

南 華 大 學

資訊管理學系碩士論文

網路行銷訂價模式之理論探討及其敏感度分析之研究

A Research on the Theoretical Development of a Pricing  
Model for Internet Marketing with Sensitivity Analysis



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中華民國 九十二年 六 月

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## 碩 士 學 位 論 文

資 訊 管 理 學 系

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口試日期：中華民國

92年6月26日

## Acknowledge

論文的完成，首先要感謝指導教授 蔣志堅老師，從研究主題的確立、研究觀念的建立、研究過程的解惑，乃至於論文內容的修正，均有賴蔣老師的細心教誨才得以順利完成。浩瀚師恩，實銘感五內。此外，感謝口試委員吳英隆教授與應立志教授於口試中所提供之精闢的建議，指導論文中之謬誤與不足之處，使得本論文得以更完整的呈現，在此亦表謝忱。

研究所求學其間，感謝書慶、小馬、承彥、東坡、雅雯、小厲、文明、阿牧等同學在生活上及課業上的關心與照顧，讓我體會友誼的可貴。此外，謝謝助教伊汝及學弟妹博議、泰誠、承君、瑞芳、碧珠的幫忙，讓我的論文能順利完成。

回首歷歷，感謝我的父母無怨無悔的付出與照顧及若梅的督促，僅以此文獻給我  
最親愛的師長、家人與朋友。

廖廷剛 謹識

于南華大學

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## 摘 要

價格在買賣雙方之交易過程中扮演相當重要的角色；然而在網路行銷領域中，尚有一能被廣泛接受之訂價模式。本研究將以傳統經濟理論為基礎並考慮網際網路之特性進而嘗試發展一網路訂價模式來協助網路訂價之決策制定。我們將先行探討網際網路對傳統行銷及訂價方式所帶來之衝擊，並闡述網路行銷之重要性及發展新的訂價模式之迫切性。其次，此研究將以企業及個人消費者購買程序來探討價格因素在整體之購買程序中所扮演的角色，同時考量賣方之成本、市場之需求強度、競爭環境及市場策略等重要因素，來訂定一符合買賣雙方均能接受之價格。最後，本研究將分析消費者及企業購買者之價格敏感度及影響其敏感度之原因，藉此協助管理者制定最佳之價格策略。本研究之主要發現如下：企業買主的價格敏感度會較個人消費者低、消費者對數位產品的敏感度較一般產品高、企業買主較願意主動加價以獲得其所需產品。

關鍵字： 網路行銷、訂價模式、企業及消費者購買程序、價格敏感度。

# A Research on the Theoretical Development of a Pricing Model for Internet Marketing with Sensitivity Analysis

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## ABSTRACT

Product prices are important in making trades and deals. However, there is not a widely accepted pricing model for Internet marketing. In this research, a new dynamic pricing model to assist Internet pricing decision-making is developed, considering economic theory and attributes of Internet markets. The factors which buyers concerned are then investigated, such as demand, costs, competitive, and strategy issues. Incorporating the BBB algorithm, CBB algorithm, and pricing model, an Internet purchasing and negotiating processes are identified for B2B and B2C markets. Finally, scenario analysis of the price sensitivity is formulated to assist the success of an Internet pricing strategy in a competitive and dynamic B2B and B2C market. Our research find that business buyer have lower price sensitivity than individual buyer, buyer's price sensitivity will higher on digital product than on physical product, and business buyer more willing to add budget to obtain what they need.

Keywords: Internet marketing, pricing model, consumer and business buying behavior (CBB & BBB), price sensitivity

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# Chapter 1 Introduction

## 1.1 Research Background and Motivation

In recent years, rapid development of the Internet has been changing the way many companies do business via flourishing electronic commerce in the digital age. One effect the Internet has had on business is the change in prices on goods and services to customers. Pricing theories and models are being changed rapidly as the Internet evolves. As suggested by Baker *et al.* (2000), marketing experiment and strategic adjustment have become more important in e-commerce activities. Digital products and their corresponding pricing models are tried out rapidly, and can be quickly modified based on actual customer behavior and their preference.

No surprising, Internet marketing becomes an essential means for businesses to attract online customers to their websites and to trigger the expected purchasing behaviors. Most marketing researches revealed that price is the major factor when consumers purchased online as well as off-line. Price plays a significant role and is much elastic than other factors in the marketing mix. Unlike product or channel, prices can change rapidly based on market demands. Therefore, how to set an 'optimal price' and adjust it dynamically according to the competitors' attitude, market circumstance, and situations between supply and demand sides to gain maximum profit is the most important issue in Internet marketing.

There is an increasing interest in understanding the effects of Internet shopping environments. An issue of particular interest to both practitioners and academics was to determine whether there are systematic differences in consumer choice behaviors between online and regular (offline) stores, and if there are differences, in understanding the reasons



for these differences (Hoffman & Novak 1996; Jagannathan *et al.*, 2002).

Few papers have explored how online consumer behaviors differ from offline ones and the difference buying behaviors between business and individual buyers. However, there were exceptions: a conceptual paper on purchase processes and prospects (Butler and Peppard, 1998) and an experimental study (Degeratu *et al.*, 2000). Butler and Peppard pointed out that a key difference between online and offline shopping is the ability of online consumers to obtain more information about both price and non-price attributes. Degeratu *et al.* (2000) compared consumer choice behaviors in online and traditional supermarkets, and they discussed the effects of brand name, price, and other search attributes. These researches provided a direction for us to understand what kinds of factors would affect consumers buying behaviors. However, an applicable Internet pricing model is expected to greatly help us appreciate the consumer buying behavior more deeply by testing their price sensitivity and understand what factors affect their price sensitivity. In fact, developing such a pricing model against online buying behavior of individual consumer and business buyers is important to assist managers make their marketing strategies.

Simonson and Drolet (2003) noted that consumers often needed to decide on the highest price they were willing to pay when purchasing products and sellers need to decide on the lowest price they were willing to accept when selling products. However, how did consumers actually decide on the highest price they want to buy? Similarly, how did sellers decide on the lowest price they were willing to accept for a product that they wish to sell? The former question, which relates to the economic concept of reservation price, has been studied extensively in both areas of marketing and economics. Although the determinants of willingness-to-pay and willingness-to-accept have been extensively studied, there has been very little research literature in developing such a pricing model to set an optimal

price for retailing on the Internet. Therefore, understand the price sensitivity of online shopping consumers and business buyers is critical for managers to determine competitive product price more precisely.

## 1.2 Research Objectives

Several researchers have reported that new pricing strategies are needed because trading on the Internet can significantly reduce search costs, transaction costs, and menu costs. On other hand, many authors examined that the price transformation in a dynamic environment such as the Internet will affect firms' pricing strategies and consumers' willingness-to-pay enormously. Therefore, how to decide an optimal price for both online sellers and buyers is a critical issue to e-commerce. This research effort is thus contributed to the understanding and analysis of price sensitivity of online buying consumers and businesses by redrawing their buying behavior and performing various scenarios to further comprehend the impact of price sensitivity to seller's pricing strategies. The objectives of this research can be divided into the following:

- (1) Develop new models of business buying behavior (BBB) and consumer buying behavior (CBB) model to fundamentally represent behaviors of buying physical and digital products on the Internet.
- (2) Develop a pricing model according to the previously developed CBB and BBB model.
- (3) Investigate the determinants of willingness-to-pay and willingness-to-accept judgments.
- (4) Perform the sensitivity analysis to analyze how various factors influence price sensitivity when buyers are buying on the Internet.
- (5) Employ scenario analysis to study possible relationships between price sensitivity and

pricing strategies among the new CBB, BBB, and pricing model.

### 1.3 Research Framework

This research focuses on the theoretical establishment of an analytical pricing model together with realistic scenario applications. A literature survey is presented in Chapter 2. The difference of 4Ps is first compared between traditional and Internet marketing to deduce that price is the dominator in Internet marketing due to significant cost reduction with respect to marketing mix. Second, how the Internet influences on product design, channel, various cost dimensions, and price dispersion is investigated to form a basis of pricing model development. Several kinds of traditional pricing model are presented in Chapter 3, which illustrates the fundamental pricing process, objectives, and decisions. In Chapters 4 and 5, the CBB and BBB model are modified to include the online features. A conceptual dynamic pricing model is then developed based on these models. Chapter 6 depicts the development of an Internet pricing model and negotiation algorithms by integrating traditional pricing models and characteristics of the Internet. The new online CBB, BBB, and pricing models are applied for different scenario analysis in Chapter 7. Finally, managerial implications, research contribution, and future research suggestions are discussed and introduced together with a detailed research flow as shown in Figure 1-1:

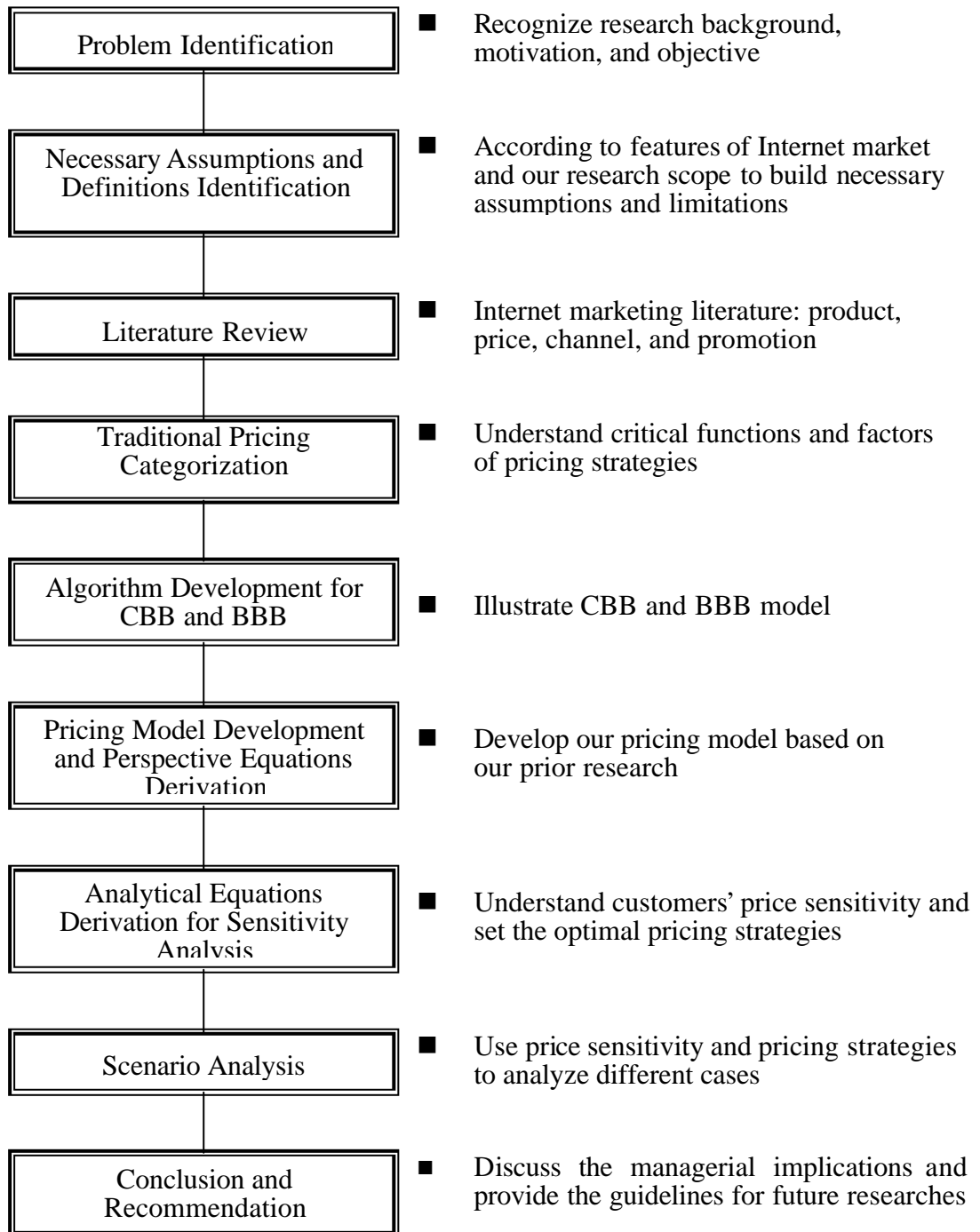


Figure 1-1: Research Flow

## 1.4 Research Scope and Assumption

### 1.4.1 Research Scope

Based on the fundamental attributes, the Internet market can be classified into four categories: single seller to single seller (C2C), single seller to many buyers (B2C), many sellers to single buyer (C2B), and many sellers to many buyers (B2B), as listed in Table 1-1. The scope of this research is mainly on B2C and B2B markets. In addition, the types of product considered in this research are both physical and digital products. The pricing of digital products is regarded as a special case in a B2C market.

Table 1-1: Four categories of the Internet market

	Single Seller	Many Sellers
Single Buyer	C2C	C2B
Many Buyers	B2C	B2B

Source: Our research

### 1.4.2 Research Assumption

To enable this research, several necessary assumptions are identified and defined in this section. The Internet market is regarded as a “perfectly competition market” with the following characteristics:

- (1) Homogeneous goods: the goods are indifferent among sellers.
- (2) Fair accessibility to all information: everyone in the digital market knows everything, all consumers know all the options available to them, and all sellers know all the other options available to them.
- (3) No barriers to entry or exit: producers and consumers are able to freely enter and leave the Internet market place. Thus, for example, if excessive profits are being made in a particular segment, new producers will be attracted to enter the market and supply

items, and this increasing competition will bring the profits back to a normal level and eventually balance both demand and supply.

In perfectly competitive markets, prices act as signals for decision-making. When prices are relatively high, this signals producers that they can earn more simply by expanding output (productivity) or entering such a market. In contrast, when prices are relatively low, producers must reduce output or some must exit the market. For the long run, price equilibrium will finally approach the balanced relation:  $P = MC$  (Marginal Cost) = Min AC (Minimum Average Cost). On the other hand, consumers may be willing to seek out different websites in search of the best price, i.e., shopping around online, but they also seemed to expect much faster search results online.

## 1.5 Research Limitation

Although a research is expected to be more general, some limitation, however, may inevitably affect this research results. These possible limitations are:

- (1) Limitation on literatures: Internet marketing and pricing theories were diverse. The essences of each research literature may not receive full understanding and extraction equally.
- (2) Limitation on scenario analysis: the scenario analyses are performed with fictitious data based on realistic situations. Although attentions are exercised to determine the optimal value by carrying out scenario analysis, some errors may still influence or embed in the results.

## Chapter 2 Literature Review

### 2.1 Growth of the Internet Commerce

Nowadays, information and communication technologies (ICT) are by far the fastest growing market in the world economy. Computers, networks, and supporting services have become more plentiful, less expensive, and user-friendlier, which leads to a greater attractiveness and more widespread usage at the same time. Internet population grows rapidly as the popularization of broadband, i.e., cable modem and ADSL. All of these advanced technologies also make consumers ever easier to shop on the Internet. According to IDC (International Data Corp.), global trade via the Internet is approximately \$500 million in 2001, and is predicted to expand to \$1.05 billion by 2006. IDC also indicated that global e-commerce trade was approximately 1 trillion US dollars in 2002, a 68% raise compared to 2001. In addition, according to eMarketer's "E-Commerce Trade and B2B Exchanges" report, Internet-based B2B e-commerce is total \$823.4 billion by the end of 2002 and the strong growth will reach nearly \$2.4 trillion by 2004. The United States remains the largest region for B2B e-commerce, with purchases increasing at a compound annual growth rate of 68 % from 2001 to 2005. Closely behind is Western Europe, where B2B purchasing increases at a compound annual growth rate of 91 % from 2001 to 2005. Asia-Pacific is the growth leader with a compound annual growth rate of 109 % during this time.

Most companies implemented their information systems to promote e-commerce on the Internet-base environment, e.g. online shopping stores, online banks, real-time financial services, online customer relationship management, and business-to-business resource exchange and so on. Obviously, Internet commerce creates many opportunities to establish

new electronic channels for marketing, distribution, business-to-business transaction processing, and enterprise coordination, one of the most critical aspects influencing the success of electronic commerce will be the effectiveness of the interface interacting with the consumers (Shaw *et al.*, 1997).

Clearly, Internet represents a tremendous opportunity for both customers and business. On one hand, Internet gives a much wider choice of products, services, and prices from different suppliers for customers and allows them to select and purchase items more readily. On the other hand, Internet gives the opportunity for businesses to marketing the products and services and to expand into new markets. The Internet also gives opportunity for businesses to develop new skills and to use the Internet to reshape and re-engineering their supply chain and value chain and improve the competitiveness. Furthermore, businesses can benefit from Internet by using it to enlarge global market penetration, reduce purchase and distribution costs, and improve service quality on customers.

## 2.2 Importance of Internet Marketing

The Internet is an information technology that diffuses at exponential rates among the business-to-business organizations (David & Daniel, 2000). Its high approval and use by business-to-business organizations may be largely attributed to two factors. First, to its interoperable idiosyncrasy that constitutes an overwhelming advantage over other competitive information network (such as value added networks, open EDI system, Intranet, etc.), since it entails significantly lower setup and operational costs and elimination of switching costs. Second, it may be attributed to its enhanced informational and interactive communicative capabilities, which enable it to be used as both a communication tool and a marketing channel, thus inducing the development of better



effective inter-organizational relationships and the emergence of new network cooperative opportunities.

The Internet's core advantage lies in its great capacity of fast, efficient, integrated, and interactive exchange of information. The Internet facilitates the information exchanges between organizations, concerning issues such as discovery of new customer needs, trends of the local and global markets, competitive moves, joint development of products, joint selling activities, etc.

The Internet allows the companies to quickly respond to market changes, require customer preferences and to customize its promotion and goods to individual customers in a more timely fashion (Kiang *et al.*, 2000). Benefits of Internet's interaction include convenience and increased efficiency, better customer service, lower transaction costs, and new relationship-building opportunities. Ancarani (2002) noted that the Internet allows firms to resort to traditional marketing strategies such as create new customer segmentation, price discrimination, dynamic and smart pricing, product and price versioning strategies, bundling and unbundling strategies more frequently and in a more efficient and effective way.

Internet marketing can be defined as the use of the Internet and related digital technologies to achieve marketing objectives and support the modern marketing concept. These technologies include the Internet media and other digital media such as wireless mobile media, cable, and satellite (Chaffey *et al.*, 2002). Marketing is the management process responsible for identifying, anticipating, and satisfying customer requirement profitability (Chaffey *et al.*, 2002).

Related researches about how Internet will affect business conduction are surveyed, as listed in Table 2-1.

Table 2-1: Efficient of Internet

Researcher (year)	Perspective
David & Daniel (2000)	Lower setup and operational costs and elimination of switching costs. Enhanced informational and interactive communicative capabilities; more effective inter-organizational relationships
Dolan & Moon (2000)	Great capacity of fast, efficient, integrated, and interactive exchange of information.
Kiang <i>et al.</i> (2000)	Quickly respond to market changes, require customer preferences and to customize its promotion and goods to individual customers in a more timely fashion
Ancarani (2002)	Create new customer segmentation, price discrimination, dynamic and smart pricing, product and price versioning strategies

Source: Our research

Internet marketing has become an increasingly important tactic to sustain competitive advantage in the age of keen competition such as Internet market. Therefore, how to make use of Internet marketing to excite demand, reduce cost, and speedy change based on response of customer is critical for success.

Internet marketing has been discussed widely in recent years and it possesses differential features from traditional marketing. Kiang *et al.* (2000) suggested that Internet marketing can document various advantages for companies. These advantages can be classified into three viewpoints. First, it can be a communication channel for information exchange between sellers and buyers to access information and improve interactivity. Second, as a transaction channel to improve visibility and reach a much bigger customer base, to improve revenues by exploiting cross-selling opportunities, and to reduce task complexity, paperwork and transaction cost. Third, as a distribution channel to eliminate huge inventories, storage cost, utilities, and space rental. The difference between Internet

and traditional marketing is listed in Table 2-1. The unique characteristics of Internet marketing mix, i.e., digital product, transformation of price, lower cost structure, and new distribution channel, and customization is investigated. How the effects of Internet on marketing mix and customer needs lead to a new pricing model of Internet marketing is as follows:

Table 2-2: Different attributes of traditional and Internet marketing

	Traditional marketing	Internet marketing
Product	Physical Product	Physical product, Digital product, Service
Price	Higher cost in broker and seeming inflexible	Lower brokerage cost and flexible
Place	Higher channel cost and inventory cost	Least Internet channel cost
Promotion	Higher adverting and marketing cost	Low adverting and marketing cost, 24/7, one-to-one

Source: our research

## 2.3 Digital Product

### 2.3.1 Definition of Digital Product

Choi *et al* (1997) explain that digital products are goods that can be digitized and sold electronically using the Internet. Digital products include a wide range of traditionally paper-based products that can be first produced in digital format and then printed on paper. Such as books, magazines, newspapers, journals, photographs, maps, and so on. Other digital products such as computer software, computer games, and database can be used in digital format and then distributed on the Internet. Moreover, several multimedia entertainment products such as movies, television programs, and music can be digitized and can be downloaded directly on the Internet. Choi *et al* (1997) group the digital products in the three broad categories show in Table 2-2. However, markets of digital

products are still in an unripe stage and it maybe difficult to developing a pricing model to fit all digital products. The scope of this research is defined to focus on information products such as software, books, and online services.

Table 2-3: Categories of digital products

<p>1. Information and entertainment product:</p> <ul style="list-style-type: none"> <li>• Paper-based information product: newspaper, magazine, journals, books</li> <li>• Product information: product specifications, user manuals, sales training manuals</li> <li>• Graphic: photographs, postcards, calendars, maps, posters</li> <li>• Audio: music recording, speeches</li> <li>• Video: movies, television programs</li> </ul>
<p>2. Symbols, tokens and concept</p> <ul style="list-style-type: none"> <li>• Tickets and reservations: airline, hotels, concerts, sport events</li> <li>• Financial instruments: checks, electronic currencies, credit cards, securities</li> </ul>
<p>3. Processes and services</p> <ul style="list-style-type: none"> <li>• Government services: forms, welfare payment</li> <li>• Electronic messaging: letters, faxes, telephone call</li> <li>• Business value creation processes: ordering, bookkeeping, inventorying, contracting</li> <li>• Auctions and electronic mark</li> <li>• Remote education, telemedicine, and other interactive services</li> <li>• Cyber cafés and interactive entertainment</li> </ul>

Source: Choi *et al.* (1997), *The Economics of EC*, pp.64

### 2.3.2 Characteristics of Digital Product

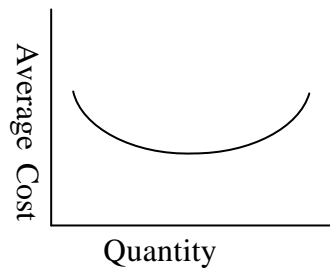
Varians (1998) indicate that digital products have three main properties that would seem to cause difficulties for market transactions. First, experience good, you must experiences a digital product before you know what it is. Second, returns to scale, digital products typically have a high fixed cost of production but a low marginal cost of reproduction. Finally, public goods, digital products are typically non-rival and sometimes non-excludable. Non-rival means that one person's consumption does not diminish the

amount available to other people, while non-excludable means, that one person cannot exclude another person from consuming the good in question. In addition, there are much characteristics of digital product. Four major characteristics of digital product are collected and categorized as follows:

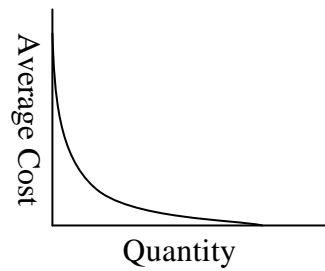
(1) Cost structure: digital products include a large cost in first production and small (almost zero) marginal cost in reproduction (Varians, 1998), and its cost structure is different from physical products (see Figure 1-1). Movies, for example, make a popular movie may spend million dollars but only few dollars to reproduce it. This unique characteristic makes it hard to pricing by using a cost-based pricing method, because marginal costs are approach to zero. A cost-based pricing method seems too meaningless when pricing digital products. Therefore, the efficient pricing method for such products should base on consumers' perception value. This perception value is called consumers' willingness-to-pay, which is discussed in the following sections.

(2) Experienced products: most digital products are experienced goods and consumers can understand its quality after actually use it. In fact, digital products producers typically offer opportunities for consumers browsing their products or provide a version of trial out to help consumer understand its quality.

(3) Lockup and switch cost: consumers face a problem of lockup and switch cost when uses a digital product. The different technology or format of products will lead to higher switch cost if consumers want to transfer current product to other product. Software, for example, software use in Microsoft windows cannot use in Mac windows because the technology and format difference. Translation between Microsoft and Mac now appears costly, time consuming, and complex.



(a) Physical products



(b) Digital Products

Figure 2-1: Cost curves of physical and digital products.

Source: Adopted from [census.gov/epdc/www/ebusins.htm](http://census.gov/epdc/www/ebusins.htm)

Note: For physical products, the average cost declines up to a certain quantity, but then, due to increased in production and marketing costs, the cost will star to increase. For digital products, the cost will continue to decline with increased quantity.

#### (4) Network externality

Network externality means that the value of a product increases as more people use it (Choi *et al.*, 1997). It occurs when the utility of using a technology increases as the network of adopters expands (Kauffman & Wang, 2001). Moreover, network externalities are known to increase an adopter's willingness-to-pay. The overall effect is that the demand curve for a good or a service will shift (Kauffman & Wang, 2001). Many digital products such as software and online content including online communities demonstrate salient consumption externalities: the larger the user base, the greater the user perceived value. The network externality in software is due to the scale economies in usage, such as exchange of data and learning tips (Jing, 2002). Several firms sold their digital products in a lower price in order to create network externality. Shapiro and Varian (1999) indicated that a clear reason for offering low prices (even below marginal

costs) is to obtain an installed base advantage at the expense of short-run profit sacrifice.

Unique characteristics of digital products make us difficult to set a right and optimal price for them. In recent years, many scholars address a lot of pricing strategies to against digital products. Varian (1995) showed that the best pricing strategies for digital products are “Versioning” and “Bundling”; Versioning means that producer provides different versions of a good which sell at different prices. Bundling occurs when distinct products are sold together as a package. Similar notions were appear in the research of information and digital markets, such as Varian (1997, 2000), Choi *et al.* (1997), Bakos (1998), Brynjolfsson, *et al.* (1999), Simon & Butscher (2001), and Ancarani (2002). Most scholars indicated that versioning is a best pricing strategy for digital products as well as bundling. However, those scholars emphasis on conceptual discuss rather than develop a model to explore how to set an optimal for digital products.

In this research, different pricing strategies and related models of digital products are investigated in the next section. Furthermore, a generic pricing model for digital products is presented in Chapter 6.

## 2.4 Costs on the Internet Marketing

Development of the Internet creates a new market to exchange information, goods, and services, and create economic value for both sellers and buyers (Bakos, 1998). Several researchers have explored that Internet-based market is a “frictionless market”, where it can increase effectiveness, reduce transaction cost, and lower search cost (Varian, 1997; Bakos, 1998; Smith *et al.*, 1999; Ancarani, 2002). The Internet market also increases the transparency of prices to customers, which requires organizations to rethink their pricing strategies. On one hand, sellers can reduce costs of collect buyer preference information

and managing multiple prices by using advanced Internet technologies such as cookies and database. These changes allow online sellers to provide custom products and charge different prices (Dewan *et al.*, 2000). Summarized from the above literature, the Internet can help increase the availability of pricing information and provide the dynamic customization of price, and easier to negotiate for price.

In addition, a number of authors have examined that the emergence of the Internet have reduced the search costs and transaction costs for both buyers and sellers (Varian, 1997; Bakos, 1998; Smith *et al.*, 1999; Dewan *et al.*, 2000; Simon and Butscher, 2001; Ancarani, 2002). The impact of these features is considered in this research.

#### 2.4.1 Lower Search Cost on the Internet

The search cost is any amount of money, time, or effort that buyers may incur in obtaining price and quality information for products (Choi *et al.*, 1997). Convenience of the Internet make buyers can search more information about products and price information thus makes them easier and efficient to compare products and prices. Choi *et al.*, (1997) indicated that online searches enable consumers to process a wide range of information about price and non-price, such as location and name of sellers, terms of sales, quality and performance variables, brand names, sizes and other product characteristics. Buyer search costs can be distinguished between search costs about price information and search costs about non-price information such quality. Bakos (1997) suggested that the emergence of a frictionless e-commerce will lower buyer search costs in electronic marketplaces should lead to lower and more homogeneous and promote price competition among sellers thus eliminate all seller profits. Sellers are threatened not only by easier price comparisons but also by cost transparency



However, not only do customers have lower search costs for information about information of product and price, but sellers also have lower search costs for information about their customers (Glanmrio and Prandelli, 2002; Pitt *et al.*, 2001). Advanced Internet technologies assist sellers to collect buyer preferences and track their buying process online. Using the information about buyer preferences enable seller to custom product and charge a superior price from buyers. Lower search costs about price information obviously lead to lower prices. However, the increased information provided to customers can lead to lower price sensitivity and even to higher prices, depending on its quality (Ancarani, 2002).

