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Exploring Customer Relationship Management using  
Simulation Modelling in the Retail Sector

By

Yuen Fung Ting

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## **Abstract**

The goal is to help the retail industry define customer-company relationships, and to manage the relationships in a more effective way in terms of the balance between retail service quality and product quality. This study proposes a two-step modelling approach to the development of an exploratory-based customer relationship management (CRM) simulation model, which consists of a static relationship (exploratory) module and a dynamic simulation module.

To support and test the model development, Hunter Douglas, a world-class leader in the window fashions industry, was used as a case study for data collection. A customer survey and focus group discussions were therefore conducted with staff and customers. Hypothesis testing and other statistical methods including factor analysis, ANOVA, multiple regression, post-hoc analysis, sensitivity analysis, and policy analysis were adopted in this research to develop the exploratory module. System dynamics modelling and simulation were applied to develop the dynamic simulation module.

The major dimensions regarding retail service quality, product quality and customer loyalty were defined in the exploratory module. Five dimensions regarding retail service quality (policy, physical aspects, reliability, problem solving, and personal interaction) and three dimensions regarding product quality (feature, aesthetics, and customer-perceived quality) were considered and their impacts on the two levels of customer loyalty - customer loyalty to the store and customer loyalty to employees - were investigated. These measures consist of forty variables in total. Through the exploratory module, it is found that reliability, physical aspects, and problem solving exert positive impacts on customer loyalty to the store while personal interaction significantly influences customer loyalty to employees. Furthermore, gender differences have significant impacts on customer loyalty to the store, particularly in terms of physical aspects, reliability, problem solving and aesthetics.

Connecting with the exploratory module, the dynamic simulation module further takes account of employee satisfaction, spending on advertising and order completion efficiency. This module can make significant contribution to the field of CRM by providing the retail industry with a full picture of CRM for the scenario analysis and strategic planning. Based on the findings of the dynamic simulation module, appropriate CRM strategies had been adopted and various aspects of Hunter Douglas, including customer satisfaction, employee satisfaction, numbers of repeat customers, sales volume, etc. have significantly improved. These fruitful results achieved by Hunter Douglas, a typical retailer, confirm the high value and the contribution of this research to the retail industry.

The model developed could form a generalised CRM model for adoption in other retail sectors after further testing and evaluation in a wider range of retail environments.

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## **Declarations**

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it reproduces no material previously published or written, nor material that has been accepted for the award of any other degree or diploma, except where due acknowledgement has been made in the text.

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Yuen Fung Ting

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# **1. Introduction**

Jay Conrad Levinson, the author of the best-selling book on Guerrilla Marketing, said: “In order to sell a product or a service, a company must establish a relationship with the consumer. It must build trust and rapport. It must understand the customer's needs, and it must provide a product that delivers the promised benefits” (Levinson and Godin, 1994, p.4).

To achieve this rapport with the customer the management of retail services is therefore of paramount importance and has become a strategic focus of retailers. As supported by many scholars (Bell and Zemke, 1992; Heskett *et al.*, 1994; Zeithaml *et al.*, 1996), companies with superior service quality are likely to be more profitable, owing to better customer satisfaction and stronger loyalty. In this regard, service management can help companies gain competitive advantages. In this cut-throat and dynamic market, companies need to build long-term customer relationship and maximise profitability through enhancing both service and product quality.

## **1.1. Importance of Service and Product Qualities**

The quality of products and services is the direct factor influencing customers' satisfaction and their loyalty to a company (Cronin, 2000; Noyan and Simsek, 2014). Products are a major starting point for satisfying customer's needs (Torres-Moraga *et al.*, 2008). Better product quality will maintain a higher satisfaction level for customers and encourage customers to spend more and/or purchase again. Service quality is another factor to delight customers and build customer relationships.

## **1.2. Importance of Customer Relationship Management**

Ghosh *et al.* (2010) indicated that retailers who are able to generate customer loyalty will succeed during a period of economic recession. According to scholars (Fuentes-Blasco *et al.*, 2014; Keaveney, 1995; O'Brien and Jones, 1995), customer loyalty will enhance the likelihood of customers returning, providing business referrals, as well as generating positive word-of-mouth publicity. Ndubisi (2004), Terpsta and Verbeeten (2014) further stated that the cost of serving one loyal customer is significantly less than that of attracting and serving one new customer. Customer relationship management (CRM), which plays an important role in maintaining long-term relationships, can therefore be essential for business survival and growth. To compete with others, CRM can serve as a powerful tool to help companies better understand their customers' needs and enable them to do so in a manner superior to that of their competitors (Chu, 2007; Khodakarami and Chan, 2014).

## **1.3. Challenges Faced by the Retail Industry**

Customers are increasingly more concerned with value of service and product qualities, which in turn influence customer satisfaction and the relationship to a company. Companies in the retail industry often face the challenge of offering customers high-quality services and products as well as shorter delivery time while remaining cost-effective. Deciding where to invest in improving customer satisfaction and retention is thus a major issue. Should the retailer invest in higher quality products, or more or better trained sales people? There is no lack of CRM's applications, such as those for solving problems of adverse selection (Cao and Gruca, 2005) and for predicting customer value (Chan *et al.*, 2010). However,

due to the lack of research in the relationship among service quality, product quality and customer loyalty, companies face challenges in formulating competitive CRM strategies. Hence, further research is required to better understand the effects of service quality and product quality on customer loyalty; a comprehensive tool balancing customer purchasing behaviour, customer satisfaction, and customer loyalty would also be desirable for better resource allocation and strategic planning.

#### **1.4. Motivation for the Study**

Service quality has long been an important research topic due to its apparent relationship to customer satisfaction and higher customer retention (Bennett and Higgins, 1988, Bolton and Drew, 1991; Chopra, 2014), repeating purchasing behaviour (Taylor and Cronin, 1994; Das, 2014) and expanded market share (Bowen and Hedges, 1993). Product quality is another crucial element contributing to customer satisfaction and leading to customer loyalty. To gain competitive advantages and formulate better CRM, the impacts of service quality and product quality on customer loyalty should be investigated. However, the linkage between service and product qualities as well as customer loyalty appears to have received little attention in the service management and marketing literature. Most previous studies in this domain place emphasis on “intentions to make purchase again”, “customers’ willingness to recommend the company to others”, “satisfaction with the brand”, “trust building”, and so on (Cronin and Taylor, 1992; Boulding *et al.*, 1993). Although Dabholkar (1996) researched the significance of service quality, his study largely focuses on measuring service quality through identifying various dimensions, such as personal interaction,

policy, physical aspects, reliability, and problem solving. The studies concerning service quality (Boulding *et al.*, 1993; Dabholkar, 1996) are not recent and thus probably not applicable to today's market, which is dynamic and rapidly changing. Due to the fact that there are a limited number of studies exploring the impacts of service quality and product quality on customer loyalty, this area needs further study and analysis. This requirement is further enhanced because increasingly social media has taken the full control of a company's service reputation outside its own control. These new social media channels mean that any lapses on service or product quality are quickly communicated to existing and potential customers.

