers go from one store to another to obtain information about a product, physically inspect it, and compare its price with that of the other stores. The actual buying of the product is embodied in the purchase phase, where transaction, financing and delivery are included. In most goods, there is no delivery involved since the consumer himself picks up the goods that he bought. There is financing in cases when purchases are made through credit card payments, and with expensive goods such as cars, real estate and large appliances, through installment payments. In goods and services where applicable, there is also the post-purchase phase where service, feedback and loyalty fall under.

Figure 3. Multiple Channels in the Purchase Process



Source: Forrester Research, Inc. (1998a)

Even though e-commerce is still in its early stages, it is expected to influence consumers in their purchase process through purchases from the internet. Regardless of which channel the customer actually buys from, e-commerce can play a greater role in the purchase process (See Figure 3). As the figure illustrates, the traditional and internet channels may be used in different combinations in the purchase process. For instance, the internet may be used in the pre-purchase, then the traditional channel in both the purchase and post-purchase.

A shift to the internet channel will enable those businesses with re-defined roles (clicks-and-bricks and pure plays) to have a greater participation in the purchase process. Furthermore, as e-commerce gains acceptance and popularity, the new intermediaries' role will consequently be highlighted. Still, all these would depend on which channel is used on the different phases of the purchase process. If the internet is more widely used in product information, then search sites and shopping agents would be more in demand. Between clicks-and-bricks and pure play companies, the types of businesses that would be supported by e-commerce would also depend on the combination of the purchase channels and purchase process.

For instance, there will be a greater demand for pure play companies if all of the phases of the purchase process are done through the internet. A firm selling theater/movie tickets on the internet would have a greater role when the transaction phase is done in the internet and delivery through the traditional channel. But when all of the phases of the purchase process are performed on-line, both clicks-and-bricks and pure play type firms

have the incentive to enter the market. In such case, a bookstore selling purely on-line such as Amazon.com, and a clicks-and-bricks store such as barnesandnoble.com can both participate and compete in book retailing. In contrast, when pre-purchase is done on-line and the actual purchase is done off-line, then retailers such as Amazon.com may find it hard to compete with those that have a physical store where customers can pick up the books they ordered.

A salient part of the interplay of re-intermediation with disintermediation (See Figure 2) is the extent to which the new intermediaries, or those businesses with re-defined roles will replace those that have been disintermediated. As some intermediaries lose their importance in the value chain, there can be job losses. But at the same time, new intermediaries can also bring in new jobs. As long as the new intermediaries generate new jobs, and old intermediaries are not fully disintermediated, then there would be overall net creation of jobs.

As businesses lose their importance and are taken out of the value-chain, job losses may follow suit, whereas newly formed businesses such as emerging new intermediaries and pure-play type firms that have entered the market, would be able to generate new jobs. With e-commerce, roles of some businesses may weaken, triggering a possible decline in revenues, and eventually cause disintermediation. Still, new companies may be formed as their business roles are enhanced. Thus, both disintermediation and re-intermediation are dependent on the shifting roles of businesses. But what determines the shifting roles of businesses? With B-TO-C e-commerce, business roles will depend on first, the channel of purchasing and second, on the purchase process of goods and services (See Figure 2).

### C. Employment Effects of E-commerce

At this point, it should be useful to present a framework that shows the employment effects of e-commerce development.<sup>14</sup> More specifically, the framework attempts to provide the reader with an understanding of the impact of e-commerce growth in terms of: a) the respective industries where workers will be hired and fired; b) the types of jobs that will be created and destroyed; and c) the mix of skills that will be needed to sustain it. Considering that e-commerce is still in its infancy, the observations made here will be of a speculative nature.

First, e-commerce will affect the employment in a wide range of industries. Its employment impact will be the net effect of new jobs created—directly or indirectly—and present jobs destroyed by the substitution of traditional jobs by e-commerce ones. Directly affected is the logistics sector—i.e. consisting of firms offering trucking, packaging, warehousing and management services—since e-commerce provides a new channel of supplying and delivering goods and services. Here, the creation of jobs due to the increase in deliveries of goods ordered on-line may be only partially offset by the

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<sup>14</sup> Except for the Philippine examples, this discussion is mostly drawn from Chapter 4 of OECD (1998a).

decrease in the delivery of print documents—such as contracts and architectural designs—due a greater facility to send them through the internet.

Indirectly affected are industries with firms either supply inputs to or use the products of e-commerce companies. These are: a) information and communication technology (ICT) industries—such as firms in data networking/telecommunication equipment, internet service providers, internet security equipment and software—that build and maintain the infrastructure of e-commerce; b) content-related industries that produce digital products such as firms in applications software, enterprise and related software, internet/on-line consulting and development; and c) transactions-related industries where firm operations are affected by the size and type of economic transactions. Examples of these industries are organisation/aggregation, on-line services/information services, publication, transaction processing, financial services, and on-line commerce.

These industries take a sizeable employment share. For example, these industries respectively account for about one-third and one-fourth of total employment in United States and the European Union. These industries also exhibit a wide range of employment growth rates and skill composition. In terms of relative contribution to total employment growth, the 1996 US and EU shares are 2.2% and 0.5%, respectively. In terms of skill composition, the financial sector typically has a higher share of high-skilled workers than the other industries but these shares varied widely across the five countries selected—US, Canada, Finland, France and Japan.

E-commerce will have both direct and indirect effects on employment. First, the direct employment impact of e-commerce will be the balance of complementarity, substitution and market size effects. For example, e-commerce may create jobs in online activities—such as web designers, call support and software designers—that complement the jobs supporting traditional off-line activities as these activities exist hand-in-hand in the short run. In the long run, these on-line jobs may substitute the off-line jobs when the activity goes totally on-line especially in the case of services and digitized information products such as videos, music CDs, software and round-trip airline tickets. However, in other industries, say the auto and appliance industries, where cars and washing machines are still delivered and serviced off-line, e-commerce jobs complement and will not totally substitute the jobs of off-line activities.

E-commerce, through the capacity of the internet to enable collaborative work, creates new markets and extends market reach which in turn creates new jobs. In other words, e-commerce—typically of a business-to-business type—makes it easier for firms to tap foreign markets as well as link themselves to a global supply chain. For example, there is a small but growing group of local firms that receive the audio files of doctors' medical orders from US hospitals through the internet. These audio files are transcribed into an electronic word processing document file and then sent back through the internet to the US hospitals where they are printed, ready to be endorsed by the physicians at a fraction of the cost of doing this in the US.



Indirect employment effects result from downstream and upstream interlinkages of e-commerce activities with the rest of the economy. For example, a firm supporting an e-commerce channel will spend on infrastructure to support an online payment scheme, print and radio advertising to draw consumers to its web site and delivery and warehousing services provided by a logistics firm. This spending will create jobs indirectly and will depend on the effect of the volume of electronic transactions on prices, costs and productivity. The magnitude of the effect of e-commerce transactions on the demand for goods in industries such software online services, audio-visual music and publishing will depend on their price elasticities.

Within the context of the framework above, it might be useful to present the jobs that will be created or destroyed in selected industries. As mentioned earlier, both high and low skilled workers will be affected in these employment changes. The magnitudes of these job losses and gains are questions to be answered by future research.

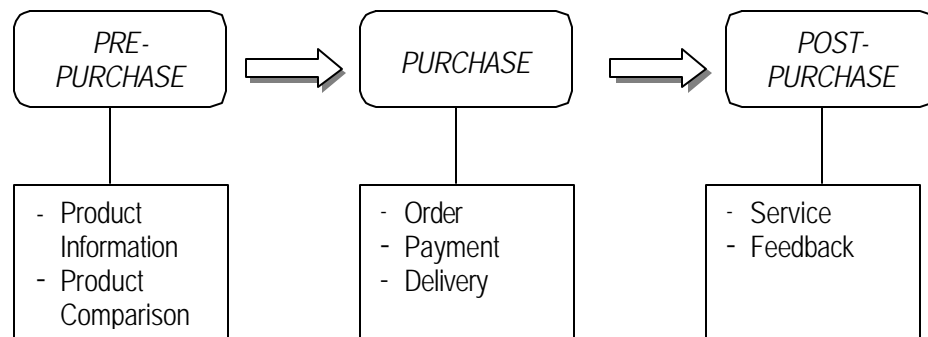
1. Information services and content industries. These include firms in software, media, motion picture, audio-visual and publishing industries. Jobs destroyed: those connected with the physical delivery of media such as CDs and printed text. Jobs created: connected with the online delivery of information.
2. Internet industry. Since the provision of internet services is not labor intensive, job creation is not expected to be great. Jobs destroyed will be due to changes in technology and will mostly likely be minimized through retraining.
3. Travel Agencies. Jobs lost: those connected with transaction tasks of selling standardized round trip tickets. Jobs created: personnel needed to man the virtual travel agencies catering to niche markets.
4. Postal Offices. Although the more widespread use of email is reducing the demand for mail handlers and related workers, the increased demand for parcel deliveries due to spread of e-commerce may create an even greater demand for these workers. Moreover, the spread of e-commerce for tangible goods will create jobs for the soon-to-boom logistics industry.
5. Financial services and banking. The shift from retail to internet banking will certainly lead to job losses such as tellers and other front desk workers. These personnel can be retrained quickly to act as customer service personnel in the bank's call support centers. Online securities brokerage services, in the case of Charles Schwab and Co, have actually seen an increase in their workforce.
6. Retail. The jobs expected to be destroyed here are those connected with sales, merchandising and cashier tasks. But similar to banking, these workers can be retrained to man their customer support department.

The skills that workers will need to participate in this development of e-commerce will be mainly those needed to support its infrastructure, produce its digital goods and services and to deliver—electronically and physically—these products. Certainly, we can expect an increased demand for high-skilled IT workers needed for sophisticated design and networking tasks. However, most companies will require well-trained knowledge workers that are steeped in the use of information technology. There will also be an increased demand for medium to low skilled workers in the logistics industry which will probably use user-friendly handheld scanners and computers.

#### D. Scenarios

The three scenarios formulated describe the extent as to how B-TO-C e-commerce would influence the purchase process.<sup>15</sup> The use of the internet with traditional channels in different combinations in the purchase process (See Figure 3) forms the basis for the three scenarios formulated under B-TO-C e-commerce. But in applying the phases to the case of the Philippines, the components of the phases were modified to include the purchases processes (See Figure 4).

Figure 4. Purchase Process in the Philippines



#### Scenario 1

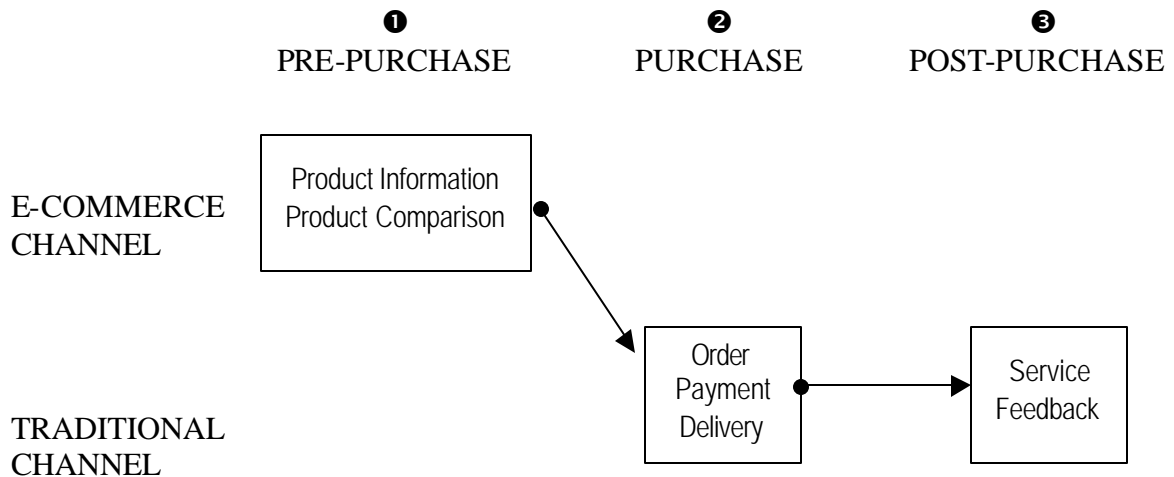
Under this scenario, only the pre-purchase phase is done in the e-commerce (internet) channel (See Figure 5). The purchase and post-purchase phases are done in the traditional channel. In a sense, e-commerce is only used as a catalog to obtain information about a product that a consumer wants to buy. An example would be a buyer of a car, who uses the internet to search for the type of car that he wants with his corresponding specifications. With the aid of search engines and shopping agents, the prospective buyer compares the prices of the different car dealers that are offering the

<sup>15</sup> The concepts involved in the scenarios formulated are drawn from Forrester Research, Inc., "Retail Power Shift," *The Forrester Report* (April, 1998), <<http://www.forrester.com>>.

type of car that he wants to buy. The buyer then narrows down his choice to one or two dealers and goes to the physical store of the dealers to see and inspect the merchandise. Actual ordering and payment, is done in the physical storefront. After-sales service for the car, as well as possible feedback is done in the traditional way, wherein the customer goes to the service centers to have his car serviced.