#### 2.4.2 Lower Transaction Cost on the Internet

In 1937, Ronald Coase first published his theory of transaction costs and the nature of the firm. All transactions require information. Information is costly to acquire, and thus imposes a “transaction cost” on the economy that reduces economic efficiency and societal well being. Downes & Mui (1998) shown the several categories of transaction costs, includes

- (1) Search costs – the cost of buyers and sellers finding one another to make a transaction. Choi *et al.* (1997) indicate that the search cost is buyers spend money, time, and effort to obtain price and quality information for products.
- (2) Information costs – the cost to buyers of learning about the products and services of sellers (including the price and quality); and the cost to sellers of determining consumer needs, and advertising and marketing the goods they sell;
- (3) Bargaining and decision costs – the cost of negotiating and assessing the terms of sale relative to other offers; and

(4) Policing and enforcement costs – the costs of assuring that the transaction met the terms of the sale and that unmet terms were remedied.

The Internet can ease transaction processing, especially for handling complex orders, thereby reducing paperwork, increasing efficiency, replacing professionals tasks, hence, reducing the transaction costs. By using the Internet to place an order, it cannot only save the processing time but also reduce the chance of human error and customer dispute. For business-to-business transactions, shortening the processing time also means the seller can maintain a lower inventory level and reduce other related overhead for handling excessive (Kiang *et al.*, 2000; Clay *et al.*, 2001; Glanmrio & Prandelli, 2002; Lynch & Ariely, 2002).

### 2.4.3 Lower Menu Cost on the Internet

Internet also reduces the menu cost for managing multiple prices to near zero, enabling the real-time individualized pricing. Reduced menu cost and customized products allow sellers to price discriminatorily and charge a price premium since personalized product features better comply with buyers' tastes (Dewan *et al.*, 2000; Clay *et al.*, 2001).

In conventional outlets, menu costs are result primarily from the cost of physically re-labeling the price of goods on store shelves. Brynjolfsson and Smith (1999), Sahlman (2000) suggested that the menu costs should be much lower on the Internet, comprised primarily of the cost to change a single entry in a database. Smaller menu costs may allow Internet retailers to more efficiently adjust their prices to structural changes in the market. Brynjolfsson and Smith (1999) also found that the Internet retailers' price adjustments over time are up to 100 times smaller than conventional retailers' price adjustments—presumably reflecting lower menu costs in Internet channels. Similar result were presented by Bailey (1998), he tests whether menu costs are lower in Internet markets

than in conventional stores by measuring the number of price changes on the Internet and conventional stores. He finds that Internet retailers change price more frequent than conventional retailers and concludes that there are lower menu costs on the Internet compared to conventional outlets.

Menu costs are important in an efficiency context because high menu costs can lead to price stickiness. Price stickiness prevents retailers from making a price change, if the benefit of the price change does not exceed the overall cost. If menu costs are high, retailers are reluctant to make any price change, and, as a result, it will be difficult to negotiate between supply and demand sides.

## 2.5 Price Dispersion on the Internet

Several researches have indicated that frictionless e-commerce and that online price dispersion is persistent and high (Clay and Krishnan, 2001; Brynjolfsson and Smith, 2000; Pan, *et al.*, 2002). Ratchford and Shankar (2002) shows that such a phenomenon is mainly due to shopping convenience, reliability and consumer awareness, and market characteristics such as number of competitors and consumer involvement. If search costs are lower in Internet markets and if consumers are more readily informed of price, price dispersion on the Internet should be lower than conventional markets (Smith *et al.*, 1999).

Understand change in price dispersion may be possible to analyze how the importance of factors such as trust and awareness changes over time. Brynjolfsson and Smith (1999) suggested that retailer heterogeneity with respect to factors such as branding, awareness, and trust remain important factors to understanding Internet markets. Ward and Lee (1999) argued that as consumers become more experienced with the Internet they will rely less on well-known price intermediaries, which may decrease the importance of awareness as a

source of price dispersion (Bakos 1998). In addition, Brynjolfsson and Smith (1999) also indicated that if retailers provide additional services may be able to charge a price premium for the corresponding products they sell, and heterogeneity in the services offered by retailers may explain some of the price dispersion observed.

Setala (2000) studied the effect of product characteristics, demographic characteristics of consumers, and market structure on search and price dispersion. He found several results. First, consumers with higher income tend to increase both search costs and price dispersion. Second, market structure did not affect price dispersion in his study data. Finally, the demographic characteristics of consumers had an important effect on the dispersion in prices. Thus, if consumers are willing to search, price dispersion decreases.

The emergence of price dispersion is very important for marketing researchers and practitioners, because high levels of dispersion demonstrates that it might be possible to design and implement customer value-based pricing strategies. Economists who study price dispersion attribute its causes to product heterogeneity, convenience and shopping experience, customer awareness, retailer branding and trust, lock-in effects, retailers' price discrimination strategies (Ancarani, 2002).

## 2.6 New Distribution Channel

Internet is radically changing the products are distribution. The change in the classic stepped distribution channel from manufacturer to distributor, to dealer to end-user, exemplifies the point. The Internet allows companies to sell directly to end-users because of the direct connection it provides. Companies can streamline their distribution channel by cutting out the intermediaries and pass the savings on to the consumer. The additional benefit for the manufacturer is a better price position in the marketplace. Clearly, if firms

manage to replicate the rich store environment on the Internet without having to incur the cost of expensive personal and retail outlets, then distribution costs might significantly decrease.

Using the Internet as a distribution channel cannot only reduce the delivery cost substantially, but also ensure instant delivery of products/services (Kiang *et al.*, 2000). Digital products such as electronic publishing, software, and digital audio and video are delivered right over the Net. Logistics has the dominant effect on the channel selection decision because digital product can take advantage of using the Internet for both transaction and delivery processes (Kiang *et al.*, 2000).

## 2.7 Customization

The Internet provides a new channel for making contact with buyers to enable products be customized to their needs. The Internet facilitate buyers and sellers to interact on a one-to-one basis and allows the seller to collect information from online user registration, cookies, log pages of the Web server and combined with collaborative filtering and data mining, allows the seller to design products for individuals (Adomavicius & Tuzbilin, 2001). Online sellers are using these technologies to target their most valuable prospects effectively with personalized messages and products (Dutta *et al.*, 1998). The low cost entry to cyber space permits many suppliers to collect and process buyer information to customize their offerings. Dell Computer, for example, utilize the “custom system” enable it to get customers exactly what they need and when they need. Dell allows customers to purchase custom-built products and custom-tailored services on the Internet. Underlying the concept of dynamic pricing is what marketers call price customization. Price customization is the charging of different prices to end consumers based on a

discriminatory variable (see Figure 2-2).

In the fixed pricing case 1a, the firm does business with customers 4 and 5 since their willingness-to-pay exceeds the firm's market price. Compare this with the customized pricing case 1b. Here, the firm does business with customers 2, 3, 4, and 5 since their willingness-to-pay exceeds the firm's break-even price. Instead of a single fixed price, a distribution of prices is now with the mean converging to the target price. However, profits will be much higher in case 1b.

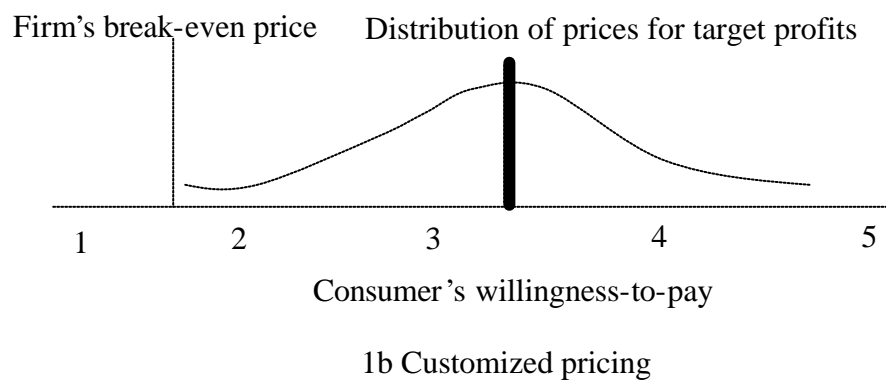
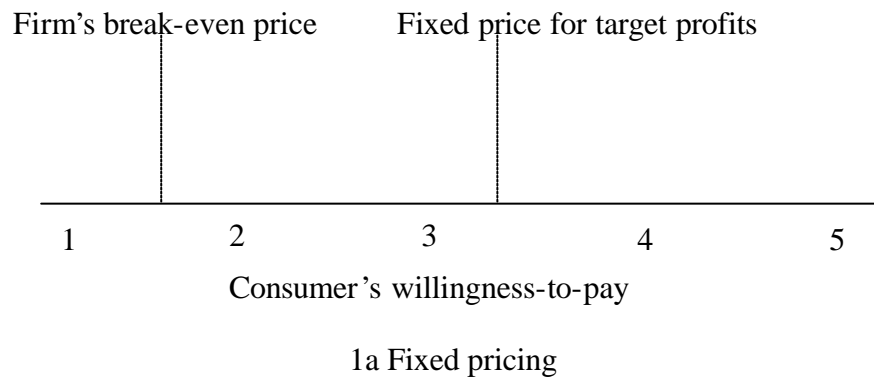


Figure 2-2: The effect of price customization on firm's profits

Source: Reinartz (2001)

## 2.8 Role of Price and Importance of Pricing on the Internet

### 2.8.1 Role of Price on the Internet

Several scholars suggest that the role of price as one of the most important product attributes used when shopping on the Web (Shankar *et al.*, 1999; Kauffman, 2001; Chaffey *et al.*, 2003). Brynjolfsson and Smith (1999) found that prices on-line are 9-16% lower than the prices for comparable products in traditional retail outlets. This might be because of lower direct costs to supply the product; i.e., no rent, lower, or centralized inventory, etc. It might also be because of more price competition on line - more competitors with more focus on price. A third potential reason for this might be the removal of the physical monopoly or an advantage any one retailer might have over another because of their proximity to the customer; that is, the customer has to incur an additional travel and time cost to go to another retail outlet. This cost does not exist to the same extent in the digital world. Because of the visibility of prices as a comparison variable across e-tailors, it puts added price pressure on each of the e-tailors. Lastly, the customer, supplied with full information, or the "efficient consumer," may be able to make a more informed choice. For the same product offered by different e-tailors, it would be easy to envision them by selecting providers with the lowest cost. All of these reasons could be part of what helps drive prices down on the Internet.

Some have argued that price will even play a lesser role on the Internet, given the opportunity for more non-price information to be provided. In contrast to the arguments above regarding the price attribute being so visible and dominant, the alternative position, with the lack of constraint on the quantity of information, is customers can spend more time looking at and assessing non-price attribute information (Lynch and Ariely, 2000). Some believe that armed with increased non-price information on which to base a choice,

consumers can make selections that lead to a higher level of post purchase satisfaction, thereby increasing levels of loyalty. These increased loyalty levels are to reflect in lower levels of price sensitivity.

Table 2-4 shows the four basic drivers of profit, two are from the revenue side (unit volume and price) and two are from the cost side (fixed and variable). Improving price impacts operating profit to a greater degree than the other profit drivers.

Table 2-4: Profit driver

1% improvement in	Creates operating profit improvement of
Fixed cost	3%
Volume	4%
Variable cost	7%
Price	11%

Source: Mckinsey & Company (2000)

### 2.8.2 Importance of Pricing on the Internet

Pricing is an area where most organizations have done very little besides simply displaying prices on-line (Dutta *et al.*, 1998). However, most firms fare relatively poorly along the price dimension. Dutta and Segev (1999) investigated the firms' pricing strategy on the Internet and they find that half of all surveyed firms do not display prices for their own products and less than 5 percent of the surveyed firms display prices for competing products. A small fraction of all firms offered any form of dynamic price negotiation or customization to customers. Baker *et al.* (2001) noted that many incumbents have simply transferred their offline prices onto the Internet.

The Internet allows companies to price with far more precision than they can offline and to create enormous value in the process. Transparency and efficiency of the Internet not



only make customers easier to compare prices but also for companies to track customers' behavior and adjust prices.

On the other hand, Shaw *et al.* (1997) reported that development of new pricing model is needed for digital products, such as electronic publications, software, and information services. These products delivered by the Internet are radically different from traditional goods in terms of their market dynamics, sensitivity to prices, perception by the consumers, economies of scale and scope, competitive conditions, and cost structures.

## 2.9 Price Sensitivity on the Internet

Customer price sensitivity depends on the benefits and costs of information search (Srinivasam & Ratchford 1991; Geroge, *et al.*, 1996). The benefits of information search include economic benefits as well as non-economic benefits such as shopping enjoyment (Marmorstein, *et al.*, 1992). The costs of information search include the cost of searching for price information and the cost of searching for information on non-price attributes. As regards of price sensitivity, all the research shows that, in contrast to conventional wisdom, when firms provide their customers with a rich flow of non-price (quality) information, the online medium does not increase customer price sensitivity (Lynch & Ariely, 2000; Baker *et al.*, 2001). Degeratu *et al.* (2000) indicated that buyer's price sensitivity was affected by the following factors:

(1) Search cost: Several researchers like Mitra and Lynch (1995), Bakos (1997), and Shankar *et al.* (1999) have suggested that the higher the expected benefits of information search, the lower the focus on prices. Therefore, the lower is the price sensitivity, the higher the cost of searching for price information. The overall price sensitivity is the net effect of the benefits and costs of information (price and non-price) search on price

sensitivity. Although the cost of non-price information search is likely to be lowering online, the reduction in the cost of price search is expected to outweigh the reduction in the costs of non-price information search for many products. Their research also suggested that search costs are lower when the time required for search is lower. Search time is typically lowered online than offline.

(2) Perceived content of web site: a website can be price-oriented or feature-oriented. Laul and Wittink (1995) found that price-oriented would increase price sensitivity, whereas non-price advertising (e.g., focus on features or benefits) should decrease price sensitivity. Mitra and Lynch (1995) further suggested that the relationship between a website's marketing information and price sensitivity might depend on the size of customers' consideration sets and the relative strength of preference for the brand. Price-oriented content may expand the consideration set and, if the brand preference is not strong, it can elevate the importance of price for customers.

In general, interactive website can prompt shoppers to examine non-price attributes more than price attributes. Interactivity can also increase customer involvement, which is positively related to non-price information search. When involvement is high, the search costs of non-price information is reduced compared to the search costs of price information. Interactivity also offers greater control to the shoppers that increase the pleasure of shopping—a benefit of information search—and this in turn lowers the importance of price (Marmorstein, Grewal, and Fische 1992).

In addition, Benjamin & Wigand (1995) suggested that perceived variety in product and price options (e.g., menu of prices for variations of the product type) can impact price sensitivity. When a greater variety of offering on the website are available, customers would typically derive benefits of information search by finding products that offer higher value to them.

(3) Customer Factors: Shankar *et al.* (1999) reported that the degree of price sensitivity to be influenced by customer factors such as brand loyalty, value of time, and frequency of shopping. These factors influence information search, and may differ across customers.

<1> Brand loyalty: brand loyalty is plays an important role in determining price sensitivity both online and offline by reducing attention to price. Brynjolfsson and Smith (2000) noted that brand name still strong influence consumer behavior and price sensitivity on the Internet. Krishnamurthi *et al.* (1992) found that customers are relatively insensitive to changes in prices of their favorite brands.

In addition, Degeratu *et al.* (2000) showed that loyal customers were more eager to pay for a brand than non-loyal customers were. More product information available online than offline, increased loyalty could reduce the cost of analytical processing and lead to less extensive price search behavior. Degeratu *et al.* also suggested that there is less brand switching online than in traditional supermarkets. Brand names are more valuable online than in traditional supermarkets. Brands can have more or less impact online n traditional supermarkets depending on the extent of relevant information available for making choices in these markets.

<2> Value of time: time-stressed shoppers (i.e., those with high costs of information search) are less inclined to search for prices and tend to use simple tactics such as “buy what you bought last time” (Shankar *et al.*, 1999). Such shoppers may also make their decisions based on impulse and not spend much effort to find better prices either online or offline (Inman and Winer 1999). Online retailers who make it easier to find and evaluate products may be able to charge a price premium to time-sensitive consumers. Source of convenience may include better search tools, general suggestion tools, extensive product reviews, product samples, and faster checkout services. These

conveniences will help consumer choose their favorites more quickly and spend less time. On the other hand, search is cheaper online for both price and non-price attributes than in offline. Thus, shoppers with high value of time to do a little more non-price shopping online than offline, and those with low value of time to do more search for price online than offline.

<3> Frequency of shopping: customers who purchase or buy more frequently either online or offline have a narrower latitude or zone of price acceptance than those who shop less often (Kalyanaram and Winer 1995). As a result, customers who purchase frequently search more for prices that fall within their narrow zone of acceptance than those who have a wider zone of price acceptance. Such customers may also find price more important than those who shop less frequently may.

## 2.10 Brief Summary

The Internet has a great impact on both of buyer and seller. It reduces various costs for buyer and seller can interact more efficient and frequent. Lower search cost, transaction cost, and menu cost enable seller to acquire more customers base and easier to adjust price in real-time based on customer's preference. However, doing business on the Internet becomes more competitive and difficult to make profit due to lower entry barriers, cost transparency, and buyer can easily compare among sellers and choose one seller who offers the lowest price. Alternatively, lower search cost and transaction cost help buyers find more candidates who match his/her need and preference. Buyers thus become more price-sensitive because they can search and transact at a lower cost.

Sellers need to change or adjust their pricing strategies and become smarter after understanding what their customers want on the Internet. Buyers' price sensitivity becomes

a guideline for sellers to set their price and offer more valuable service or customization to reduce buyer's price sensitivity. It will help sellers to create more customer base and make more profit on the Internet. This seems like the most important for seller if they want to survive in a dynamic and competitive environment such as Internet.



## Chapter 3 Traditional Pricing Strategies

Companies must to answer several questions before setting their price strategies. For example, how should we price our products to make best use of our manufacturing capacity, raw materials, and storage and distribution capabilities? What is the optimal price at which we should commit to an order? At what price should we be willing to walk away from the business? What is the optimum range for negotiating a profitable price? How should our prices be adjusted for specific strategic objectives such as market share targets, competitor positioning, and other goals? In order to answer these questions, we should fully understand the pricing process, objectives, customers' demand, cost, competitive environment, and so on. Therefore, pricing decision must combine company objective and marketing objective, and then develop the best pricing strategies and policies (see Figure 3-1).

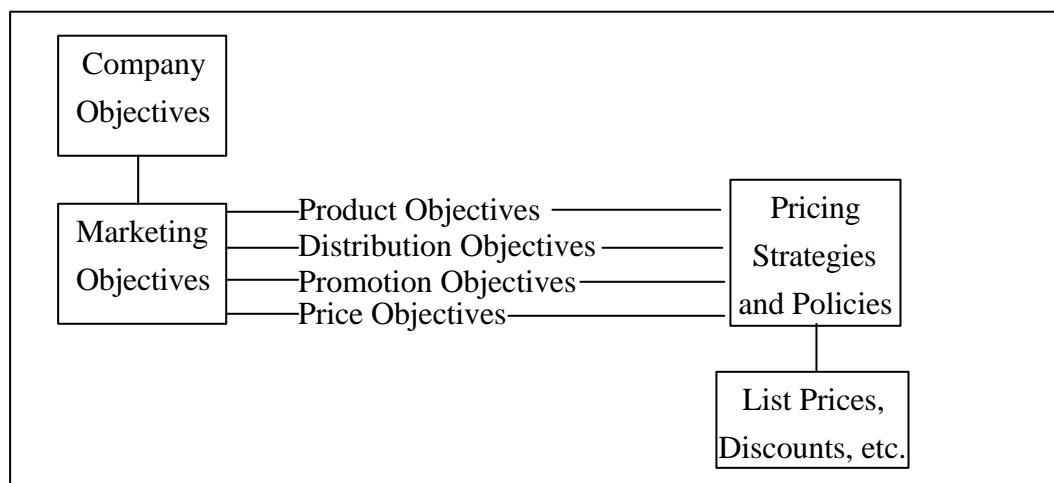


Figure 3-1: Pricing decision

Source: Kotler (1999)

### 3.1 Pricing Process

In most industries, pricing process can be divided into six sections, including objective setting, demand analysis, cost analysis, competitive analysis, impact on companies' other products, and legal consideration, as shown in Figure 3-2. Six major tasks are identified as follows:

(1) Objective setting: setting pricing objectives are critical because pricing objectives form a foundation on which the decisions associated with subsequent stages are based. Organizations may have numerous pricing objective like: achieve a target return on investment (ROI); stimulate demand to maximize throughout consistently; enhance profit across channels and segments; effectively manage product life cycle; respond rapidly to competitor actions; respond rapidly to changes in market demand; reflect strategic objectives such as increasing market share, protecting market share and maintaining brand image; and improve supply chain efficiency by smoothing demand through pricing. The pricing objectives can be separated from three orientations – profit oriented, sales oriented, and status quo oriented, as shown in Figure 3-3.

(2) Demand analysis: company will consider the demand curve and price elasticity of demand. First, if demand is elastic, a change in price causes an opposite change in total revenue. Secondly, inelastic demand results in a parallel change in total revenue when a product's price is changed. Finally, unitary represents the total revenue is maximized at the point where demand is unitary elastic.

(3) Cost analysis: company need to set the price and must cover all costs of producing, distributing, and selling the product, including a fair return on effort and risk. The costs include two patterns: fixed and variable costs.

<1> Fixed costs that vary little with changes in the number of products sold.

<2>Variable cost is duplicated with every unit of product sold.

Furthermore, when analysis of demand, cost, and profit relationships, this stage of the pricing process can be accomplished through marginal analysis or breakeven analysis. Marginal analysis combines the demand curve with a firm's costs to develop an optimum price for maximum profit.

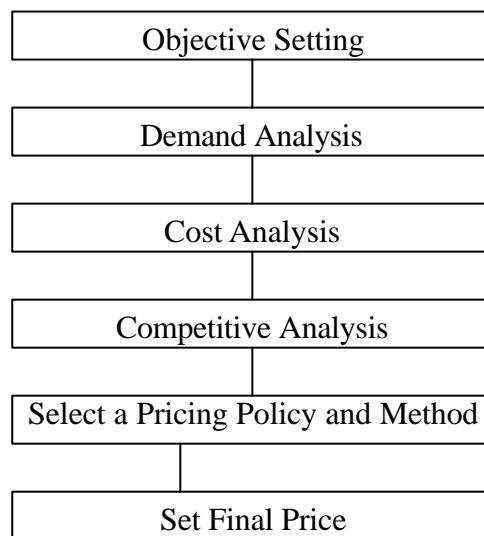


Figure 3-2: An industry pricing process

Source: Kotler (1999)

To do marginal analysis, marketers must first calculate fixed costs, average fixed cost, variable costs, average variable cost, total cost, average total cost, and revenue. Then marginal costs (MC) and marginal revenue (MR) are calculated. The optimum price is the point at which marginal cost (MC) equals marginal revenue (MR) (see Figure 3-4). Marginal analysis is only a model. It offers help in pricing new products before costs and revenues are established.



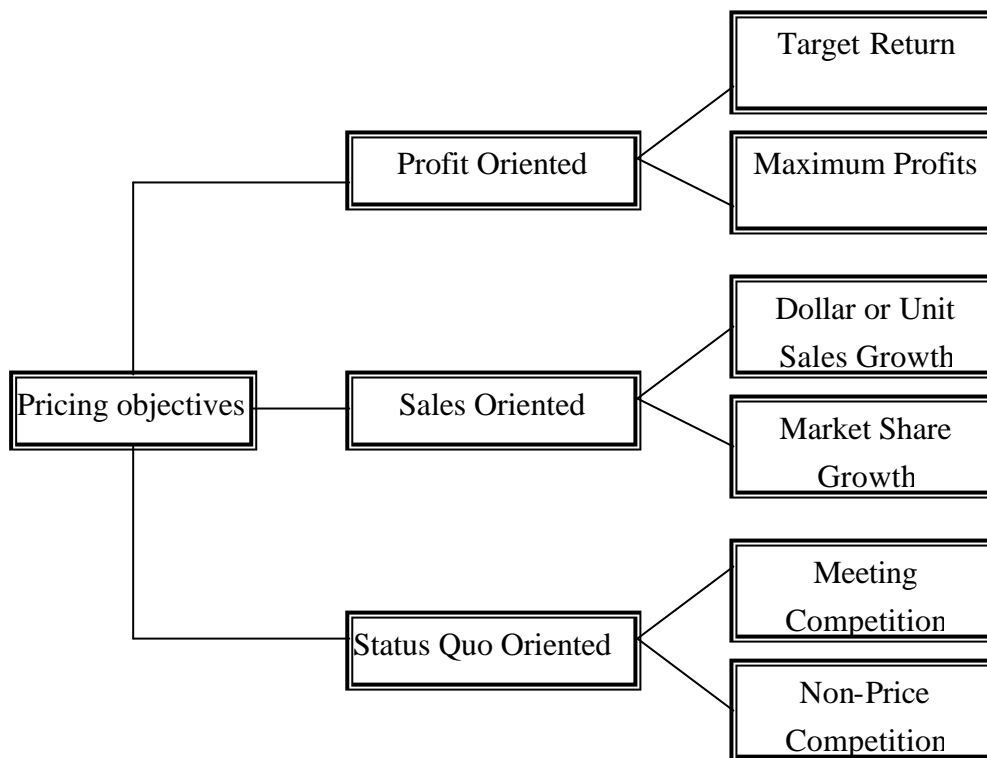


Figure 3-3: Common Pricing Objectives

Source: Kotler (1999)

Break-even analysis is important in setting price. To use breakeven analysis effectively, company should determine the break-even point for each of several alternative prices. This determination makes it possible to compare the effects on total revenue, total costs, and the break-even point for each price under consideration (see Figure 3-5). However, this approach assumes that the quantity demanded is fixed and the major task is to set prices to recover costs.

(4) Competitive analysis: analyze competitors' costs and prices are important for company, it must predict the response of its competitors to its price moves. Kotler (1999) presented a model to assist company in assessing and responding to competition's price (see Figure 3-6).

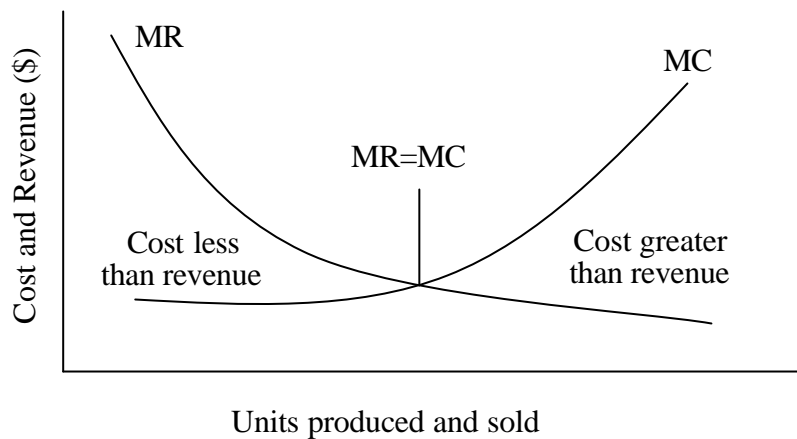


Figure 3-4: Marginal analysis

Source: Kotler (1999)

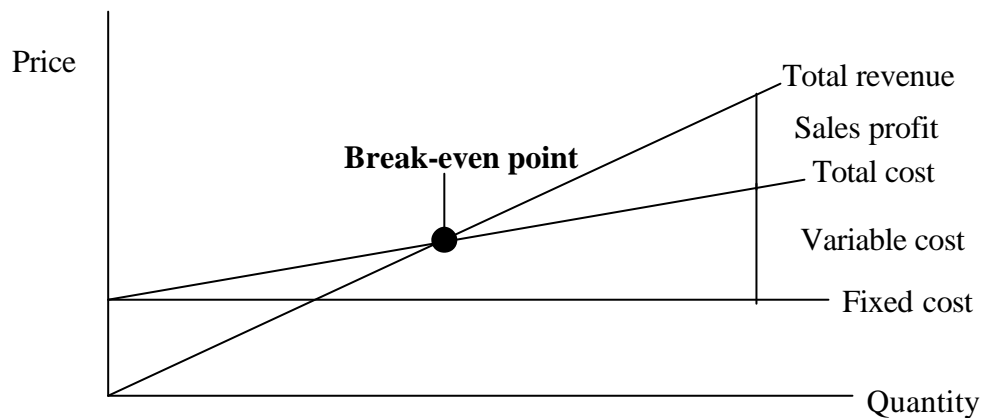


Figure 3-5: Break-even point analysis

Source: Kotler (1999)

(5) Select a pricing policy and method: company will set the specific price level that achieves its pricing objectives and it may make use of several pricing methods. These methods include:

<1> Cost-plus pricing method: focus on adding a standard mark- up to the cost of a

product.