CRM plays an important role in supporting business growth particularly in this competitive and dynamic market. However, it is often a complex and challenging task for companies to apply it, particularly those in the retail industry. A Hong Kong based retailer "Hunter Douglas" will serve as a case study in this research. It utilises a marketing strategy named "4Ps", standing for product, price, promotion, and place. "4Ps" is a common and popular marketing strategy in the retail industry. However this approach only helps envisage strategies from the perspective of products (Kwok, 2007), thus it cannot fully capture the essence of CRM – the interactions between customers and the company. Secondly, customer satisfaction is a key measure of the customers' response to products and services (Barnes, 2001). Relationships with customers can only be built when customers are satisfied with the products and services of a company, hence repeating purchases. To retain customers and maximise customer loyalty for long-term customer relationships, it is crucial to assess customer satisfaction constantly and to investigate the major factors that affect customer satisfaction and their

purchasing behaviour. Retailers often conduct surveys to analyse customer relationships in the hope of determining factors that drive customers to be satisfied and make purchases. However, they find that the survey results are often insufficient to support decision making and policy settings. Despite the fact that surveys are relatively easy to conduct and can yield rich information, the survey methods are limited by people's insight into their own behaviour and by their willingness and ability to reveal what they know (Sternthal *et al.*, 1994). In this regard, retailers are unable to identify and gather useful information to construct a full picture which describes the interactions among various major factors affecting customer relationships. Consequently, they fail to understand customers' behaviour and to manage customer satisfaction and this hinders retailers from formulating appropriate CRM strategies.

As suggested by Cowart and Goldsmith (2007), different measurement scales should be adopted in future research to determine if causal relationships exist. A model which illustrates the full picture of customer relationships with retailers and provides support for strategic planning would be helpful to tackle these matters (Swift, 2002). This effort can contribute towards better CRM.

## **1.5. Study Aim and Objectives**

This study aims to develop an exploratory-based CRM simulation model (ECSM), with a focus on product and service qualities as well as customer satisfaction and loyalty, ultimately providing a CRM solution to the retail industry. The objectives of this study are as follows:-

1. To construct and verify an exploratory module, in which

- (a) major measures of retail service quality and product quality are identified,
  - (b) the impacts of retail service quality and product quality on customer loyalty are examined, and
  - (c) the various measures of retail service quality and product quality with regard to gender difference are explored.
2. To develop a dynamic simulation module that significantly influence customer relationships and provide the case study industry with a model of CRM for scenario analysis and strategic planning.
  3. Analysing and understanding the relationships can help companies get insights into new possibilities and opportunities to achieve desired goals (Hakansson and Snehota, 1995; Esbjerg *et al.*, 2012). The ECSM developed would be a practical tool to help manage customer relationships with internal and external factors.

## **1.6. Organisation of this Thesis**

This thesis starts with an explanation of the fundamentals for the development of this research. Thereafter, the recent development of CRM and the related tools are introduced and discussed in Chapter 2. The impacts of service and product qualities on customer loyalty are also explored, this then provide insights into the subsequent formulation of hypotheses. In addition, this chapter presents a review of literature to justify the approaches adopted in the proposed methodology. Chapter 3 provides the study framework and highlights promising research paradigms in the field of CRM. The research methodology, procedures and tools for data collection and analysis are described in this chapter and provide supports to the construction of the proposed ECSM.

The development of the ECSM consisting of the exploratory module and the dynamic simulation module is explained in Chapters 4 and 5 respectively. Chapter 4 describes the framework of the exploratory module and the procedure to test the hypotheses defined in Chapter 3. The empirical results are discussed. Chapter 4 also verifies the exploratory module with statistical methods and provides findings on the impacts of product and service qualities on customer loyalty as well as customer loyalty with regard to gender difference. These findings could give companies insights into their strategic focus and marketing strategies. To enhance decision makers' understanding on CRM, the dynamic simulation module is then developed and discussed in Chapter 5 to visualise the interrelationships among customer satisfaction, customer purchasing behaviour and customer loyalty. Chapter 6 further explains the simulation of the dynamic simulation module and the results. The evidence from the module can help companies allocate appropriate resources to improve the retention of customers. The importance of the key factors and the focal points of the two modules are highlighted in Chapter 7. The findings would help companies get insights into the formulation of better business strategies for the sake of enhancing CRM.

The originality and the contributions from this research are discussed in Chapter 8. The two-step modelling approach for CRM proposed in this research is original. Apart from this, the research also makes contributions to the literature as well as practical insights from the case study. Chapter 9 draws the conclusion and suggests the directions for further extending the research area.

## **2. Literature Review**

A literature review was conducted to provide theoretical basis for the development of the model proposed. The proposed CRM model focuses on retail service quality, product quality and customer loyalty for the reasons highlighted in Chapter 1. Studies of these aspects are therefore examined so as to provide grounds for the subsequent model development. Furthermore, literature on analytical methods for CRM and system dynamics was investigated to derive the approach to the proposed model development.

### **2.1. Customer Relationship Management**

In order to better satisfy customer needs, it was proposed that the role of marketing should be changed from putting the manufacturers' focus on products to putting it on the customers (Kimery and Rinehart, 1998). It is important for modern enterprises to manage relationships with customers carefully (Madill *et al.*, 2007), thus researchers have analysed the essence as well as the benefits of CRM (Zeng *et al.*, 2003; Chalmeta, 2006; Khodakarami and Chan, 2014). Bryan (2002) pointed out that adopting CRM is imperative to help maintain relationships with suppliers and customers. Buttle (2004) suggested that CRM is the core business strategy that integrates internal processes and functions with external networks to generate value that benefits customers; CRM is also an important way for companies to stay competitive in the market. This is grounded on high-quality customer data with the help of information technology. According to Payne and Frow (2005), CRM is the strategic process of identifying desirable customer segments, micro-segment or individual customers on a one-to-one basis, and of developing integrated programmes that maximise both value to the customer as



well as the lifetime value of customers to the company through targeted customer acquisition, profit enhancing relationship activities, and customer retention. CRM is an effective approach to improve new product development and company performance (Ernst *et al.*, 2011).

Customer satisfaction and loyalty are not only the key drivers of profit growth but also the necessary elements for CRM. Measuring customer satisfaction from buying and using a product or service is the first step to decide whether the quality of a product or service needs to be enhanced to improve customer relationships. Taylor (1995), Harness and Harness (2004) also identified customer satisfaction as the key element in company competitiveness. Through striving for greater customer satisfaction, companies will continuously improve the rate of customers making repetitive purchases. This is because customers who have a repetitive pattern of purchase behaviours are those having a satisfying experience, and thus are loyal customers (Sherry, 2003). Loyal customers would offer favourable word-of-mouth referrals to their friends and family, and thus help the company generate more transactions and hopefully profits. Customer loyalty without doubt, is beneficial to a business. Customer satisfaction and loyalty are interrelated and indispensable when formulating strategies for better CRM as they contribute to the long-term profits of companies.

Buttle (2004) indicated that it is profitable for companies to adopt CRM, as it links and coordinates business performance and customer satisfaction, as illustrated in Figure 2.1. Through understanding customers' needs and creating improved customer value propositions, companies can increase customer

satisfaction, thereby increasing customers' intention to make purchases again (Anderson, 1994; Taylor, 1995). This in turn enhances customer loyalty and results in a significant impact on the financial performance of the business. Companies are motivated to adopt CRM for both offensive and defensive reasons. Offensive motivations are associated with a desire to improve profitability by reducing costs and increasing revenues through improving customer satisfaction and loyalty. Defensive motivations arise when leading competitors adopt CRM successfully and a company fears losing customers and revenues (Buttle, 2004). It is clear that the increasing emphasis on CRM leads to concern over determining the relationships among parties. It is evident that taking customer satisfaction, customer loyalty, and business performance into consideration is necessary when designing a CRM model and this study is not an exception.