Payment schemes under this scenario are usually in cash, since the buyer goes to the store to order and pay for goods. Since consumers may need to physically inspect the goods, the types of goods supported under this model are the expensive consumer goods, such as household appliances, cars, and computers. Finally, since there is no fulfillment, the market is constrained to the local market.

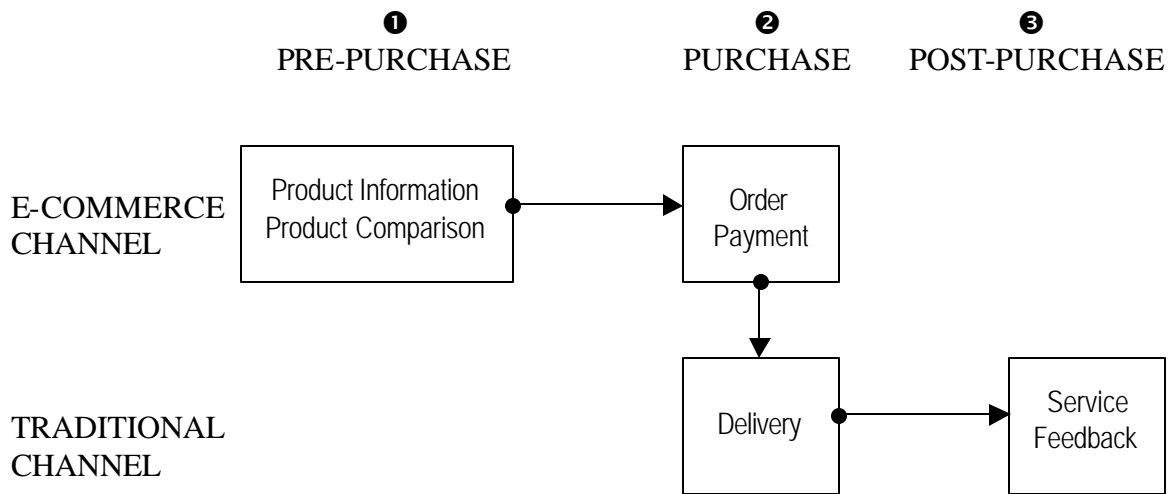
Figure 5. Purchase Process Under Scenario 1



*Scenario 2*

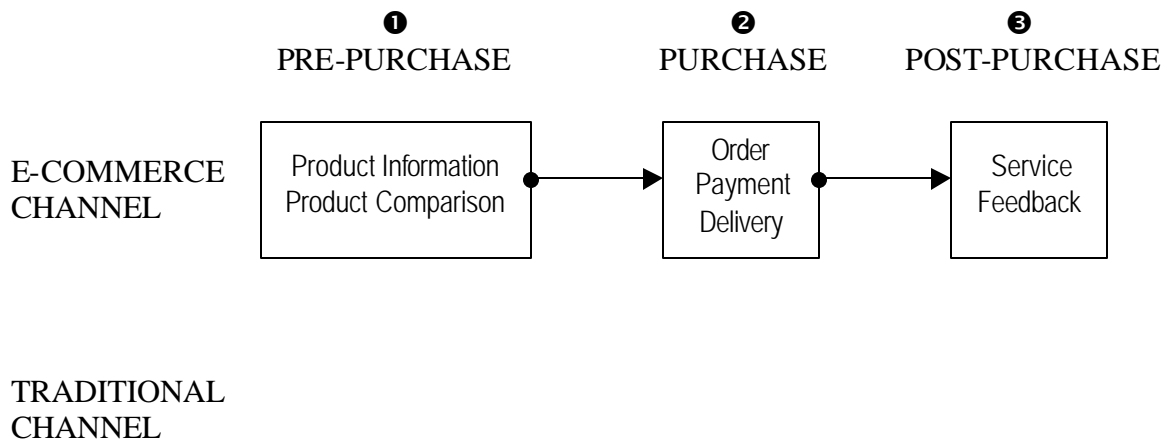
In this scenario, product information, product comparison, order and payment are done on-line, while delivery, service and feedback are done off-line (See Figure 6). Order and payment – two activities under the purchase phase are transferred to the e-commerce channel. Thus in a sense, purchase transaction takes place over the internet. This scenario would include the sale of airline tickets, movie tickets, groceries, food, and the like. The sale of an airline ticket best embodies this scenario. The buyer searches for the possible websites that might be selling tickets to his desired destination, and compares its prices with other airlines, again with the aid of search engines and shopping agents. The buyer then makes his decision, orders for the ticket on-line and pays with his credit card. The ticket is claimed personally, and any queries he might have are asked over the phone, or personally. Payment under the e-commerce channel would imply credit card as the mode of payment, and as in the first scenario, purchases are within the local market, since consumers pick up their goods from the physical stores.

Figure 6. Purchase Process Under Scenario 2



*Scenario 3*

Figure 7. Purchase Process Under Scenario 3



All the phases of purchasing are done through the e-commerce channel under the third scenario (See Figure 7). A distinct characteristic that sets this scenario apart from the other two is that there is fulfillment, since delivery and service may be done on-line. Depending on the type of good, delivery may be done on-line as with intangibles (software, music, videos, subscription), or may entail doorstep delivery for tangibles (CD's, books, flowers, electronics). Hence, more products are covered by this scenario –

and includes services such as banking, and both tangible and intangible goods. Here, the buyer does an on-line search for an item, for instance, an anti-virus software. After on-line product information and comparison, order is also made on-line, and payment by credit card. The buyer is then able to download the said software, while troubleshooting and questions are coursed through the vendor's website. Since delivery is done either on-line, or to consumers' doorsteps in the case of tangible goods, the market reach of this model extends even to different countries (as in the case of Amazon.com).

#### E. Culture and Philippine E-commerce

The scenarios for e-commerce development and the corresponding employment effects presented in the two previous sections need to be understood within the context of Filipino culture and consumer behavior as well as the way we can expect e-commerce to develop in the next ten years.

For example, the frequently cited of constraints of low PC ownership, low internet usage low credit card and poor parcel delivery services may only be apparent. The Philippines may not follow the US e-commerce model where a purchase typically consists of a prospective customer surfing the web for options, ordering it online, paying for it with a credit card and having it delivered to his home by postal mail.

Here's why. The Filipino's shopping experience consists not only in the actual search and purchase of the good. A Filipino shops because he also needs to relax and eat a meal with his friends and family in the air-conditioned and pleasant ambiance of the mall. Moreover, a Filipino's purchasing activity includes touching and smelling the product he intends to purchase as well as to indulge in haggling for its price. Due to cheaper mobile phone handsets and services, the use of texting and calling through mobile phones is widespread.

In order to meet these needs of the Filipino consumer, the e-commerce model may follow the Japanese model. Filipino buyers have many similarities with Japanese buyers. Both have a high percentage of mobile phone users and both have a low usage of credit cards, i.e. most Japanese have credit cards but don't use them. Both usually buy their groceries at their neighborhood stores—the Japanese at a 7-11 convenience store; the Filipino at a drug or sari-sari store. So what do the Japanese do for e-commerce? The convenience store company, 7-11, has set up e-commerce kiosks in its branches. A Japanese consumer can order his products at one of these terminals, returns after a week to inspect the ordered goods and pays for it in cash all within the confines of the convenience store.

Filipinos may follow the same model maybe using the widespread network of drug-stores. It is possible, perhaps, to harness the sari-sari store into an e-commerce network where parcel delivery may be handled by any of the local transport cooperatives. The Filipinos may even introduce a variation where e-commerce becomes m-commerce where a local buyer may order for his movie ticket and dinner reservations via a text

message to a virtual store. Thus, the adoption of this model overcomes the constraints mentioned earlier. The Filipino's perennial need to shop in malls for the reasons mentioned earlier may dampen the actual adoption of e-commerce by local firms and therefore soften and smoothen the job losses that may result from it and delay the job losses. In other words, the adoption of e-commerce could be seen as just one more supplier and delivery channel that complements the traditional ones. When Filipino household incomes reach the threshold for widespread credit card usage and logistics services become more reliable, then we may see Philippine e-commerce becoming to look more like the US mode.

## **IV. Methodology**

### **A. Methodological approach**

The roles of businesses and how these are changing with the advent of e-commerce (as illustrated in Figure 2) were analyzed, in order to estimate the impact of business to consumer (B-TO-C) e-commerce<sup>16</sup> on employment.<sup>17</sup>

The importance of business roles of firms is reflected in the demand for their products and services since demand measures the need for a firm's products and services. Demand for a product can be gauged through revenues or receipts from the sale of a product. A firm's total revenue is the number of units (of a product) that is produced and sold, times the price received per unit. At constant prices, increasing revenues would mean that demand for the product is increasing, since the quantity of output that a firm produces would depend on the value that the market places on the firm's product. If there is increasing demand for a product, then a firm will decide to increase its output, and this is reflected in total revenues (since revenues equal quantity produced and sold times price per unit). In increasing its output, a firm must also increase its inputs. This means that the demand for inputs is dependent on the demand for outputs. Labor, being one of the inputs of production, may thus be determined through revenues.

As with the study made by Databank Consulting (1998a) in estimating the multiplier effects of e-commerce on the employment of four European countries, input-output (I-O) methodology<sup>18</sup> was also employed in this study. The main consideration in input-output impact analysis (on employment) is that an exogenous change in final demand in one industry plus multiplier effects can, not only bring about a change in employment in that industry, but also with other industries and thus, the whole economy.

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<sup>16</sup> For an overview of e-commerce, refer to Appendix A.

<sup>17</sup> Although business-to-business (B-to-B) e-commerce transaction are considered to comprise the bulk of current and future e-commerce activity, they were excluded from the scope of this study because 1) Most of the benefits derived the adoption of B-to-B e-commerce are in the form corporate savings and product quality improvements and therefore the collection of this data may be tedious and difficult; 2) B-to-B e-commerce involves the international trade of services and goods and forecasting this component is fraught with difficulties. 3) Since B-to-B e-commerce involves firms selling products in many industries, this makes it difficult to apply input-output analysis to estimate employment changes.

<sup>18</sup> For a detailed discussion on the input-output methodology, refer to Appendix B.

Here is how the impact of business-to-consumer e-commerce on employment from 2000-2005 was projected. The assumptions and caveats presented here should be kept in mind when going over the results and conclusions.