<2> Target-profit pricing method: determine the price that would produce the profit you seeking.

<3> Perceived-value pricing method: base your price on the perceived value of product or service. You use the customers' perception of value, not your costs, as key in this pricing.

<4> Going-rate pricing method: base the price of your product or service largely on competitors' prices, with less attention on your own costs or demand.

<5> Competitive-oriented pricing method: when you bid for contract work, the competitive-oriented pricing method is appropriate. You base the price for your home-based services on the expectations of how competitors will price rather than on a rigid relation to your costs or demand.

(6) Set final price:

Several factors must be considered when set final price, these factors can be distinguished into two parts, internal and external factors (see Figure 3-7).

<1> Internal factors: Marketing objectives, marketing mix strategy, cost, organizational consideration.

<2> External factors: Nature of the market and demand, competitors other, environment factors.

Moreover, the optimal prices you set are based on a variety of appropriately weighted factors in a complex environment, including demand, price sensitivity, competitive threat, cost, and strategic objectives.

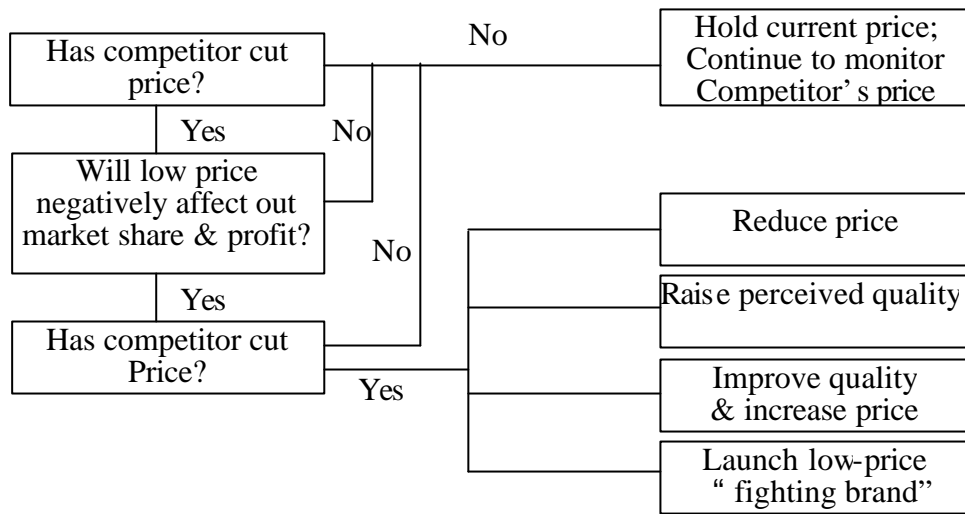


Figure 3-6: Algorithm for the “Status-Quo” oriented pricing

Source: Kotler (1999)

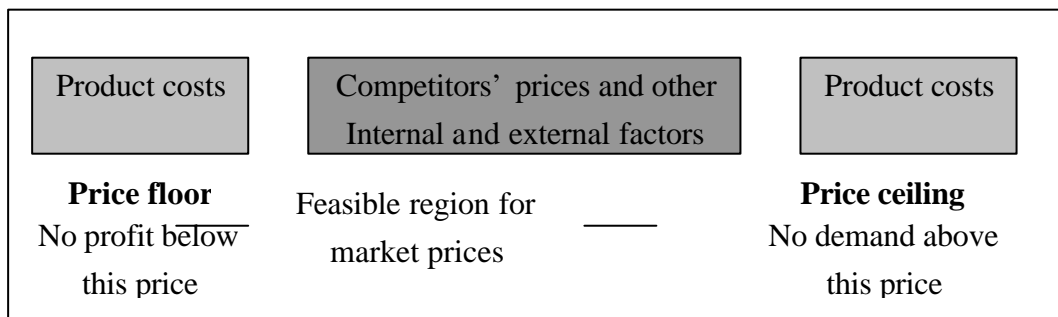


Figure 3-7: General Pricing Approach

Source: Kotler (1999)

### 3.2 Product Lifecycle with Pricing Orientation

Differences in consumers' properties and competitive situation need different pricing strategies, base on the each period of product lifecycle. The pricing orientation is further discussed for each stage of the product lifecycle as follows:

(1) Introduction Period: most adopters in this period are the opinion leaders, pioneers, or innovators. Therefore, the price elasticity of demand is low. In addition, most products are new products, which have less product information and comparable price information in specific market segmentation in this period. Consequently, fewer competitor and cost information are available. For this reason, the pricing strategies of competitive-oriented and cost-based are unsuitable in this period.

The objective of pricing strategy is to possess the market share and make much acceptance as possible. Hence, the demand-based pricing strategy on the average market price is more adaptable in this period. There exists no average market price to refer to such new product. Eventually, the price of similar or high substitute product is used to assist to price decision.

(2) Growth Period: Demands of market grow rapidly is the feature in this period. Because the higher profit in this period, the competitors' entry this market segment rapidly. Therefore, the uncertain of market share will be a problem for company. The market share grows if the grow speed of a sale can sustain in a high rate than grow speed of market. The company will obtain a large number of funds when the market becomes maturity. Alternatively, the company may eliminate from market if company absorb in profit pursuance but disregard in market share. Consequently, products in this period should try to promote the market share and the pricing strategy should focus on the demand and competition.

(3) Maturity Period: the grow speed of market will alleviate even to zero. Profits are relatively high and marketing expenses should begin to decline. In this period, product differentiation is more important than before. With little or no differentiation, price becomes more important and company will try to reduce costs. Companies elect to differentiate rather than lower prices. They will offer more service for consumer, or

create differentiate through effective promotion. For these reasons, companies adopt different strategies according to different situations. These pricing strategies are based on competition, cost, demand, and integration.

(4) Decline Period: sales decline and products are removed from the market in this period. Investment on marketing is cut and manager is looking for ways to extract the last few dollars of profit before withdrawing the product. In addition, there exist several loyal customers in the market. Therefore, the pricing strategies can focus on demand and cost orientated. A summary of the basic pricing strategies for each stage of product lifecycle is listed in Table 3.

Table 3-1: The basic pricing strategies of product lifecycle

Introduction	Growth	Maturity	Decline
Demand orientated	Demand and competition orientated	Demand, competition, cost, and integration orientated	Cost and demand orientated

Source: our research

### 3.3 Pricing digital products

Development of Internet provides a new channel for digital products and reduces the cost of production, transaction, and distribution. The Internet creates new opportunities for firms to using more smart pricing strategies to obtain more profit from consumers. On the other hand, the unique cost structure of digital products makes firms difficult to set price base on costs. For instance, digital product is costly to produce but cheap to reproduce. Its cost structure contains high fixed costs and low marginal costs—cause great difficulties for competitive markets (Succi *et al.*, 1998; Varian, 1998). Competitive markets tend to push

price to marginal cost, in the case of information goods; its marginal cost is close to zero. Nevertheless, this leaves no margin to recover those huge fixed costs. How can digital product be sold at all? The answer is that information is rarely traded on competitive markets. In place of that information, goods are highly differentiated (Varian, 1998).

The market structure for digital product is one of monopolistic competition. Due to product differentiation, producers have some market power, but the lack of entry restrictions tends to force profits to zero over time. In addition, the digital product generally have some degree of market power also allows producers to recover fixed costs through more creative pricing and marketing arrangements (Varian, 1998). However, if products have similar user interfaces and similar data, consumers will buy only from the cheapest producer (Varian, 1995).

Therefore, the pricing strategies must change as well to reflect the digital age. Digital products also raise interesting pricing opportunities. Clearly, the traditional rules of thumb such as “price equal to marginal cost” or using a standard markup over cost are not suitable in such environment. Instead, value-based pricing strategies are likely to be more effective (Varian 1995). Inoue *et al.* (2001) presented several valued-based pricing strategies, as shown in Figure 3-8, are likely to be more suitable when pricing in digital age.

### 3.3.1 One-to-one and grouping pricing

Digital products often make firms difficult to set price based on costs, due to its unique cost structure. Therefore, the more suitable pricing method is to pricing digital products based on consumers’ willingness-to-pay. Both of one-to-one and group pricing is based on this conception. This conception can be regard as price discrimination as noted in economics.

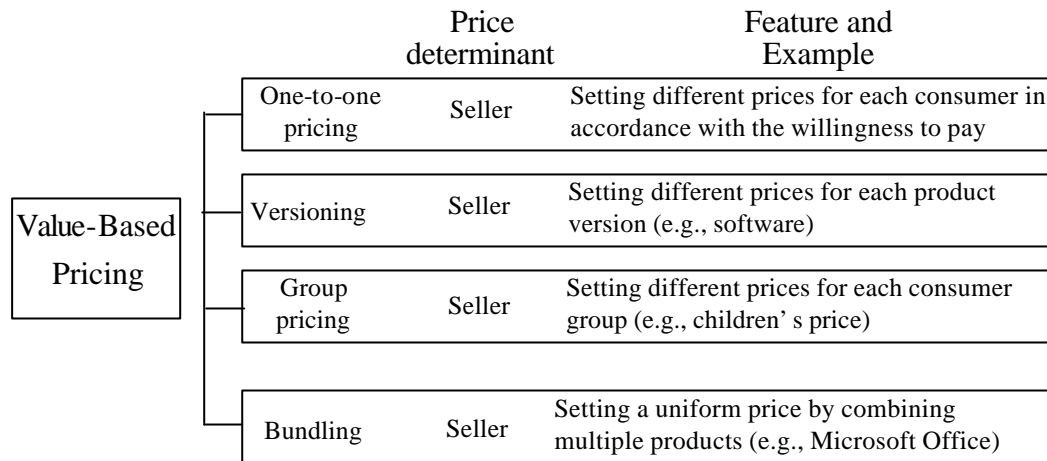


Figure 3-8: Pricing strategies in the digital age

Source: Kazuhisa Inoue, Hsiao Nakajima, and Naohiro Yoshikawa, 2001

Price discrimination on the Internet is easier because menu costs are lower on the Internet than in physical store and because retailers can gather more information about customers through Internet at low costs. There are three different types of price differentiation as follows:

- (1) First-degree price differentiation: each unit of the product is sold to the individual who values it most highly at maximum price that an individual is willing to pay. This means that the producer sells different units of output for different prices and these prices may differ from person to person (Varian, 1996). The first-degree price differentiation also called "perfect price differentiation" and it needs to require detailed information about consumers, such as consumers' preference and their price sensitivity.
- (2) Second-degree discrimination: charging the same customer lowers prices for additional purchases from the same customer.
- (3) Third-degree discrimination: third degree price discrimination is also called 'Market Segmentation'. That is, the seller splits the market into different groups of buyers and charges different prices on them.



However, there are two problems with implementing price discrimination in practice: determining the willingness-to-pay of different consumers, and preventing consumers with high willingness-to-pay from purchasing the product intended for the consumers with low willingness-to-pay. Since consumers will not willingly reveal their true motivation to pay, pricing needs to be based on something that is correlated with willingness-to-pay. There are two solutions to solve these problems: versioning and bundling, and are presented in the following sections.

### 3.3.2 Product and quality variation

One dimension on which producers can price discriminate is on characteristics of the product. It is often thought that users who want the product immediately are willing to pay more than those who are willing to wait. The producer may want to charge differentially for different degrees of timeliness regardless of the cost of providing such service. A nice example of this is stock market quotations: quotations that are 5 minutes old demand a premium price, while those that are 1/2 hour old sell for much less.

Quality variation is another dimension of price discrimination, which based on consumers' willingness-to-pay. Producers of digital products such as electronic journals want to consider the possibility of differential pricing, letting prices vary both across consumers and across qualities of the good. Quality variation may take the form of offering a degraded quality in order to sell to the low end of the market while still maintaining revenue from the high end of the market. Such quality variation can generate additional revenue to cover costs as well as increasing access to the good making all parties to the transaction better off. Reducing the "quality" of the good by imposing additional restrictions allows the producer to segment the market and induce self-selection so that

prices can be based on willingness-to-pay.

How do we ensure that the consumers with higher willingness-to-pay actually pay the higher price? One answer is to degrade the quality of the product offered to the consumers with a low willingness-to-pay. This strategy is common in high technology. Denechere and McAfee (1994) describe several examples:

- (1) Student versions of mathematical software that disable calls to the math coprocessor in order to slow down calculations.
- (2) Federal Express offers both morning and afternoon delivery. It appears that FedEx does not deliver afternoon packages in the morning, even if they arrive in time for morning delivery. Instead, they will make two trips to the same location.
- (3) The IBM Laser Printer Series E was a low-cost alternative to the IBM Laser Printer. The series E printed at 5 pages per minute rather than the 10 pages per minute of its higher cost brother. Apparently, both printer use exactly the same print engine, the only difference being five chips that inserted wait states to slow down the series E printer.

Quality variation may take the form of offering a degraded quality in order to sell to the low end of the market while still maintaining revenue from the high end of the market. Such quality variation can generate additional revenue to cover costs as well as increasing access to the good making all parties to the transaction better off.

### 3.3.3 Versioning

In practice, the firm develops the high-end version first and then degrades to obtain lower quality versions. Digital product vendors usually adopt such a high-to-low or “value-subtraction” versioning strategy to exploit the cost savings in content, design, and

code reuse (Deneckere, 1996; Shapiro & Varian, 1999). Furthermore, versioning can bring more sales revenue than set the single price, as shown in Figure 3-9. Therefore, firms will distinct high quality with high price from low quality with low price. Consumers will select the suitable product according to their willingness-to-pay. Therefore, consumers with high willingness-to-pay will choose the high quality with high price and low willingness-to-pay will choose the low quality with low price.

One can “version” information goods along many other dimensions. Shapiro and Varian (1998) described several of these dimensions, including delay, user interface, convenience, image resolution, format, capability, comprehensiveness, features, annoyance, and support, which are explained as follows:

(1) Convenience: buyers will reveal the value they place on information if their access to it is restricted. Restricting the information of time, place, or length of time buyers can access will reveal how much they value that information. Users who want more access to the Internet will pay more to access it when and for how long they want.

(2) Comprehensiveness: The most interested buyers will pay more for depth of information. Business Week gives free access to its current edition on the Web, but charge students, writers, and researchers for access to its archives of past issues.

(3) Manipulation: Want to print, store, or duplicate information online? Expect to pay more than you would just to read it on screen. If the information is in audio or video form in the popular RealPlayer format, providers can code it so that visitors can download it if they bought the \$30 retail version of the RealPlayer. With the free version of the player, they cannot download the files. Therefore, in this example, both the information provider and the provider of the enabling software stand to make money from those who value the information most highly.

(4) Community: Certain chat rooms and bulletin boards on the Web allow visitors to

read the information available. However, to post their messages, they must pay a fee. The free information on these sites builds traffic and attracts advertisers, while the income for messages brings additional income to the provider.

(5) Annoyance: I use a free accelerator program that preloads links on Web pages when I surf the Internet. This greatly speeds movement. To keep my program free, I must view advertisements in the title bar at the top of my browser page. To get rid of these, the list price \$30 must be paid for the program. Similarly, many shareware programs have an opening registration screen that will continue to appear until the user pays for the program.

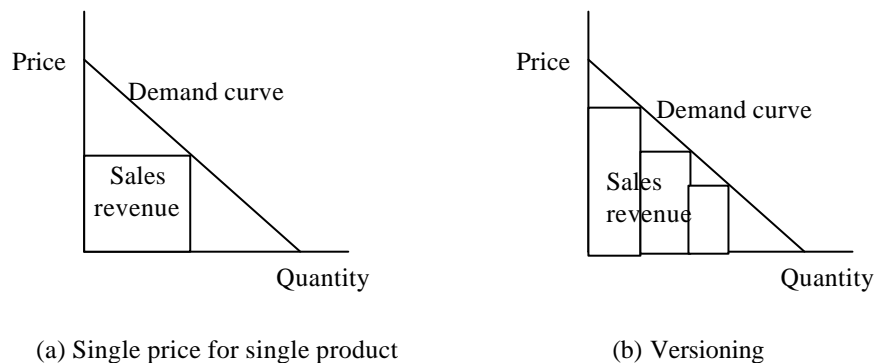


Figure 3-9: Versioning can bring more sales revenue

Source: Kazuhisa Inoue, Hsiao Nakajima, and Naohiro Yoshikawa, 2001

(6) Speed: Software publishers write versions on their products that run at different speeds. Users demanding more speed will pay a higher price for it.

(7) Data Processing: Some software publishers build computational features into one version of their product. Sophisticated users will pay more for this added capability.

(8) User Interface: Adobe Photoshop has a complex user interface and a powerful set of features that professionals demand. Users who just want to clean up and adjust family

photos will opt instead for Adobe Photo deluxe.

(9) Image Resolution: Digital images can be offered at different resolutions sold at different prices.

(10) Support: Software purchasers sometimes can pay different prices for varying levels of technical support, depending on their needs.

### 3.3.4 Free Version

It is impossible for a computer manufacturer free to present a computer to consumer. However, free to present a product to consumers is a normal behavior in the digital market. Consumers can get the free software, database, computer games, and financial service from Internet. This is because the marginal cost of digital product is low and the digital products are experienced goods as noted earlier. Of course, firms can free to spread their product for consumers, however, what reasons make them to do that. Varian (1998) denotes five reasons to explain why firms provide free version.

(1) Building Awareness: To build awareness of a new digital product, sellers often offer a free version with limited capabilities. They hope the user will be enticed to buy the full version. This works well if the product is unique, such as a game. However, if many competitors offer similar products, all may appear to be commodities if each seller offers a free version.

(2) Gaining Follow-on Sales: Some software vendors offer a fully functional, free version of their product to build customer dependency. Then they offer a priced upgrade with additional features, hoping customers will go for it. For example, a consumer uses a free Internet accelerator from Netsonic that speeds his/her Net surfing by preloading pages from text links on each page visited. A \$100 upgrade would preload graphic

images on those pages as well and further speeding his/her travels. The consumer might take the bait and bought the upgrade version.

(3) Creating a Network: Many digital goods are subject to Metcalfe's Law: They become more valuable as the user base increases. This makes it reasonable to give away the product to build the critical mass, and then sell a follow-on product that adds more user value. Adobe seeded the market early with its free Acrobat Reader to make it the standard for viewing print and electronic documents online. With Adobe, users can view documents even though they do not have the software that created them. Now Adobe can sell full versions of Acrobat so that users can create their documents in its Portable Document Format.

(4) Attracting Eyeballs: Some Web sites find that they can earn more money from selling advertisements on website than they can earn from selling the information they offer. Therefore, they attract visitors with free information and collect money from the advertiser.

(5) Gaining Competitive Advantage: The strategic value of getting much people to use your information may be more valuable than selling your information to fewer people. Microsoft gives away its browser to keep Netscape from gaining control of the desktop. Sun gives away its Java programming tools to reduce Microsoft's market power and to make others consider Java as a replacement for Windows 2000.

### 3.3.5 Bundling

Another very attractive form of price discrimination is known as product bundling and it occurs when distinct products are sold together as a package, Microsoft office, for example. Bundling is profitable in this example because it reduces the heterogeneity of the

consumer's willingness-to-pay. By creating the bundle, the producer can sell at the average willingness-to-pay, and this typically is more profitable (see Figure 3-10). Bundling unrelated information goods is shown to be much more profitable than selling them separately and larger bundles can better compete against smaller ones (Bakos & Brynjolfsson, 2000).

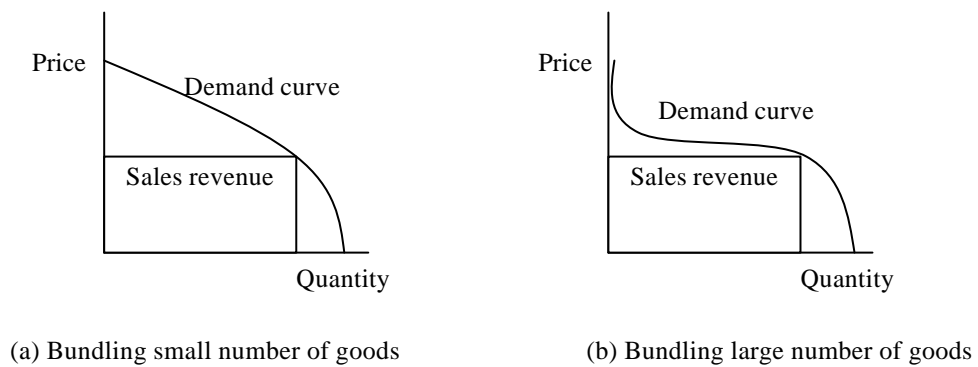


Figure 3-10: Bundling effect on sales revenue

Source: Kazuhisa Inoue, Hsiao Nakajima, and Naohiro Yoshikawa, 2001

## Chapter 4 Business Buying Behavior on the Internet

### 4.1 Importance of Understand Buying Behavior

It is important to understand the buying behavior of individual consumer and business buyer on the Internet as well as in the physical world. Understand consumers' behavior is to understand how they make purchase choice decisions. Butler & Peppard (1998) noted that the modeling of consumer decision-making can assist managers to explain and predict consumers buying behavior, and thereby provides a basis for marketing decisions.

A unique feature of Internet marketing is its ability to support all the stages in the buying process. In this chapter, how the Internet affects business and consumer buying behavior to reduce their buying costs is given. Then, the characteristics of B2B market are presented together with the characteristics of business buying behavior. Furthermore, illustration of their online buying process and extension of pricing strategies from the buying process is also discussed in this chapter.

#### 4.1.1 Internet affects buying behavior

Kiang *et al.* (1999) defined how a company could support the buying decision process through the Internet. During the Pre-purchase stage, the Internet could work as a communication channel where information is exchanged between sellers and buyers. The Internet is become an important source for seeking and evaluating products and offers as discussed earlier. The marginal cost for search and evaluation is expected lower on the Internet. Buyers can find a better fit between products and personal preferences, and gather purchase-related information through websites rather than through traditional media. In the



purchase stage, the Internet can act as a transaction channel during the purchase stage. By doing so the company can reach a larger customer base, improve its revenues and streamline its transaction process as well as customize promotion. Finally, in post-purchase, the Internet can function as a distribution channel by exchanging products and services (Kiang *et al.*, 1999).

## 4.2 Business Buying Behavior on the Internet

Business Buyer Behavior refers to the buying behavior of all the organizations that buy goods and services for use in the production of other products and services that are sold, rented, or supplied to others. The Internet is affecting business-buying behavior in many sections. First, it significant in reduce the setup and operational cost and eliminate the switch cost. Second, it can enhance the informational and interactive communicative capabilities, thus more effective in information acquired and new network cooperative opportunities created. In buyers' perspective, the more valuable information of sellers and products they obtained the more bargain power they possess when buying on the Internet. Thus, this advantage to bargain or negotiate more frequently can be applied to business-buying behavior on the Internet.

On the other hand, in sellers' perspective, many companies make significant effort to provide value-adding information on their product, and thus, compel buyers to buy. Dutta & Segev (1999) noted that most companies would provide detailed product specifications and valuable information about their products to aid the buying decision. In addition, Brynjolfsson and Smith (1999) suggested that companies who provide additional services may be able to charge a price premium for the corresponding products they sell, and heterogeneity in the services offered by sellers may explain some of the price dispersion.

#### 4.2.1 Characteristics of B2B Market

In the B2B market, it emphasizes in establish, maintain, and enhance relationship with customers and other partners to create profit by mutual exchange and fulfillment of promises. Marketing in the B2B market can be described as marketing of good and/or services in industrial markets essentially for use in the production process or the provision of services, as well as marketing between organization buyers and organization users. The factors that distinguish business marketing from consumer marketing are the nature of customers and how that the customers use the product. In the business marketing, the customers are organizations (Businesses, government, and institution).

The challenge of industrial marketer is to identify the various role-players in the purchasing decision and to fulfill their individual needs. Marketers need to demonstrate their superior, augmented product complement related to that of competitor. By forging close relationships with selected key customers, suppliers can differentiate themselves and raise entry barriers.

##### (1) More Closer relationship between buyers and sellers

In consumer markets, there are few industries where close personal relationships exist between buyer and seller. However, in the B2B market, business buyers need to make sure that the product fits their needs and that it is available when needed at the right cost. Therefore, many companies enter into long-term contracts and build relationships to make buyers and sellers to plan jointly for both companies.

##### (2) Shorter Distribution Channels

In the B2B market, most of manufacturers sell directly to their customer, which reflects a large difference between business market and consumer market. For example, shorter distribution channels may be able to explain why the relationships were more closer

between buyers and sellers.

### (3) Unique Promotional Strategies

The complex buying process and inclusion of several people from different functional areas impact the business marketing promotional strategies. When an organization makes a purchase, however, personnel from several different departments will determine together what the organization needs (Dwyer & Tanner, 1999).

In fact, there are many unique characteristics of B2B market and they are very different from consumer market, including demand, numbers of customers, and so on. Several major different characteristics between business market and consumer market are sorted, as listed in Table 4-1.

Table 4-1: Characteristics of Business and Consumer Markets

Characteristic	Business Market	Consumer Market
Demand	Organizational (more inelastic)	Individual (elastic)
Size (volume)	Larger	Smaller
Numbers of customer	Fewer	Many
Location	Concentrated	Dispersed
Product	More complex and customized	Less complex and more standardized
Price	Competitive bidding and negotiation	List price
Distribution	More direct and short	More indirect and longer
Relationship	More closer	Separable
Nature of buy	More professional	More personal
Buying influence	Multiple	Single
Negotiation	More complex	Simpler

Source: Our research

## 4.2.2 Types of Buying Situation

Buy-class refers to the type of buying decision based on the experience of the buyer with a purchase of a particular product or service. Dwyer and Tanner (1999) distinguished three types of buying situation, which they called buy-class, including straight rebuy, modified rebuy, and new buy. The distinguishing characteristics of the three types of buy-class are presented and the different relationships between buy-class and marketing specified, as implication in Table 4-2.

(1) Straight Rebuy: only two steps were required—need recognition and placing an order.

Buyers will choose the suppliers from reference list according to their past buying satisfaction and automatic purchasing.

(2) Modified Rebuy: buyers will search and evaluate the new suppliers (out-suppliers) because they want to modify product specifications, prices, delivery requirements, or others.

(3) New Buy: the buyer has no experience with the product or service and must become educated about the product or service in order to make a purchase. They need to gather more information and people will participate in the purchase decision. Therefore, the decision time will last longer than other two buying situations. To verify that there exist different price sensitivity among different buying situations; scenario analysis is employed and presented in Chapter 7.

## 4.2.3 The Decision-Making of Business Buying Process

The beginning of a business-buying process occurs when an organization is anticipating solving a problem through purchasing products or service. Dwyer and Tanner (1999) brought up an eight-step business buying process, whose relationship with buy-classes are

listed Table 4-3, as follows:

- (1) Recognition of a need: The buying process begins when someone in the organization recognizes a problem or need that can be met by acquiring a product or service.
- (2) Definition of the product-type needed: The buyer proceeds to determine the general characteristics and quantity of the product or service.
- (3) Development of detailed specifications: Continues to examine its needs and detailed specifications such as the size and number of product.
- (4) Search for qualified suppliers: To search and identify the most appropriate suppliers through trade advertisements or trade shows.
- (5) Acquisition and analysis of proposals: Acquisition and analysis of proposals, involves receiving and reviewing bids from each contractor.
- (6) Evaluation of proposals and selection of supplier: Evaluate the proposals, and select a contractor.
- (7) Selection of an order procedure: Involves the creation of a contract specifying and negotiates the final order, quantity needed, expected time of delivery, discount, warranties, and so on.
- (8) Evaluation of product performance: Reviews the performance of the particular supplier and may contact the end users and ask for their evaluation. This step is critical for sellers if they want to gain the loyalty of buyers. They must recognize this dimension of consumer behavior if they are to take advantage of the potential for relationship development and buyer loyalty and retention (Butler & Peppard, 1998).

Table 4-2: Distinguishing characteristics and marketing implications of Buy-Class in the BBB

	Straight Rebuy	Modified Rebuy	New Buy
Newness of the Problem	Low	Medium	High
Information Requirement	Minimal	Moderate	Maximum
New Alternatives	None	Limited	Important
Advertising	Reminder, build image	Comparison	Educational, detailed, go to try the product
Promotion	Hospitality at trade show	Demo's hospitality at trade show	Demo's, free trial at customer site
Selling	Build relations, increase switching cost	Protect customer relationship, special pricing, anticipate and react fast	Customer need, show how it work

Source: Dwyer and Tanner, 1999

#### 4.2.4 Participants Involved in the Business Procurement Process

When a person makes a purchase decision alone for an organization, the decision is said to be autonomous. When more than one person is involved, the group of participants in the company is called the buying center or decision-making unit (Dwyer & Tanner, 1999).