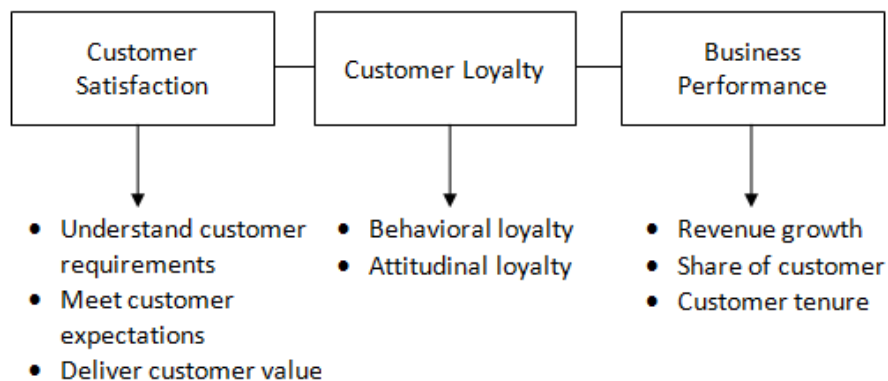


Figure 2.1 Relationships among customer satisfaction, customer loyalty and business performance (Buttle, 2004)

A CRM system includes tools, technologies and procedures that help manage customer relationships, facilitate sales, as well as improve interactions with customers, business partners, and even throughout the enterprise (Davenport *et al.*, 2001). The main goal of a CRM system is to help sales and marketing personnel analyse customers' behaviour and their value for the company (Luis *et al.*, 2007).

The extensive use of CRM can have a substantial influence on gaining loyal and satisfied customers as the business processes are improved, acquisition costs reduced, and the brand is better acknowledged, all of which would translate into financial performance (Gefen and Ridings, 2002). Bryan (2002) described CRM system as a strategic tool for improving customer satisfaction and therefore customer loyalty would be enhanced in the long term. A CRM system is always useful for companies to measure the resource utilisation for customer satisfaction to be built, so that the effectiveness of the customer relationship strategy can be determined.

## **2.2. Analytical Methods of Customer Relationship Management**

Customers today are better educated and confident, and would always have higher expectations of services and demand a wider range of choices. Companies may face challenges to analyse massive amount of customer and marketing data in an effective manner for managing customer relationships in this dynamic market. CRM is a significant tool for modern enterprises to stay competitive in the dynamic market. The current trends with social media, open data and big data has vastly increased the data assets available to marketers, thus analytical methods of CRM will therefore become necessary and are a popular research topic.

Researchers use different analytical tools to analyse CRM data and help foster strong relationships between customers and companies. Sheng and Liu (2005) analysed the research data collected from hair salons in Taiwan using hypothesis testing with SPSS and AMOS software to construct a customer satisfaction model,

assessing the influential level and causal relationships among variables. The findings of such study highlight the importance of service quality, which has strong and positive impact on customer satisfaction. In addition, Chow (2004) proposed a relationship quality model which provides recommendations to financial service practitioners on managing CRM via information sharing. The aim was to enhance the relationship quality, which eventually increases anticipation of future interaction and willingness to refer the products or services to others. A two-step analytical method of confirmatory factor analysis and structural model evaluation were employed in testing hypotheses and analysing the results. The model enables financial service companies to decide which CRM strategies are most beneficial to both customers and companies. Chu (2007) adopted a data mining software tool, Clementine, to analyse the customer service data so as to find the pattern, on which the decision made can be grounded. The analysis results direct the company to provide value-added services. However, the analysis model omitted key information such as product attributes and customer behaviours, and also disregarded the linkages between information. The results appear to be less than comprehensive and fail to support the formulation of effective CRM strategies.

Buttle (2004) used a balanced scorecard which covers four sets of interrelated key performance indicators, namely “financial”, “customer”, “internal”, and “learning and growth” for studying CRM strategies. The connection between these indicators is that employees/staff (learning and growth) do things (internal) for customers (customer) that have effects on business performance (financial). This illustrates how the four performance indicators are linked together and show the

interdependent relationship. This also suggests that satisfied employees perform internal processes well to create value for customers who in turn become loyal and to profitable processes for the company.

Through reviewing the literature, it can be summarised that the existing analytical methods commonly used for CRM are the balanced scorecard, data mining, as well as statistical and empirical analyses. They can reveal patterns and relationships but do not provide the value and significance of these patterns and relationships. They are used for historical data analysis rather than prediction. The value and significance of these patterns and relationships are important to provide companies with decision support and strategic planning options in the hope of achieving greater customer satisfaction. In the dynamic and fast-changing environment, it is necessary to employ a system that is highly flexible and user-friendly so that companies can analyse and monitor the situations based on different scenarios or on a case-by-case basis. This could make the analysis more authentic, pragmatic and practical for the business world. In this regard, this study further explores this area and proposes to develop the ECSM.

### **2.3. System Dynamics**

Though CRM is significant, it involves various elements that are hard to manage, such as customer behaviours and the market environment, which are dynamic and complex. System dynamics is a useful approach for analysing and managing complex and dynamic problems. It has been widely applied in different disciplines for strategic management and decision support. Thanks to its characteristics, which are described in Chapter 3.5.2, system dynamics could be an appropriate

tool to support CRM.

### **2.3.1. *Introduction to System Dynamics***

System dynamics is a method for studying and managing complex feedback systems. Systems dynamics was founded in the early 1960s by Forrester at the Massachusetts Institute of Technology (Forrester, 1961). Forrester (1961) stated that system dynamics is used to investigate the information-feedback characteristics in complex systems, as well as to look into the models that design an organisational form and policy. With the application of system dynamics, companies can better understand the structure and dynamics of complex systems (Sterman, 2000; Chen *et al.*, 2014). Coyle (1996) defined system dynamics as a method of analysing problems, with time being an important factor. Wolstenholme (1990) also considered system dynamics a rigorous method for qualitative description, exploration, and analysis of complex systems in terms of their processes, information, organisational boundaries, and strategies. It facilitates quantitative simulation modelling and analysis for the system structure to be designed and the system behaviours to be analysed.

System dynamics is built on the information-feedback theory, which provides symbols for mapping business systems in terms of diagrams and equations, and a programming language for making computer simulations (Pugh, 1998). Chen *et al.* (2008) remarked that system dynamics is capable of addressing every sort of feedback system practically. While the word “system” is applied to all sorts of situations, “feedback” refers to the differentiating descriptor. Sterman (2000) stated that system dynamics aid in modelling, discovering, and representing

feedback processes, along with stock and flow structures, time delays, and nonlinearities, as well as in determining the dynamics of the system through simulation. More importantly, the feedback loops of system dynamics make it distinctive and outperform other approaches to studying complex systems (Sterman, 2000).

System dynamics is a useful approach to modelling and simulations. It is valuable for gaining insights into complex systems and thus making the right decisions (Lin *et al.*, 1998). Through visualising and simulating complex situations, companies can test their business plans, strategies, and policies so that the decision making process can be facilitated. As mentioned by Lai *et al.*, (2003), companies can make use of a system dynamics model to test alternative policies and to redesign the system in order that business plans can be improved and more effective policies can be made. John (2007) also pointed out that the idea of rehearsing future plans is fundamental to contemporary strategy formulation and scenario development. Modelling and simulations of system dynamics are beneficial for companies and individuals to forecast and anticipate future plans before bringing them to life. System dynamics therefore becomes a strategy issue as a top concern for the management (Helms, 1990).

System dynamics, with its modelling and simulation, can show the structure of the system, the interconnection among its components, and changes in any area that would affect the whole system and its constituent parts over time. Hence, system dynamics models can be used to measure and predict the behaviour of systems, as well as to facilitate and accelerate group learning (Kambiz and Robert, 2000).