1. Since there were no 2000 employment figures for the 11 industries in this study, these were estimated from the 1995 employment figures. Here, we used the 1994 input output table and subjected it to changes in final demand from 1995-2000 in each of the eleven industries in order to get the corresponding changes in employment. These were used to arrive at the 2000 employment figures.
2. The same estimating procedure was used to project the employment impacts of e-commerce in the three scenarios as described Chapter 3 Section C. In general, the extent of e-commerce activity was assumed to increase from scenario 1 to scenario 3 that were described in Chapter 3 Section D. This translated in annual percentage changes in final demand in scenarios 2 and 3 that were greater than those in the baseline scenario 1.
3. For both estimations done in 1 and 2, we first made estimates of percentage changes in revenue. These percentages change in industry revenue were assumed to be equal to percentage changes in industry final demand. We find this assumption to be tenable because it is based on a related assumption that final demand is directly proportional to industry revenues. Should the period allotted for the study allowed for it, we would have preferred to have estimated separate econometric relations between these two variables. With this said, we reckon that this assumption may have resulted in the slight overestimation of the 2000 employment levels.
4. Revenue projections for the various scenarios were based on the revenue to GDP ratios of these industries in the US. In general, we assumed that the industries would reach a certain revenue to GDP ratio based on our assessment of how the firms and consumers would adapt to increased e-commerce activity and translated these in corresponding annual percentage changes in industry revenues. If there was an alternative measure of e-commerce activity expressed as ratio of final demand to GDP for the corresponding US industries and if final demand data was available for the 11 industries in this study, then we would have preferred to omit the revenue projections as well as the assumption that percentage changes in industry revenue equal percentage changes in industry final demand.
5. Note that even if employment levels may be overestimated for 2000 as well as in the projections from 2000-2005, these errors may have a minimal impact on the differences in employment between the different scenarios since they will tend to cancel out. Moreover, the losses in jobs due to the substitution of traditional purchase channels by e-commerce channels will be relatively small

for all the industries because the level of e-commerce activity in 2005 is projected to be at the emerging stage. Greater e-commerce activity is assumed to take a longer period of time considering the cultural realities discussed in Chapter 3 Section E.

## B. Data Description

The impact of e-commerce on employment was estimated based on the effect of the B-TO-C aspect of e-commerce, and covered 11 industries.<sup>19</sup> Based on the Annual Survey of Establishments (ASE) published by the National Statistics Office (NSO), these industries fall under four major industry groups:

- 1) Manufacturing
  - printing/publishing of newspapers, periodicals, books and pamphlets
  - electrical communication equipment
- 2) Wholesale and Retail Trade
  - book, office and school supplies retailing
  - dry goods, textile and wearing apparel retailing
- 3) Transportation and Communication
  - tour and travel agencies
  - forwarding, packing and crating
  - mail and express
  - telephone services
- 4) Financing, Insurance, Real Estate and Business services
  - securities dealers / brokers
  - advertising agencies
  - engineering and technical services

These industries with their Philippine Standard Industrial Classification (PSIC) codes are shown in Table 1.<sup>20</sup> Revenue and employment data were gathered from the ASE (published by the NSO),<sup>21</sup> and actual data obtained was from the years 1990 to 1995.

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<sup>19</sup> The foregoing industries were based on the industries classified as e-commerce-related industries by the Organization for Economic Co-Operation and Development (OECD) in their 1998 study *The Economic and Social Impact of E-Commerce: Preliminary Findings and Research Agenda*. Some of these industries are projected by the OECD to have significant shares of on-line revenues. The U.S. industries were then matched with the Philippine industries classified under the 1977 Philippine Standard Industrial Classification (PSIC).

<sup>20</sup> The tables are presented in the Annex.

<sup>21</sup> Appendix C enumerates the definitions of the variables, based on the ASE, as well as an outline of the sampling procedure used by the NSO for the 1995 survey.



The four major industry groups<sup>22</sup> to which the 11 industries fall under, make up 65% of total employment as of 1995, with manufacturing, and wholesale and retail trade accounting for already half of the total (See Table 2).

The selected industries represent 7% of total employment, and 11% of the aggregate of the four major industries (See Table 3). Dry goods, textile and wearing apparel retailing; and mail and express have the biggest and smallest share in total employment, respectively. Telephone services, as well as dry goods, textile and wearing apparel retailing have relatively large shares in their respective industry groups. The Philippine counterparts of the industries that are currently considered as aggressive users of e-commerce in the U.S. (book and office supplies retailing, securities dealers, tour and travel agencies) employ relatively a small percentage of the labor force in the Philippines.

### C. Computational procedures

As discussed, revenue projections were used to estimate corresponding employment impacts for the 11 industries, as well as for the whole economy, using input-output (I-O) methodology. The projection period for the estimation of the impact of B-TO-C e-commerce on employment is from the year 2000 to 2005. Since actual data obtained was from the years 1990 to 1995, two sets of revenue and employment projections were made—first from 1996 to 2000, and then from 2001 to 2005.

#### *Revenues*

Revenue projections from 1996 to 2000 were based on proxy variables, such as revenues from the Top 7,000 Corporations publication<sup>23</sup> and the gross value-added (GVA) of major industry groups. Revenue projections for the next five years (2001-2005) were based on three scenarios of e-commerce. The scenarios were formulated on the basis of three different models of B-TO-C e-commerce, particularly on how these would affect the purchase process of consumers. The detailed methodology for the revenue projection from 1996 to 2000 is outlined in Appendix D. The (revenue) projections for the years 2001 to 2005 were computed using growth rates that were based on the three models of e-commerce.<sup>24</sup> The general consideration was that as e-commerce incorporated more phases of the purchase process, demand for a particular product or service will increase since e-commerce would provide added choice, convenience and customization for the consumer, as well as market extension and an additional channel of revenue for firms. As more products and services can be availed of in the internet channel, revenues

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<sup>22</sup> The four major industry groups are: manufacturing; wholesale and retail trade; transportation and communication; and financing, insurance, real estate, and business services.

<sup>23</sup> The Top 7,000 Corporations is published annually by the Philippine Business Profiles and Perspectives, Inc.

<sup>24</sup> Growth rates were also based on historical annual growth rates, as well as growth rates for the past five years.

are also seen to increase since new firms can enter the market.<sup>25</sup> Since the second scenario supports more types of products and services that can be offered in the internet, revenues for this model are expected to be higher than that of the first one. Still, the third scenario, being the advanced phase of B-TO-C e-commerce (where all purchase phases are done on-line), supports more products and services compared with the second model. Thus, of the three scenarios, the third scenario is seen to have the highest revenues among the three. The soundness of the differences of the growth rates among the three scenarios (per year) was checked by estimating the additional revenues each establishment and/or company under each industry would have as a result of e-commerce.

E-commerce related revenues (and employment) were computed only for the second and third scenarios, since the first scenario can be considered as a baseline scenario of B-TO-C e-commerce, where the internet is used only as a catalog of information to search for different kinds of products and services and compare their prices with other e-commerce merchants.<sup>26</sup>

### *Employment*

Using the assumption that *percentage changes in revenues equal percentage changes in final demand*, and employing input-output computations, the impact on employment on the 11 industries and on the whole economy was determined.<sup>27</sup>

Two sets of projections were computed for the employment impacts—the first one using the technical coefficients of the 1994 I-O table, and a second one assuming adjusted technical coefficients for wholesale and retail trade.<sup>28</sup> Under each set of projections, two assumptions were made—one assuming that on-line revenues do not substitute traditional revenues, and another assuming partial substitution of traditional by on-line revenues.<sup>29</sup>

For employment projections assuming partial substitution, revenue projections under the third scenario for the year 2005 were revised to reflect partial substitution of traditional by on-line revenues.<sup>30</sup> Revised revenue projections were used to calculate employment estimates assuming partial substitution.<sup>31</sup>

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<sup>25</sup> These are firms solely engaged in commerce over the internet, without having physical shopfronts, and known as pure plays.

<sup>26</sup> The formulas for the computation of e-commerce related revenues and employment are indicated in Box 1 and Box 2 of Appendix D.

<sup>27</sup> The formulas for the computation of the employment impacts are discussed in Appendix C.

<sup>28</sup> Wholesale and retail trade was chosen since B-TO-C e-commerce involves mainly retail trade.

<sup>29</sup> On-line revenues are assumed to be revenues from direct sale of goods and services in the internet, and are differentiated from e-commerce-related revenues, as discussed above and in Box 1 of Appendix D.

<sup>30</sup> The adjustment for substitution of traditional employment by e-commerce generated employment was applied only to Model/Scenario 3 since this is the model where all purchasing phases are done on-line. This adjustment was applied to industries providing intermediary services: newspaper/periodical publishing and printing; book, office and school supplies retailing; dry goods, textile and wearing apparel retailing; tour and travel agencies; mail and express; securities dealers/brokers; and advertising agencies.

<sup>31</sup> For a detailed methodology of the revised revenues, refer to Box 3 of Appendix D.

In adjusting the technical coefficients<sup>32</sup> of the IO table for wholesale and retail trade, the coefficients were ranked from highest to lowest, row and column wise. Sectors that are expected to increase their input contributions to wholesale and retail trade due to B-TO-C e-commerce were identified. Growth rates were applied to the coefficients corresponding to these sectors, most of which are already heavy contributors of production inputs of trade.<sup>33</sup> Likewise, sectors that would be allocated more outputs of wholesale and retail trade, with e-commerce, were identified, and growth rates were also applied to the coefficients of these industries.<sup>34</sup> Revised estimates for employment impacts were then computed for the two assumptions—with and without partial substitution.

## **W. Results**

### **A. 1995-2000 Projections**

1. Among the 11 industries, electrical communication equipment; securities dealers/brokers; and telephone services are estimated to have relatively high revenue growth in the past five years (See Table 8). Generally, these industries did not experience significant drops in revenues in the post-Asian crisis years.
2. The 11 industries are estimated to have generated a total of about 310,000 additional jobs from 1995 to 2000 (See Table 9). Electrical communication equipment; dry goods, textile and wearing apparel retailing; engineering and technical services; and telephone services had the largest increases in employment levels (per industry), relative to employment levels in 1995.
3. The industries that were projected to have generated the most jobs for the whole economy between the years 1995 and 2000 were electrical communication equipment; dry goods, textile and wearing apparel retailing; and telephone services (See Table 10). For newspaper and book publishing and printing, as well as advertising, employment changes within their respective industries account for only small percentages of employment generated for the whole economy. These industries, thus, have a great capacity to create employment for other industries. Indirect effects are greater than direct effects only for publishing and printing of newspapers and books; electrical communication equipment; tour and travel agencies; and forwarding, packing and crating. These four industries have high forward and backward linkages.

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<sup>32</sup> The technical coefficient of industry A and B refers to the ratio of the production input flow from industry A to B, to the total output of industry B.

<sup>33</sup> In determining the growth rates for the input requirements, financial statements of some retail companies (Value Plus, Inc., Uniwide Sales Warehouse Club, Shoe Mart, Inc., and Philippine Seven Corp.) were consulted. Growth rates were based on the growth of percentage shares of the different components of operating expenses.

<sup>34</sup> The magnitude of growth rates for output shares were based on the growth rates of the input coefficients, and were scaled upward or downward, depending on the industry.

## B. 2000-2005 Projections

1. For the next five years, electrical communication equipment; tour and travel agencies; and telephone services are estimated to be the top three revenue earners among the 11 industries, while newspaper/periodical, book and pamphlet printing and publishing; mail and express; and dry goods and wearing apparel retailing are expected to grow the slowest (See Table 11).
2. By the year 2005, total e-commerce-related revenues (for the 11 industries) are projected to amount to approximately ₱ 15 billion under scenario 2, and ₱ 57.9 billion under scenario 3 (See Table 12). When e-commerce-related revenues for the Philippines are compared with that of Asia and the U. S., figures for the Philippines are very small, relative to the others. For the year 2001 alone, projections for Asia and the U.S. are 51 and 325 times that of the Philippines, respectively (Table 13).
3. Assuming three different paces of overall growth for the economy,<sup>35</sup> and considering scenario 2, total e-commerce-related revenues as of 2005 are projected to account for 0.22% to 0.25% of nominal GDP, contributing 1.4% to 2.1% of GDP growth (Table 14). Assuming scenario 3, revenues attributed to e-commerce are estimated to be about 1% of GDP, contributing from 5.4% to 8% of GDP growth (See Table 15). Tables 14 and 15 reveal that the percentages of GDP represented by e-commerce-related revenues, as well as contributions to GDP growth are increasing through time. Although these figures are small, their increasing trend nevertheless implies the strong potential of e-commerce to contribute a large percentage to GDP growth in the long term.
4. E-commerce related revenues under the second scenario account for 0.7% of total revenues for the 11 industries as of the year 2005 (See Table 16). Under the third scenario, 2.6% of total revenues can be considered as e-commerce-related, where tour and travel agencies; advertising; mail and express; and securities dealers are expected to have the largest ratios of e-commerce related revenues.