In organizational buying, several roles have been identified. The organization buying center includes members playing seven roles in the above buying decision process as follows:

- (1) Initiator: those who start the purchase process by recognizing the need.
- (2) Decision maker: the person who makes the final decision. (There could be several decision makers to vote on the final decision.)
- (3) Users: those who will use the product or service.

(4) Influencers: those individuals who seek to affect the decision maker's final decision. They often help define specifications and provide information for evaluating alternatives.

(5) Controller: the person who controls or sets the budget for the purchase.

(6) Purchasing agent: the person who actually makes the purchase.

(7) Gatekeepers: those who control information into and out of the buying group or between members of the group.

Traditionally, it was thought that the best marketing strategy would be to determine who typically participated in the decision and then work to satisfy the needs of the participants (Dwyer and Tanner, 1999). Recently, however, marketers have begun to recognize that it is important to influence who might participate in the buying center and to what extent.

Table 4-3: Buy-grid Framework: Major Stages of the Business Buying Process in Relation to Major Buy-classes

		Buy-classes		
		Straight Rebuy	Modified Rebuy	New Buy
Buy-Steps	Problem of a need	No	Maybe	Yes
	Definition of the product type need	No	Maybe	Yes
	Development of detailed specification	Yes	Yes	Yes
	Search for qualified suppliers	No	Maybe	Yes
	Acquisition and analysis of proposal	No	Maybe	Yes
	Evaluation of proposals and selection of a supplier	No	Maybe	Yes
	Selection of an order procedure	No	Maybe	Yes
	Evaluation of product performance	Yes	Yes	Yes

Source: Dwyer and Tanner (1999)

### 4.3 Different Relationship in B2B market

There are several different relationships between buyers and sellers, as depicted in the next section. Furthermore, different price sensitivity is anticipated to occur when buyers and sellers make transaction in different types of relationship as follows:

- (1) Pure transactions: The buyer-seller relationships involve “one time exchange of value between two parties with no prior or subsequent interaction.” The prices are determined by competitive market and contain all information necessary for both parties to conclude the exchange.
- (2) Repeat transactions: Repeat purchase move the level of exchange beyond the pure transaction and reflect the success of marketers in achieving product differentiation and creating preference and loyalty.
- (3) Long-term relationships: Based on the relatively long-term contractual commitment, this relationship is managed at arm’s length. The buyer and seller are opposed to each other, with price being the focal issue.
- (4) Buyer-seller partnerships: In this relationship, a mutual dependency exists in which the value of the augmentation of the product is negotiated. The buying has one or few preferred suppliers who undertake to delivery the augmented product. Augmentation typically includes quality, delivery, technology support, and after-sales service. Information is openly exchanged between functional departments or project teams of both parties. This is in stark contrast to the purr transactional exchange, in which only buyer and seller interact.
- (5) Strategic alliance: A strategy alliance is characterized by the intent of each party to attain a long-term strategic goal. It involves “a formal long-run linkage, found with direct co-investments by two or more companies, which pool complementary



capabilities and resource to achieve general agreed objective.” Such objective could pertain to accessing a market or technology, gaining economies of scale by combining complementary expertise, faster entry of new products to markets and sharing risks.

#### 4.4 Critical Factors for Business Pricing

Dwyer & Tanner (1999) presented a model for managing price, as shown in Figure 1. This model shows that prices are rightly determined by demand factors -- price sensitivity, connectedness to other products, and customer perceptions -- interacting with cost factors and competitive factors in the economic environment. The three critical factors are discussed as follows:

(1) Cost factors:

Focus on four types of cost, first, procurement and inventory cost, the cost of procurement and inventory of raw materials, manufactured material, component, and product *et al.* Second, production costs, the cost of producing additional units for inclusion in the bundle, including storage, processing, and communications costs incurred in the process. Third, transaction and distribution costs refer to the costs of distributing a bundle of goods and administering the related transactions. Finally, promotion cost, the cost of marketing and advertising in order to attracting customer to purchase.

Better cost structures may lead to more efficient pricing in two ways. First, low market entry costs may limit the price premiums more sustainable by existing market participants by increasing actual or potential competition (Porter, 2001). Second, favorable cost structures can lead to lower equilibrium price levels in a long-term equilibrium by decreasing the underlying costs on which any price premiums are based

(Smith *et al.*, 1999).

(2) Competitive factors: marketing department need to monitoring the competitors' price in the market and evaluating the influence. If there exist many competitors in the market, the degree of competition is raised among them. The profit margins will go down by putting down price, and lead to shift the basis of competition away from quality, features, and service and toward price war (Porter, 1985). In addition, barriers to entry are another critical factor to compete. As Internet development, it provides a powerful ability for buyers easier to acquire and access information thus bolstering buyer bargaining power. Internet reduce barriers to entry due competitors can establish a sale force effortless and offer a new substitute to compete.

(3) Demand factors: precise to forecast buyers' demand elasticity will help companies in saving cost and market response rapidly. Demand elasticity is the percentage change in sales relative to the percentage in price. When there are many substitutes and the choice of one or the other has no visible impact on the final product, demand will be more prices elastic, or more affected by price (Dwyer & Tanner, 1999).

In addition, customer value perceptions will affect the demand elasticity largely. The buyers' circumstances play a great role in determining the value of any product or service. In a fierce competitive market such as Internet makes buyers easier to compare price and choose a best one to pay. The sellers need to differentia themselves and offer a distinctive product or service to rise the buyers' willing to pay and their value perception thus charge a superior price.

The intersection of market factors with company strategy issues need to be fully understood - targeting, positioning, programming, and goals - within a marketing environment that is circumscribed by trade factors and legal factors. In addition, a product can provide value in the business market not only when its invoice price is lower than

those of the competitor's, but also when its performance is superior.

The Internet's core advantage lies in its great capacity of fast, efficient, integrated, and interactive exchange of information. Internet facilitates the information exchanges between organizations, concerning issues such as discovery of new customer needs, trends of the local and global markets, competitive moves, joint development of products, joint selling activities (Mckinsey & Company, 2001).

As the most companies transfer their business into Internet, it makes them more economical and efficient to conduct their online business. Internet also contributes for businesses to interact with their partners and makes it easier to search more suppliers that are superior. In the business market, many companies have claimed a reduction in costs when they have put their supply chains online and benefited by lower procurement and inventory costs (OECD, 2000). Sachs (2000) indicate that the costs savings could be in the magnitude of 2 to 40% of total input costs depending on the industry, and it's claimed that could lead to a reduction in prices across a wide range of industries.

## 4.5 New online BBB Algorithm

### 4.5.1 Algorithm and Conditions

A new online BBB algorithm, as shown in Figure 4-2, is developed with insights of the characteristics of the Internet to comprehend how the Internet influences the BBB. The new BBB algorithm applies traditional eight stages BBB and combines eight conditions to assist in finding the optimal price between buyers and sellers. Three criteria are defined as product specification, price-performance ratio, and budget to evaluate how businesses make their purchasing decisions and to find the optimal price of a product. Product specification need be clearly identified at first before searching for candidate product

information on the Internet.

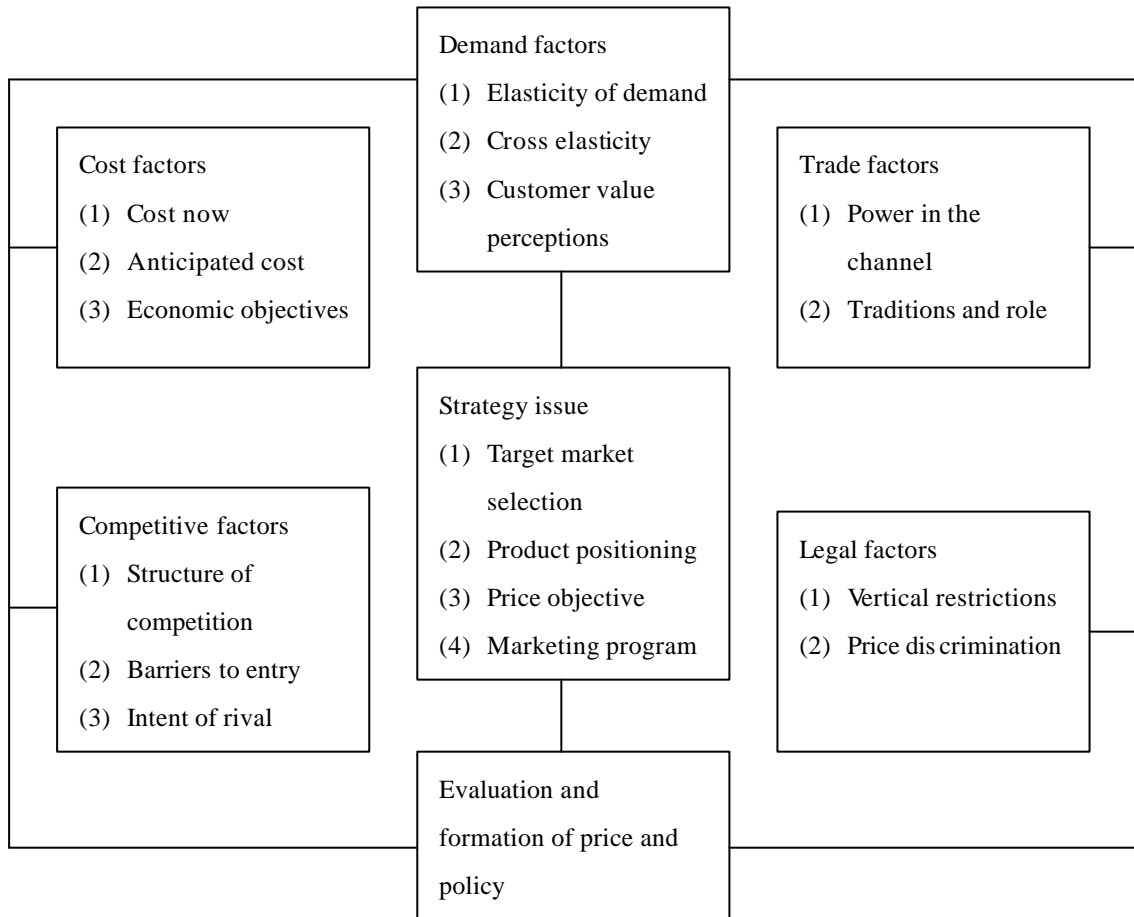


Figure 4-1: A model for managing price

Source: Dwyer and Tanner (1999)

Secondly, price-performance ratio acts like an indicator to assist consumers evaluate all the alternatives before making any buying decision. Several alternatives that satisfy the minimum price-performance ratio may be available for a consumer to select. Finally, business will then find a lot of price level among several candidates against its budget. If the budget is insufficient, a consumer may elect to increase its budget or asking for a discount according to its price sensitivity. In addition, eight conditions are identified to control the new BBB algorithm, as listed in Table 4-4.

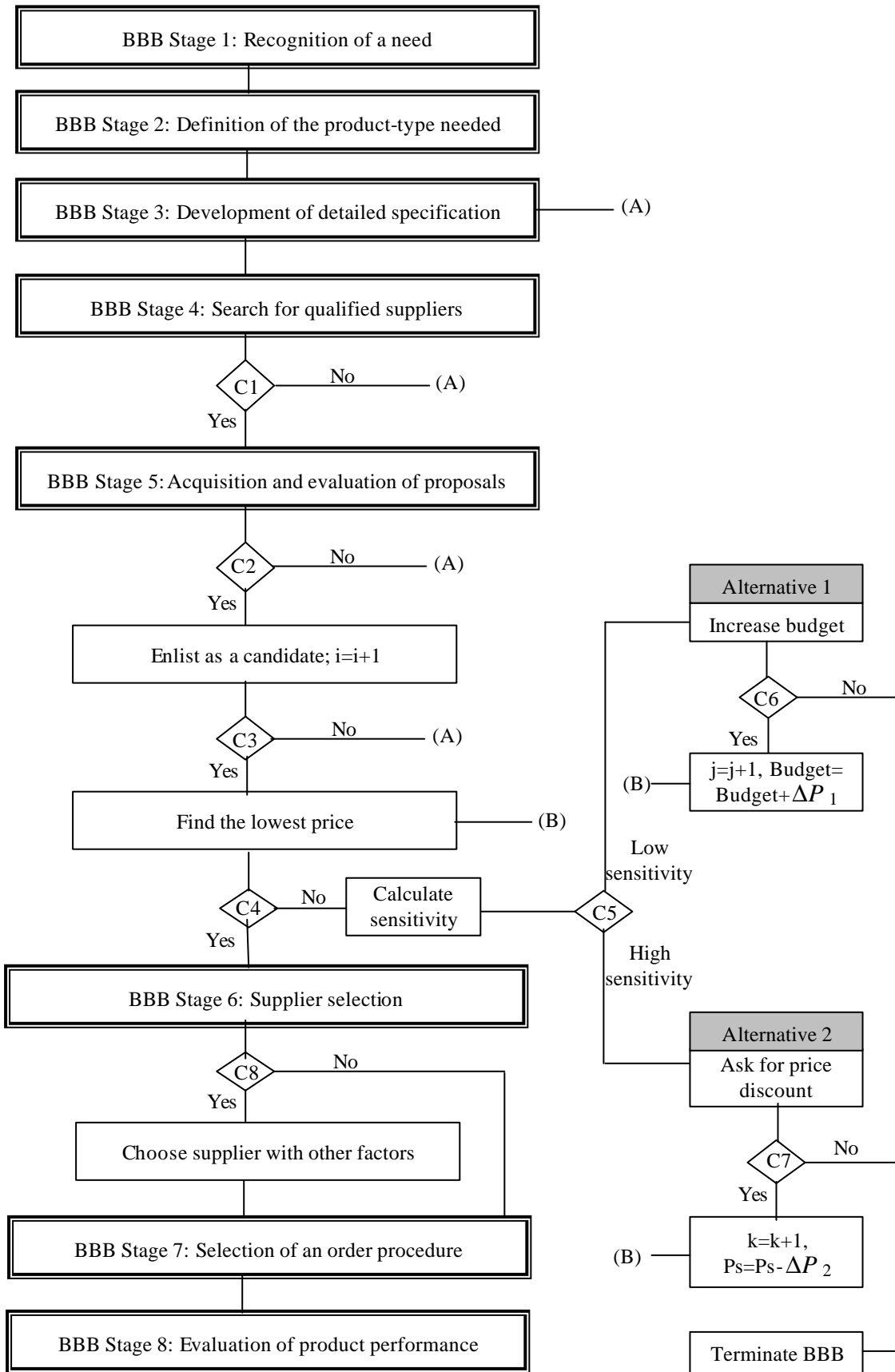


Figure 4-2: Flowchart of the proposed BBB-based online buying

Table 4-4: Seven conditions to control the consumer-buying flowchart

	Description
Condition1 (C1)	If product specification is satisfied
Condition2 (C2)	If the price-performance ratio is satisfied
Condition3 (C3)	If $i > N$ , where N is a number of candidate decide by the buyer
Condition4 (C4)	Product price is available to budget
Condition5 (C5)	For alterative selection, low sensitivity $\rightarrow$ alterative 1; high sensitivity $\rightarrow$ alterative 2
Condition6 (C6)	If additional budget is available
Condition7 (C7)	If seller is willing to negotiation
Condition8 (C8)	If more than one supplier offer the same lowest price

Source: Our research

#### 4.5.2 Detailed explanation

Theses conditions we used to control our BBB algorithm and the detailed explanation as shown in follow:

(1) Condition 1: means the business buyer will search for qualified sellers who fill the bill after product-type and detailed specification were satisfied. Buyer will ask for and evaluate sellers' proposal if its product specification is satisfied. Conversely, buyer needs to re-develop the detailed specification and search for qualified seller again if sellers' product specification is unsatisfied.

(2) Condition 2: denotes the business buyer will enlist several candidates if price-performance ratio of product is satisfied. Contrarily, buyer needs to modify its detailed specification and search for suitable seller again if price-performance ratio of product is unsatisfied.

(3) Condition 3: signify that business buyer want to create a number of sellers who correspond to his needed. Buyer will continue to find the lowest price among sellers if the qualified candidates of seller were big than the number of sellers created by buyer.

Conversely, buyer needs to modify his detailed specification and search again if the qualified candidates were not satisfied with his expectation.

(4) Condition 4: means that buyer will use this condition to select a seller directly if seller can provide the lowest price and corresponds to his budget. Otherwise, it needs to calculate the buyer's price sensitivity to determine the tendency that he/she preferred.

(5) Condition 5: is used to calculate buyer's sensitivity and determine what alternative he tends to choose. Here, a sensitivity equation is formulated to calculate buyer's sensitivity. The complete equations are presented in the next chapter. Buyer with lower price sensitivity will tend to choose the alternative 1 – increase budget; conversely, he/she will choose to ask for discount from seller if he/she is a high price-sensitive buyer. The different situations are discussed in the following chapter.

(6) Condition 6: means that buyer will increase his budgets step by step to buy the product if his additional budget is available. Otherwise, he/she will terminate the buying process.

(7) Condition 7: denotes that seller will cut down the price to match buyer's preference if he wants to negotiate with buyer. Otherwise, buyer's buying process will terminate if seller not wants to negotiate.

(8) Condition 8: means that buyer will select a seller with other factors if there is more than one seller offers the lowest price. These factors will determine by buyer himself such as brand.

## Chapter 5 Consumer Buying Behavior on the Internet

### 5.1 Consumer Buying Behavior on the Internet

Consumer Buying Behavior refers to the buying behavior of final consumers-- individuals and households who buy goods and services for personal consumption. In the past, the acts of browsing and product selection, purchasing, and even customer service were established for a given set of customers and generally predictable. Today these patterns have been broken. It is difficult to predict when a customer would rather browse online versus in person, what products that customer prefers to purchase on the Internet.

As mainstream as online shopping observed today, commerce models continue to develop and evolve as quickly as the market value varies. The consequence of this unpredictable consumer behavior is that nothing can be trust. Past behavior appears meaningless in predicting future behavior. Consumer behavior should be carefully measured and analyzed under a broad range of circumstance in order to understand those customer patterns and preferences. This measurement and analysis need to be performed iteratively, as any observed behavior is likely to continually evolve and change in the future.

#### 5.1.1 Purchasing Categories

It's important for sellers to understand what reasons prompt consumer to buying and how they make buying decision if they want to obtain the full information of consumer buying behavior. Butler & Peppard (1998) depicted a continuum schema of problem-solving behavior, which from routine problem-solving behavior through limited



problem solving to extensive problem solving, as shown in Figure 5-1. Any consumers' buying situation is placed along the continuum according to the degree of active reasoning required for a particular purchasing decision. Routine problem-solving behavior, typified by the purchase of a soft drink or newspaper, is a simple and straightforward task for the individual. The consumer is contented and experienced with the process do it on a daily basis. There is no great of personal sense involved in this purchase – the individual can hardly be judged on this purchase, the price is low, and the risks are negligible. At the other extreme, however, typified by the purchase of television, a car or a house is the extensive problem-solving situation. Here, there is a great personal sense involved in the decision, the purchase is infrequent, so the consumer does not have any or much experience in this process and the perceived risks are high. Between the two extremes is the limited problem-solving situation. When involvement is relatively low, the alternatives are not widely differentiated, and the time frame is relatively short, then this situation prevails.

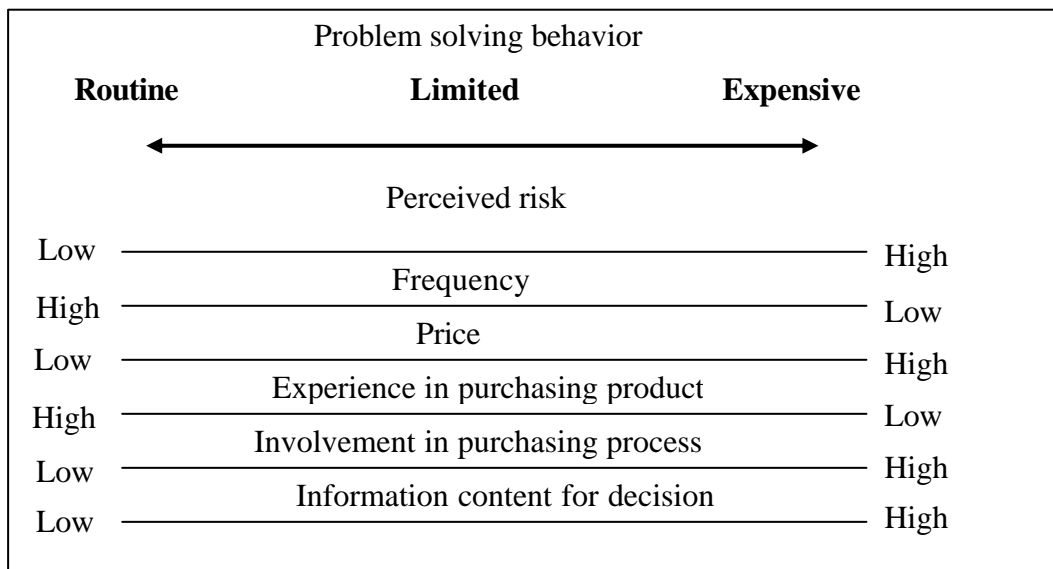


Figure 5-1: Consumer purchasing and characteristics of purchasing

Source: Butler & Peppard (1998)

For comparing the issues in the individual buying decision process between in the physical world and on the Internet, the extensive problem-solving (EPS) situation is examined in the first instance. This is appropriate early in the life of consumer-level electronic commerce, given the lack of experience of potential customers, the perceived risks in payment security, and the time taken to learn and become familiar with the purchase routines on the web. With experience, however, many such purchases will be more realistically categorized as limited problem solving (LPS).

### 5.1.2 The stages of consumer buying behavior

The five-stage of CBB begins with the stage of problem (demand) recognition; consumers will search for product information from internal or external sources for possible solutions. The information is used to evaluate the alternatives. Finally, consumers have some criteria to evaluate the products or service they purchased (Butler & Peppard, 1998). Each stage of CBB is explained as shown in Table 5-1.

Table 5-1: The stages of CBB

Stage 1	Problem recognition (demand intensity)
Stage 2	Information search (internal search and external search)
Stage 3	Evaluation of alternatives (to set criteria for evaluation)
Stage 4	Purchase
Stage 5	Post-purchase evaluation (satisfaction or dissatisfaction)

Source: Butler & Peppard (1998)

(1) Problem recognition (need identification): a buying event begins when a buyer becomes aware of a difference between a desired state and an actual condition (Butler & Peppard, 1998). Consumers become aware of some unmet need and they can be

energized through product information. Higher demand intensity has higher reservation price to buy the product. In terms of consumer problem recognition, the online seller can capture the consumer at this early stage in the process. The seller can use the powerful databases of consumer information to know and anticipate the consumer's needs and wants. Furthermore, the problem thresholds that will trigger action may also be known.

Direct marketing activity in recent years has been based on this kind of relationship potential. However, the leap forward of the Internet can be largely empowered by tracking technologies. The tracking device like "cookies" enables "click stream" analysis of individuals, such as their browsing activities, interests and purchase behavior, may be exactly known to the managers. The problem recognition stage in the purchase decision process remains essentially the same, but the potential for e-marketer - consumer relationships are enhanced.

The primary strategy issues for seller at this stage in the process are the development of communications technologies that enables the degree of customer relationships wherein the consumer's problem recognition is anticipated, or even triggered, by the seller.

(2) Information search: whereas the problem recognition stage motivates the consumer to act, the information search stage is when the consumer takes action to gain knowledge. The sourcing of information is at the heart of this stage in the consumer buying decision process. Essentially, the consumer seeks information for decision making, and the marketer must provide the necessary information.

Information search could divide into two fractions including internal search and external search. Internal search means that buyers search their memories for information about products that may solve their problem. External search means that buyers seek information from outside source. Then, buyers will integrate the information and to find products that match their demand. For the seller, the strategy issues related to this stage

of the process revolve around attracting information-seeking consumers and providing the information, they require. They need to ensure their websites are accessible via these search mechanisms. This is by no means a trivial task and retailers need to carefully consider the search criteria and typical keywords that their potential consumers may use when searching for information about their product. Internet-based sellers can utilize mechanisms such as internal search facilities and structured interaction and question/answer sessions to support the information search of the potential consumer once their website is accessed (O' Keefe & McEachern, 1998; Häubl & Trifts, 1999).

(3) Evaluation of alternatives: the third stage of the consumer buying decision process involves the analysis and evaluation of alternative solutions. So, the consumer has sought and found the relevant information, and must now use it to make the purchase decision. Traditional sources of information for the evaluative stage include past experience, marketing-sponsored communications, consumer groups and research institutions, and word-of-mouth. In the online markets, however, information technologies allow more and more criteria to be used. From this perspective, when consumer experiences information overload in the evaluation process, or when the "psychological price" of evaluation becomes too high, the advantage may be to the "safe branded or established competitor." In addition, Internet allows both online consumers and competitors alike can quickly compare prices. Using Internet-based aggregators and cross-firm comparisons, online consumers can easily compare prices of selected products across different online retailers (Kaufman & Wood, 2000). Competitors immediately know (and can even automatically follow) when a leading online retailer lowers price. Online consumers can also turn to Internet-based discussion groups, FAQs, and other summaries to compare alternatives for pre-purchase (O' Keefe and McEachern, 1998).

For the perspectives of marketing strategy, the first issue for evaluating alternatives is to understand the product evaluation criteria employed by the consumers, the preferences of the consumer, and the positions of competitors on these criteria. Corporate identity and branding strategies are also relevant issues since the Internet provides excellent opportunities and visibility for exciting new brands.

(4) Purchase: the purchase stage of the process involves decisions on where and how to buy. A core question concerns why people go shopping. Consumers do not shop only to buy. Personal shopping motives include diversion from daily routines, self-gratification, learning about new trends and physical activity. Among the social motives are communicating with others with similar interests, peer group attraction and the pleasure involved in bargaining and negotiation. Therefore, the investigation of these kinds of motives between physical shopping and Internet shopping also requires comparison.

Where to buy is a decision regarding the choice of seller. Competition on the Internet is driven by sellers who are attempting to build more exciting and interesting websites than those by their competitors, attracting the right customers to those sites, and providing better shopping experiences. Online seller must make the shopping experience easy and enjoyable for their customers. Ease of ordering, payment, and delivery are critical in this purchase stage. Straightforward routines with minimum complexity and maximum compatibility with marketplace patterns of behavior will aid in the diffusion of Internet purchasing at the consumer level. Clear explanations of how to order, how to pay, what to expect on delivery—all enhanced by innovative text and graphical features – are the key.

In terms of the marketing implications of consumer behavior at this stage of the decision framework, ordering, payment and delivery are the key strategic issues. Choose the product or brand to buy base on the outcome of the evaluation stage. Factors such as

terms of sale, price, delivery, or warranties may affect the sale.

(5) Post-purchase evaluation: the final stage is post-purchase behavior. It is explicitly included as a component of the model, rather than as something that is outside the process, because of its contribution to understanding the totality of consumer behavior. Given the emphasis in marketing on the development of ongoing relationships with customers, the actual sale should be perceived as a starting point rather than an end. Therefore, how the customer takes delivery of the product, how the product is used, the degree of satisfaction, quality of the service dimensions, customer complaints and suggestions are all critical to understanding consumer behavior.

Early sellers on the Internet often make a mistake in their misjudgment regarding the necessity to continually update their site. Post-purchase activity updates their sites. Post-purchase activity involves consumers returning to the sellers' site with queries, for new information, and to repurchase.

In strategic terms, seller must recognize the critical post-purchase dimension of consumer behavior if they are to take advantage of the potential for relationship development and customer loyalty and retention. Buyers then evaluate the satisfaction of product and customer service of the overall buying experience and decision. Buyers are most likely to seek reassurance after the purchase of an expensive, high-involvement product. Factors such as terms of sale, price, warranties, and delivery may affect the sale.

## 5.2 New Online CBB Algorithm

The new CBB model, as shown in Figure 5-2, is based on the classical CBB, which extends the model and applies it to develop an Internet pricing model. In this CBB model, three criteria are used as product specification, price-performance ratio, and budget are

defined to evaluate how consumers make their purchasing decisions and to find the optimal price of a product. Product specification need be clearly identified before searching for candidate product information on the Internet. Price-performance ratio acts like an indicator to assist consumers evaluate all the alternatives before making any buying decision.