These modelling and simulation characteristics make system dynamics distinctive. With system dynamics theory as a basis, causal loop diagrams and stock-and-flow diagrams are the tools used to model the system (Sterman, 2000). Causal loop diagrams describe a set of variables, linked by arrows, through which the causal influences between the variables can be shown. They are used to capture the hypothesis about the causes of dynamics and to show the feedbacks that are believed to be responsible for a specific problem (Fulvio, 2006). However, causal loop diagrams do not allow the stock-and-flow structure of a system to be described. With reference to Frida *et al.* (2004), stock-and-flow diagrams help describe how a system is connected by feedback loops, which create nonlinearity a frequently found problem. Stocks represent the state of the system and generate the information upon which decisions and actions are based. They give systems inertia and create delays by accumulating the difference between the inflow and outflow to a process (Fulvio, 2006). These accumulations can be tangible stocks, such as cash and equipment, as well as intangible ones, such as employee skills, customer loyalty, and knowledge. Besides, computer applications are often useful for developing and simulating system dynamics models. iThink is a helpful computer application for modelling, simulating, and redesigning business, and it provides a multi-level, hierarchical environment for models to be constructed and interacted (Towill, 1993). Running “what if” simulations to test certain policies on such a model can greatly aid in understanding how a system changes over time. The rationales of adopting iThink in this research are further explained in Chapter 3.5.2.



### **2.3.2. Applications of System Dynamics**

System dynamics has been developing for over 40 years (Robert, 1996). Recent advances in interactive modelling tools, particularly simulation applications and those for the representation of feedback structure, make it possible for everyone to engage in the modelling process (Sterman, 2000). Since system dynamics is a powerful method to gain useful insights into situations of dynamics complexity and policy resistance, it is increasingly used to support the design and analysis of policies in companies (Sterman, 2000). This suggests that system dynamics could be an appropriate and useful tool to support the formulation of CRM strategies.

With reference to the existing literature, there is a wide range of applications of system dynamics to other disciplines, such as strategic planning (Lam *et al.*, 2010), business process reengineering and system redesign (Berry *et al.*, 1994; Georgantzas, 1996; Ashyeri and Keij, 1998), policy design and analysis (Lai *et al.*, 2003), knowledge management (Frida *et al.*, 2004), business decision making (Chan *et al.*, 2010), and supply chain management (Lai *et al.*, 2003). For instance, Berry *et al.* (1994) implemented system dynamics in a manufacturing system to study the system behaviours, particularly the causal-effect relationships, for the sake of improving the design, robustness and operating effectiveness of the system. Lai *et al.* (2003) applied system dynamics, using minimal inventories, to a company's supply system in order to facilitate just-in-time logistics. This provided a new paradigm to analyse logistics policies and to understand the interactions among customers, competitors, and suppliers. As a consequence, a company's performance can be shaped over time and an improvement in terms of inventory control, quality, and productivity are expected. Despite the availability

of many studies on the application of system dynamics in strategy and policy planning, there is limited study material on adopting system dynamics for CRM.

### ***2.3.3. System Dynamics as a Strategic Facilitator***

Most of the problem-structuring methods yield qualitative models that only show causal relationships but omit the parameters, functional forms, external inputs and initial conditions to test the models. Regardless of the forms of the models and techniques employed, the results of these models are never more than a set of causal attributions, and initial hypotheses must then be tested (Starman, 2000). Due to the complexities of these conceptual models, it is also difficult for one to fully understand their implications. To address these problems, system dynamics is suggested to test different models. Without system dynamics, even the best conceptual model can only rely upon the feedback from the real world for it to be tested and improved. This feedback process is very slow and often rendered ineffective by dynamic complexity, time delays, inadequate and ambiguous feedback, poor reasoning skills, defensive reactions, and the costs of experimentation. Under these circumstances, system dynamics become a reliable way to test hypotheses and evaluate the possible effects of policies. Scholars have done much research to further provide evidences to support that system dynamics is useful for supporting decision making (Forrester, 1961; Forrester, 1992; Robert, 1996; Sterman, 2000; Mohammed and Arunee, 2001; Lai, 2002), facilitate effective strategy and policy design (Morecroft, 1992; Sterman, 2000; Zhang *et al.*, 2007), and managing business growth (Forrester, 1968; Senge, 1990). This implies that customer relationships could probably be managed with the support of system dynamics.

#### **2.3.4. *System Dynamics and Customer Relationship Management***

CRM often involves complex systems that are difficult to understand. Such systems are very sensitive to some changes and insensitive to others, which makes it challenging to predict the behaviour of the system. Bryan (2002) defined CRM as a dynamic process of managing a customer-company relationship so that customers continue to attach to the company for mutual benefits and are dissuaded from participating in activities unprofitable to the company. The process of CRM is dynamic and therefore the working assumptions and appropriate actions may need to be changed in response to fluctuations in environment or in customer-company relationships. System dynamics is thus suitable and useful for CRM. Chen *et al.* (2008) used system dynamics to develop a CRM model based on the theory of customer chain relationship, which highlights how to manage and build a good relationship with customers for the CRM of the company.

To strive for survival in the market, companies should be able to manage customers and build customer loyalty. Every interaction between customers and companies is as much an opportunity for companies to build customer loyalty as a risk to lose customers and business to competitors. If companies can take a more active role in listening and responding to customers' feedback, they are more likely to satisfy customers and build customer loyalty. The application of system dynamics in CRM is thus recommended as it is suitable and handy for helping companies capture, analyse and manage customers' responses, through which strategies and policies can be formulated to build customer loyalty. It can not only identify causal relationships and feedback mechanisms, but also forecast and analyse future pattern which would provide companies with decision making

support and strategic planning in the hope of achieving better customer satisfaction and CRM.

## **2.4. Effects of Retail Service Quality and Product Quality on Customer Loyalty**

To improve CRM, it is necessary to understand the effects of retail service quality and product quality on customer loyalty. Retail service quality and product quality are two important and primary elements to satisfy customers and ultimately build customer loyalty. This section will involve a discussion of the three elements, namely retail service quality, product quality and customer loyalty, followed by a discussion of their relationships.

### **2.4.1. Retail Service Quality**

Retail service quality is a key driver of customer loyalty (Clotney *et al.*, 2008). Retailers often classify their retail services into two categories. One is “store service”, which means in-store credit, returns and exchanges adjustments, variety, quality and dependability of service, and price of after-sale service. Another one is “sales service”, which means the extent to which prompt and individual service attention can be achieved (Gagliano and Hathcote, 1994). Parasuraman *et al.* (1988) defined service quality as “the degree of discrepancy between customers' normative expectations for the service and their perceptions of the service performance”. In order to measure this discrepancy, they devised SERVQUAL which divides service items into five dimensions, including tangibles, reliability, responsiveness, empathy, and assurance. Khatibi *et al.* (2002) stated that SERVQUAL is the most comprehensive and frequently cited tool for measuring

service quality, but this is not supported by all researchers. Cronin and Taylor (1992) introduced SERVPERF, a measure that concerns only perception, indicating that it outperforms SERVQUAL and is more applicable for measuring service quality. In addition, when people are asked to indicate their “desired level” (expectations) and “existing level” (perceptions) of the service, there is a psychological constraint that people always tend to rate the former higher than the latter (Wall and Payne, 1973). It is found that service quality measured in SERVQUAL relies more heavily on the perception score than on the expectation score (Babakus and Boller, 1992), rendering it unreliable. Respondents sometimes even appear to be bored and confused by the administration of the expectation and perception for SERVQUAL (Bouman and van-der-Wiele, 1992), which might affect the quality of the data adversely. The ability for SERVQUAL to be generalised across various service settings is also doubted (Rao and Kelkar, 1997), as it has not been tested empirically in the retail store environment (Dabholkar *et al.*, 1996).

In order to capture the dimensions that are important to retail customers, Dabholkar *et al.* (1996) combined findings from three qualitative studies on retail service quality as well as those from SERVQUAL to develop a scale named Retail Service Quality Scale (RSQS). There are five dimensions in the RSQS and they are shown in Figure 2.2 and presented as follows:-

- (i) Personal interaction: Employees are courteous, helpful, able to inspire confidence and trust from the customers;
- (ii) Policy: Operating hours, payment options, store charge cards, parking, and so forth;

- (iii) Physical aspects: Store appearance and convenience of the store layout;
- (iv) Reliability: Retailer keeps its promises and “does things right”; and
- (v) Problem solving: Employees are trained to handle potential problems, such as customer complaints, returns, and exchanges.