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<sup>35</sup> GDP growth was based on projections by the Asian Development Bank (ADB) for the Southeast Asian countries, and were either scaled upward or downward to obtain three different paces of economic growth.

Table A – Projected Increase in Average Total Employment (2000-2005)

	<i>Average Total Employment as of 2000</i>	<i>Projected Increase in Average Total Employment</i>			<i>Percentage Increase</i>		
		<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	10,345	3,806	3,899	4,223	37%	38%	41%
Electrical Communication Equipment	213,307	159,717	161,242	165,863	75%	76%	78%
Book, Office & School Supplies Retailing	30,326	10,589	10,850	11,844	35%	36%	39%
Dry Goods, Textile & Wearing Apparel Retailing	273,689	88,337	88,699	89,436	32%	32%	33%
Tour & Travel Agencies	10,508	15,150	16,828	19,778	144%	160%	188%
Forwarding, Packing & Crating	24,724	12,663	12,707	13,193	51%	51%	53%
Telephone Services	45,533	22,141	22,397	22,916	49%	49%	50%
Mail & Express	1,427	52	53	63	4%	4%	4%
Securities Dealers/Brokers	3,684	238	245	271	6%	7%	7%
Engineering & Technical Services	12,267	4,673	4,756	5,144	38%	39%	42%
Advertising Agencies	6,353	368	378	443	6%	6%	7%
<i>Total</i>	<i>632,163</i>	<i>317,734</i>	<i>322,054</i>	<i>333,174</i>	<i>50%</i>	<i>51%</i>	<i>53%</i>

Source: Author's calculations

- The first scenario is estimated to generate additional 317,734 jobs in the next five years for the 11 industries (See Table A). This represents a 50% increase from projected employment levels as of the year 2000. When compared with the first scenario, the number of jobs that is expected to be generated by the second and third scenario does not differ significantly, accounting for a 51% and 53% increase in employment levels from year 2000 levels, respectively.

6. Tour and travel agencies; electrical communication equipment; and forwarding, packing and crating are the industries with the top three employment growth rates among the group. Industries with relatively low projections for employment growth include mail and express; advertising agencies; and securities dealers/brokers (See Table A).
7. Industries with relatively low projections for employment growth include mail and express; advertising agencies; and securities dealers/brokers (See Table A).

Table B – Breakdown of Increase in Average Total Employment Under Scenario 3  
(2000-2005)

	2001	2001	2003	2004	2005	2000-2005
1) Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	314	626	793	1,121	1,369	4,223
2) Electrical Communication Equipment	13,416	19,923	27,095	40,943	64,486	165,863
3) Book, Office & School Supplies Retailing	1,111	1,555	2,146	2,813	4,220	11,845
4) Dry Goods, Textile & Wearing Apparel Retailing	7,851	10,579	15,025	22,392	33,589	89,436
5) Tour & Travel Agencies	1,516	2,275	3,639	5,254	7,093	19,777
6) Forwarding, Packing & Crating	1,248	1,674	2,198	3,230	4,844	13,194
7) Telephone Services	2,011	2,899	4,215	5,480	8,311	22,916
8) Mail & Express	5	7	11	16	24	63
9) Securities Dealers/Brokers	23	30	50	69	100	272
10) Engineering & Technical Services	402	594	981	1,267	1,900	5,144
11) Advertising Agencies	39	54	75	122	153	443
Total	27,936	40,216	56,228	82,707	126,08	333,17

Source: Author's calculations

Table C – Percentage of Increase in Average Total Employment As Against Total

	2001-2002	2003-2005	2001	2002	2003	2004	2005
1) Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	22%	78%	7%	15%	19%	27%	32%
2) Electrical Communication Equipment	20%	80%	8%	12%	16%	25%	39%
3) Book, Office & School Supplies Retailing	23%	78%	9%	13%	18%	24%	36%
4) Dry Goods, Textile & Wearing Apparel Retailing	21%	79%	9%	12%	17%	25%	38%
5) Tour & Travel Agencies	19%	81%	8%	12%	18%	27%	36%
6) Forwarding, Packing & Crating	22%	78%	9%	13%	17%	24%	37%
7) Telephone Services	21%	79%	9%	13%	18%	24%	36%
8) Mail & Express	19%	81%	8%	12%	18%	25%	38%
9) Securities Dealers/Brokers	19%	81%	8%	11%	18%	25%	37%
10) Engineering & Technical Services	19%	81%	8%	12%	19%	25%	37%
11) Advertising Agencies	21%	79%	9%	12%	17%	28%	35%
Average	21%	79%	8%	12%	18%	25%	36%

Source: Author's calculations

8. The bulk of the increase in employment under the third scenario is seen to come in the last three years of the projection period. Approximately 80% of the total increase from the years 2000 to 2005 is expected to be generated from the years 2003 to 2005, while the first two years account for the remaining 20% (See Tables B and C).
9. The change in employment from 2004 to 2005 alone represents an average of 36%, across all the industries, of the total increase for the five years (See Table C). These percentages of employment increases for each year as against the total are consistently increasing throughout the projection period for all the industries.
10. In terms of the direction of the growth rates of employment changes, there is no general consistent trend evident for each industry for the next five years, except for dry goods and wearing apparel retailing, which exhibited increasing growth rates for the five-year projection period. On the other hand, office and school supplies retailing showed a decreasing trend up to year 2004, but nevertheless, had an increase in the last year (See Table D).

11. Printing and publishing, tour and travel agencies, and advertising exhibited a decreasing trend in growth rates within the last year. The remaining industries are projected to increase their growth rates of employment changes in the last year (See Table D).

Table D – Growth Rate of Increase in Average Total Employment

	2001-2002	2002-2003	2003-2004	2004-2005
1) Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	99%	27%	41%	22%
2) Electrical Communication Equipment	49%	36%	51%	58%
3) Book, Office & School Supplies Retailing	40%	38%	31%	50%
4) Dry Goods, Textile & Wearing Apparel Retailing	35%	42%	49%	50%
5) Tour & Travel Agencies	50%	60%	44%	35%
6) Forwarding, Packing & Crating	34%	31%	47%	50%
7) Telephone Services	44%	45%	30%	52%
8) Mail & Express	53%	54%	38%	51%
9) Securities Dealers/Brokers	32%	68%	38%	44%
10) Engineering & Technical Services	48%	65%	29%	50%
11) Advertising Agencies	40%	38%	64%	25%
Average	48%	46%	42%	44%

Source: Author's calculations

Table E – Percentage of E-Commerce Related Employment as of 2005

	Model 2	Model 3
1) Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	0.7%	2.9%
2) Electrical Communication Equipment	0.4%	1.6%
3) Book, Office & School Supplies Retailing	0.6%	3.0%
4) Dry Goods, Textile & Wearing Apparel Retailing	0.1%	0.3%



5) Tour & Travel Agencies	6.1%	15.3%
6) Forwarding, Packing & Crating	0.1%	1.4%
7) Telephone Services	0.4%	1.1%
8) Mail & Express	0.1%	0.7%
9) Securities Dealers/Brokers	0.2%	0.8%
10) Engineering & Technical Services	0.5%	2.7%
11) Advertising Agencies	0.1%	1.1%
<i>Total</i>	<i>0.5%</i>	<i>1.6%</i>

Source: Author's calculations

12. Tour and travel agencies have significant ratios of employment due to e-commerce under scenarios 2 and 3 (See Table E). Book/school supplies retailing, and newspaper/book publishing and printing are the industries with the next highest ratios of e-commerce-related employment. Total e-commerce-related employment for the 11 industries are minimal. Of the total projected employment for the 11 industries as of 2005, only 0.5% can be considered ecommerce generated under the second scenario, and 1.6% under the third scenario.
13. The industries that are expected to generate the most jobs for the whole economy (given increases in their respective final demands) in the next five years are electrical communication equipment; dry goods and wearing apparel retailing; and telephone services (See Table 17). These are the same industries that generated the most employment for the whole economy for the past five years (See Table 10), and are also the sectors that have the largest projected revenue levels as of the year 2000, as well as the biggest absolute amounts of increases in revenues in the next five years (See Table 11).
14. Assuming partial substitution of traditional by on-line revenues, projections for employment changes are quite minimal, affecting just 0.26% of total employment for the 7 intermediary services as of the year 2000. The industry with the greatest percentage of employees that may be affected with the substitution of traditional revenues is tour and travel agencies, where 1.1% of employees as of the year 2000 (117 employees) may lose their jobs (See Table 18).
15. With regard to employment generated for the whole economy with partial substitution, dry goods, textile and wearing apparel retailing is seen to cause the most number of jobs lost for the whole economy – 581 jobs under the extreme case of 80% substitution (See Table F).

Table F – Differences in Employment Generated for the Whole Economy with Partial Substitution (2000-2005)

	<i>Assumed % of E-Commerce Revenues<sup>a</sup></i>	<i>Employment Generated Without Subs.<sup>b</sup> (Model 3)</i>	<i>Employment Generated With Subs. (80%)</i>	<i>Difference in Employment Generated<sup>c</sup></i>	<i>% Difference</i>
Printing and Publishing of Newspapers, Periodicals, Books and Pamphlets	0.67%	10,710	10,568	142	1.30%
Book, Office & School Supplies Retailing	1.33%	15,368	15,076	292	1.90%
Dry Goods, Textile & Wearing Apparel Retailing	0.33%	116,044	115,463	581	0.50%
Tour & Travel Agencies	0.53%	25,480	25,330	150	0.59%
Mail and Express	1.33%	121	118	3	2.50%
Securities Dealers/Brokers	4.00%	483	454	29	6.00%
Advertising Agencies	0.33%	1,079	1,074	5	0.46%

<sup>a</sup> Share of on-line revenues

<sup>b</sup> Substitution

<sup>c</sup> Employment generated without substitution and that assuming 80% partial substitution

Source: Author's calculations

16. With adjusted technical coefficients for wholesale and retail trade, there may be an additional 5,858 jobs generated for the 11 industries under the third scenario (See Table 19). This accounts for just 0.93% of the total employment for the 11 industries as of the year 2000. With adjustment of coefficients, scenario 3 will have a 0.61% difference of total jobs as of 2005 compared with the original estimates.
17. As a result of adjustment of coefficients, the differences of employment generated for the whole economy with the original estimates are as low as 2.1% (of original estimates) for securities dealers/brokers, to 6.6% for printing and publishing of books/newspapers – under the third model (See Table G). For both book and school supplies retailing, and dry goods and wearing apparel retailing, both of which are

classified under wholesale and retail trade, the difference accounts for 28.6% of the original estimates.

Table G – Projected Employment Generated for the Whole Economy with Adjusted Coefficients  
(2000-2005)

	<i>Original Estimates <sup>a</sup> (Model 3)</i>	<i>Employment Generated With Adj. <sup>b</sup> (Model 3)</i>	<i>Difference In Employment Generated</i>	<i>% Difference</i>
Printing and Publishing of Newspapers, Periodicals, Books and Pamphlets	10,710	11,420	710	6.6%
Electrical Communication Equipment	239,143	254,956	15,813	6.6%
Tour & Travel Agencies	25,480	26,059	579	2.3%
Forwarding, Packing and Crating	17,131	17,598	467	2.7%
Telephone Services	36,976	38,085	1,109	3.0%
Mail and Express	121	125	4	3.3%
Securities Dealers/Brokers	483	493	10	2.1%
Engineering & Technical Services	6,941	7,091	150	2.2%
Advertising Agencies	1,079	1,105	26	2.4%

<sup>a</sup> Assuming the original technical coefficients of the 1994 I-O table.