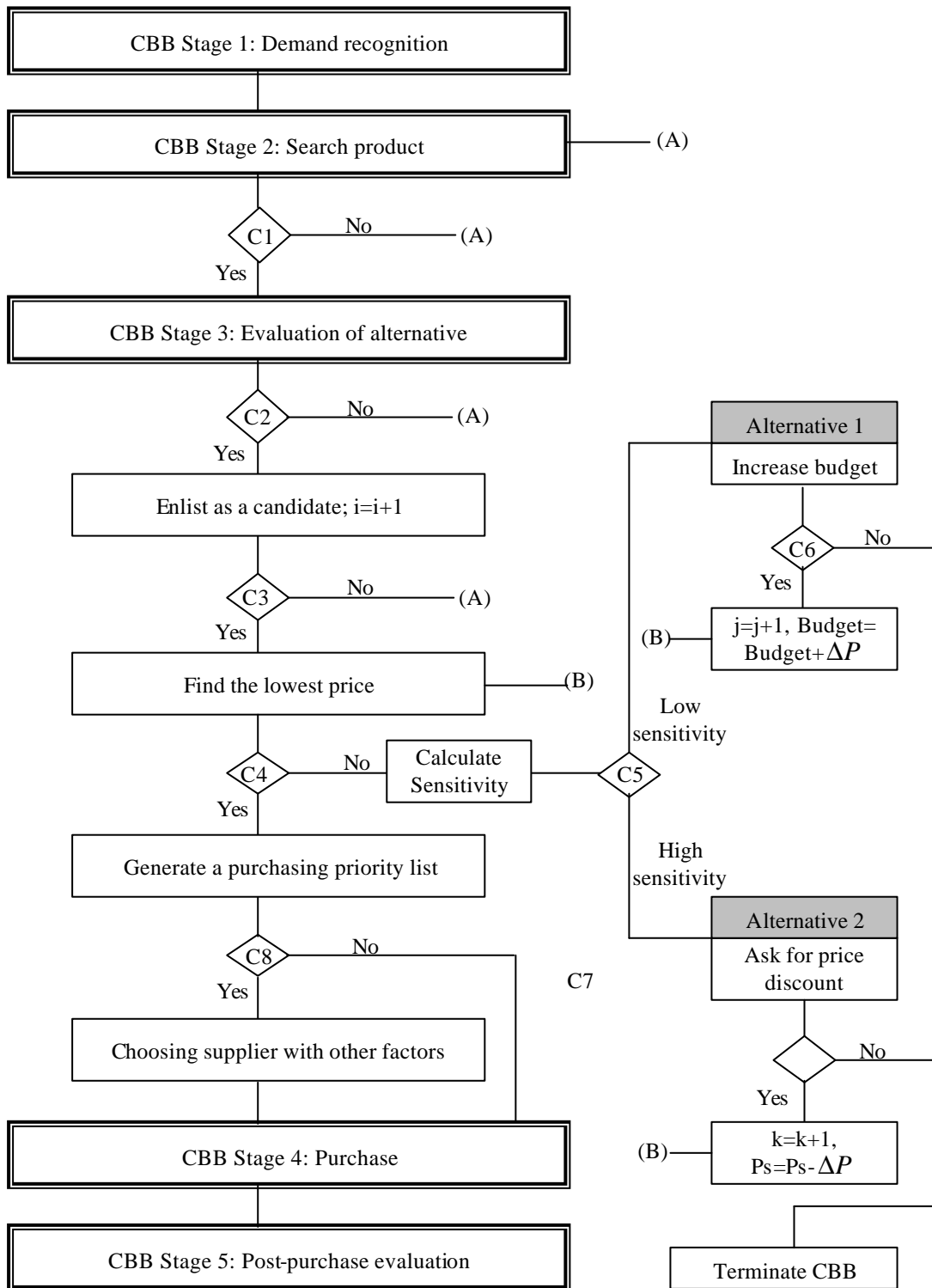


Figure 5-2: Flowchart of the proposed CBB-based online buying



Several alternatives that satisfy the minimum price-performance ratio may be available for a consumer to select. A consumer then finds a lot of price level among several candidates against his or her budget. If the budget is insufficient, a consumer may elect to increase his or her budget, turn to a sub-optimal alternative, or start negotiation by asking for a discount. In addition, seven conditions are identified to control the new CBB pricing model, as listed in Table 5-2. The detailed explanations were similar to the BBB pricing model discussed in the last chapter.

Table 5-2: Seven conditions to control the consumer-buying flowchart

	Description
Condition1 (C1)	If product specification is satisfied
Condition2 (C2)	If the price-performance ratio is satisfied
Condition3 (C3)	If $i > N$ , where N is a number of candidate decide by the buyer
Condition4 (C4)	Product price is available to budget
Condition5 (C5)	For alterative selection, low sensitivity → alterative 1; high sensitivity → alterative 2
Condition6 (C6)	If additional budget is available
Condition7 (C7)	If seller is willing to negotiation
Condition8 (C8)	If more than one supplier offer the same lowest price

Source: Our research

### 5.3 Key factors affect CBB

The Internet has helped drive significant price declines in many industries. Gloosbee (2000) found evidence that Internet has driven down price in life insurance and cars industries in which buyers use the Internet to gather pricing information but typically make purchases offline. Furthermore, the Internet has had a dramatic influence on how

customers expect commerce to be conducted regardless of the channel through which they browse, select, and purchase. A Jupiter consumer survey shows that 81% of online consumers visit two or more sites before making an online purchase and 54% visit three or more sites. The heavy use of online discounts and promotions to encourage customer purchase and grow customer acquisition has resulted in extremely price-sensitive consumers. Reverse exchanges, which allow customers to set their price, and comparison-shopping sites, further strengthen this trend so that the web is seen as a vehicle for finding or driving the best deal. Unfortunately, one of the consequences is that your customers are choosing where to purchase based more on price, not brand, or loyalty. This can hold your margin down as discounting is the only way to fight the competition for the purchase. Knowing that competitive pricing is only a few clicks away, consumers may browse in stores, but if the pricing is not attractive, they will take their purchasing to the web.

This demand for pricing efficiency is not restricted to B2C markets. The explosive growth of net markets attests to the B2B demand for similar pricing efficiencies. Many companies are increasingly willing to share internal manufacturing, pricing, supply chain and logistics data with partners, if they can lower transaction costs and improve processing efficiencies. This has to become a consideration in your business and marketing plans.

An excellent understanding of market mechanisms lays the basis for identifying the key buying factors. Price may be a “knock-out” factor in most industrial purchasing contexts, but successful marketers keep in mind that, as shown in Figure 5-3, non-price factors such as quality of product, logistics, and on-time delivery often account for 60-70% of the customer decision. Pricing is thus found a critical component of business strategy. The Internet adds greater flexibility and information availability to pricing strategies. Online sellers can easily gather information about online customer searching and buying habits is

than in traditional offline. It can enable online sellers setting their price strategy to match the customer's tastes more accurately also allows it to charge closer to what the customer is willing to pay (Bailey, 1998; Degeratu *et al.*, 1998; Baker *et al.*, 2001).

Price is assumed the most important factor for buying decision across all products. In fact, understanding customers' price perceptions can be extremely helpful in determining retail-pricing strategies. Assess how and where price factors into shoppers' decisions relative to other considerations. In the next chapter, both online CBB and BBB algorithms are applied to develop a new dynamic pricing model.

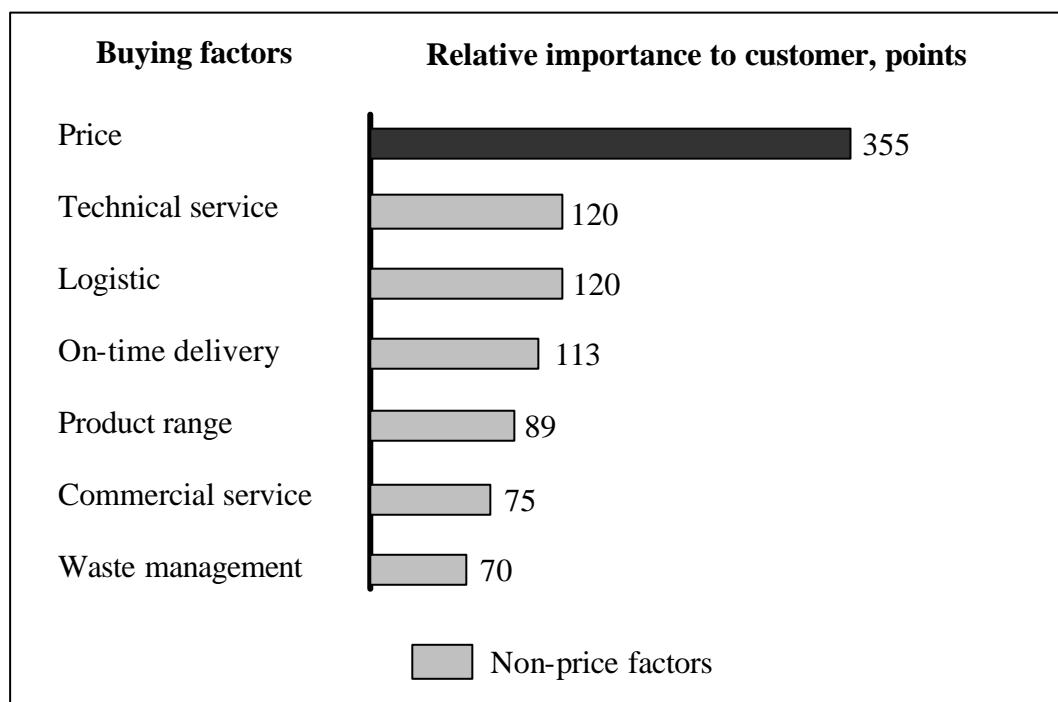


Figure 5-3: Importance of buying factors

Source: Mckinsey & Company (2000)

## Chapter 6 Dynamic Pricing and the New Pricing Model

Dynamic pricing is the practice of modifying prices for different audiences and changing market conditions. Dynamic pricing mechanisms occur on the Internet when buyers and sellers negotiate the final transaction price for the exchange of goods or services. Reinartz (2001) presented that the concept of dynamic pricing is what marketers call price customization. Price customization is the charging of different prices to end consumers based on a discriminatory variable. Srivastava (2001) further indicated that dynamic pricing models take advantage of real-time customer information, and market demand and supply to create customized offers, and in most instances maximize revenue capture.

The emergence of Internet was changing the ways of traditional pricing and enable sellers can embrace dynamic pricing due to characteristic of Internet. In this chapter, the concept of dynamic pricing is introduced first, and then the new pricing model based on the traditional and dynamic pricing model is presented.

### 6.1 Dynamic pricing

Internet-based dynamic pricing enhances market efficient and lower transaction costs by aggregating buyers and sellers in a single medium. As noted earlier, the Internet makes the markets become more transparence in price, available, supplier, and product. Buyers get more uniform, predictable pricing with real-time information on availability as well as better controls over their own procurement processes. Suppliers can more intelligently plan production, reduce inventory, customize promotions for buyers, lower their order processing costs, and able to realistically make immediate and timely adjustments to price

(Sahlman, 2000; Joan Morris, 2001).

Dynamic pricing includes auction, negotiation, exchange, and the traditional bidding process on the Internet (see Figure 6-1). It's a critical component of e-commerce and it can be formally defined as the buying and selling of goods and services in markets where prices are free to move in response to supply and demand conditions. A well-designed dynamic pricing operation can assist firms to increased revenues, reduced costs, and improved processes.

The emergence of new interactive networks and the rapid adoption of e-commerce capabilities ultimately give rise to Internet markets where goods and services are exchanged in real-time dynamic pricing environments. The Internet enables buyers to eliminate barriers of geographic and cost to potential suppliers, and to comprise additional suppliers into the bidding process at very low cost. Forrest Research (2001) predicted that about one-third of e-commerce in the next several years will involve dynamic pricing. Dynamic pricing is going to control a dramatically increasing proportion of transactions on the Internet.

## 6.2 Characteristic and advantages

With the dynamic pricing of buying and selling, product prices will vary in real time based on the current state of supply and demand. Buyers will pay only what they are willingness-to-pay and sellers will consider the buyers' price sensitivity into the transaction.

Sellers learn to adjust their price based on current market conditions. They do not have to guess the market prices, so they can avoid changing too much and missing their market, or charging too little and leaving money on the table.

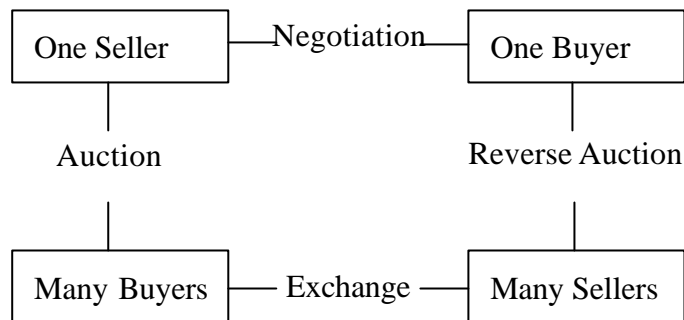


Figure 6-1: Participants interaction models of dynamic pricing

Source: Appell & Gressens (1999)

### 6.2.1 Characteristics

Appell and Gressens (1999) presented a set of characteristics of dynamic pricing as follows:

(1) Power has shifted to the customer

<1> Customers want access and service 24x7x365

<2> Customers also want choice, convenience, quality, and low prices

(2) Competition is everywhere

<1> New competitors emerging daily

<2> Barriers to entry have reduced

(3) Partnerships and alliances are critical

<1> Partners provide the means to extend your offering to the marketplace

<2> Partners allow you to reach new sets of customers

(4) Speed is everything

<1> First mover advantage

## 6.2.2 Advantages

Apply dynamic pricing can help to create an efficient markets and a better experiences for customer. On the other hand, by using dynamic pricing can help supplier to remove inefficiencies, decrease costs and increase revenues. Appell and Gressens (1999) indicated that the following improvements could be realized through dynamic pricing:

- (1) Increase return on inventory: By reaching the most interested prospects in the most efficient way possible, an auction enables businesses to sell excess inventory or reconditioned goods without having to resort to traditional liquidation prices.
- (2) Decrease processing costs: Customers can eliminate paper trails and lengthy communications by using the power of the Internet and the negotiation efficiencies of dynamic pricing.
- (3) Eliminate costly middlemen: Suppliers can gain more of the customers' dollars by offering items directly, rather than going through expensive brokers and liquidators.
- (4) Test pricing: Sellers can determine true market prices for items; which avoids the problem of predicting demand incorrectly and pricing items too low or high.
- (5) Create better customer experiences: The excitement and involvement of a dynamic pricing format adds to a web site's "stickiness"--customers stay on the site longer and return more often

## 6.3 Benefits and risks

Online dynamic pricing can help businesses in a variety of ways. First, it creates the efficient markets by providing a mechanism to eliminate imperfect information. Secondly, it increases the geographic reach of smaller suppliers, and streamlining purchasing processes. Thirdly, it can help to eliminating inefficiencies and enable suppliers to decrease

costs and increase revenues on inventory, decrease overhead, eliminate costly middlemen, and increase inventory turns. Finally, dynamic pricing allows business to “test pricing,” and can yield increased revenue from new and unique items. Appell and Gressens (1999) presented major benefits when businesses adopt dynamic pricing, see Figure 6-2.

Appell and Gressens (1999) further explained that dynamic pricing could carry several benefits and risks to both buyer and seller as listed in the following:

(1) Benefits to Buyer

- <1> Opportunity to create or increase competition for buying dollars
- <2> Better information about the marketplace
- <3> Enhance the RFQ process and compress cycle time

(2) Benefits to Seller

- <1> Access to new customers
- <2> New and timely information on state of the market
- <3> Automating the RFQ process
- <4> New demand management capability

(3) Risks to Buyer

- <1> In the event sufficient competition does not materialize, then the price could potentially be higher than the buyer expected
- <2> Risks of taking on new suppliers
- <3> Potential effects on decision-making and relationships

(4) Risks to Seller

- <1> In the event sufficient competition exists to ignite a bidding frenzy, the price may get driven below that desired by the vendor
- <2> Risks of taking on new buyers
- <3> Potential effects on decision-making and relationships



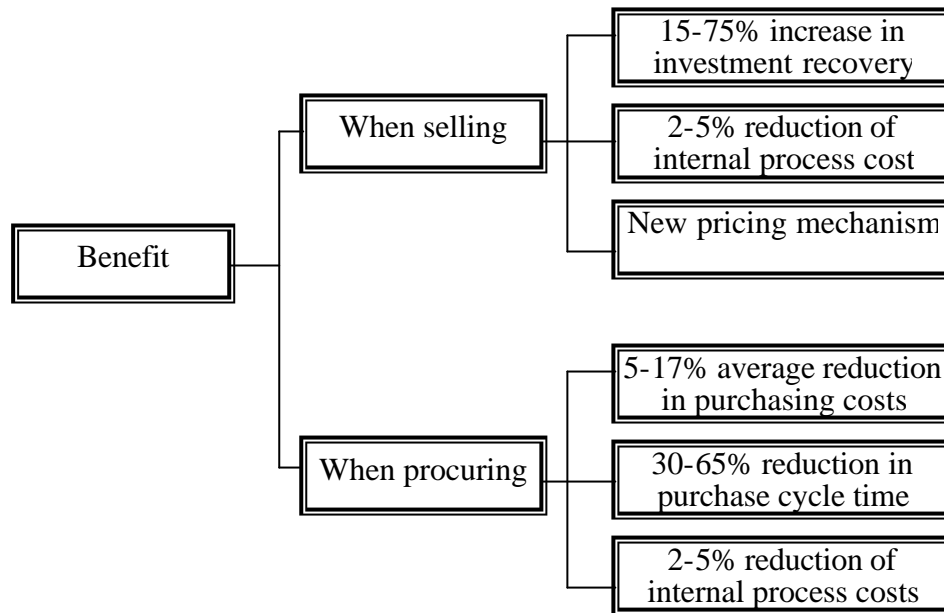


Figure 6-2: Business benefits hierarch due to dynamic pricing

Source: Appell & Gressens (1999)

#### 6.4 The New Pricing Model

Dynamic pricing allows sellers to use large amounts of information to assist in making a pricing decision. This can be viewed as a competitive advantage in the marketplace since this particular seller can make a better-informed decision on what to charge. This is beneficial to the seller when historical data is available on a buyer that is not considerably price-sensitive. This allows the seller to increase the price within the threshold of the buyer's upper limit, thereby increasing the profit margins for the firm. Dynamic pricing provides new opportunities for companies to maximize their return per customer. With lower menu costs, companies can have multiple prices for different segmentations and product configurations-and can change those prices more frequently.

However, consumers have a good understanding of Internet and know how to

manipulate the methods to make themselves look like more price-sensitive, dynamic pricing may yield them a lower price. If the potential buyer has a proven record of accomplishment of being price-sensitive on online purchases and is well informed of the product's market price, dynamic pricing should offer a better deal to this type of buyer.

The benefits to the buyers are that they are in more control of their buying process, purchasing from sellers that they select at the price they want to pay. Buyers can instantly compare prices and other related fees across sellers, and buyers can review what other buyers are willing to pay. The benefits to sellers is more control of the process by enabling them to close a deal on their own terms quickly and without predetermined time limits or delays. Sellers also have the capability to instantly accept or reject the price that buyers' willingness-to-pay. If the price is still higher than the buyer's budget, buyers can add their budget or ask for a price discount.

In the end, dynamic pricing can be viewed as a necessary practice on the Internet for e-commerce firms to remain competitive given the large, diverse consumer base, which has quick access to competitors' offerings and prices. Companies able to gather information about their competition and about customer needs and willingness-to-pay can customize their offerings and prices. Give their customers exactly what they want, at exactly the price they are willing to bear.

#### 6.4.1 Models

A generic equation set for dynamic pricing decision-making is derived for both B2B and B2C applications. In realistic situation, the parameters should be identified as the pricing factors in perspective BBB or CBB models.

The objective of the new pricing model is to find the optimal price between seller and

buyer based on buyer's price sensitivity. In fact, the art of finding a feasible region for marginal price, for how many additional budget buyers should add and how many discounts sellers should drop; appear critical in making an acceptable deal between them. For this reason, the following equations are formulated to model this problem, which can help define the best practice to make an online deal. A set of dominant equations are described as follows:

(1) Proposed Equation 6-1: Optimal deal price between buyer and seller

$$\text{Min}(P_b) \cong \text{Max}(P_s) \quad (\text{Eq. 6-1})$$

(2) Proposed Equation 6-2: Buyer chooses the lowest price among sellers

$$\text{Min} \left[ \text{Max}_i P_s \right] \quad (\text{Eq. 6-2})$$

Both equations 6-1 and 6-2 imply that buyers try to find the lowest price among sellers which price fit his/her criterion when they are buying on the Internet. In contrast, seller will want to charge a high price to maximum his profit. The optimal price is sought for both buyer and seller in order to make deal successfully. Of course, the need to coordinate pricing with other marketing decision means that the price offered may not equal this unconstrained optimal price. For example, to increase market share indicates the ability to offer 'optimal prices' for continuous successful trades. On the other hand, to maintain a certain price image may preclude us from deep discounts through certain channels—even though such deep discounts may lead to increased short-run profitability. Optimizing price offerings is a complex, multidimensional problem—one that must incorporate strategic considerations and tactical requirements as well as customer response and costs.

(3) Proposed Equation 6-3: Lowest acceptable price for buying the product

$$P_b = Budget_{original} + \underset{j}{Min}(j * \Delta P_1) + d_1 \quad (\text{Eq. 6-3})$$

(4) Proposed Equation 6-4: Lowest acceptable price for selling the product

$$P_s = Price_{original} - \underset{k}{Min}(k * \Delta P_2) - d_2 \quad (\text{Eq. 6-4})$$

Detailed description:

Equation 6-3 indicates that buyer must increase his/her budget step-by-step, if the budget is insufficient for purchasing the product. However, the buyer's additional budget must be enough and the price must to conform to his/her willing to pay. Otherwise, this deal will be terminated. Equation 6-4 notes that seller decrease his price step-by-step if he can benefit from this deal. The average cost is the lowest limit when provide discounts for buyer. Sellers tend to maximum their profit when negotiate with buyer.

In the new BBB and CBB algorithms, seller and buyer maybe negotiate at several times in order to make deal. The optimal price between seller and buyer will update continually until they make deal.

(5) Proposed Equation 6-5: Buyer's price sensitivity

$$\Delta S = \frac{P_s - P_b}{P_s - P_{cost}} \quad (\text{Eq. 6-5})$$

Detailed description:

This equation indicates that price sensitivity  $\Delta S$  will change dynamically according to price of seller and buyer. The concept "Moderate Sensitivity" is used to consider the potentiality of making a deal. The threshold value of price sensitivity  $\Delta S$  is set at 0.5. If

$\Delta S = 0.5$ , buyer will tend to ask for discount at first and increase his budget in the next place; otherwise, buyer will increase his budget at first and ask for discount in the next place if  $\Delta S < 0.5$ .

In these equations, a buyer maybe acquires a set of qualified sellers' price list  $i$  which against his/her price-performance ration and he/she will choose the seller who offer the lowest price. Price  $P_b$  and  $P_s$  represent the prices of buyers and sellers in a transaction, respectively, and  $P_{cost}$  represents the minimum price that seller can accept. Variable  $j$  represents the number of times that buyers will increase their budgets to acquire their favorite products; and variable  $k$  represents the number of times sellers cut down their prices to conform to buyers' anticipation. Variable  $\Delta P_1$  and  $\Delta P_2$  denotes the stepwise price difference that buyers will increase and sellers will cut down, respectively. Variable  $d_1$  and  $d_2$  denotes the partial stepwise price difference that buyers will increase and sellers will decrease, respectively;  $\Delta S$  represents the buyer's price sensitivity and it will drop off continue due to seller and buyer adjust their price. Then, these equations can be used to find the optimal price between seller and buyer in the transaction and analyze the radius of buyer price sensitivity to help managers pricing smart on the Internet.

#### 6.4.2 Cost Factor and Equations of the New Pricing Model

Eight cost factors in the new pricing model are considered since we tend to distinguish from B2C to B2B market and from physical to digital product. We survey amount of researches and find the most important cost factors when pricing for a product. The importance of these cost factors to be employed in the new pricing model is outlined in the follow:

(1) Cost factors

<1>Fixed Cost (FC): the cost that does not depend on the output level.

<2>Variable cost (VC): the cost which would be zero if the output level was zero. Any resource for the quantity can change during the period of time under consideration.

<3> Logistic cost (LC): the cost that delivery product or service from seller to buyer (McCann, 1996; Bollo & Stumm, 1998; So & Song, 1998; Lee & Whang, 2001; Sung *et al.*, 2002; Shinna & Hwangb, 2003).

<4>Transaction cost (TC): the cost involved with transaction activities such as searching for information, negotiating, monitoring and comparing are called transaction cost (Mason, 2000; Daripa & Kapur, 2001; Garicano & Kaplan, 2001).

<5>Promotion cost (PC): the cost that invest in marketing activities in order to increasing revenue or market share (Teng & Thompson, 1996; Sung *et al.*, 2002; Hadjinicola & Kumar, 2002).

<6> Customization cost (LC): the cost involved with produce product according to buyer's preference (Dewan *et al.*, 2000; Lee *et al.*, 2000; Reinartz, 2001; Verona & Prandelli, 2002).

<7> Sale commission (SC): seller charge for buyer with each transaction.

<8> Shipping and handling cost (SC and HC): shipping costs include costs to move the product from the seller's place of business to the buyer's location. Handling costs consist of the costs to store, move, and prepare a product for shipment from the time the product is removed from finished goods inventory until it is delivered to the shipper (Hadjinicola & Kumar, 2002; Jorgensen & Kort, 2002).

<9> Total cost (TC): sum of the costs denoted above.

<10> Average cost (AC): total cost divided by output level.

(2) Equations

$$\langle 1 \rangle P_{\text{cost}} = \text{Total cost} / \text{Expected sales quantity} \quad (\text{Eq. 6-6})$$

$$\langle 2 \rangle \text{Total cost} = \text{Total Fixed cost} + \text{Total Promotion cost} + (\text{Variable cost} + \text{Logistic cost} + \text{Transaction cost} + \text{Customization cost} + \text{Sale commission} + \text{Shipping and Handling cost}) * \text{Expected sales quantity}$$

$$\text{Total cost} = (\text{FC} + \text{PC}) + (\text{VC} + \text{LC} + \text{TC} + \text{CC} + \text{SC} + \text{HC}) * Q \quad (\text{Eq. 6-7})$$

$$\langle 3 \rangle P_{\text{list}} = (1 + n\%) * P_{\text{cost}}, \text{ where } n \text{ is expected profit} \quad (\text{Eq. 6-8})$$

### 6.4.3 Cost Difference between B2B and B2C Market

The advantages of doing business on the Internet can save various costs are introduced in earlier chapter. These savings can be ranged from: lower overhead costs, lower selling cost, general and administration expenses, reduce processing time and cost of order, reduced support personnel, and lower marketing expenses. Figure 6-3 shows that electronic commerce can shift economic curves. The production function will decline (from L1 to L2) since you can get the same quantity with less labor and IT cost. The transaction cost for the same quantity will be lower due to computerization. Finally, the agency cost for the same quantity will be lower. The significant characteristics of Internet pricing are compared with traditional pricing, as described in Table 6-1. The results imply that Internet pricing is more efficient and cost saving, thus enable seller to dynamic adjust price according to demand in a real-time. In traditional companies, pricing decisions are made intuitively and globally. However, the Internet allows and requires companies to price with greater precision, speed, and flexibility (Baker et. al, 2001). It is clear that traditional pricing contains a higher cost structure in several aspects, especially in advertising and distribution channel cost.

Moreover, understand the cost different between B2B and B2C markets have a

significant meaning to develop a new pricing mechanism correspond to their buying behavior. Thus, the cost structure of a B2B market is further compared with that of a B2C market, as shown in Table 6-2. This comparison is based on the earlier discussions on Internet marketing, CBB, and BBB.

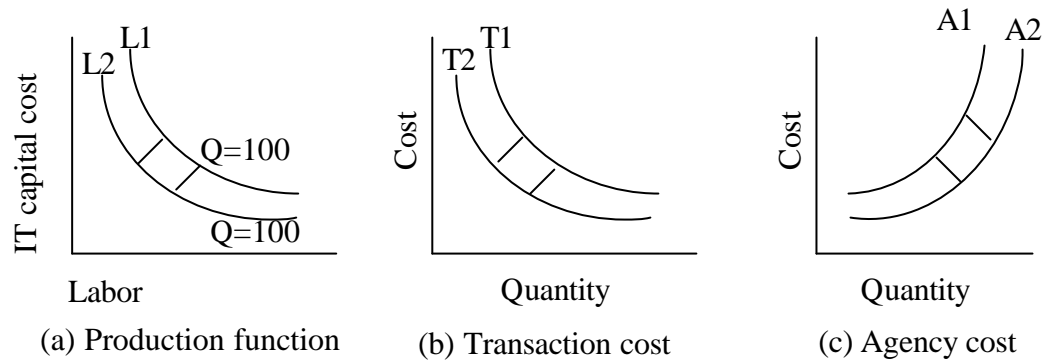


Figure 6-3: Economic effects of e-commerce

Source: <http://www.census.gov/epdc/www/ebusins.htm>

Table 6-1: Difference between traditional pricing and Internet dynamic pricing

	Traditional pricing	Internet pricing
Characteristic	Quasi-static	Dynamic
Logistic cost	Included	Extra
Advertising cost	High	Low
Distribution channel cost	High	Zero
Order processing cost	High	Low
Competitor's influence on pricing	Low (local)	High (global)
Visibility of pricing information	Low	High
Price change	Frequently	Continually
Corresponding production method	Mass-production	Mass-customization

Source: Our Research



Table 6-2: Cost difference between B2B and B2C Markets

	B2B	B2C
Fixed costs	Equal	Equal
Promotion costs	Equal	Equal
Variable costs	Lower	High
Logistic costs	Lower	High
Transaction costs	Lower	High
Sale commission	High	Lower
Customization costs	Lower	High
Shipping and handling costs	Lower	High

Source: Our Research

#### 6.4.4 Cost Difference between Physical and Digital Products

Unique cost structure of digital product makes seller difficult to pricing based on cost. However, realize the difference between digital and physical product enable us to evaluate the price sensitivity difference between them when buyer buying on the Internet. The major cost difference between digital and physical product are listed in Table 6-3.