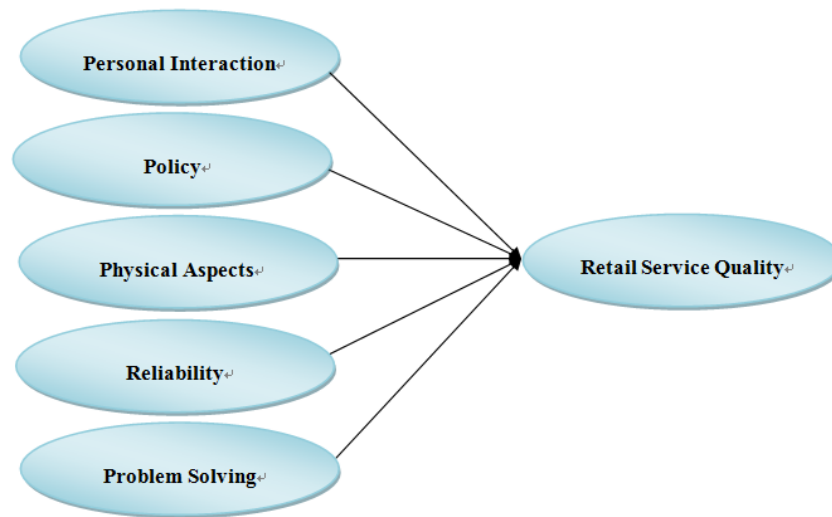


Figure 2.2 Dimensions of retail service quality

According to Dabholkar *et al.* (1996), the dimension of physical aspects has a broader meaning than the tangible dimension of SERVQUAL does. This dimension includes not only the appearance of the physical facilities but also the convenience of the store layout and public areas (e.g. fitting rooms). The dimension of reliability is similar to SERVQUAL’s reliability dimension and involves the store’s ability to keep promises and do things right. The dimension regarding personal interaction is a combination of the SERVQUAL’s dimensions of responsiveness and assurance. It measures customers’ perceptions of whether the store is operated by courteous and helpful employees who inspire confidence and trust. Problem solving is newly proposed by Dabholkar *et al.* (1996) as a new dimension that measures the store’s ability to handle potential problems. This

dimension is viewed as separate from the personal interaction dimension because “service recovery is being recognised as a critical part of good service” (Dabholkar *et al.*, 1996). Joe (2012) also supported that problem solving is one of the key factors to measure retail service quality. The last dimension, policy, is also a new dimension introduced by the researchers and represents “aspects of service quality that are directly influenced by store policy” (Dabholkar *et al.*, 1996).

The RSQS is a generalised scale suitable for studying retail businesses which offer a mix of services and goods. Siu and Cheung (2001) have adopted this scale to measure the service quality of a well-known multi-national retail store in Hong Kong. Wong and Sohal (2003) used this scale to measure the service quality of a large chain retail store in Australia. With reference to the use of the scale in retail service quality validated by scholars, this scale was considered to be suitable and was adopted in this study.

#### **2.4.2. Product Quality**

Product development is often a good starting point for satisfying customers and building customer loyalty. The advantages of getting an early start to develop products include market pioneering, first mover advantages, low-cost proactive innovation, and industry redefinition. The disadvantages of ignoring product development at an initial stage include loss of market opportunities, loss of market leadership, high cost reactive innovation, and high-cost brand development (Eduardo *et al.*, 2008). According to Matsa (2011), it is a strong incentive for companies to invest in product quality for the sake of excelling in the market.

Product quality is often the key to delight customers and drive business success. It is also one of the key drivers of customer loyalty in retail store environment (Clottey *et al.*, 2008). In order to measure product quality, Garvin (1984) proposed a definition of product quality with the following eight dimensions (see Figure 2.3):-

- (i) Performance: A product's primary operating characteristics;
- (ii) Features: The additional features or the "bells and whistles" of the product;
- (iii) Conformance: The extent to which a product's design and operating characteristics meet established standards;
- (iv) Reliability: The probability that a product will operate properly over a specified period of time under stated conditions of use;
- (v) Durability: The amount of use the customer gets from a product before it physically deteriorates or until replacement is preferable;
- (vi) Serviceability: The speed, competence, and courtesy of repair;
- (vii) Aesthetics: How a product appeals to our five senses; and
- (viii) Customer-perceived quality: Customer's perception of a product's quality based on the reputation of the company.



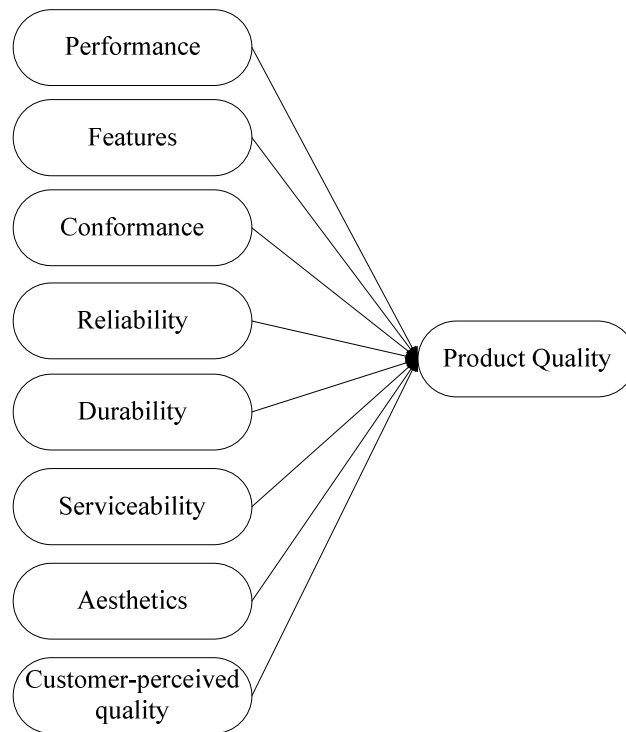


Figure 2.3 Dimensions of product quality

Each of the eight dimensions (in Figure 2.2) is self-contained and distinct. A product can be ranked high on one dimension but low on another (Garvin, 1984). Even though Garvin's eight-dimension framework was initially proposed in 1984, its relevance to the definition of product quality is still apparent, given its continued application in the research in this area (Rose and Nabil, 2002). In 1995, Madu *et al.* (1995) used "price", "product features", and product reliability" as some of the key indicators under the construct of "customer satisfaction". In 1996, Ahire *et al.* (1996) conducted a study to examine the effects of integrated quality management strategies on a company's product quality; the study examines the dimensions (performance, reliability, conformance, and durability) suggested by Garvin. Causal relationships between multifarious constructs of quality (i.e. customer satisfaction, employee satisfaction, and employee service quality) and

organisation performance are also examined. It was found that in reality quality managers also cited, among other responses, Garvin's dimensions such as "reliability", "aesthetics" and "performance" when answering the open-ended question "how is quality defined in your primary place of employment" (Sebastianelli and Tamimi, 2002).

Dimensions which are important to CRM and more relevant to this research are chosen to be included in this study. Those having less measurable effect and being less relevant are excluded (Eduardo *et al.*, 2008). For example, the dimension of performance and features are combined in many cases, as the line separating primary product characteristics (i.e. performance) from secondary characteristics (i.e. features) is difficult to draw (Garvin, 1984). Besides, the ranking of conformance and reliability is based on performance or features that are less likely to reflect individual preferences. Moreover, given that data on conformance are often difficult to obtain and proxies are frequently used, these two dimensions are not used in this study. Durability is a measure of product life requiring measureable product attributes but may not be able to reflect individual preference, so it is also not included in the study. Serviceability refers to the speed, competence, and courtesy of repair, which are all represented in the problem solving aspect of service quality and thus, it need not be measured under the construct of product quality. As a result, the following three dimensions are defined and used to describe the construct of product quality in this study:-

- (i) Product features;
- (ii) Aesthetics; and
- (iii) Customer-perceived quality.