<sup>b</sup> Assuming adjusted technical coefficients of the wholesale and retail trade

sector.

Source: Author's calculations

18. With the assumption of partial substitution and adjustment of coefficients, estimates remain the same, except for the two industries under trade – book and school supplies retailing, and dry goods and textile retailing. The former can cause 13 more job losses compared with the estimates assuming the original coefficients, while the latter can cause 25 more jobs to be affected, under the extreme case of 80% substitution (See Table 20).
19. For the employment for the whole economy with partial substitution and adjustment of coefficients, there might be 167 more jobs in the whole economy that can be affected as a result of a change in final demand for dry goods and wearing apparel

retailing, and 84 more jobs for book and school supplies retailing, under a substitution rate of 80% (See Table H).

Table H – Estimated Number of Jobs Affected for the Whole Economy Assuming Partial Substitution with Adjusted Coefficients (2000-2005)

	<i>Estimated Number of Jobs Affected for the Whole Economy<sup>a</sup></i>			<i>Difference from Previous Projections<sup>b</sup></i>			<i>% Difference (80%)<sup>c</sup></i>
	<i>40%</i>	<i>60%</i>	<i>80%</i>	<i>40%</i>	<i>60%</i>	<i>80%</i>	
Printing and Publishing of Newspapers, Periodicals, Books and Pamphlets	75	113	151	4	6	9	6.3%
Book, Office & School Supplies Retailing	188	282	376	42	63	84	28.8%
Dry Goods, Textile & Wearing Apparel Retailing	374	561	748	83	125	167	28.8%
Tour & Travel Agencies	77	115	154	2	2	4	2.7%
Mail and Express	1	2	2	-	-	-	-
Securities Dealers/Brokers	14	21	29	-	-	-	-
Advertising Agencies	2	3	5	1	1	-	-

<sup>a</sup> Assuming adjusted technical coefficients of the wholesale and retail trade sector.

<sup>b</sup> Assuming the original technical coefficients of the 1994 I-O table.

<sup>c</sup> Assuming 80% partial substitution (the percentage difference is computed as the difference of projections against the original estimates)

Source: Author's calculations

## VIII. Conclusions

Total e-commerce related revenues as of the year 2005 is projected to account for about 1% of (nominal) GDP, contributing up to 8% of GDP growth. When compared with Asia and the U.S., these figures suggest that the Philippines has a rather slow pace of adoption of e-commerce. Nevertheless, the steady growth of revenues due to e-commerce, as well as the increase in contribution (in terms of percentage) of e-commerce to GDP growth, also suggest that e-commerce has the potential to have a big role in promoting overall Philippine growth and recovery in the long term.

Among the 11 industries studied, tour and travel agencies; electrical communication equipment; and forwarding, packing and crating are estimated to grow the most in terms of employment in the next five years, under the three formulated scenarios. However, employment attributed to e-commerce is greatest for tour and travel agencies. This implies that from the 11 industries, the greatest impact of B-TO-C e-commerce in terms of employment generation may be felt on tour and travel agencies.

B-TO-C e-commerce is seen to provide an alternative distribution channel in the value chain of industries as the need for some intermediaries may be bypassed. Thus, the points on the value chain that might be affected are those involving distribution, particularly wholesale and retail trade. At the same time, B-TO-C e-commerce is also seen to create new points on the value chain with new kinds of intermediaries. This combination of disintermediation and re-intermediation, which may bring about job gains and losses, will be dependent on the shifting roles of business and further, on the purchase channels and processes that would be influenced by e-commerce.

Assuming partial substitution of traditional revenues by on-line revenues, the proportion of affected jobs in the industries performing intermediary services is somewhat insignificant. Although quantitatively, the impact on employment displacement may be minimal, the nature of work may nevertheless change. Displaced or possible affected employees of the intermediary services, as a result of increasing on-line activities and revenues, may be deployed as support staff, where applicable. For instance, travel and advertising agents, sales personnel from retail stores, and securities dealers and brokers may lose the importance of their jobs, as these may be replaced by the internet channel. However, agents, dealers, brokers, as well as sales personnel may be deployed as customer service staff – attending to the needs of on-line customers or re-trained to monitor on-line orders and transactions. In other cases they may also be promoted to higher management or supervisory levels. Moreover, employment displacement effects may be overtaken by expansionary effects brought about by the projected increases in demand, and thus in revenues for all the industries. While it is true that some job descriptions may become obsolete in the coming years, it is also true that the new intermediaries and companies that are expected to arise with B-TO-C e-commerce will bring in new jobs. Thus, overall job creation may absorb possible job losses with substitution of traditional by on-line revenues.

The effect on employment of individual industries, considering the changes to be brought about by B-TO-C e-commerce on the industrial relationships between the wholesale and retail trade sector with the other sectors of the economy, can be considered insignificant. In the next five years, approximately 5,900 additional jobs<sup>36</sup> will be generated for the 11 industries considering the changes in inter-industry relationships (of wholesale and retail trade) as a result of e-commerce. However, in terms of employment generated for the whole economy, there may be significant changes, given an increase in final demand of wholesale and retail trade, as there may be almost 29% additional jobs generated for the whole economy. With partial substitution, and again considering the

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<sup>36</sup> This accounts for 0.93% of average total employment as of the year 2000, and represents a 1.8% difference from original estimates.

changes in industrial relationships of trade, significant changes in employment generated for the whole economy is seen only for office and school supplies retailing, and textile and wearing apparel retailing<sup>37</sup>--affecting 29% more employees than if the industrial relationships as of 1994 were still followed.

Since the economy in general is projected to expand with e-commerce, this study suggests the need for more policies that will first, promote e-commerce, such as Republic Act 8792, or the E-commerce Act. Secondly, for the development of B-TO-C e-commerce, it is essential to have the proper infrastructure in place, such as adequate phone lines and PC's. Since most people cannot afford these types of media to be connected to the internet, the promotion of alternative means to PC's and the provision for affordable telecommunications services is thus required. An example is the deregulation of the telecommunications industry, particularly the cellular phone service sector, which was already started a few years ago. This has enabled a number of telephone companies to help in the provision of additional telephone lines, especially in the provinces. It has also made the cellular phone more affordable, as evidenced by the surge in subscribers in recent years. In the same light, encouragement of new entrants into internet-enabling businesses such as internet service providers (ISP's) and cyber-café business and the like, through, perhaps the removal of some barriers or granting of benefits, will also be beneficial to the promotion of e-commerce. Likewise, encouragement of investments in the information technology (IT) to provide the support for newly formed companies and joint ventures, is also important.

Sector-specific policies are also needed especially in the case of tour and travel agencies; electrical communication equipment; and forwarding, packing and crating – the top three sectors that are expected to have the largest percentages of employment increases in the next five years. There may be a need for more administrative staff, particularly for call support, for tour and travel agencies. For the electrical communication equipment sector, additional production staff (factory workers) may be required, especially in the semiconductors industry, which is also classified under this sector, and provides the necessary infrastructure for e-commerce to flourish. Both computer proficient staff to manage transactions, and production workers are essential for the forwarding, packing, and crating sector as firms migrate their operations into the internet and as other industries, specifically the retail trade, may need more of its services. This would result from more intangible goods being delivered to various warehouses and homes, owing to the nature of fulfillment with e-commerce.

In general, we will see changes in the nature of work – from the front to back office is likely within the sectors performing intermediary services.<sup>38</sup> Employment demand for these industries, therefore, may be focused away from agents and blue-collared workers, toward higher-end management and administrative staff. Industries that are indispensable for the growth of e-commerce—electrical communication equipment;

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<sup>37</sup> These are the two sectors classified under retail trade.

<sup>38</sup> These sectors are: newspaper/periodical publishing and printing; book, office and school supplies retailing, dry goods, textile and wearing apparel retailing; tour and travel agencies; mail and express; securities dealers/brokers; and advertising agencies.

forwarding, packing and crating; telephone services; and engineering and technical services—may experience a steady or increasing demand of both production workers and managerial level personnel due to the expected increase in demand of their services in the coming years. All these imply the need for multi-skilled employees, as well as a re-training of existing employees.

Having thus identified some of the sectors that might be significantly affected by B-TO-C e-commerce, it is essential for policy makers to be prepared with the possible consequences of this so-called new way of conducting business. By doing so, we would be able to reap the benefits of e-commerce, and in the process enable it to contribute to the growth of our economy.

## **IX. Recommendations for future research**

In the light of the limitations of the data and methodology of this study, the need for further studies is recognized. In order to get a better grasp of the readiness of the Philippines for e-commerce, there is a need for a study that puts together baseline data, especially with regard to how many have PCs and are online users.

Estimates could better approximate actual industrial interrelationships through the use of updated revenue and employment data, as well as I-O tables, and the inclusion of more industries in the analysis, particularly the banking and education sectors. With this, the effects of changes in the industrial relationships of the banking sector with the other sectors can also be looked into. The forecast period can also be lengthened to five more years (2005 to 2010), so as to give a glimpse of the impact of e-commerce on employment in the long-term.

Since the impact on employment was computed from revenue projections using inter-industry relationships, it can be considered that employment projections were based only on the supply side. As such, revenue increases of the industries may fail to capture actual changes in consumer final demand. Further studies could incorporate the demand side, thus also considering consumer income. Moreover, the market for B-TO-C e-commerce was constrained only to the local market, excluding possible demand from abroad – from overseas workers and Filipino-Americans. Studies can be made to include demand outside the country, so as not to underestimate the results, to a certain extent.

The study considers the impact of only one aspect of e-commerce (B-TO-C) on the 11 industries and does not include the effects of the business-to-business (B-TO-B) aspect of e-commerce. It would be, thus, interesting to note the effects of both B-TO-C and B-TO-B e-commerce, since at present, B-TO-B accounts for a much bigger share of e-commerce revenues in the U.S.

More importantly, studies can also be undertaken, first, to analyze the implications of the results of the foregoing study on different economic policies and issues, such as the liberalization of some industries. Second, to study the proper laws

needed, with regard to e-commerce and its surrounding issues of security and encryption, taxation, consumer and vendor protection, etc. Finally, to analyze the societal implications of e-commerce, including education, health, income, and quality of life.



Table 1 - Description of Industries

	<i>1977 PSIC* Code</i>	<i>Description of Industries</i>
1)	3421 3422	Printing of newspapers and periodicals Printing and publishing of books and pamphlets
2)	38323 38324 38325 38329	Manufacture of electrical communication equipment Manufacture of radio and television transmitting, signalling and detection equipment and apparatus Manufacture of parts and supplies used for radio, television and communication equipment and apparatus Manufacture of radiographic, fluoroscopic and other X-ray apparatus and tubes and other electronic equipment and apparatus
3)	621	Books, office and school supplies, including newspapers and magazines retailing
4)	623	Dry goods, textile and wearing apparel
5)	7192	Tour and travel agencies
6)	7199	Services allied to transport, n.e.c. (includes forwarding, packing and crating; arrangement of transport; inspection, sampling and weighing connected with transportation; and all other services allied to transport
8)	732	Telephone service
7)	731	Mail and express services
9)	8214	Securities dealers/ brokers
11)	85131	Engineering and technical services
10)	85201	Advertising agencies

\* Philippine Standard Industrial Classification

Sources: 1977 PSIC; National Statistics Office (NSO)

Table 2 – Share of Major Industry Groups to Total Employment

	<i>Average Total Employment as of 1995</i>	<i>Percentage of Total Employment</i>
Agriculture, Fishery and Forestry	145,693	3.3%
Mining and Quarrying	24,443	0.6%
Manufacturing	1,224,342	27.7%
Electricity, Gas and Water	71,646	1.6%
Construction	141,567	3.2%
Wholesale and Retail Trade	1,014,812	23.0%

Transportation, Communication, Storage and Warehousing	185,603	4.2%
Financing, Insurance, Real Estate and Business Services	437,290	9.9%
Community, Social & Personal Services	963,031	21.8%
Public Services	209,799	4.8%
<i>Total</i>	<i>4,418,226</i>	<i>100.0%</i>

Source: National Statistics Office

Table 3 – Share of Selected Industries to Total Employment

	<i>Average Total Employment as of 1995</i>	<i>Share in Major Industry Group*</i>	<i>Share in Total Employment</i>
1) Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	9,325	0.8%	0.2%
2) Electrical Communication Equipment	71,429	5.8%	1.6%
3) Book, Office & School Supplies Retailing	20,908	2.1%	0.5%
4) Dry Goods, Textile & Wearing Apparel Retailing	149,983	14.8%	3.4%
5) Tour & Travel Agencies	8,617	4.6%	0.2%
6) Forwarding, Packing & Crating	15,904	8.6%	0.4%
7) Telephone Services	28,366	15.3%	0.6%
8) Mail & Express	1,464	0.8%	0.0%
9) Securities Dealers/Brokers	3,032	0.7%	0.1%
10) Engineering & Technical Services	7,146	1.6%	0.2%
11) Advertising Agencies	6,235	1.4%	0.1%
<i>Total</i>	<i>322,409</i>	<i>11.3%</i>	<i>7.3%</i>

\* Manufacturing for industries (1) and (2); wholesale and retail trade for industries (3) and (4); transportation, communication, storage and warehousing for (5) to (9); and financial and business services for (10) and (11).