Table 6-3: Cost difference between physical and digital products

	Physical product	Digital product
Fixed costs	Lower	Higher
Variable costs	High	Close to zero
Logistic costs	High	Close to zero
Transaction costs	High	Lower
Promotion costs	High	Lower
Sale commission	Lower	High
Customization costs	High	Lower
Shipping and handling costs	High	Lower

Source: Our Research

## Chapter 7 Scenario Analysis

### 7.1 Introduction

In this chapter, the pricing theories developed in this research are implemented into a specific-purpose program. Moreover, various scenarios analysis of B2B and B2C are performed with consideration of different values of sensitivity. The characteristics of Internet are also included in the scenarios.

A program is developed to implement the new pricing model using Visual Basic 6.0, Microsoft Access 2000, and Excel 2000. All of the new pricing mechanisms are included in this program and outcomes are stored in database. The pricing process is divided into four steps: seller's costs and prices are displayed in step 1 and 2, see Figures 7-1 and 7-2, respectively; furthermore, buyer's price sensitivity and dynamic negotiation process are shown in step 3 and 4, see Figures 7-3 and 7-4, respectively.

After understand the basic operation of the program, scenario analysis are performed with different types of buying-class in B2B market and with different product lifecycle in B2C market. A special scenario analysis with digital product in B2C market is also performed in this chapter.

The basic notations must be set before perform the scenario analysis (see Table 7-1). One things need to take care; we denote the  $P_1$  and  $P_2$  were 5% and 2% of seller's original list price. For a high sensitivity buyer, he/her increases the budget only at a small range and sellers need to reduce their price, if they want to make the deal. Therefore,  $P_1$  and  $P_2$  is 2% and 5% for high sensitivity scenario. Conversely,  $P_1$  and  $P_2$  is 5% and 2% for low sensitivity scenario. In addition, the price is assumed the only consideration in each scenario, which means that price sensitivity is the most important consideration in the

analysis. The price sensitivity with the optimal price in each scenario will be zero. This assumption will not lose general in the perfectly competitive market such as the Internet.

Table 7-1: Major notation use in scenario analysis

Notation	Meaning in scenario	Description
$P_{cost}$	Average cost	Cost per unit
$P_s$	Price / seller's initial	Seller's minimum price
$P_b$	Buyer's budget / Buyer's initial price	Buyer's willingness-to-pay
$\Delta S$	Price sensitivity	Buyer's price sensitivity
$P_1$ and $P_2$	Buyer_Increase_Range and Seller_Decrease_Range	Seller and buyer will increase or decrease with sensitivity
$1$ and $2$	$1$ and $2$ represent how much budget and price that buyer and seller only need to add and reduce	Partial $P_1$ and $P_2$

Source: Our research

The screenshot shows a software window titled "TotalCost" with a "Total Cost" section. It contains the following input fields and values:

- Fixed Cost: 1000
- Promotion Cost: 100
- Variable Cost: 5
- Customization Cost: 5
- Logistic Cost: 5
- Sales Commission: 5
- Transaction Cost: 5
- Shipping & Handling Cost: 5

At the bottom, there is a section for "Expected Sales Quantity" (10) and "Total Cost:" (1400), along with a "Next Step" button.

Figure 7-1: Total cost calculation – an example

Source: Our research

**Seller's price**

Pricing

Total Cost:

Expected Sales Quantity  Average Cost

Expected Profit  %

---

Price

Figure 7-2: Seller's price calculation – an example  
 Source: Our research

**Calculate Buyer's Sensitivity**

Seller's Price

Buyer's Budget

---

Buyer's Sensitivity

Figure 7-3: Buyer's sensitivity calculation – an example  
 Source: Our research

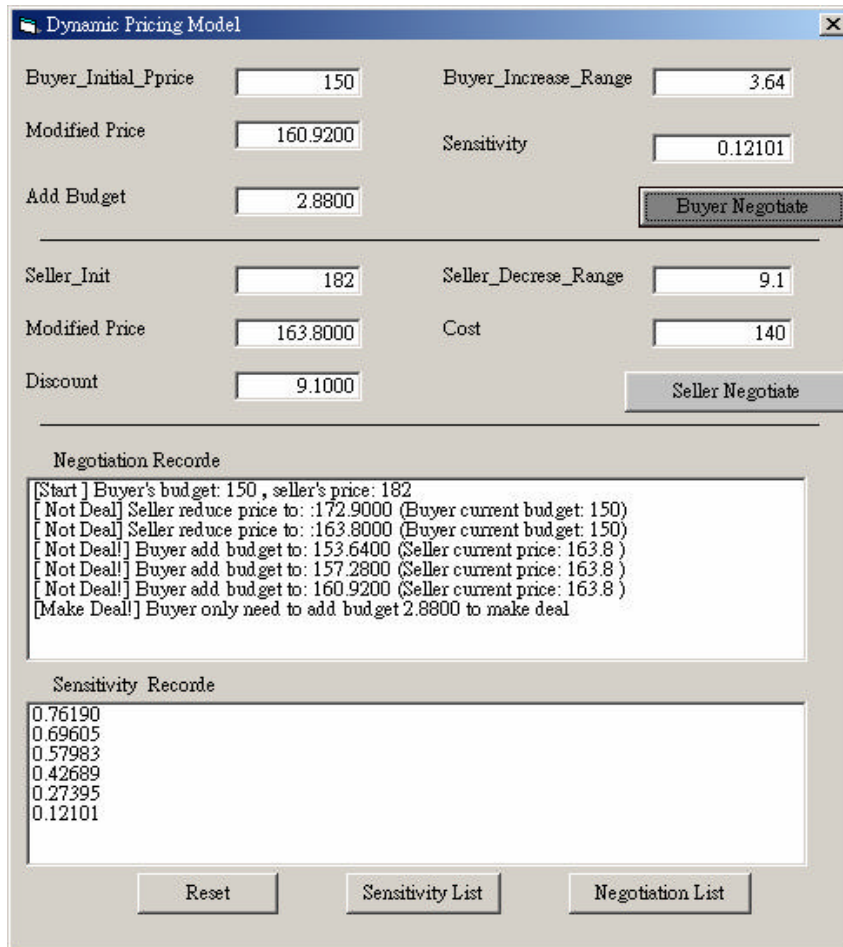


Figure 7-4: Negotiation process between seller and buyer – an example  
Source: Our research

## 7.2 Scenario Analysis with Different Buy-Class in B2B Market

### 7.2.1 Scenario 1 -- Buying-Class with High Price Sensitivity

Business buying behavior could be divided into three situations as noted in Chapter 4. The situations of new buy and modified rebuy are expected to have higher price sensitivity due to the following reasons:

First, in new buy situation, because of high newness of the problem, require great quantity information, and new alternative is important. Therefore, higher price sensitivity is reasonable in this buying situation. However, its price sensitivity will be lower than new

buy situation. On the other hand, high price sensitivity in this buying situation results from need to spend time on re-identifying his buying problem, searching information, and finding a suitable seller. Moreover, uncertainty of this new buy situation will raise buyers' price sensitivity due to Internet makes it easier to search information, more interaction between seller and buyer, and lower search cost.

Secondly, in modified rebuy situation, the characteristic includes moderate in newness of problem, information requirement, and limited in new alternative were major characteristics. Buyer will search and evaluate the new sellers because they want to modify product specifications, prices, delivery requirements, and so on. If significant features of Internet were combined, such as lower search cost, ease to acquire information, and ease to compare prices, then buyers' price sensitivity would be expected higher than before. Moreover, buyers will occur a modified rebuy situation due to they want to find the better sellers to meet their demand. If sellers can offer a better product or service for buyers, it can lower buyers' price sensitivity. In general, a well reputation on brand will also reduce buyers' sensitivity.

Before conducting the scenario analysis, the detailed data used need specified. First, the related costs and price data, as shown in Figures 7-5 and 7-6, are generate after considering the characteristics of B2B market and Internet mentioned before. In realistic, these values could be modified according to different circumstance. Secondly, the buyer's budget is set at a reasonable value and make the value of price sensitivity higher than 0.5, as shown in Figure 7-7. Then, go into the new pricing model – dynamic negotiation process. The detailed data of seller and buyer will be displayed, see Figure 7-8. The Seller will reduce his price at first time in this dynamic negotiation process because the buyer's price sensitivity is high with seller's initial price. Then, this negotiation process will generate the optimal prices between seller and buyer. Finally, the

Excel 2000 is applied to show the negotiation processes with the prices and sensitivity change of each process, as shown in Figure 7-9 and Table 7-2. The figures are used to compare with other scenarios. The detailed process of dynamic negotiation is as follows:

- (1) Step 1: Seller will give a discounted price for buyer due to buyer's price sensitivity is high and he/she would not want to buy that product before sensitivity small than 0.5 ( $\Delta S < 0.5$ ).
- (2) Step 2: Buyer will increase his/her budget if it is available when his/her price sensitivity is small than 0.5. Buyer according to his/her performance with the product to determine the times of increase budget.
- (3) Step 3: Seller will tend to make deal to earn more revenue or market share. It is reasonable to explain that the Internet market is a competitive market where seller will tend to make deal with buyer if the buyer's price is higher than the  $P_{\text{cost}}$ . Therefore, seller will continuous to decrease his price to make deal with buyer if buyer's budget is not available to obtain the product.
- (4) Step 4: The final deal price between seller and buyer is \$389.01 after six rounds of negotiation. Both of seller and buyer were negotiating three times before they agree the deal price. A total discount from seller is \$68.64 and sum up of buyer increase budget is \$19.01. The detailed information is listed in Table 7-2.

The 'TotalCost' dialog box contains the following fields and values:

Fixed Cost	5000000	Promotion Cost	800000
Variable Cost	10	Customization Cost	6
Logistic Cost	20	Sales Commission	5
Transaction Cost	3	Shipping & Handling Cost	5
Expected Sales Quantity	20000	Total Cost:	6780000

Next Step

Figure 7-5: Cost calculation in B2B scenario analysis 1  
Source: Our research

The 'Seller's price' dialog box contains the following fields and values:

Total Cost:	6780000	Average Cost	339
Expected Sales Quantity	20000	Expected Profit	35 %
Price	457.6500		

Next Step

Figure 7-6: Seller's price calculation in B2B scenario analysis 1  
Source: Our research

The 'Calculate Buyer's Sensitivity' dialog box contains the following fields and values:

Seller's Price	457.65	339
Buyer's Budget	370	
Buyer's Sensitivity	0.7387	

Next Step

Figure 7-7: Buyer's sensitivity calculation in B2B scenario analysis 1  
Source: Our research



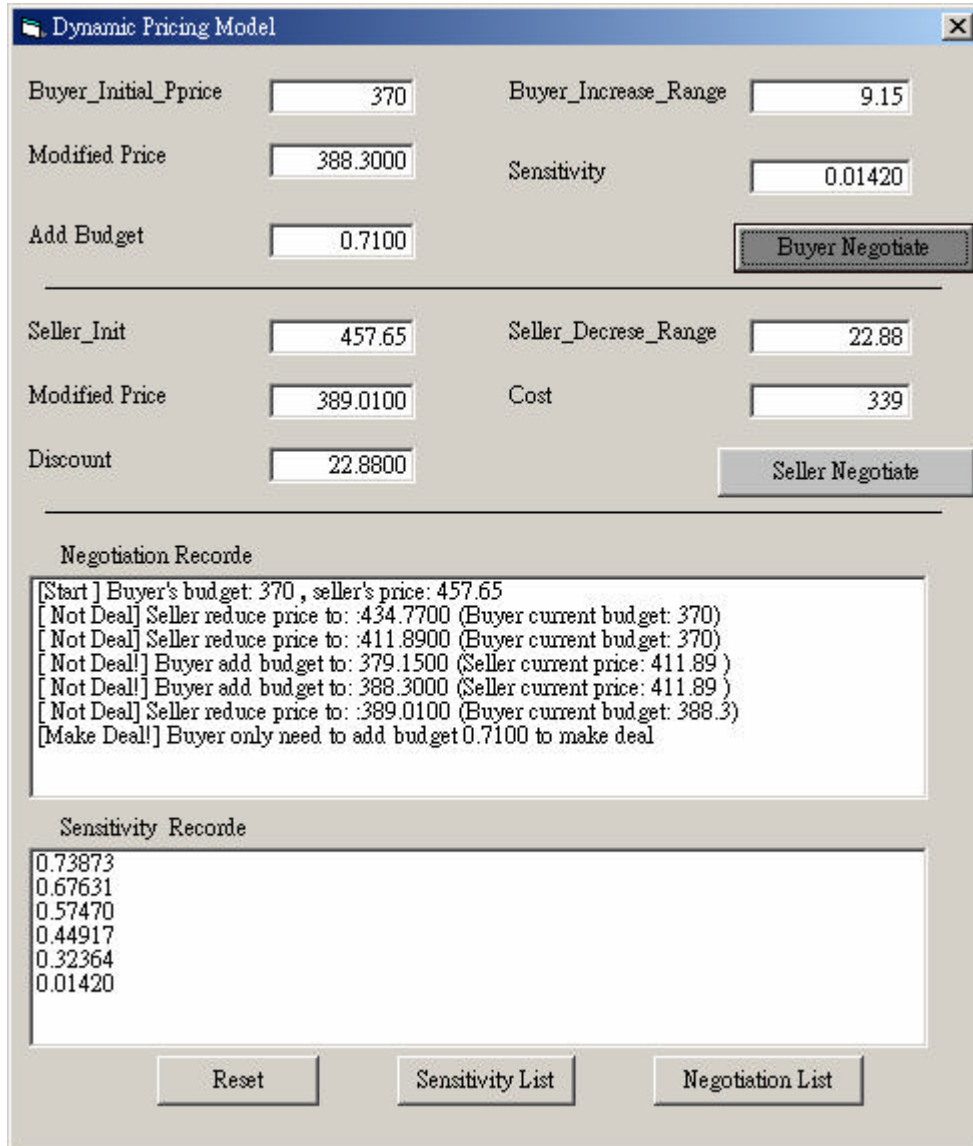


Figure 7-8: Dynamic negotiation process in B2B scenario analysis 1

Source: Our research

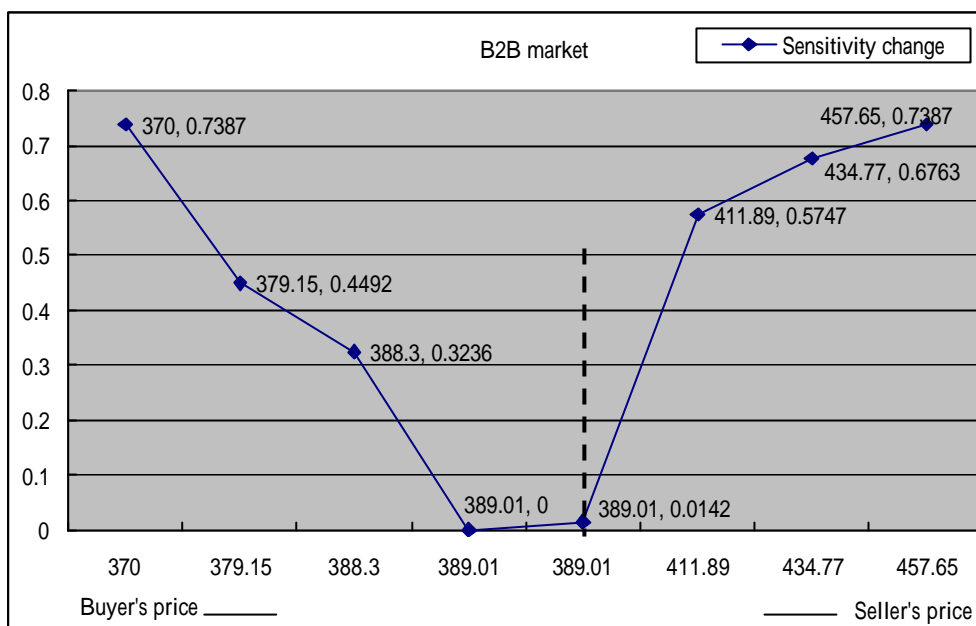


Figure 7-9: Price sensitivity change with step-by-step negotiation in B2B scenario 1

Source: Our research

Table 7-2: Detailed negotiation process in B2B scenario 1

Round / Sensitivity	Seller's price	Buyer's price	Buyer's Sensitivity
0	\$457.65	\$370	0.7387
1	\$434.77 (-22.88)		0.6763 (-0.0621)
2	\$411.89 (-22.88)		0.5747 (-0.1016)
3		\$379.15 (+9.15)	0.4492 (-0.1255)
4		\$388.30 (+9.15)	0.3236 (-0.1256)
5	\$389.01(-22.88)		0.0142 (-0.3094)
6		\$389.01(+0.71)	0 (-0.0142)
Optimal price	\$389.01 (-68.64)	\$389.01(+19.01)	0

Source: Our research

### 7.2.2 Scenario 2 -- Buying-Class with Low Price Sensitivity

The scenario with low price sensitivity of buying-class in B2B market is called straight rebuy. The major characteristics in this buying situation were lower newness of problem,

minimal information requirement, and have no any new alternative. These factors make business buyers insensitive on price because they often selecting suppliers and automating purchase according to their past purchase histories. Therefore, price sensitivity in this buying situation is expected lower than other two situations as discussed early.

The basic data of cost and price set in this scenario is similar to that of scenario 1, as shown in Figures 7-5 and 7-6. The buyer's budget is set at a reasonable value and the value of price sensitivity is lower than 0.5, see Figure 7-10, before go into the major pricing model – dynamic negotiation process. The detailed data of seller and buyer is displayed in Figure 7-11, and detailed negotiation processes are shown in Figure 12 and Table 7-3, respectively.

The detailed process of dynamic negotiation is as follows:

- (1) Step 1: Buyer will increase his/her budget if it is available when his/her price sensitivity is small than 0.5 as assumed earlier. Buyer according to his/her performance with the product determined the times of increase budget. The value of buyer's price sensitivity is 0.1985, which represents that buyer's sensitivity is extremely low. He/she will tend to increase his/her budget directly to buy the product due to such a low sensitivity.
- (2) Step 2: Buyer will buy the product successfully by increase budget by only increase partial of budget denoted  $d_1$ .
- (3) Step 3: The final deal price between seller and buyer is \$457.65 after two rounds of negotiation. Both of seller and buyer were negotiating three times before they agree the deal price. Seller does not reduce his price in this negotiation and total of buyer increase budget is \$27.65. The detailed information is revealed in Table 7-3.

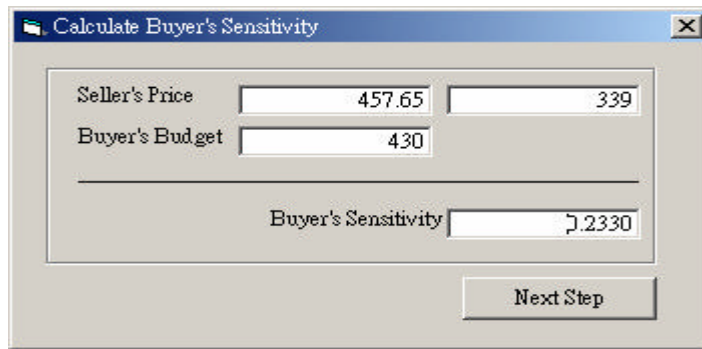


Figure 7-10: Buyer's sensitivity calculation in B2B scenario analysis 2

Source: Our research

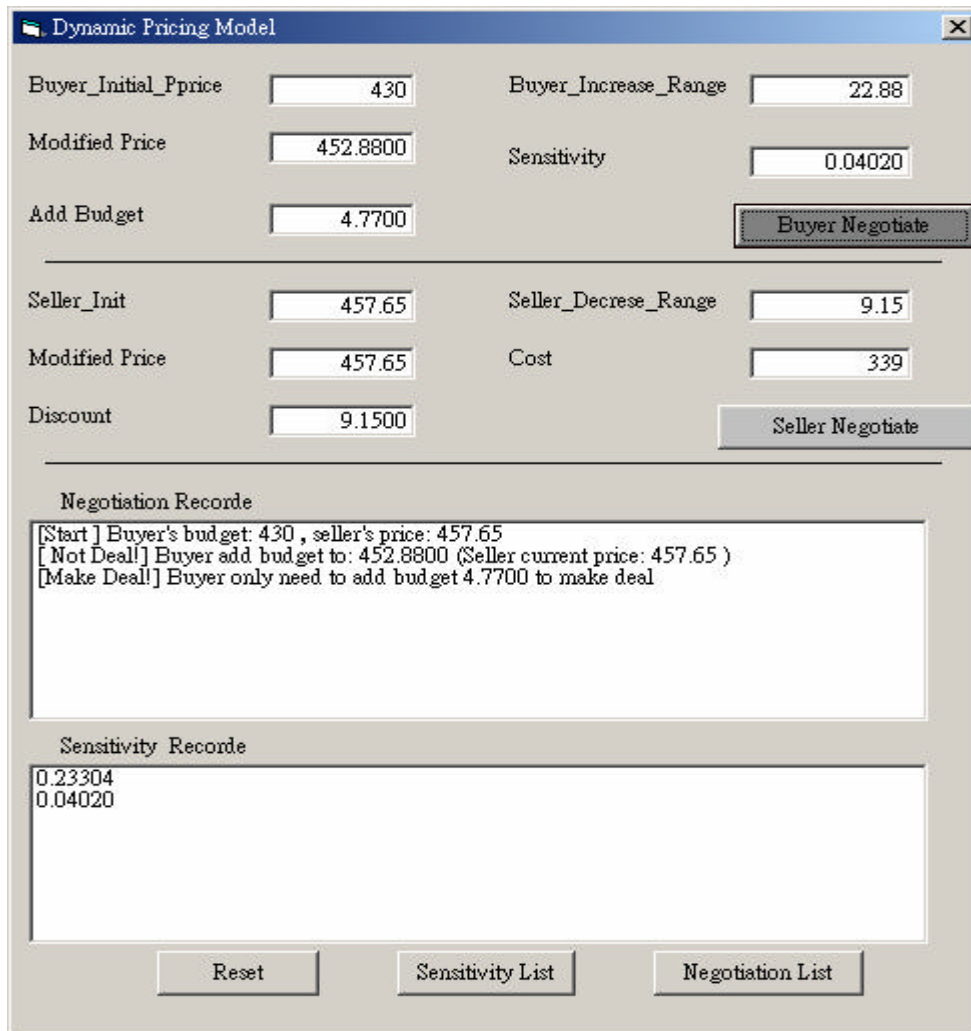


Figure 7-11: Dynamic negotiation process in B2B scenario analysis 2

Source: Our research

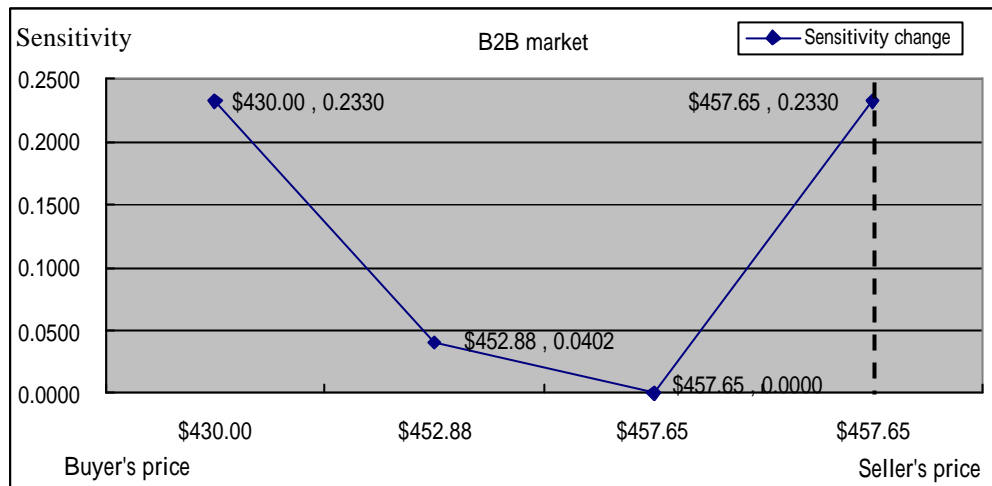


Figure 7-12: Price sensitivity change with step-by-step negotiation in B2B scenario 2

Source: Our research

Table 7-3: Detailed negotiation process in B2B scenario 2

Round / Sensitivity	Seller's price	Buyer's price	Price Sensitivity
0	\$457.65	\$430	0.2330
1		\$452.88 (+22.88)	0.0402
2		\$457.65 (+4.77)	0
Optimal price	\$457.65 (0)	\$457.65 (+27.65)	0

Source: Our research

### 7.2.3 Brief Summary

From the results of the scenario analysis, buyer's budget and price sensitivity is concluded to vary at different buying-classes. To further investigate the reasons of these results, different relationships between businesses are discussed and suggested that relationship is the critical factor affects the businesses buying behavior.

There exist several different relationships between buyers and sellers, as presented in Section 4. Furthermore, different price sensitivity are anticipated when buyers and sellers make transaction in different types of relationship. Now, each relationship and their price

sensitivity can be explained with respect to the accounts of buying-classes as follows:

(1) Pure transaction: means that the relationship between seller and buyer involve “one time exchange of value between two parties with no prior or subsequent interaction in this relationship.” Price sensitivity is assumed high because buyers can utilize the characteristics of Internet such as lower search cost and easier to compare price to find another seller easier. This pure transaction relationship can explain why new-buy and modified-rebuy situations of buying-classes are high price sensitivity. Most of the transactions in these situations are close to the ‘trial and error’ transaction. For example, buyer will evaluate the sellers in various dimensions carefully before and after they buying. It may spend much of time and the risk attitude maybe higher in this situation, so the high price sensitivity is confirmable.

(2) Repeat transaction: it moves the level of exchange beyond the pure transaction and reflects the success of marketers in achieving product differentiation and creating preference and loyalty. The price sensitivity is low because seller understand what their customer want and offer the product to meet their preference thus raise buyers’ willingness-to-pay and lower their price sensitivity.

(3) Long-term relationships: this relationship based on the relatively long-term contractual commitment, this relationship is managed at arm’s length. The buyer and seller are opposed to each other, with price being the focal issue.

(4) Buyer-seller partnerships: in this relationship, a mutual dependency exists in which the value of the augmentation of the product is negotiated. The buying has one or few preferred suppliers who undertake to delivery the augmented product. Buyers’ price sensitivity is low because their concern is not about price but about quality, delivery, technology support, and after-sale service.

(5) Strategic alliance: a strategy alliance is characterized by the intent of each party to

attain a long-term strategic goal. It involves “a formal long-run linkage, found with direct co-investments by two or more companies, which pool complementary capabilities and resource to achieve general agreed objective.” Buyers’ price sensitivity is low because they focus their interest on the long-term relationship and complementary technology or product rather on price.

The straight-rebuy case is of lower price sensitivity because it consists closer relationship between buyer and seller. Most of their transactions are based on long-term contract or strategy partnership, buyer’s concern not emphasis on price but on relationship maintenance.

An interesting finding in the scenario analysis for a B2B market is that business buyers are more active regardless of their price sensitivity. As implied by the results, the great quantities they bought with lower price may be one of the reasons that they tend to increase their budget to buy. Another consideration may lies in building relationship with seller who posses a critical component. It will also force the buyer to increase his budget to get to product.

## 7.3 Scenario Analysis with Product Lifecycle in B2C Market

### 7.3.1 Scenario 1 -- Periods with High Price Sensitivity

The art of pricing strategies for product lifecycle were studied widely in academic research and in practice. There are different pricing strategies for different period of product lifecycle as mentioned earlier. In this section, different price sensitivity corresponds to different product lifecycle is studied and these pricing strategies align to the outcomes of scenario analysis discussed. The degree of price sensitivity varies with respect to the three period of product lifecycle, including growth period, maturity period, and

decline period. The reasons are as follows:

(1) Growth period, emergence of competitors will lead to a violent competition in the market in this period. It have higher market growth but uncertain in market share. Each player in this market will try to maximum their market share and profit at the same time. Buyers can obtain much product information and easier price comparison among sellers, thus have high price sensitivity in this period.