### **2.4.3. Customer Loyalty**

There are several definitions of customer loyalty in the literature available. It refers to a favourable attitude towards a brand in addition to purchasing it repeatedly (Day, 1969), “the relationship between the relative attitude toward an entity and patronage behaviour” (Dick and Basu, 1994), and it “occurs when repeat purchase behaviour is accompanied by a psychological bond” (Javis and Wilcox, 1977). With reference to these definitions, customer loyalty is generally used to describe an occurrence when customers repeatedly purchase a product or service over time and hold favourable attitudes towards the product or service, or towards the company supplying the product or service.

Customer loyalty refers to both attitudinal and behavioural measures towards the product, service or company. It concerns the likelihood of repurchase, introduction and recommendation of companies to others, establishment of public praise (Bowen and Shoemaker, 1998), price tolerance, and reduction in opportunity to switch to competitors. Customer loyalty is also the best predictor of behavioural intentions (Zeithaml *et. al.*, 1996). Customers are loyal to a store and will continue to make purchases from it in the future. Taking account of the benefits that customer loyalty can bring, retailers are encouraged to pursue, develop, and maintain a loyal customer base. For example, loyal customers allocate relatively more of their budget to their “first choice” store than other customers do (Knox and Denison, 2000) and they are likely to make more purchases compared to the less loyal customers (Baldinger and Robinson, 1996). To ensure survival in the long term, companies need to pay more attention on customer loyalty as the increase in customer loyalty is frequently argued to be the

single most important driver of companies' financial performance (Reichheld, 2003).

There are two forms of loyalty, namely person-to-person loyalty (employee level) and person-to-company loyalty (store level). These two forms of loyalty differ from each other. Person-to-company relationship is typically short-term and less intense in comparison to person-to-person relationship, which tends to be symmetric and pleasant (Lacobucci and Ostrom, 1993). It is also argued that person-to-person loyalty is more substantial than other forms of loyalty, such as brand loyalty (Oliver, 1997). Even so, they are interrelated. Beatty *et al.* (1996) pointed out that customers' primary loyalty is to a salesperson, who positively influences customers' loyalty to the store. Macintosh and Lockshin (1997) confirmed that loyalty to salesperson is an antecedent to the loyalty to the store. Therefore, customer loyalty is measured in two levels in this study, i.e. the employee level and store level, by different loyalty scales.

Researchers indicated that there are important conceptual differences between store and employee levels (Wong and Sohal, 2003). It is found that positive feelings towards the employee whom they contact are often carried over to feelings towards the company (Goff *et al.*, 1997). A positive feeling towards the salesperson who gives kindly and right advice in the course of the purchase can help build up trust and confidence, thus leading to a positive image to the store as well (Wong and Sohal, 2003). Regarding the positive relationship between employee loyalty and store loyalty, the former is demonstrated to be an antecedent of the latter (Macintosh and Lockshin, 1997). Thus, if a customer is highly loyal

to the salesperson and this salesperson is highly loyal to the company, the customer's positive feelings about the salesperson will translate into positive feelings about the company (Reynolds and Beatty, 1999). This is because customers' loyalty to the company will be manifested through their loyalty to the employee whom they contact (Wong and Sohal, 2003). As there is an interrelationship between these two forms of loyalty, establishing good relation between salespersons and customers is an approach recommended to bring positive image and loyalty to the company (Wong and Sohal, 2003).

#### **2.4.4. *Linkage between Retail Service Quality and Customer Loyalty***

In general, good service quality leads to customer loyalty as it would enhance customers' trust and satisfaction towards the company. Customers would be more willing to act beneficially to the strategic health of a company, a process during which customer loyalty will be gradually established. Boulding *et al.* (1993) found that favourable perceptions of service quality increase the likelihood of customers engaging in behaviours that are advantageous to companies. Furthermore, de-Ruyter *et al.* (1998) indicated that there is a positive relationship between perceived service quality and loyalty in five different service industries. This is further exemplified by a study conducted in the hospital industry (Wong *et al.*, 1999) where the relationship between the dimensions of service quality and customer loyalty is positive.

While loyalty is often included as an outcome variable in service quality models (Cronin and Taylor, 1992; Boulding *et al.*, 1993), there is a number of factors that limit a comprehensive understanding of service quality and its impact on customer

loyalty in services, thus preventing the research findings to be generalised (Zeithaml, 1996). In fact, the relationship between perceived service quality and customer loyalty remained relatively underdeveloped (Gremler and Brown, 1996; Bloemer *et al.*, 1999). Although previous studies have confirmed the positive relationship between perceived service quality and loyalty in five different service industries (de-Ruyter *et al.*, 1998), other studies failed to find the direct relationship (Cronin and Taylor, 1992). So, this research aims to explore the links between the individual dimensions of service quality and the various levels of customer loyalty.

#### **2.4.5. *Linkage between Product Quality and Customer Loyalty***

Developing good products can be an effective starting point for satisfying customers and building customer loyalty (Eduardo *et al.*, 2008). Selnes (1993) stated that customers' intended behaviours towards products are closely related to and reflected by customer loyalty. The advantages of getting an early start to develop products for customer satisfaction and loyalty include market pioneering, first mover advantages, low-cost proactive innovation, and industry redefinition (Eduardo *et al.*, 2008). When customers are satisfied with the product, they like to express their satisfaction through sharing their experiences and this is positive word-of-mouth publicity (Arndt, 1967). When customers recommend the product to others, this reflects a high degree of loyalty (Selnes, 1993). This explains that there is an impact of product quality on customer loyalty. Customer loyalty could be enhanced by promoting the product quality. Hence, product perception is essential and fundamental to customer satisfaction and loyalty. This statement is also supported by Eduardo *et al.* (2008).

In the literature, as far as customer satisfaction and loyalty are concerned, researchers appear to have placed greater emphasis upon brands than products, which are often subsumed into brands, thus ignoring the products as a separate entity (Eduardo *et al.*, 2008). Consequently, marketers do not use products as a base to gain customer satisfaction and build customer loyalty even if customer loyalty is reduced to customer retention or repetitive purchases (also known as spurious loyalty). A little research has been made to examine the relationship between product quality and customer loyalty. Such a relationship is worth further investigation in this study due to its potential significance in customer satisfaction and loyalty.

### **3. Methodology**

#### **3.1. Research Framework**

An exploratory-based CRM simulation model (ECSM) is proposed to be developed through this research. The proposed ECSM could be of great benefit to companies as a full picture of the relationship network with customers will be formulated. Effective alternative strategic planning can also be devised for customer retention and better CRM. An exploratory module can help companies better understand customers' behaviour and the relationships among retail service quality, product quality and customer loyalty. With its simulation module based on system dynamics, the ECSM supports managers in managing effective CRM, particularly in the process of strategic decision making and planning. To achieve the objectives, a two-step modelling approach was adopted and the framework for this research is structured as shown in Figure 3.1.

A literature review was conducted to assess the formulation of hypothesis for the exploratory module and the structure of the dynamic behaviour for the dynamic simulation module. The findings from the literature review are validated via a customer survey, the data from which are used to test the hypotheses in the exploratory module. The data also provide initial values for the dynamic simulation module. Hunter Douglas, the industry's leading manufacturer and retailer of custom-made window coverings, was used as a case study for this research. The target respondents for the customer survey were the existing customers of Hunter Douglas. The data obtained from customers are supported with historical data, such as sales volumes, spending on advertising, and so on from Hunter Douglas, and, if appropriate, used in the proposed ECSM. The



reasons to use Hunter Douglas as an example in Hong Kong for the case study are explained in Chapter 3.3.