Source: National Statistics Office

Table 4 – GVA Industry Group

	<i>GVA Industry Group Used</i>
1) Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	Printing
2) Electrical Communication Equipment	Electrical Machinery
3) Book, Office & School Supplies Retailing	Retail Trade
4) Dry Goods, Textile & Wearing Apparel Retailing	Retail Trade
5) Tour & Travel Agencies	Services Incidental to Transport
6) Forwarding, Packing & Crating	Services Incidental to Transport
7) Telephone Services	Communication
8) Mail & Express	Communication
9) Securities Dealers/Brokers	Non-Banks
10) Engineering & Technical Services	Business Service
11) Advertising Agencies	Business Service

Source: National Statistical Coordination Board

Table 5 – Summary of Formulas Used for Revenue Projections (1998 – 2000)

	<i>1998</i>	<i>1999 and 2000</i>
1) Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	Formula 3b	Formula 3b
2) Electrical Communication Equipment	Formula 3b	Formula 3b
3) Book, Office & School Supplies Retailing	Formula 3b	Formula 3b
4) Dry Goods, Textile & Wearing Apparel Retailing	Formula 3b	Formula 3b
5) Tour & Travel Agencies	Formula 3b	Formula 3b
6) Forwarding, Packing & Crating	Formula 3b	Formula 3b
7) Telephone Services	Formula 2	Formula 3b
8) Mail & Express	Formula 3a	Formula 3a
9) Securities Dealers/Brokers	Formula 3b	Formula 3b

10) Engineering & Technical Services	Formula 3b	Formula 3b
11) Advertising Agencies	Formula 2	Formula 3a

Source: Author's calculations

Table 6 – OECD Estimates of On-Line Shares, 2000-05 (in Percentages)

<i>Industry / Product</i>	<i>On-Line Share of Revenues</i>
Newspaper/Magazines	10%
Books	20%
Airline Ticketing	8%
Mail/E-mail	20%
Retail Stock Trade	60%
Television	5%

Source: OECD (1998a)

Table 7 – Estimates of On-Line Shares for the Philippines (in Percentages)

<i>Industry / Product</i>	<i>On-Line Share of Revenues</i>
Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets Newspaper, Periodical	0.67%
Book, Office & School Supplies Retailing	1.33%
Dry Goods, Textile & Wearing Apparel Retailing	0.33% <sup>a</sup>
Tour and Travel Agencies	0.53%
Mail and Express	1.33%
Securities Dealers/Brokers	4.00%
Advertising Agencies <sup>b</sup>	0.33%

<sup>a</sup> Percentage of on-line revenues for the U.S. is assumed to be 5% -- the lowest among the estimates of OECD

<sup>b</sup> Assumed to be related to television

Source: Author's calculations

Table 8 – Projected Increase in Revenues from 1995 to 2000  
(in thousand pesos)

	<i>Total Revenues as of 1995</i>	<i>Projected Increase in Total Revenues</i>	<i>Percentage Increase</i>
1) Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	P 8,255,115	P 1,342,236	16%
2) Electrical Communication Equipment	57,704,590	195,276,701	338%
3) Book, Office & School Supplies Retailing	9,706,149	9,877,591	102%
4) Dry Goods, Textile & Wearing Apparel Retailing	82,593,943	130,145,062	158%
5) Tour & Travel Agencies	2,221,781	554,030	25%
6) Forwarding, Packing & Crating	6,385,315	7,221,662	113%
7) Telephone Services	34,627,734	65,033,369	188%
8) Mail & Express	179,715	-96,381	-54%
9) Securities Dealers/Brokers	2,171,212	6,248,810	288%
10) Engineering & Technical Services	2,969,923	4,920,470	166%
11) Advertising Agencies	3,160,795	1,160,526	37%
<i>Totals</i>	<i>P209,976,272</i>	<i>P421,684,076</i>	<i>201%</i>

Sources: National Statistics Office; Author's calculations

Table 9 – Projected Increase in Average Total Employment per Sector (1995-2000)

	<i>ATE* as of 1995</i>	<i>Projected Increase in ATE*</i>	<i>Percentage Increase</i>
1) Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	9,325	1,020	11%
2) Electrical Communication Equipment	71,429	141,877	199%
3) Book, Office & School Supplies Retailing	20,908	9,418	45%
4) Dry Goods, Textile & Wearing Apparel Retailing	149,983	123,706	82%

5) Tour & Travel Agencies	8,617	1,891	22%
6) Forwarding, Packing & Crating	15,904	8,820	55%
7) Telephone Services	28,366	17,167	61%
8) Mail & Express	1,464	-37	-3%
9) Securities Dealers/Brokers	3,032	652	21%
10) Engineering & Technical Services	7,146	5,121	72%
11) Advertising Agencies	6,235	118	2%
<i>Total</i>	<i>322,409</i>	<i>309,753</i>	<i>96%</i>

\* Average Total Employment

Sources: National Statistics Office; Author's calculations

Table 10 – Employment Generated for the Whole Economy (1995-2000)

	<i>Total Effect</i>	<i>Initial Effect</i>	<i>Direct and Indirect Effect</i>	<i>Direct Effect</i>	<i>Indirect Effect</i>
Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	2,587	1,020	1,567	677	890
Electrical Communication Equipment	204,560	60,986	143,573	49,874	93,700
Book, Office & School Supplies Retailing	12,220	9,132	3,088	1,655	1,433
Dry Goods, Textile & Wearing Apparel Retailing	160,509	119,947	40,562	21,739	18,824
Tour & Travel Agencies	2,436	1,847	589	276	312
Forwarding, Packing & Crating	11,453	8,791	2,662	1,295	1,367
Telephone Services	27,698	17,058	10,640	5,323	5,317
Mail & Express	-71	-35	-35	-19	-17
Securities Dealers/Brokers	1,159	647	512	334	179
Engineering & Technical Services	6,911	5,050	1,862	1,144	717
Advertising Agencies	288	117	171	119	52

Source: Author's calculations

Table 11 – Projected Revenues from 2000 to 2005  
(in thousand pesos)

	<i>Projected Revenues as of 2000</i>	<i>Projected Increase in Revenues</i>			<i>Percentage Increase (%)</i>		
		<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	9,597,351	5,822,244	5,965,018	6,460,243	61	62	67
Electrical Communication Equipment	252,981,291	963,751,833	972,959,515	1,000,841,587	381	385	396
Book, Office & School Supplies Retailing	19,583,740	22,407,226	22,959,781	25,062,488	114	117	128
Dry Goods, Textile & Wearing Apparel Retailing	212,739,005	239,373,928	240,356,783	242,353,205	113	113	114
Tour & Travel Agencies	2,775,811	5,546,417	6,160,773	7,240,841	200	222	261
Forwarding, Packing & Crating	13,606,976	22,093,988	22,170,272	23,018,087	162	163	169
Telephone Services	99,661,103	241,404,107	244,195,158	249,862,525	242	245	251
Mail & Express	83,334	62,726	63,413	76,272	75	76	92
Securities Dealers/ Brokers	8,420,022	8,835,129	9,104,761	10,094,023	105	108	120
Engineering & Technical Services	7,890,393	11,927,118	12,140,826	13,129,863	151	154	166
Advertising Agencies	4,321,322	4,944,348	5,066,274	5,940,737	114	117	137
<i>Total</i>	<i>631,660,348</i>	<i>1,526,169,064</i>	<i>1,541,142,574</i>	<i>1,584,079,871</i>	<i>242</i>	<i>244</i>	<i>251</i>

Source: Author's calculations

*Table 12 – Total Projected Revenues Attributed to E-Commerce*

(in billion pesos)

<i>Year</i>	<i>Model 2</i>	<i>Model 3</i>
2001	₱ 1.8	₱ 7.9
2002	4.2	16.8
2003	7.9	29.9
2004	10.8	41.4
2005	15.0	57.9

Source: Author's calculations

*Table 13 – Comparison of Projected Revenues Attributed to E-Commerce for Philippines with E-Commerce Revenues of Asia and the U.S. (in billion \$)*

<i>Year</i>	<i>Phils.<sup>a</sup></i>	<i>Asia<sup>b</sup></i>	<i>U.S.<sup>b</sup></i>
2001	\$ 0.16	\$ 8.2	\$ 52.0
2002	0.34	15.6	76.0
2003	0.60	26.4	108.0
2004	0.83	38.0	
2005	1.16		

<sup>a</sup> assuming Scenario 3 and ₱50 = \$1

<sup>b</sup> B-TO-C E-Commerce Revenues

Sources: Author's calculations (Phils.); eMarketer, Inc. (Asia); Nua surveys (U.S.)



Table 14 – Ratio of E-Commerce Related Revenues to GDP and Percentage Contribution to GDP Growth  
(under Scenario 2)

Year	Assumption 1			Assumption 2			Assumption 3		
	Real GDP growth	% of GDP <sup>a</sup>	Cont. <sup>b</sup> to GDP Growth	Real GDP growth	% of GDP <sup>a</sup>	Cont. <sup>b</sup> to GDP Growth	Real GDP growth	% of GDP <sup>a</sup>	Cont. <sup>b</sup> to GDP Growth
2001	3.3	0.05	0.5	3.3	0.05	0.5	3.3	0.05	0.5
2002	3.6	0.10	1.0	3.7	0.10	1.0	4.3	0.10	0.9
2003	3.9	0.17	1.6	4.3	0.17	1.4	4.9	0.16	1.2
2004	4.2	0.21	1.8	4.9	0.21	1.5	5.5	0.19	1.3
2005	4.5	0.25	2.1	5.5	0.24	1.6	6.1	0.22	1.4

<sup>a</sup> nominal GDP

<sup>b</sup> contribution

Source: Author's calculations

Table 15 – Ratio of E-Commerce Related Revenues to GDP and Percentage Contribution to GDP Growth  
(under Scenario 3)

Year	Assumption 1			Assumption 2			Assumption 3		
	Real GDP growth	% of GDP <sup>a</sup>	Cont. <sup>b</sup> to GDP Growth	Real GDP growth	% of GDP <sup>a</sup>	Cont. <sup>b</sup> to GDP Growth	Real GDP growth	% of GDP <sup>a</sup>	Cont. <sup>b</sup> to GDP Growth
2001	3.3	0.21	2.3	3.3	0.21	2.3	3.3	0.21	2.3
2002	3.6	0.41	4.1	3.7	0.44	4.0	4.3	0.40	3.4
2003	3.9	0.65	6.0	4.3	0.64	5.5	4.9	0.62	4.7
2004	4.2	0.80	6.9	4.9	0.77	5.8	5.5	0.73	5.0
2005	4.5	0.98	8.0	5.5	0.92	6.3	6.1	0.86	5.4