(2) Maturity period, the speed of market growth will slacken even to stagnate. Profits are relatively high and marketing expenses should begin to decline. Buyers have sufficient product information and their price sensitivity is based on their demand intensity towards a specific product. On the other hand, buyers' willingness-to-pay is different according to different properties, functions, and quality of product. In general, for the same product, buyer with high willingness-to-pay will have lower price sensitivity and buyer with lower willingness-to-pay will have high price sensitivity.

(3) Decline period, the sales quantity will decline, and products are removed from the market in this period. Sellers look for ways to extract the last few dollars of profit before withdrawing the product. Buyers' price sensitivity is based on their willingness-to-pay. Loyal customers, for example, will have lower price sensitivity for products and they will buy the product at the price they paid former. Sellers will offer a higher discount rate to extract profit and control their costs strictly to avoid loss. Consequently, the major pricing strategies of sellers will focus on demand-based (promotion and extraction) and cost-based (avoid loss) in this period.

In conducting this scenario analysis, the related costs and price data, see Figure 7-11 and 7-12, are generate these data after considering the characteristic of B2C market and Internet. Several sets of values for different B2B market are selected to distinguish prices of single product from that of a bundle product. In realistic, these data could be modified



according to different circumstance. Secondly, the buyer's budget is set at a reasonable value and make the value of price sensitivity higher than 0.5 ( $P > 0.5$ ) (see Figure 7-13). Then, go into the new pricing model – dynamic negotiation process. The detailed data of seller and buyer is displayed in Figure 7-14, and negotiation processes are shown in Figure 7-15 and Table 7-4. The detailed process of dynamic negotiation is as follows:

- (1) Stage 1: seller will give a discounted price for buyer due to buyer's price sensitivity is high and he/she would not buy the product before sensitivity small than 0.5.
- (2) Stage 2: buyer will increase his/her budget if it is available when his/her price sensitivity is small than 0.5. The times of increase budget were determined by buyer according to his/her performance with the product.
- (3) Buyer will tend to make deal to earn more revenue or market share. It is reasonable to explain that the Internet market is a competitive market where seller will tend to make deal with buyer if the buyer's price is higher than the  $P_{cost}$ . Therefore, seller will continuous to decrease his price to make deal with buyer if buyer's budget is not available to obtain the product.
- (4) The final deal price between seller and buyer is \$399.84 after six rounds of negotiation. Both of seller and buyer were negotiating three times before they agree the deal price. A total discount from seller is \$99.96 and sum up of buyer increase budget is \$19.84. The detailed information is listed in Table 7-4.

The 'TotalCost' window displays the following data:

Category	Value
Fixed Cost	5000000
Promotion Cost	800000
Variable Cost	12
Customization Cost	10
Logistic Cost	30
Sales Commission	2
Transaction Cost	5
Shipping & Handling Cost	8
Expected Sales Quantity	20000
Total Cost	7140000

A 'Next Step' button is located at the bottom right of the window.

Figure 7-13: Cost calculation in B2C scenario analysis 1  
 Source: Our research

The 'Seller's price' window displays the following data:

Category	Value
Total Cost	7140000
Expected Sales Quantity	20000
Expected Profit	40 %
Average Cost	357
Price	499.8000

A 'Next Step' button is located at the bottom right of the window.

Figure 7-14: Seller's price calculation in B2C scenario analysis 1  
 Source: Our research

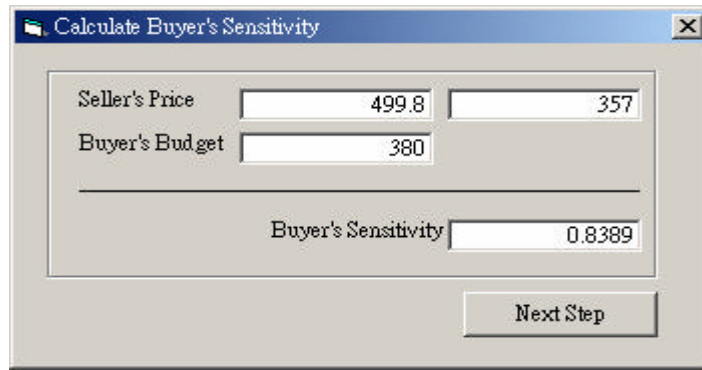


Figure 7-15: Buyer's sensitivity calculation in B2C scenario analysis 1

Source: Our research

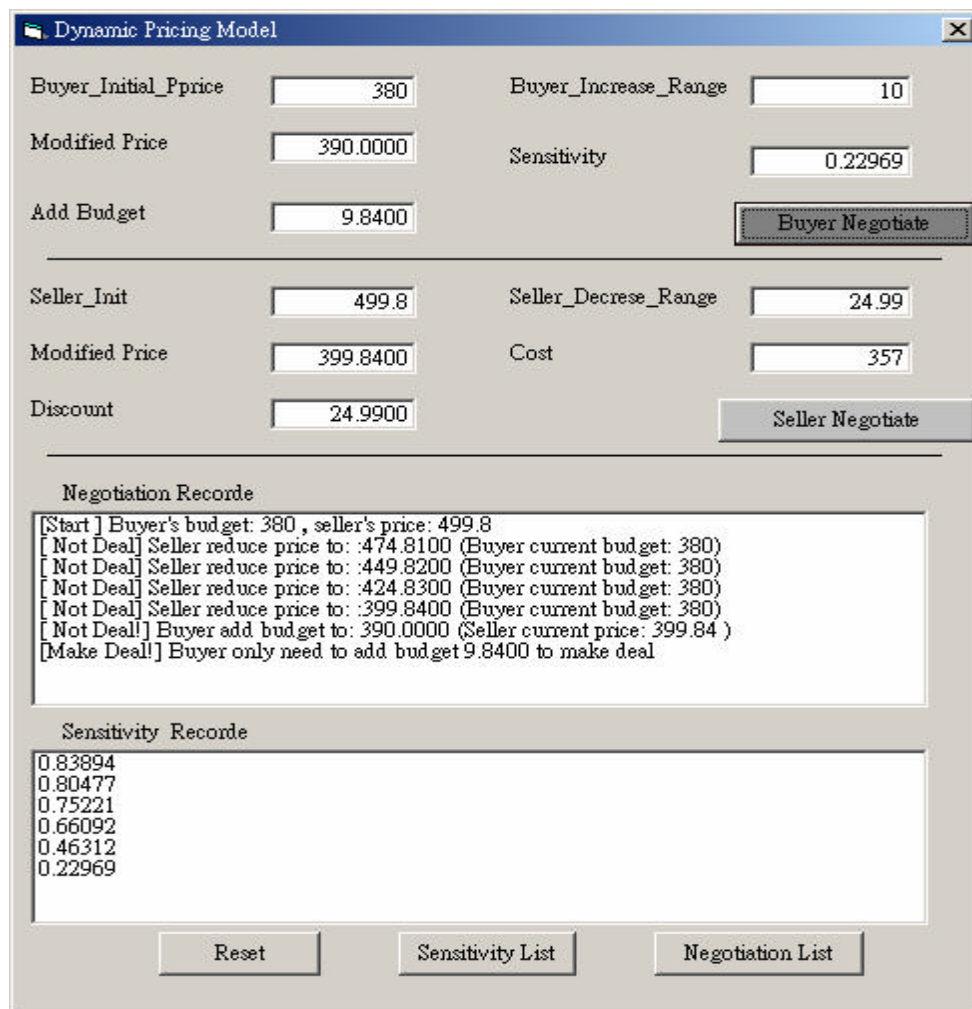


Figure 7-16: Dynamic negotiation process in B2C scenario analysis 1

Source: Our research

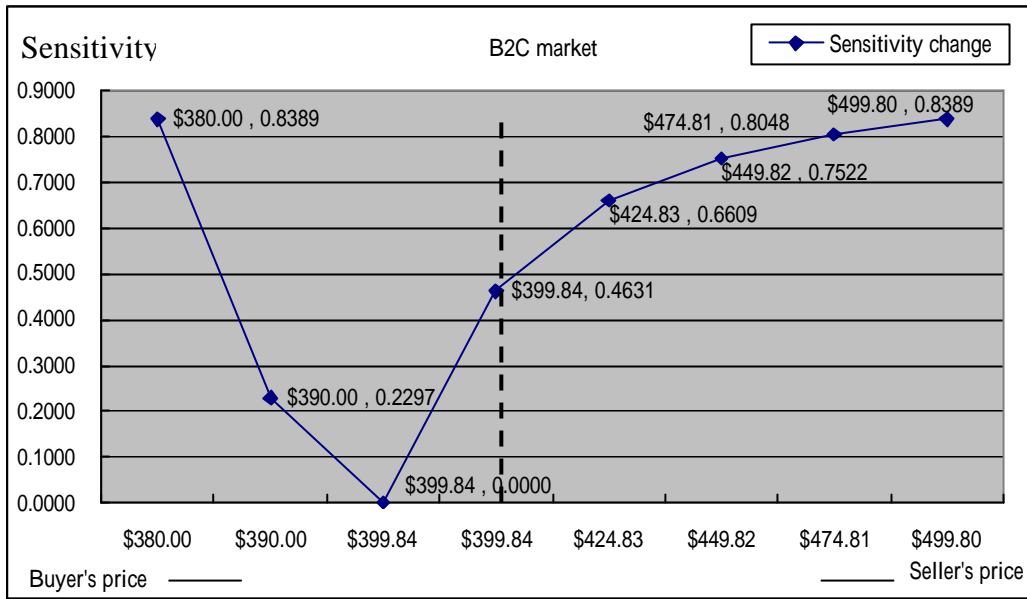


Figure 7-17: Price sensitivity change with step-by-step negotiation in B2C scenario 1  
Source: Our research

Table 7-4: Detailed negotiation process in B2C scenario 1

Round / Sensitivity	Seller's price	Buyer's price	Buyer's Sensitivity
0	\$499.8	380	0.8389
1	\$474.81 (-24.99)		0.8048
2	\$449.82 (-24.99)		0.7522
3	\$424.83 (-24.99)		0.6609
4	\$399.84 (-24.99)		0.4631
5		\$390 (+10)	0.2297
6		\$399.84 (+9.84)	0
Optimal price	\$399.84 (-99.96)	\$399.84 (+19.84)	0

Source: Our research

### 7.3.2 Scenario 2 – Stage with Low Price Sensitivity

(1) Introduction period, most buyers have lower price elasticity of demand (lower price sensitivity) for new product. On the other hand, the seller's market power will be larger than that of the buyers' because there have few or no competitor in this market segment.

Therefore, seller can control the  $\Delta P_2$  (discount) base on what strategies they adopt. They maybe emphasize in their brand if they offer a lower discount for buyers. In the other hand, they can offer a high discount rate for buyer to getting the acceptance from buyers and permeate into the market to create the first mover advantage.

The basic data of cost and price set in this scenario is similar to that of scenario 1, as shown in Figures 7-13 and 7-14. Then, the buyer's budget is set at a reasonable value and the value of price sensitivity is lower than 0.5, as shown in Figure 7-18, and go into the new pricing model – dynamic negotiation process. The detailed data of seller and buyer is displayed in Figure 7-19. The detailed negotiation processes with the prices and sensitivity of each process are shown in Figure 7-20 and Table 7-5. The detailed process of dynamic negotiation is described as follows:

- (1) Stage 1: buyer will increase his/her budget if it is available when his/her price sensitivity is small than 0.5 as assumed earlier. The times of increase budget were determined by buyer according to his/her performance with the product. The value of buyer's price sensitivity is 0.1985, which represents that buyer's sensitivity is extremely low. He/she will tend to increase his/her budget directly to buy the product due to such low sensitivity.
- (2) Stage 2: buyer will buy the product successfully by increase budget by only increase partial of budget.
- (3) The final deal price between seller and buyer is \$389.01 after six rounds of negotiation. Both of seller and buyer were negotiating three times before they agree the deal price. A total discount from seller is \$68.64 and sum up of buyer increase budget is \$19.01. The detailed information is depicted in Table 7-5.

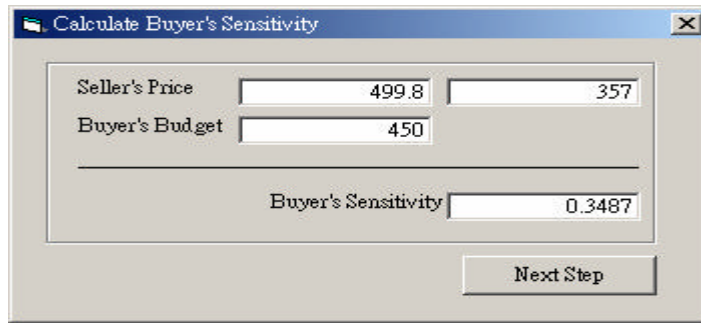


Figure 7-18: Buyer's sensitivity calculation in B2C scenario analysis 2  
Source: Our research

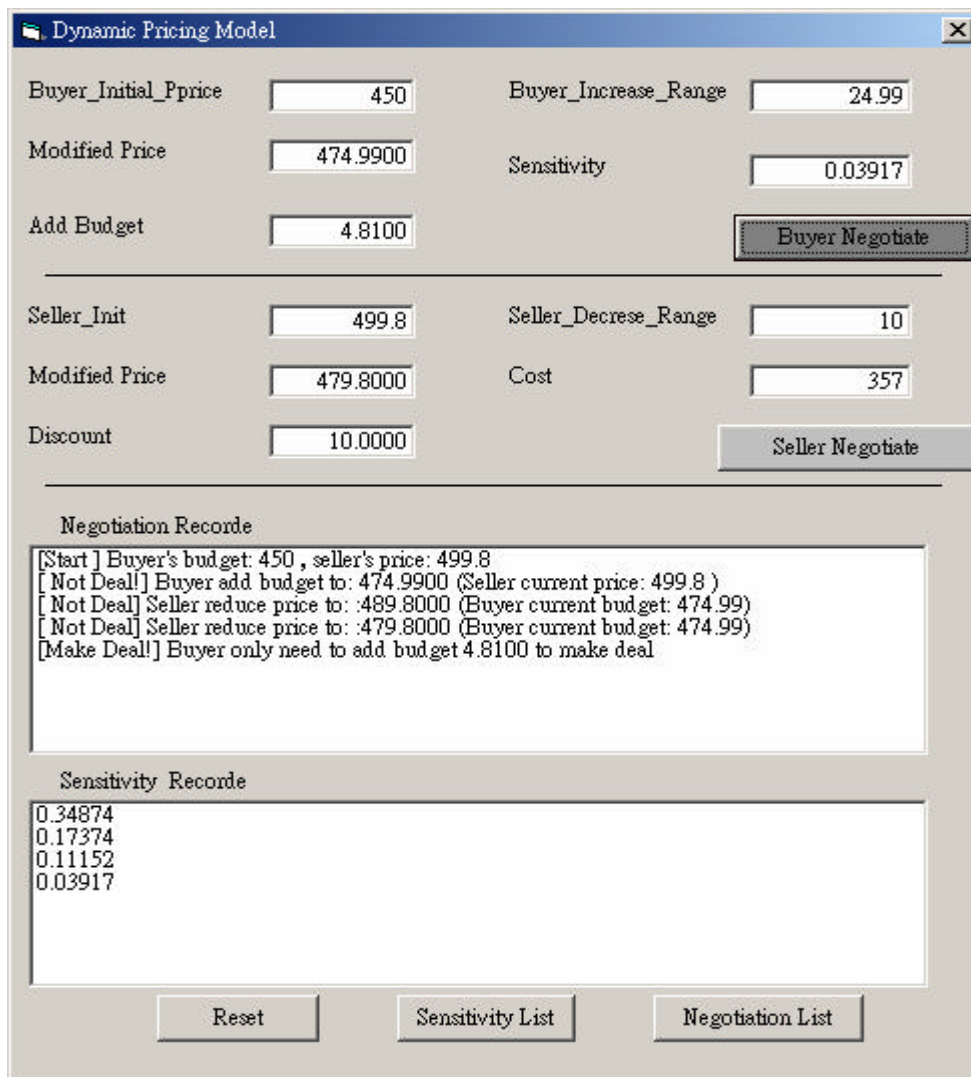


Figure 7-19: Dynamic negotiation process in B2C scenario analysis 2  
Source: Our research

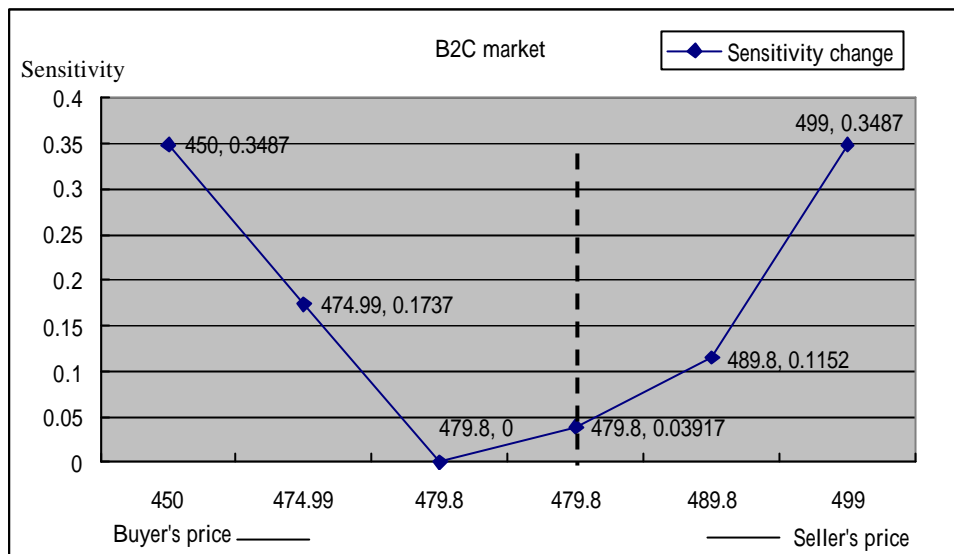


Figure 7-20: Price sensitivity change with step-by-step negotiation in B2C scenario 2  
Source: Our research

Table 7-5: Detailed negotiation process in B2C scenario 2

Round / Sensitivity	Seller's price	Buyer's price	Buyer's Sensitivity
0	\$499.8	\$450	0.3487
1		\$474.99 (+ 24.99)	0.1737 (-0.167)
2	\$489.8 (-10)		0.1152 (-0.0585)
3	\$479.8 (-10)		0.0392 (-0.076)
4		\$479.8 (+4.81)	0 (-0.0392)
Optimal price	\$479.8 (-20)	\$479.8 (+29.8)	0

Source: Our research

### 7.3.3 Brief Summary

The result of the scenario analysis shows that deal price have a significant different between buyers with high and low sensitivity. Buyer with high sensitivity will tend to wait for seller's discount price and do not increase his/her budget actively before that price is close to his/her budget. From the perspective of product lifecycle, this scenario can explain the relationship between buyer and seller when they lie in the growth and maturity period

of product lifecycle.

The Internet not only provides an efficient channel for buyer to search the qualified sellers and find the lower price to deal but also reduces kinds of cost in entire buying processes. It takes the full advantages for buyers to wait until the price is low enough. On the other hand, buyer with lower price sensitivity will tend to increase his/her budget to match seller's price in this scenario analysis. The reasons they favor to add budget include the good buying experience on the Internet they did previous, their risk attitude for online buying, and their preference for certain product.

From seller's perspective, seller's pricing strategies in the growth and maturity period will be determined by the  $P_2$ . They can offer lower discounts for buyer with lower price sensitivity and try to extract the higher buyers' willingness-to-pay to maximum their profit. Conversely, seller can offer a higher discount rate for buyer with high price sensitivity and adopt a powerful promotion strategy to obtain more market share.

## 7.4 Scenario Analysis with Digital Product in B2C Market

### 7.4.1 Customer with High Price Sensitivity

In this scenario of digital product for B2C market, the unique cost structure of high fixed cost and utmost low in variable and marginal cost make seller can't easy to set their price based on cost structure. In contrast, seller can set his price according to buyer's preference and their value perception. It means that seller can charge based on buyer's willingness-to-pay. Actually, seller will accept to make deal if  $P_b = P_{cost}$  due to seller is focus on costs recovers when selling such product.

To conduct this scenario analysis, the related costs and price data (see Figures 7-21 and 7-22) are used by generating these data after considering the characteristics of B2C market



and digital product. In realistic, these data could be adjusted according to different conditions. Secondly, the buyer's budget is set at a reasonable value and the value of price sensitivity is made higher than 0.5, as shown in Figure 7-23, before starting the new pricing scheme – dynamic negotiation process. The detailed data of seller and buyer is shown in Figure 7-24, and the negotiation processes with sensitivity change are displayed in Figure 7-25 and Table 7-6, respectively. The specific processes of dynamic negotiation are as follows:

- (1) Stage 1: seller will adjust his price from initial price to a discounted price for buyer due to buyer's price sensitivity is high and he/she would not buy the product before sensitivity small than 0.5.
- (2) Stage 2: buyer will increase his/her budget if it is available when his/her price sensitivity is small than 0.5. The times of increase budget were determined by buyer according to his/her performance with the product.
- (3) Buyer will tend to make deal to earn more revenue or market share. It is reasonable to explain that the Internet market is a competitive market where seller will tend to make deal with buyer if the buyer's price is higher than the  $P_{cost}$ . Therefore, seller will continuous to decrease his price to make deal with buyer if buyer's budget is not available to obtain the product.
- (4) The final deal price between seller and buyer is \$72.01 after six rounds of negotiation. Both of seller and buyer were negotiating three times before they agree the deal price. A total discount from seller is \$28.49 and sum up of buyer increase budget is \$2.01. The detailed information is outlined in Table 7-6.

The 'TotalCost' window displays the following data:

Category	Value
Fixed Cost	10000000
Promotion Cost	800000
Variable Cost	0
Customization Cost	1
Logistic Cost	0
Sales Commission	3
Transaction Cost	5
Shipping & Handling Cost	4
Expected Sales Quantity	200000
Total Cost	13400000

A 'Next Step' button is located at the bottom right of the window.

Figure 7-21: Cost calculation in digital product scenario analysis 1

Source: Our research

The 'Seller's price' window displays the following data:

Category	Value
Total Cost	13400000
Expected Sales Quantity	200000
Average Cost	67
Expected Profit	5%
Price	100.5000

A 'Next Step' button is located at the bottom right of the window.

Figure 7-22: Seller's price calculation in digital product scenario analysis 1

Source: Our research

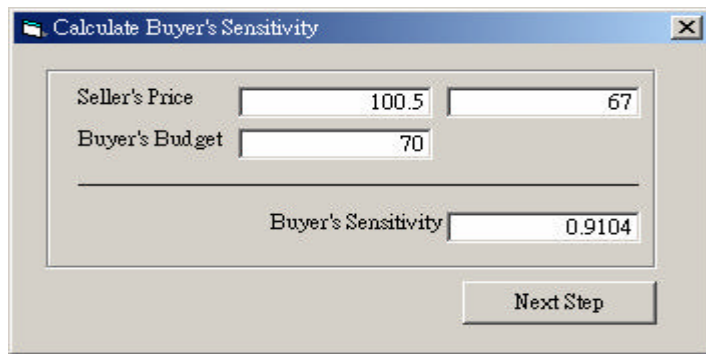


Figure 7-23: Buyer's sensitivity calculation in digital product scenario analysis 1  
Source: Our research

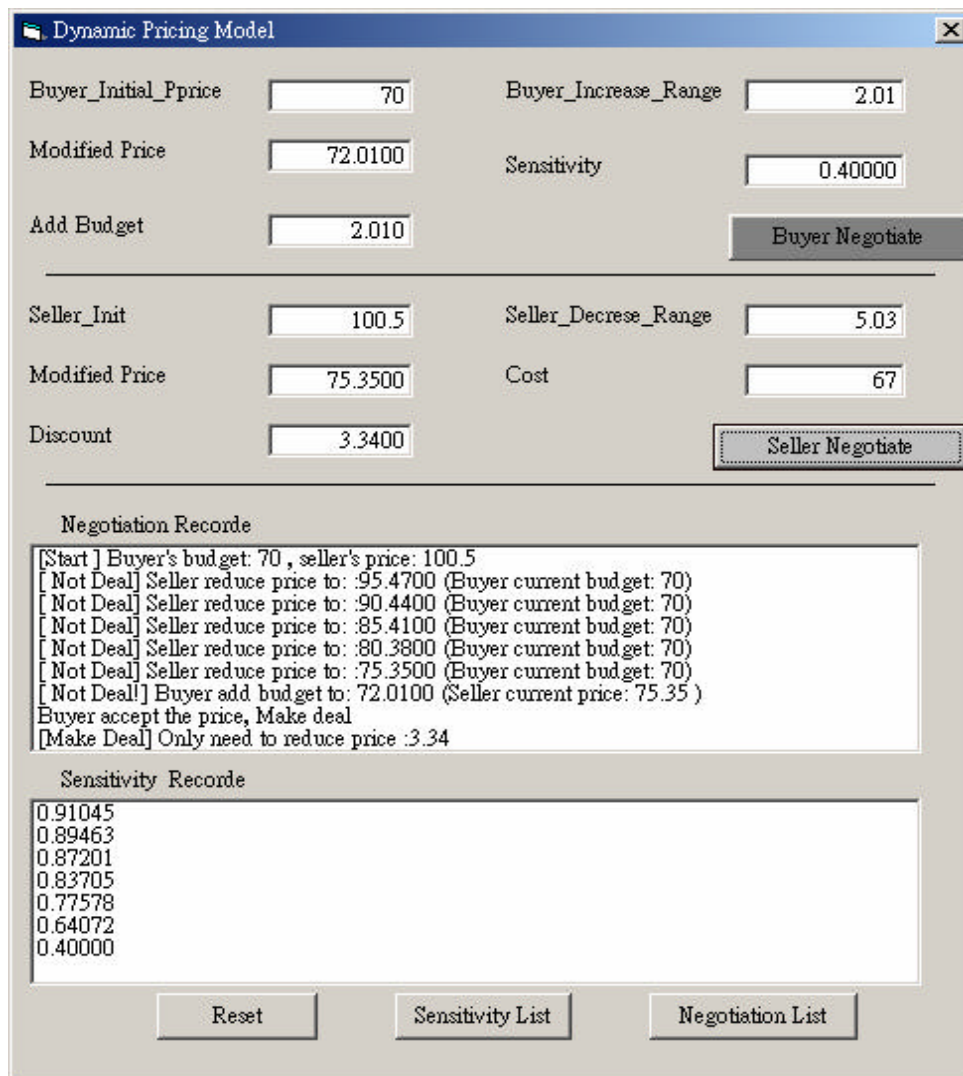


Figure 7-24: Dynamic negotiation process in digital product scenario analysis 1  
Source: Our research

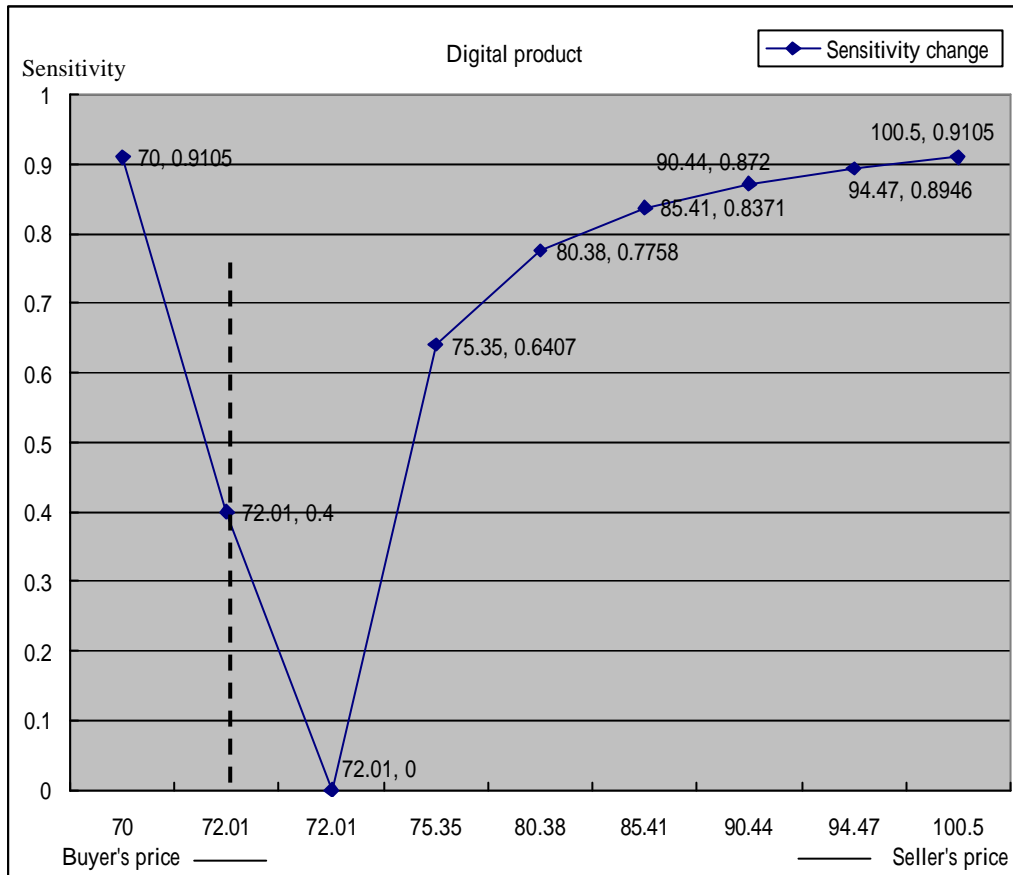


Figure 7-25: Price sensitivity change with step-by-step negotiation in digital product scenario 1

Source: Our research

Table 7-6: Detailed negotiation process in digital product scenario 1

Round / Sensitivity	Seller's price	Buyer's price	Buyer's Sensitivity
0	\$100.5	\$70	0.9105
1	\$94.47 (-6.03)		0.8946 (-0.0159)
2	\$90.44 (-6.03)		0.8720 (-0.0226)
3	\$85.41 (-6.03)		0.8371 (-0.0349)
4	\$80.38 (-6.03)		0.7758 (-0.0613)
5	\$75.35 (-6.03)		0.6407 (-0.1351)
6		\$72.01 (+2.01)	0.4 (-0.2407)
7	\$72.01 (-3.34)		0 (-0.4)
Optimal price	\$72.01 (-28.49)	\$72.01 (+2.01)	0

Source: Our research

## 7.4.2 Customer with Low Price Sensitivity

In the scenario of low price sensitivity, the basic data of cost and price set in this scenario is similar to that of scenario 1, as shown in Figures 7-21 and 7-22, respectively. Then, the buyer's budget is set at a reasonable value and the value of price sensitivity is lower than 0.5 (see Figure 7-26) and go into the new pricing model – dynamic negotiation process. The detailed data of seller and buyer are displayed in Figure in Figure 7-27 and negotiation processes with sensitivity change are shown in Figure 7-28 and Table 7-7. The detailed process of dynamic negotiation is as follows:

- (1) Stage 1: buyer will increase his/her budget if it is available when his/her price sensitivity is small than 0.5 as assumed earlier. The times of increase budget were determined by buyer according to his/her performance with the product. The value of buyer's price sensitivity is 0.3134, which represents that buyer's sensitivity is low. However, buyer will not increase his/her budget actively and fewer times to increase budget compare to buying physical product on the Internet.
- (2) Stage 2: although price sensitivity of buyer with high willingness-to-pay is much lower than others, buyer may still ask for a price discount. Although buyer's original budget is close to seller's initial price, he/her will wait for a discount price from seller to meet their price. The deal price is assumed to close to buyer side.
- (3) The final deal price between seller and buyer is \$95.03 after six rounds of negotiation. Both of seller and buyer were negotiating three times before they agree the deal price. A total discount from seller is \$4.57 and sum up of buyer increase budget is \$5.03. The detailed information is listed in Table 7-7.