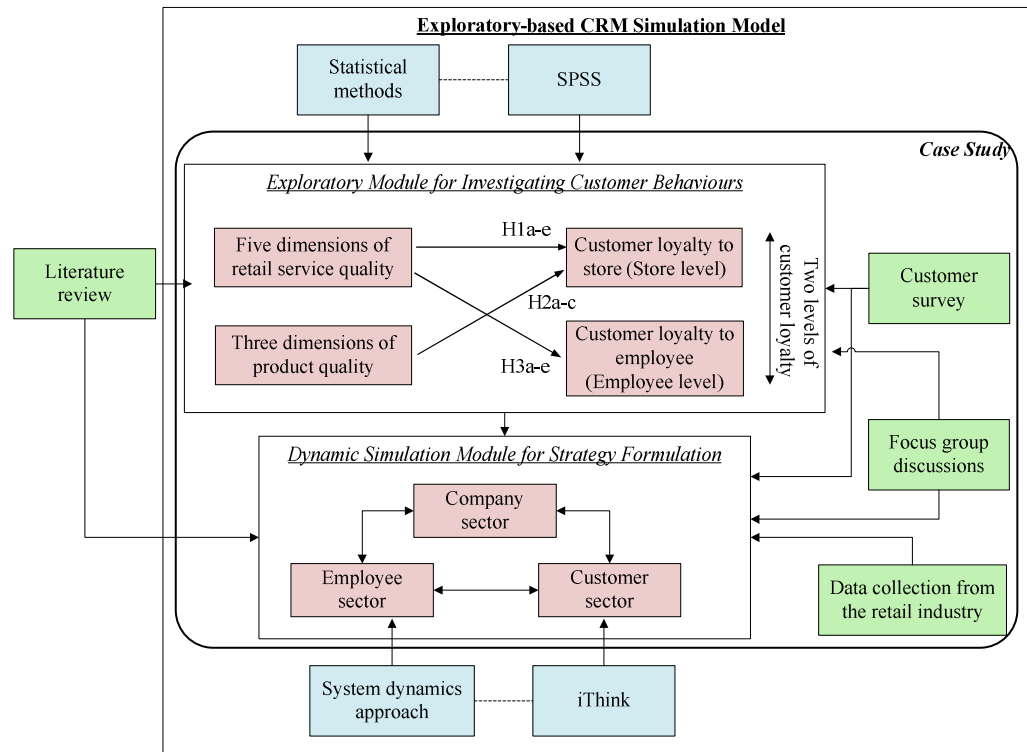


Figure 3.1 Research framework

To test the hypotheses and verify the exploratory module, statistical methods including factor analysis, multiple regressions and descriptive statistics analysis, all described in Chapter 3.4.2, are adopted in this research. The Statistical Package for Social Science (SPSS) as introduced in Chapter 3.5.1 was used to help conduct the analysis. The powerful modelling and simulation software, iThink, was used to build and simulate the dynamic simulation module. This computer application is introduced and described in a more detailed manner in Chapter 3.5.2.

### 3.2. Hypothesis Formulation for the Exploratory Module

From the literature review conducted in Chapter 2, an exploratory module

examining the measures and impacts of retail service quality and product quality on customer loyalty was constructed and is depicted in Figure 3.2. In the exploratory module developed, the following thirteen hypotheses (i.e., H1a-H3e) were proposed, with reference to the discussions in Chapter 2.4. Based on the reviewed literature in this area in the last decade, there is limited literature indicating any possible interactive processes between product quality and employees. It is assumed that the linkage between product quality and customer loyalty for employees is inconsequential and/or inapplicable and hence, such a hypothesis is not proposed in this research.

H1a: Personal interaction exerts a positive influence on customer loyalty to the store.

H1b: Policy exerts a positive influence on customer loyalty to the store.

H1c: Physical aspects exert a positive influence on customer loyalty to the store.

H1d: Reliability exerts a positive influence on customer loyalty to the store.

H1e: Problem solving exerts a positive influence on customer loyalty to the store.

H2a: Product feature exerts a positive influence on customer loyalty to the store.

H2b: Aesthetics exerts a positive influence on customer loyalty to the store.

H2c: Customer-perceived quality exerts a positive effect on customer loyalty to the store.

H3a: Personal interaction exerts a positive influence on customer loyalty to employees.

H3b: Policy exerts a positive influence on customer loyalty to employees.

H3c: Physical aspects exert a positive influence on customer loyalty to employees.

H3d: Reliability exerts a positive influence on customer loyalty to employees.

H3e: Problem solving exerts a positive influence on customer loyalty to employees.

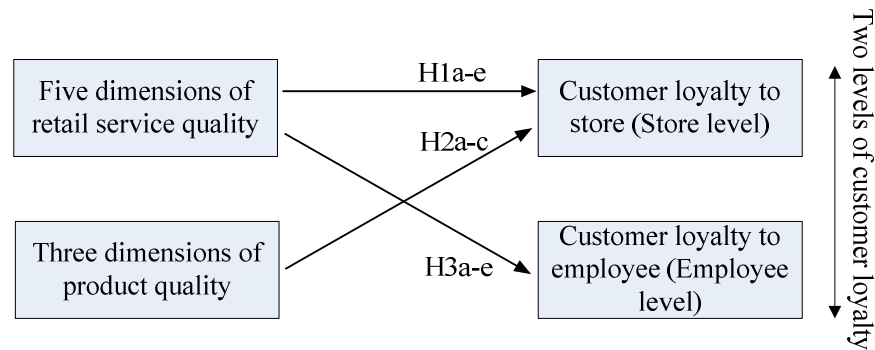


Figure 3.2 Proposed exploratory module

### 3.3. Case Study

Case study is adopted in this research to examine the relationships between customer satisfaction, customer services and product quality in retail industry. As suggested by Yin (2009), case study helps to preserve the holistic and meaningful characteristics of real-life events. Case study methods, among other research methods, have considerable advantages like the operationalisation and measurement of qualitative variables, the addition of new and omitted variables or hypotheses, the examination of potential causal mechanisms in particular contexts and the incorporation of complex relations (Sprinz *et al.*, 2004).

An empirical study on how service quality and product quality affect customer satisfaction, and in turn, customer loyalty to retail industry is carried out in this research. An in-depth investigation of the key factors and their relationships to different variables in a real-life context are studied. To achieve this objective, a variety of evidence is needed like documents, interviews and observations to

analyse the complex relationships among variables (Yin, 2009). It is believed that case study is the most appropriate research method to be employed in this research.

### **3.3.1. *Selection of a Typical Retailer***

To develop and verify the ECSM for the retail industry, data collection from retailers is necessary and case study is a usual and effective means to illustrate and validate the proposed model. In this regard, a typical retailer should be selected to support this research. Retail is the sale of goods and services from individuals or businesses to the end-user. Hence, retailers are often categorised based on their products (tangible) or services (intangible) provided. Different types of products draw different levels of service to achieve the same level of customer satisfaction. The required service level seems to be gradually increased from tangible products to intangible products. For tangible products, service levels are also different among products under mass production, batch production and job production. For intangible products, different service levels can also be applied to achieve customer satisfaction.

Figure 3.3 illustrates the relationship of service level required and classification of product types. Typically, products are widely divided into the following five categories.

- Category A: Products are manufactured under mass production, such as household equipment (e.g. refrigerator and toaster), food and beverages. Extensive market research on customer needs, pricing and marketing strategies are well identified before the products are made. Since customer

needs are well studied before these products are launched in the market, customer satisfaction is derived more from the product level rather than the service level. Lower service level requirement is found in this category.