<sup>a</sup> nominal GDP

<sup>b</sup> contribution

Source: Author's calculations

Table 16 – Percentage of E-Commerce Related Revenues as of 2005 (in %)

	<i>Model 2</i>	<i>Model 3</i>
1) Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	0.9	4.0
2) Electrical Communication Equipment	0.8	3.0
3) Book, Office & School Supplies Retailing	1.3	6.0
4) Dry Goods, Textile & Wearing Apparel Retailing	0.2	0.7
5) Tour & Travel Agencies	6.9	16.9
6) Forwarding, Packing & Crating	0.2	2.5
7) Telephone Services	0.8	2.4
8) Mail & Express	0.5	8.5
9) Securities Dealers/Brokers	1.5	6.8
10) Engineering & Technical Services	1.1	5.7
11) Advertising Agencies	1.3	9.7
<i>Total</i>	<i>0.7</i>	<i>2.6</i>

Source: Author's calculations

Table 17 – Employment Generated for the Whole Economy Under Scenario 3 (2000-2005)

	<i>Total Effect</i>	<i>Initial Effect</i>	<i>Direct and Indirect Effect</i>	<i>Direct Effect</i>	<i>Indirect Effect</i>
Printing & Publishing of Newspapers, Periodicals, Books & Pamphlets	10,710	4,221	6,488	2,803	3,686
Electrical Communication Equipment	239,143	71,297	167,846	58,305	108,541
Book, Office & School Supplies Retailing	15,368	11,484	3,884	2,081	1,802
Dry Goods, Textile & Wearing Apparel Retailing	116,044	86,719	29,325	15,716	13,609
Tour & Travel Agencies	25,480	19,320	6,160	2,891	3,269
Forwarding, Packing & Crating	17,131	13,149	3,981	1,936	2,045

Telephone Services	36,976	22,772	14,204	7,105	7,098
Mail & Express	121	60	60	32	29
Securities Dealers/Brokers	483	269	213	139	74
Engineering & Technical Services	6,941	5,072	1,870	1,149	721
Advertising Agencies	1,079	439	640	445	195

Source: Author's calculations

Table 18 – Projected Average Total Employment with Partial Substitution (2000-2005)

	<i>Assumed % of E-Commerce Revenues<sup>a</sup></i>	<i>ATE<sup>b</sup> as of 2000</i>	<i>Increase in ATE Without Substitution (Model 3)</i>	<i>Increase in ATE With Substitution (80%)</i>	<i>Difference in Projected Increase in ATE<sup>c</sup></i>	<i>Affected % of Employment as of 2000</i>
Printing and Publishing of Newspapers, Periodicals, Books and Pamphlets	0.67%	10,345	4,223	4,167	56	0.54%
Book, Office & School Supplies Retailing	1.33%	30,326	11,844	11,619	225	0.74%
Dry Goods, Textile & Wearing Apparel Retailing	0.33%	273,689	89,436	88,988	448	0.16%
Tour & Travel Agencies	0.53%	10,508	19,778	19,661	117	1.10%
Mail and Express	1.33%	1,427	63	62	1	0.07%
Securities Dealers/Brokers	4.00%	3,684	271	255	16	0.43%
Advertising Agencies	0.33%	6,353	443	441	2	0.03%
<i>Total</i>		<i>336,332</i>	<i>126,058</i>	<i>125,193</i>	<i>865</i>	<i>0.26%</i>

<sup>a</sup> Share of on-line revenues

<sup>b</sup> Average Total Employment

<sup>c</sup> Increase in ATE without substitution and that assuming 80% partial substitution

Source: Author's calculations

Table 19 – Projected Average Total Employment with Adjusted Coefficients  
(2000-2005)

	<i>ATE<sup>b</sup> as of 2000</i>	<i>Increase in ATE Without Adj. Coeff.<sup>b</sup> (Model 3)</i>	<i>Increase in ATE With Adj. Coeff.<sup>b</sup> (80%)</i>	<i>Difference in Projected Increase in ATE<sup>c</sup></i>	<i>Affected % of Employment as of 2000</i>
Printing and Publishing of Newspapers, Periodicals, Books and Pamphlets	10,345	4,223	4,223	-	-
Electrical Communication Equipment	213,307	165,863	165,968	105	0.05%
Book, Office & School Supplies Retailing	30,326	11,844	12,512	668	2.20%
Dry Goods, Textile & Wearing Apparel Retailing	273,689	89,436	94,479	5,043	1.80%
Tour & Travel Agencies	10,508	19,778	19,778	-	-
Forwarding, Packing and Crating	24,724	13,193	13,194	1	0.00%
Telephone Services	45,533	22,916	22,956	40	0.09%
Mail and Express	1,427	63	63	-	-
Securities Dealers/Brokers	3,684	271	272	1	0.03%
Engineering & Technical Services	12,267	5,144	5,144	-	-
Advertising Agencies	6,353	443	443	-	-
<i>Total</i>	<i>632,163</i>	<i>333,174</i>	<i>339,032</i>	<i>5,858</i>	<i>0.93%</i>

<sup>a</sup> Average Total Employment

<sup>b</sup> Adjusted coefficients

<sup>c</sup> Assuming the original technical coefficients of the 1994 I-O table, and the one with adjusted coefficients.

Source: Author's calculations

Table 20 – Projected Average Total Employment Assuming Partial Substitution  
With Adjusted Coefficients (2000-2005)

	<i>Assumed % of E- Commerc e Revenues <sup>a</sup></i>	<i>ATE<sup>b</sup> as of 2000</i>	<i>Increase in ATE Without Substitutio n (80%)</i>	<i>Increase in ATE With Substituti on (80%)</i>	<i>Difference in Projected Increase in ATE<sup>c</sup></i>	<i>Affected % of Employme nt as of 2000</i>
Printing and Publishing of Newspapers, Periodicals, Books and Pamphlets	0.67%	10,345	4,223	4,167	56	0.54%
Book, Office & School Supplies Retailing	1.33%	30,326	12,512	12,274	238	0.78%
Dry Goods, Textile & Wearing Apparel Retailing	0.33%	273,689	94,479	94,006	473	0.17%
Tour & Travel Agencies	0.53%	10,508	19,778	19,662	116	1.10%
Mail and Express	1.33%	1,427	63	62	1	0.07%
Securities Dealers/Brokers	4.00%	3,684	272	256	16	0.43%
Advertising Agencies	0.33%	6,353	443	441	2	0.03%

<sup>a</sup> Share of on-line revenues

<sup>b</sup> Average Total Employment

<sup>c</sup> Increase in ATE without substitution and that assuming 80% partial substitution

Source: Author's calculations

## Appendix A

### Overview of E-Commerce<sup>39</sup>

Different sources have varied definitions of e-commerce. To some, e-commerce may include electronic data interchange (EDI), electronic funds transfer (EFT), and all credit/debit card activity. Others limit electronic commerce to retail sales to consumers for which the transaction and payment take place on open networks like the internet. The first definition refers to forms of electronic commerce that have existed for decades and result in trillions of dollars worth of activity everyday. The second, on the other hand, has existed for about four years (in the U.S.), and is barely measurable.

This study will consider e-commerce as commercial transactions, involving both organizations and individuals that are based upon the processing and transmission of digitized data (including text, sound and visual images) that are carried out over networks using non-proprietary protocol through an open standard setting, such as the internet.

The potential of e-commerce is large because it dramatically reduces the economic distance between producers and consumers. Consumers can make their purchases directly without involving traditional retailers, wholesalers, and distributors. In the process, consumers benefit from improved information, lower transaction costs, translating to lower prices and wider choices, which can include products tailored to individual requirements, and instant delivery for intangible goods and services in digital form. There are also advantages for producers and retailers. With e-commerce, they are able to gain easy access to a global marketplace. Lower inventory costs and better inventory management results from not having to maintain inventory at all.

E-commerce has four general segments: business-to-business (B-TO-B), business-to-consumer (B-TO-C), consumer-to-business (C-to-B), and consumer-to-consumer (C-to-C). B-TO-B e-commerce refers to large scale internet transactions between companies, or groups of them. Examples include the purchase process of raw materials by car manufacturers in the U.S., such as General Motors or Ford. B-TO-C embraces normal retail activity on the web, such as bookselling by Amazon.com or on-line stockbroking by Charles Schwab. C2B, a smaller component of e-commerce, takes advantage of the internet's power to drive transactions the other way around – for instance, passengers bidding for airline tickets on Priceline.com. In effect, airline companies are left to decide whether to accept these offers. Finally, C2C refers to e-commerce between individuals and covers a new kind of consumers' auctions such as the auction site eBay.com, where consumers bid against each other. A matrix showing the four different segments of e-commerce is shown in Table A-1.

Table A-1 – The E-Commerce Matrix

	<i>CONSUMER</i>	
<i>BUSINESS</i>	<u>B-to-B</u> GM/Ford EDI Networks	<u>B-to-C</u> Amazon Charles Schwab
<i>CONSUMER</i>	<u>C-to-B</u> Priceline Accompany	<u>C-to-C</u> eBay QXL

Source: The Economist (2000a)

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<sup>39</sup> The following discussion is drawn from OECD, “The Economic and Social Impact of ECommerce: Preliminary Findings and Research Agenda” (1998), Box 1.1, 28; OECD, “Electronic Commerce” (1997); and The Economist, “Shopping Around the Web” (2000), B15.

## Appendix B

### Input-Output Methodology

The 1994 177 by 177 input-output make and use matrices obtained (from the National Statistical Coordinating Board – NSCB) were aggregated into 35 by 35 matrices, taking into consideration the nine industries classified as e-commerce related, and other industries which may be relevant to their respective inputs and outputs. The groupings were done as indicated in Table A-2 below.

Table A-2 – Groupings of Industries in the I-O Table<sup>40</sup>

<i>Gro up</i>	<i>Columns</i>	<i>Industries</i>
1	1-27	Agriculture, Fishery and Forestry
2	28-37	Mining and Quarrying
3	38-68	Food, Beverage and Tobacco
4	69-84	Textile, Footwear and Leather
5	85-95	Wood and Furniture
6	96-98, 101	Paper, and Commercial Printing
<b>7</b>	<b>99-100</b>	<b>Printing and Publishing</b>
8	102-110, 116	Chemical and Chemical Products
9	111-112	Products of Coal and Petroleum
10	113-115, 117-124	Non-metallic Mineral and Rubber Products
11	125-136	Basic Metal Industries and Metal Fabrication
12	137-142	Manufacture of Other Machinery, Except Electrical
13	143-144, 147-151	Electrical Machinery
<b>14</b>	<b>145-146</b>	<b>Electrical Communication Equipment</b>
15	152-157	Transport Equipment
16	158-169	Miscellaneous Manufacturing
17	170	Construction
18	171-173	Electricity, Gas and Water
<b>19</b>	<b>174</b>	<b>Wholesale and Retail Trade</b>
20	175-184, 187	Land, Water, Air Transport and Storage and Warehousing
<b>21</b>	<b>185</b>	<b>Tour and Travel Agencies</b>
<b>22</b>	<b>186</b>	<b>Customs Brokers and Other Services Allied to Transport</b>
<b>23</b>	<b>188</b>	<b>Telephone Service</b>
<b>24</b>	<b>189-190</b>	<b>Postal, Messengerial and Other Communication Services</b>
<i>Gro up</i>	<i>Columns</i>	<i>Industries</i>
25	191	Banking
<b>26</b>	<b>192</b>	<b>Investment, Financing and Non-Banking Services Except</b>

<sup>40</sup> Items in bold face lettering are the industries classified as e-commerce related, and are the ones focused on in this study.