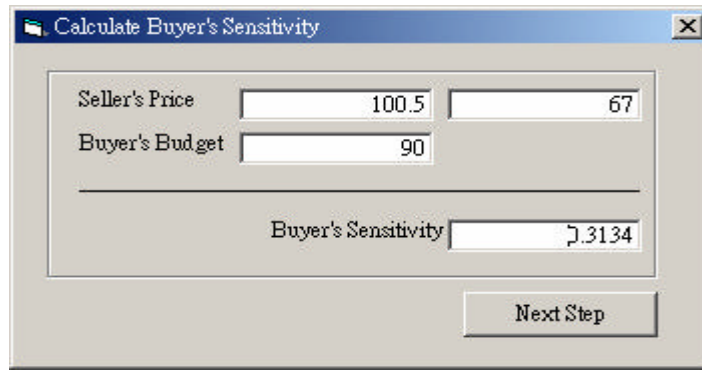


Figure 7-26: Buyer's sensitivity calculation in digital product scenario analysis 2  
Source: Our research

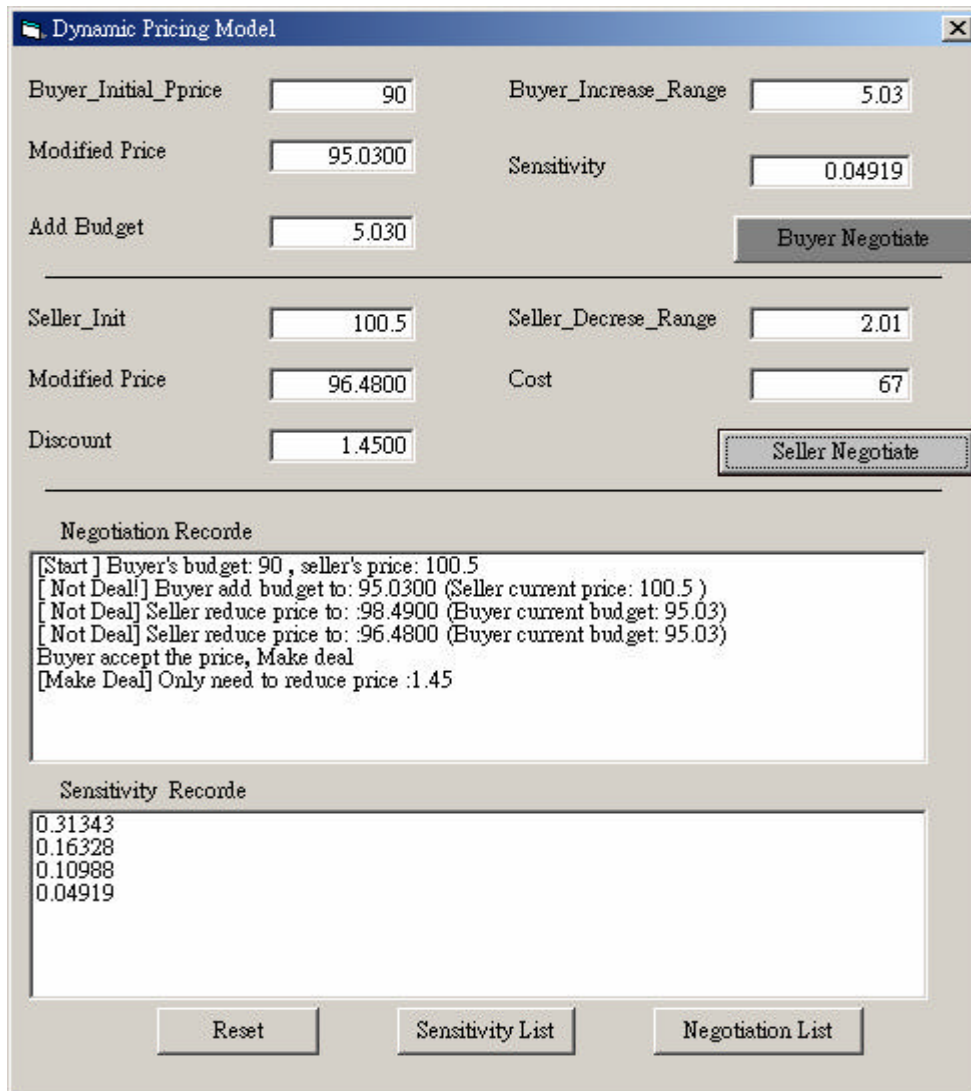


Figure 7-27: Dynamic negotiation process in digital product scenario analysis 2  
Source: Our research

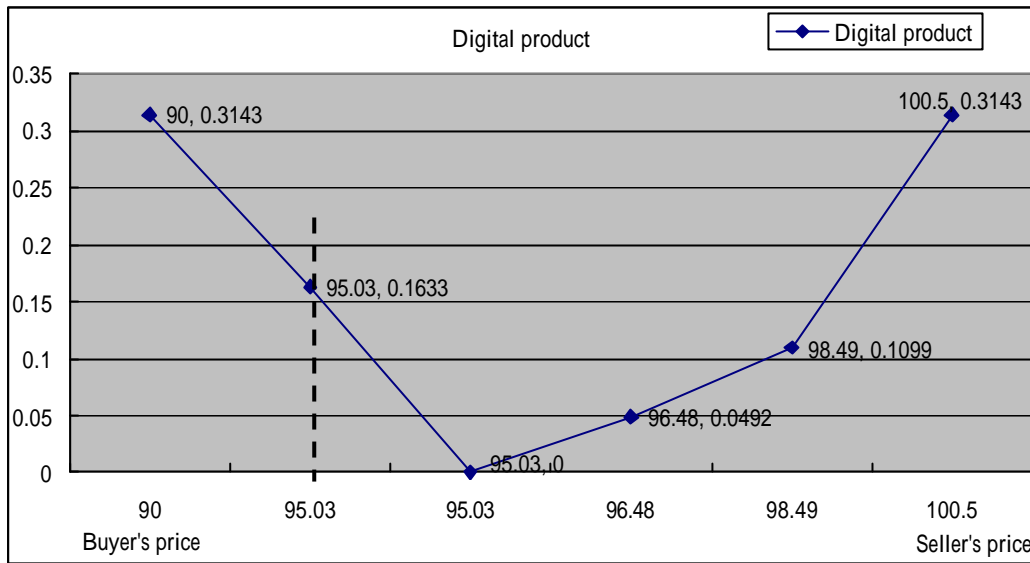


Figure 7-28: Price sensitivity change with step-by-step negotiation in digital product scenario 2

Source: Our research

Table 7-7: Detailed negotiation process in digital product scenario 1

Round / Sensitivity	Seller's price	Buyer's price	Buyer's Sensitivity
0	\$100.5	\$90	0.3143
1		\$95.03 (+5.03)	0.1633 (-0.1510)
2	\$98.49 (-2.01)		0.1099 (-0.0534)
3	\$96.48 (-2.01)		0.0492 (-0.0607)
4	\$95.03 (-1.45)		0 (-0.0492)
Optimal price	\$95.03 (-5.47)	\$95.03 (+5.03)	0

Source: Our research

### 7.4.3 Brief Summary

The analysis result reveals that buying digital product on the Internet is with high price sensitivity. Both buyers of high and low willingness-to-pay need more discount incentive to generate a buying behavior. This is resulted from the fact that digital product is a new product and few people use it when it is first launched to market. Buyer's price sensitivity

would be lower after some people used it and gave a positive evaluation on it. On the other hand, network externality also plays an important role in lower buyer's price sensitivity. More people use it and it become more valuable. Therefore, buyer's sensitivity is high when the product is a new product and lower when the users reach critical mass (network externality).

Because of the unique cost structure of digital product, i.e. high fixed cost and lower variable cost, seller will tend to cover his fixed cost several pricing strategies. First, the versioning strategies, seller can adopt a "high-to-low" or "value-subtraction" versioning strategy to exploit the cost savings in content, design, and code reuse. Furthermore, versioning can bring more sales revenue than set the single price, as shown in Figure 3-9. Secondly, the bundling strategies, seller uses the bundling strategy to sell at the average willingness-to-pay and this typically will enable seller make more profit. Thirdly, seller can provides a free version for buyer when they beginning launch to market, seller can building a awareness, gaining follow-on sales, creating a network, attracting eyeballs, and gaining competitive advantage by using this strategy.

## 7.5 Different Scenario Comparison

### 7.5.1 B2B and B2C Comparison

It is interesting to understand the whether price sensitivity were difference between business and individual buyer. The sensitivity change of the B2B scenario is compared with that of the B2C ones, as shown in Figures 7-29 and 7-30. Furthermore, the critical numerals used to compare B2B with B2C are shown in Table 7-8. The significant findings are as follows:

- (1) Initial price sensitivity of business buyer is lower than individual buyers. One of the



possible reasons is that although online market enable buyer to search for more sellers, limited sellers in B2B market may lead business buyer has fewer choice compare to individual buyer in B2C market. Therefore, their price sensitivity will lower than individual buyer, especially when they needed were critical component. Another possible reason is that B2B market more focuses on relationships rather than price. Seller's price may not have a significant influence in online business buying behavior, but a profitable long-term contract will be. Hence, lower price sensitivity is expectable.

(2) The price of make a deal in a B2B market will be lower than that in a B2C market. Major reason lies in business buyer have a great bargaining power than individual buyer. This result from the large quantities that business buyer buy in each transaction. They can ask for a large price discount than individual buyer.

(3) Price adjustment in B2C market is more frequent than in B2B market. It results from that higher price sensitivity in B2C market and more candidates can choose by individual buyer.

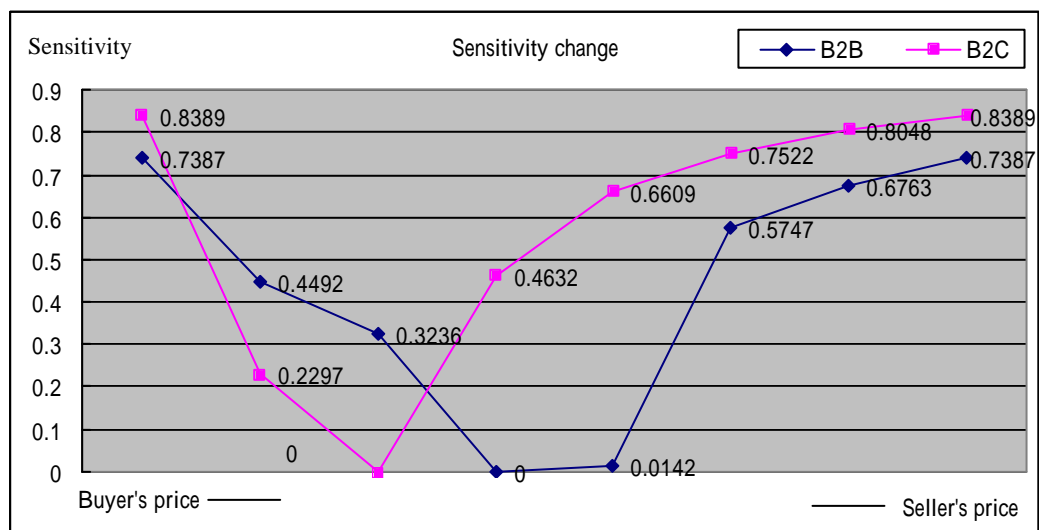


Figure 7-29: Comparison between scenarios of B2C and B2B with high price sensitivity  
Source: Our research

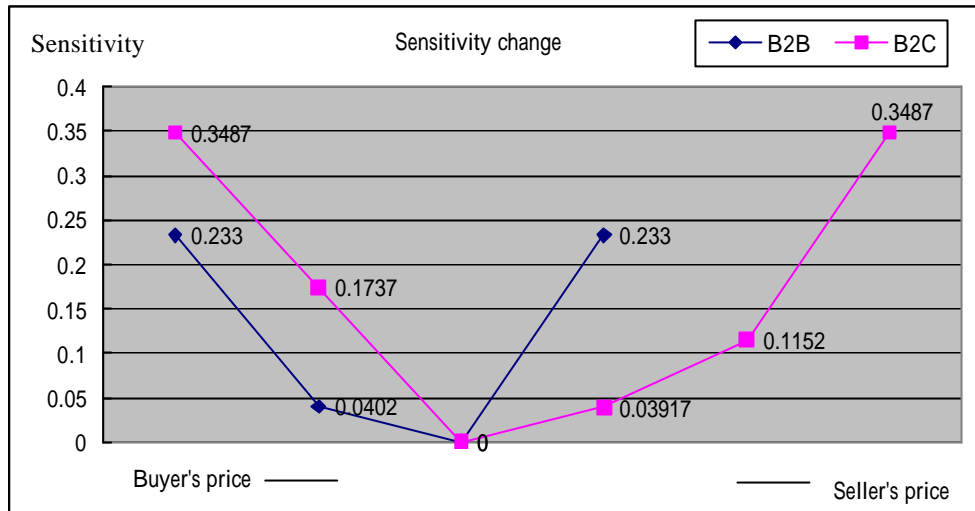


Figure 7-30: Comparison between scenarios of B2C and B2B with low price sensitivity

Source: Our research

Table 7-8: Comparison between scenarios of B2C and B2B

	B2B (HS)	B2C (HS)	B2B (LS)	B2C (LS)
Total Negotiation Rounds	6	6	2	4
Times of seller discount	3	4	0	2
Times of buyer add budget	3	2	2	2
Final deal price	\$389.01	\$399.84	\$457.65	\$479.8

Source: Our research

### 7.5.2 Physical and Digital Product Comparison

The unique features of digital product can be illustrated by compare it with physical product. Figures 7-31 and 7-32 present the comparable sensitivity change of digital product with physical product. Furthermore, the critical numerals used to compare physical and digital product are listed in Table 7-9. Several prominent implications are found from the comparison as follows:

- (1) Consumer has higher price sensitivity with digital product than physical product. The possible reason is that digital product belongs to experienced product and can be

evaluated after used it.

(2) Consumer with lower price sensitivity also tends to ask for large discount. It results from the features of digital product such as high switch cost, experienced product, and cost structure. Compare with physical product, consumer need to spend much time and cost if they want to transfer current product to another. Therefore, consumer will have an intense desire to buy a new digital product only if he/she can obtain it in a lower price.

(3) Seller will set a higher price for digital product compare with physical product. Unique cost structure makes it possible for seller to set their price according to buyer's preference. He can set price at higher level to make more profit from buyer with high willingness-to-pay and give a large discount to attract buyer with lower willingness-to-pay. Furthermore, for digital product, buyer will buy such product more based on his/her value perception; seller can adopt various pricing strategies to make more profit, such as price discrimination, versioning, and bundling.

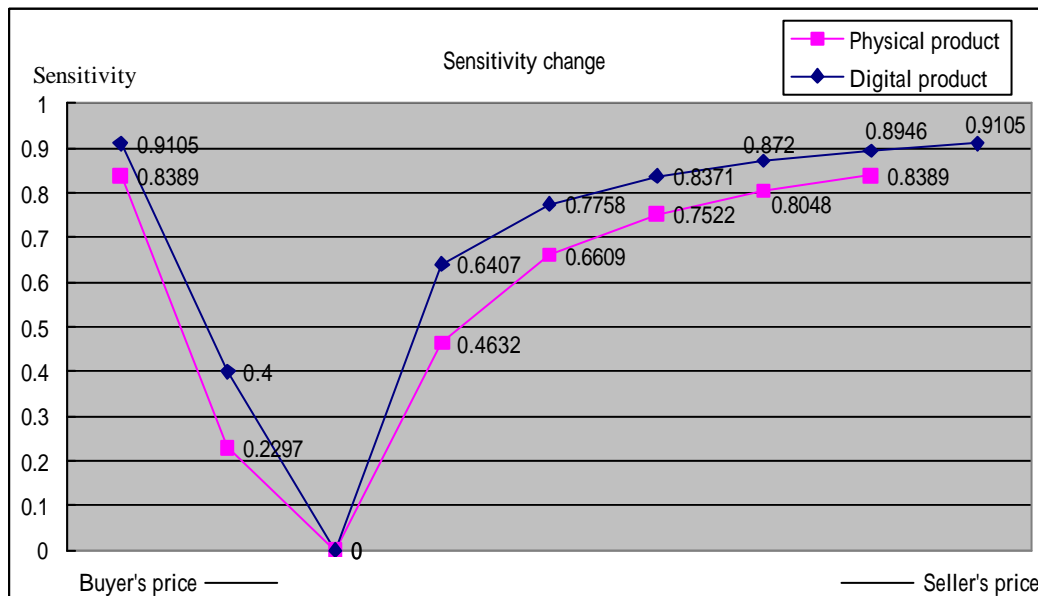


Figure 7-31: Comparison between scenarios of digital and physical product with low price sensitivity

Source: Our research

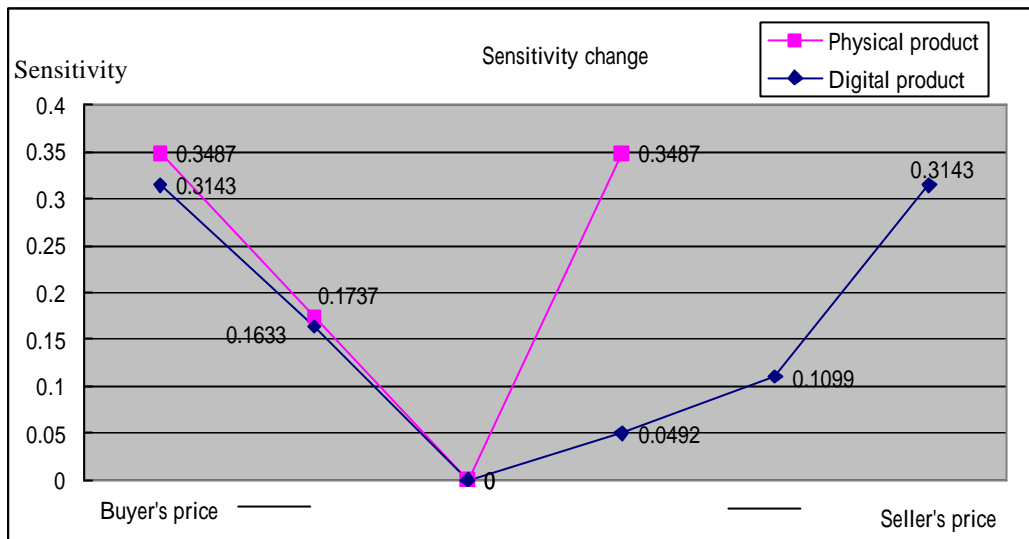


Figure 7-32: Comparison between scenarios of digital and physical product with low price sensitivity  
Source: Our research

Table 7-9: Comparison between scenarios of physical and digital product

	Physical product (HS)	Digital product (HS)	Physical product (LS)	Digital product (LS)
Total Negotiation Rounds	6	7	4	4
Times of seller discount	4	6	2	3
Times of buyer add budget	2	1	2	1

Source: Our research

## 7.6 Brief Summary

Understand buyer's price sensitivity can assist seller to place product price. Utilize price sensitivity can further help managers adjust price for designated consumers in real-time. Both can help sellers extend their market share and make more revenue. Much can be said that the Internet makes it easier for online companies to interact with their target customers to understand their preference through testing customers' willingness-to-pay or their price sensitivity. The dynamic pricing model can be used to investigate customers' sensitivity online, however, what factors would make them sensitive or insensitive must be further

discussed to fully understand customers' price sensitivity when they purchase online. The following perspectives are presented:

(1) Buyer Behavior: Buyers appear more and less price sensitive on the Internet, relative to physical channels. Buyers who are already price sensitive can more easily search for low prices online than offline, leading to extremely high elasticity. For customers who are already price insensitive because of high income or limited time may appear extremely price insensitive. Part of their apparent insensitivity may be the limited information available to them in the Internet context.

(2) Information Acquired and Search Cost: as Clay *et al.* (2001) indicate that if search were easier on the Internet, the competitive pressures are expected stronger and prices lower than in offline. Economic theory predicts that if the Internet allows consumers to compare sellers more easily, it will lead to a greater price competition, a trend toward lower prices, and raise consumer's price sensitivity (Dolan & Moon, 2000).

(3) Brand Name: we suppose that brand name will also have an impact on buyer behavior and their price sensitivity. As Degeratu *et al.* (1999) indicated that brand names were more valuable online in categories where information on fewer product attributes was available; that 'non-sensory' attributes had more impact on online choice than 'sensory' ones; and that price sensitivity was higher online because online promotions were stronger signals of price discounts. The combined effect of price and promotion on consumer choice was found to be weaker online than offline. Clay *et al.* (2002) indicate that making information available online can create brand loyalty by improving the quality of the decision for the customers and by better matching their tastes.

In perfect competitive market, the equilibrium price will be the minimum a supplier is willing to accept, equal to marginal cost of producing the product. Under perfect competition, consumer surplus takes on its maximum possible value. On the other side,

least effective market where supplier has control and assess customer's reservation price. Internet allows a large growing number of suppliers interact with large, growing number of buyers. This makes markets more competitive and more efficient, where free flow of information permits buyers to search competing sellers and sellers are less able to sustain monopolistic positions. The main factors are IT reduces the transaction cost, helps to understand information and to change the supplier with out too many hassles, helps for easy customization, and increase in free flow of information.

## Chapter 8 Conclusions and Recommendations

### 8.1 Conclusions

Our research contributes to the significant development of a new Internet pricing model in terms of the CBB and BBB models. Moreover, the CBB-based and BBB-based decision process models can be extended for Internet pricing and price sensitivity analysis to help decision-makers determine competitive prices with various marketing factors considered in the Internet environment, internal factors of company, competitors' attitudes, etc. The dynamic pricing model tends to approach a price balance between buyers and sellers more accustomed to the digital age -- provides both buyers and sellers with a much broader and more value-creating set of pricing options. Therefore, no one leaves money on the table.

E-commerce lowers both search cost and transaction cost, which enables buyers to make convenient comparison among sellers. From the strategic perspective, fierce competitions of Internet market often lead sellers to compete in price and make revenue close to marginal cost. All sound disadvantageous for seller. How to avoid a price war or competitive convergence is thus a serious problem for sellers. Porter (1985) advised some solutions for seller to lower buyer's price sensitivity and become more competitively. First, he suggested that raise buyers' switching costs is a critical manner. Lower buyer switching costs will lead to lower price sensitivity and make seller earn more revenue. Porter (1985) presented various strategies to lift buyers' switching cost as follows:

- (1) Provide free or low training costs to buyers in the use or maintenance of a firm's product, or set up specialized procedures such as record keeping of compatible product information.
- (2) Participate joint-product-development with buyers, or provide engineering assistance

to help buyers coordinate the firm's products into buyers' product or buying process.

(3) Establish ties to the buyer using dedicated computer terminals to allow direct ordering or inquires, or through maintaining buyers' databases on the firm's computer.

In general, for the same product, buyers with higher willingness-to-pay will be low price-sensitive and buyers with lower willingness-to-pay will be higher price-sensitive. Most buyers tend to ask a price discount to meet their need. We can conclude that Internet will make buyers become more price-sensitive, especially for individual buyers. However, Internet also provides various opportunities for sellers to amend their pricing strategies and reduce possible buyer's price sensitivity, such as customization. As the competition among sellers last, the same exists between buyer and seller continuously. It is interesting to observe the interactions among sellers and between buyer and seller.

## 8.2 Managerial Implications

Dynamic pricing is an increasingly important strategy as sellers begin to use on the Internet. To respond to market dynamics, the fastest and easiest way to increase profits is to adopt dynamic pricing as their active pricing policy. In contrast, the ways traditional managers making pricing decisions were often very sophisticated. The new pricing mechanism is capable to help managers decide price based on buyer preference and price sensitivity. Furthermore, the new dynamic pricing model could assist manager to realize by implying what kind of buyer cluster they should focus on.

In general, conducting a business on the Internet has become more frictionless than in physical world. As stated in Chapter one, the Internet market actually demonstrates itself as a "perfectly competition market." Sellers face huge pressure due to price transparency, increased customer bargaining power, and pricing processes transparency. Price competition and price war will drive most sellers doing business in digital environments to



compete only on price. However, sellers can adopt different strategies to avoid engaging into a price war. This research results bring about several managerial implications as follows:

(1) The research modifies the traditional CBB and BBB models into a new online CBB and BBB algorithms. It will help manager to further understand what their customer wants and at what price level they prefer to pay. Various pricing strategies they can adopt, once recognizing their customers' preference, such as customization for physical product and bundling for digital product. Through the insights of customers' buying behavior and price sensitivity, managers can modify the shopping environment they provided and create better value-add services to implicitly increase buyer's switch cost, which eventually improve the competency of their pricing strategies in the digital economic.

(2) The dynamic pricing model developed can assist managers adjust product price according to customers' perceptions of the product value with respect to different circumstances and timing. In addition, the model helps managers to match product, price, channel, and customers more accurately and enable 'customized' price changes using the enormous data store in database. These data include the price history, negotiation process of each transaction, and buyer's price sensitivity records. It can definitely help managers decide the right price for the right customer at the right time.

### 8.3 Recommendations for Future Research

It is imperative to understand the pricing parameters (the range of the highest and lowest prices customers are willing to pay for a specific product offering) of each customer segment, as such nature determines the room to move in for setting a dynamic price. Based

upon this research results, future research activities can be extended in three folds as follows:

First, the artificial neural network (ANN) approach can be applied to learn the above-mentioned features by solving constrained optimization problems of minimizing the cost function subject to various constraints. Consequently, the optimal price and the maximum profit can be determined through this neural network approach.

Second, intelligent agents can be employed for Internet pricing by adopting the new model as their principal knowledge. In this agent approach, different software agents are expected to appear on the Internet assisting both sellers and buyers to trade, according to the new online purchasing algorithm to accomplish their transactions.

Third, the technology of artificial intelligence (AI) can be used to improve the efficiency of the new pricing model to behave more heuristic via automatically adjusting the stepwise increment  $\Delta P$ , which facilitates the speed of the BBB and CBB processes with better customer satisfaction and trading rates.

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