		<b>Pawnshops</b>
27	193-195	Pawnshops and Insurance
28	196-198	Real Estate Development and Ownership of Dwellings
29	197	Letting, Operating Real Estate and Other Real Estate Activities
<b>30</b>	<b>201</b>	<b>Engineering, Architectural and Technical Services</b>
<b>31</b>	<b>202</b>	<b>Advertising Services</b>
32	199-200, 203-208, 210-212, 218-223	Other Private Business and Personal Services
33	213-217, 224-226	Other Private Recreational Services / Hotels, Restaurants
34	209,227	Education
35	228-229	Public Administration and Public Health

Source: Author's calculations

The aggregated I-O tables for both the make matrix (industry x commodity) and use matrix (commodity x industry) were used to obtain the technical coefficients of the industry x industry matrix.

For the impact analysis on employment, the individual impact was considered, where one sector exhibits a change in final demand (the impacting agent). The resulting impact effect was seen on the sector that exhibited the change, as well as the other sectors, and on the whole economy. The following formulas were utilized:

$$(a) \text{ Initial, Direct and Indirect Effect : } \Delta L = l [I - A]^{-1} \Delta Y$$

$$(b) \text{ Direct and Indirect Effect : } \Delta L = l [(I - A)^{-1} - I] \Delta Y$$

$$(c) \text{ Indirect Effect : } \Delta L = l [(I - A)^{-1} - I - A] \Delta Y$$

where

$\Delta L$  = change in employment in sector that exhibited a change in final demand

$l$  = diagonalized matrix of labor employment coefficients ( $l_i$ )<sup>41</sup>

$I$  = identity matrix

$A$  = matrix of technical coefficients

$\Delta Y$  = change in final demand in one sector

<sup>41</sup>  $l_i = L_i/X_i$  where  $L_i$  = labor employed at sector  $i$ ; and  $X_i$  = output at sector  $i$

The column sum of the column matrix  $\Delta L$  equals to the total labor generated for the whole economy, due to a change in final demand for 1 industry. Results from (b) were subtracted from (a) to obtain the initial effects and likewise, results from (c) were subtracted from (b) to get the direct effects.

For the formulas above, it was assumed that the percentage change in revenues is equal to the percentage change in final demand, and that the 1994 IO table (with its corresponding coefficients and final demand values) is still applicable in the following year, 1995.

## Appendix C

### Sampling Procedure of 1995 ASE<sup>42</sup> and Definition of Variables

The latest data obtained from the ASE published annually by the National Statistics Office is as of 1995.<sup>43</sup> The 1995 ASE is a nationwide survey of establishments engaged in the following economic activities as defined in the 1977 Philippine Standard Industrial Classification (PSIC):

- (1) Agriculture, Fishery and Forestry
- (2) Mining and Quarrying
- (3) Manufacturing
- (4) Electricity, Gas and Water
- (5) Construction
- (6) Wholesale and Retail Trade
- (7) Transportation, Storage and Communication
- (8) Financing, Insurance, Real Estate and Business Services
- (9) Community, Social and Personal Services

The 1995 survey covered all establishments regardless of type of ownership and economic organization including government-owned establishments. Also included are establishments whether single units or part of multi-establishment enterprises. However, ancillary units, except main offices, which function only in support of the parent establishments, were excluded. Excluded from this survey were the following:

- (1) Agriculture, forestry and fishery establishments with less than 10 persons engaged and not registered with the Securities and Exchange Commission (SEC);
- (2) Mining and quarrying establishments with less than 5 persons engaged and not registered with the SEC;
- (3) Sari-sari stores with no regularly paid employees;
- (4) Individual transportation unit (i.e. motor launches, boats and bancas operated by transport establishments); tricycle, jeepney, pedicab and calesa operators;
- (5) Government postal and telegraph system;
- (6) Establishments engaged in letting and operating real estate such as residential and non-residential buildings including rental of land;
- (7) Religious services and civic organizations;
- (8) Business, professional and labor associations;

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<sup>42</sup> Annual Survey of Establishments

<sup>43</sup> The definitions and procedures are based on the 1995 Annual Survey of Establishments publication.

- (9) Domestic services;
- (10) Foreign diplomat missions, international organizations and extra-territorial bodies;
- (11) Individual professionals and technical workers or craftsmen who do not maintain fixed offices or shops;
- (12) Public education services;
- (13) Public administration and defense;
- (14) Public medical, dental and other health services;
- (15) Pseudo-establishments found in stalls, booths, or stands that could easily transfer or disappear, e.g. open market stalls, movable magazine and book stands, barbecue and pizza pie booths, bingo stands and shooting galleries in ferias.

The establishments listed by the NSO (from the updated list of establishments in the 1994 census of establishments) were classified into 5 categories based on Average Total Employment (ATE):

- with ATE 1-9
- with ATE 10-19
- with ATE 20-49
- with ATE 50-99
- with ATE 100 or more

The following are the definitions of some variables used in the survey:

(1) *Establishment* – an economic unit which engages, under a single ownership or control, i.e., under a single legal entity, in one or predominantly one kind of economic activity at a single fixed physical location.

(2) *Average Total Employment (ATE)* – is the total employment of the pay periods nearest the middle of each quarter (February 15, May 15, August 15, and November 15) divided by four (4), regardless of the number of quarters the establishment was in operation.

(3) *Revenues* – includes cash received and receivable for goods sold and services rendered.

(4) *Total Value of Output* – includes total value of products sold, receipts from contract work and industrial services done for others, receipts from goods bought and sold in same condition, fixed assets produced on own account, and change in inventories (ending less beginning of finished products, work-in-process, and goods for resale).

The establishments are stratified by region, by 3-digit or 4-digit PSIC code and by employment size (average total employment or ATE). For each stratum, establishments were selected using systematic sampling ratios specified in the ff. table:

Table A-3 – Systematic Sampling for the 1995 Annual Survey of Establishments

	<i>Average Total Employment Size</i>				
	<i>1-9</i>	<i>10-19</i>	<i>20-49</i>	<i>50-99</i>	<i>100 or more</i>
Agriculture, Fishery and Forestry	20%	50%	50%	100%	100%
Mining and Quarrying	20%	50%	50%	100%	100%
Manufacturing	2%	10%	25%	50%	100%
Electricity, Gas and Water	20%	50%	50%	100%	100%
Construction	20%	50%	50%	100%	100%
Wholesale and Retail Trade					
Wholesale Trade	2%	10%	25%	50%	100%
Retail Trade	1%	10%	25%	50%	100%
Transportation, Communication, Storage and Warehousing	10%	50%	100%	100%	100%
Financing, Insurance, Real Estate and Business Services	5%	10%	25%	50%	100%
Community, Social and Personal Services	2%	10%	25%	50%	100%

Source: 1995 Annual Survey of Establishments

Methodology for Revenue and Employment Projections

1. Revenue Projections for 1996-1998:

a) Calculate

Formula 1:

$$\frac{T_i}{A_i}$$

where T = revenues from Top 7000 Corp.<sup>44</sup> of corresponding industry  
 A = revenues from ASE of corresponding industry  
 i = years 1990, 1991, 1992, 1993, 1994

b) Assume that

Formula 2:

$$\left[ \frac{T}{A} \right] = \left[ \frac{T_x}{A_x} \right]$$

AVE

where x = years 1996, 1997, 1998.

c) Derive for  $A_x$  in the corresponding years in Formula 2 to obtain the projected revenues.

2. Revenue Projections for 1999-2000:

- a) In the absence of actual data from the Top 7000 Corporations for the years 1999-2000, the GVA of the major industry group corresponding to the industry was used as a proxy variable.<sup>45</sup>
- b) Assume either of Formula 3a or 3b:

<sup>44</sup> Publications available for the Top7000 are as of 1990 to 1994, and 1997 to 1998. Data from the Top12000 was obtained for the years 1994 and 1998. Hence, this set was utilized for 1994 and 1998.

<sup>45</sup> The major industry groups where the 11 industries are classified under are indicated in Table 4 of the Annex.

Formula 3a:

$$\left[ \frac{g_m}{a_m} \right] = \left[ \frac{g_x}{a_x} \right]$$

where

- g = annual growth rates of nominal GVA of corresponding industry group
- a = annual growth rates of gross revenues ASE of corresponding industry
- m = 1997 (benchmark year)<sup>46</sup>
- x = years 1999, 2000

Formula 3b:

$$\left[ \frac{G_m}{A_m} \right] = \left[ \frac{G_x}{A_x} \right]$$

- where
- G = nominal GVA of corresponding industry group
  - A = revenues from ASE of corresponding industry
  - m = 1997 (benchmark year)
  - x = years 1999, 2000

- c) Using Formula 3a, derive for  $a_x$ , and apply this growth rate to the previous year's revenue projection. Using Formula 3b, derive for  $A_x$ .

Formula 2 was used for the projections for 1996 and 1997. But possibly due to the different groupings of the industries used in the Top 7,000 Corporations publication for 1998,<sup>47</sup> revenues for some industries were too low for that year. Thus for most industries for 1998, either Formula 3a or 3b was used, whichever gave more conservative estimates. The corresponding formulas used for each industry for the different projection periods are indicated in Table 5 (Annex). For the years 1999 and 2000, Formula 3a or 3b was applied, depending on which gave conservative estimates.

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<sup>46</sup> The year 1997 was considered as a stable year since it was the year prior to the Asian crisis.

<sup>47</sup> The 1994 PSIC was used in the industry groupings for 1998, whereas the 1977 PSIC was used for earlier years.

E-commerce related revenues and employment were computed, as outlined in Box 1 and Box 2 below:

Box 1. Computation of E-Commerce Related Revenues

$$E_i^2 = A_i^2 - A_i^1 \quad \text{and} \quad E_i^3 = A_i^3 - A_i^1$$

where  $E_i^2$  = e-commerce related revenues under scenario 2 in year i  
 $A_i^2$  = revenue projection under scenario 2 in year i  
 $A_i^1$  = revenue projection under scenario 1 in year i  
 $E_i^3$  = e-commerce related revenues under scenario 3 in year i  
 $A_i^3$  = revenue projection under scenario 3 in year i  
*i* = years 2001, 2002, 2003, 2004, 2005

Box 2. Computation of E-Commerce Related Employment

$$M_i^2 = L_i^2 - L_i^1 \quad \text{and} \quad M_i^3 = L_i^3 - L_i^1$$

where  $M_i^2$  = e-commerce related employment under scenario 2 in year i  
 $L_i^2$  = employment projection under scenario 2 in year i  
 $L_i^1$  = employment projection under scenario 1 in year i  
 $M_i^3$  = e-commerce related employment under scenario 3 in year i  
 $L_i^3$  = revenue projection under scenario 3 in year I  
*i* = years 2001, 2002, 2003, 2004, 2005

Under the assumption of partial substitution, the *revenues substituted by e-commerce* were determined by multiplying the computed B-TO-C on-line revenues<sup>48</sup> by various substitution rates (20%, 60% and 80%). *Net revenues* (adjusted for substitution) were then obtained by getting the difference of the original projected revenues for 2005

<sup>48</sup> On-line revenues for the U.S. were divided by 15 since e-commerce revenues in the U.S. are projected to be 12.6% of GDP by 2004 (eMarketer, 2000), whereas e-commerce revenues for the Philippines are forecasted to be 0.8% of GDP (based on the author's calculations). The percentage for the U.S. is approximately 15 times that of the Philippines. The corresponding percentages are indicated in Tables 6 and 7 (Annex).



and the revenues substituted by e-commerce. New employment projections were then computed (through I-O) using this revised set of revenues. Box 3 below outlines the procedure for calculating the revenues adjusted for substitution effects.

Box 3. Computation of Revenues Adjusted for Substitution Effects

- (1)  $w = w^{US} / 15$       where  $w$       = assumed share of on-line revenues  
 $w^{US}$       = estimated share of on-line revenues for the U.S.
- (2)  $A_x^e = A_x * w$        $A_x^e$       = on-line revenues as of year x  
 $A_x$       = projected revenues as of year x
- (3)  $A_x^{qe} =$   
revenues, year x       $A_x^e * qA_x^{qe}$       = projected revenues substituted by on-line  
 $q$       = assumed substitution rate
- (4)  $A'_x = A_x - A_x^{qe}$        $A'_x$       = revised revenue projection for year x  
 $x$       = year 2005
- where  $w$       = assumed share of on-line revenues

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