- Category B: Products are manufactured under batch production. Product life cycle is short. Seasonal or trendy products like mobile phone, car and fashion clothing fall in this category. Reactions to the market trends and needs are fast. Customer satisfaction is largely based on the product itself although part of customer satisfaction is generated from the service level through promoting the products in showroom or giving instructions to customers on how to use the products.
- Category C: Products are manufactured in job production, i.e. tailor-made products, which are manufactured according to the requirements and needs of customers. Products such as tailor-made clothing and made-to-measure furniture including window blinds belong to this category. Generally, this type of products costs more than off-the-shelf products even though the materials are the same. High level of customer satisfaction is achieved if the final product is made according to the customer's specifications. Since the product is not ready-made or can be inspected on spot, high level of service is unavoidable.
- Category D: This type of products cannot be taken back home but be "enjoyed" or "consumed" by customers. Hotel and airline services are probably the most representative intangible products in this category. While no one can take a hotel room or an airline back home, customers have a high expectation of service level in this type of products. Certainly, different service levels are expected from a one-star hotel to a five-star hotel or from

an economy class cabin to a first class cabin.

- Category E: The products within this category are intangible while customers' satisfaction is very subjective. Different people may have different views on the same service. Products like “training and education” and “VIP tourism” fall into this category. For example, two students attending the same class may learn different knowledge. Since customer satisfaction is rather subjective, understanding the customers and providing service according to an undefined specification require the highest service level.

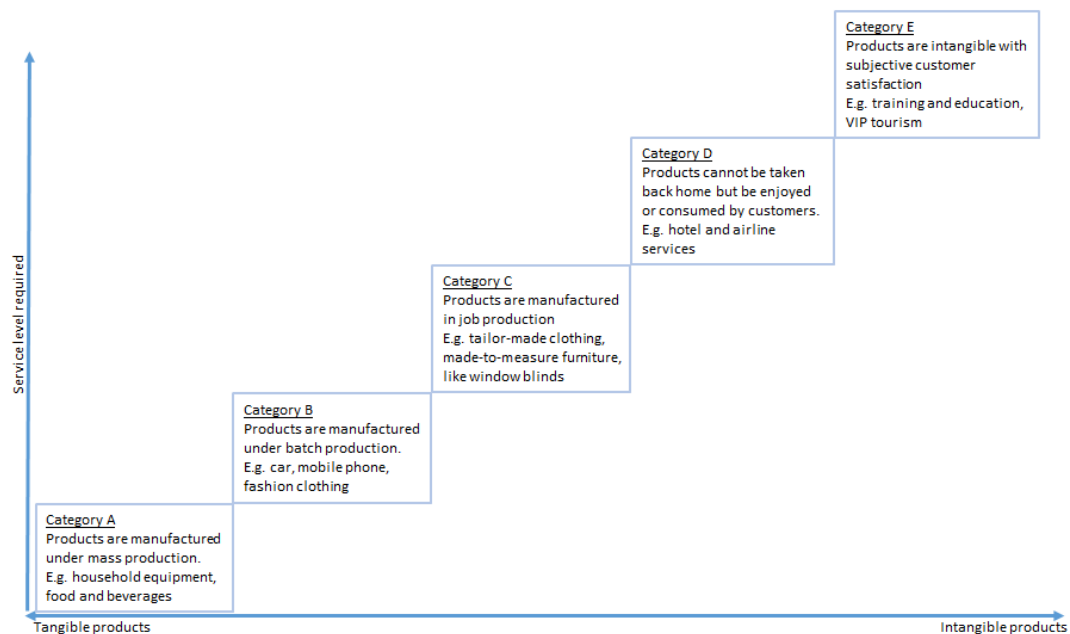


Figure 3.3 Product classification versus service level required

Since the proposed model in this research focuses on the management of customer relationships as well as the enhancement of customer satisfaction with retail service and product qualities, it is essential to select a suitable representative in the retail industry for case study in this research. In order to make the proposed model more generalised, products in category C are chosen as they lie in the

centre of Figure 3.3. To a certain extent, it strikes a balance of product and service that certainly fits this study.

There are numerous types of retailers that fall in category C of Figure 3.3. To formulate a generalised ECSM for retail industry, it is crucial to collect genuine primary data for the study. However, this objective can hardly be achieved as companies, in particular the brand name products, are reluctant to release trade secrets (including customer records, marketing strategy, sales volume, etc.), and to facilitate in the model validation process. This makes the research impossible to go further. It was lucky that the author had known the Managing Director of Hunter Douglas, the leading window fashions company in Hong Kong, for years and they were willing to support in this research by providing all kinds of assistance. Not only primary data can be collected from one of their biggest retailers, focus group with the management staff can be arranged and more importantly, Hunter Douglas agreed to adopt the findings in the ECSM for model validation purpose.

Hunter Douglas is a leading window fashions company all over the world. However, its business had not performed well in Hong Kong over the last 20 years. The products were sold via small scale home decoration retailers together with other products like carpet, furniture, lighting, wall paper, etc. The brand could not stand out in the market. Revitalisation of the brand was suggested by the Managing Director of Hunter Douglas with the aim to increase exposure of the brand and the sales volume in Hong Kong. They cut down the number of outlets and opened its own franchised shops. However, they struggled in identifying the

appropriate CRM strategies to satisfy customers' needs. In this regard, Hunter Douglas was willing to provide the necessary assistance to facilitate in this research.

By studying the characteristics of Hunter Douglas window coverings, it gives a fair picture of the relationships between different products and service and can be further generalised to either end of the graph (see Figure 3.3). In addition, among the retailers selling window coverings, Hunter Douglas is the world's market leader and well-known for its brands such as Silhouette, Duette, Luminette and many others. Being a well-established company for over sixty years, Hunter Douglas enjoys the largest market share in the industry in the world. Due to its success and substantial influences in the window fashions industry, it is no doubt that Hunter Douglas was deemed to be a traditional and typical example under category C of the retail industry.

### ***3.3.2. A Company Profile of Hunter Douglas***

Headquartered in Rotterdam, Hunter Douglas is the leading manufacturer of customised window coverings worldwide since it developed the first lightweight aluminium blind in 1946. It has led the industry in creating innovative window coverings of the highest quality for homeowners. Hunter Douglas continues introducing state-of-the-art and innovative products to grow its market share, providing its customers with consistently superior service and expanding its presence in key geographic markets.

With more than sixty-year experience, Hunter Douglas has been making a big



difference in the evolution of window fashions. Window coverings are not only stunning and stylish but also become functional. Hunter Douglas is committed to designing and manufacturing window coverings which cope with customers' practical everyday needs, such as privacy, light control, insulation, child safety, sound absorption, motorisation technology, sunlight and UV blocking, and so on. Meanwhile, it is also devoted to satisfying customers' desires for a stylish furnishing that transforms their home. Its blinds can be custom-made according to customers' requirements.

The 6 franchised shops of Hunter Douglas were chosen as the case study for this research to study CRM for the retail industry. These franchised shops were given the name as Hunter Douglas Gallery.



Unlike other window coverings retailers in Hong Kong, Hunter Douglas Gallery only sells Hunter Douglas products while other retailers sell other brands of window blinds as well as furniture, floor coverings, lighting, etc. The sales turnover of Hunter Douglas Gallery constitutes nearly 60% of the total sales turnover of Hunter Douglas in Hong Kong (a total of 18 retail outlets) and hence, the data collected are highly typical. More importantly, the availability and flow of data of Hunter Douglas Gallery is controllable as a close relationship had been built up in the past years; this is essential for the case study and development of the ECSM. For this purpose, data such as sales volume, employee satisfaction, number of customers and so on were collected from Hunter Douglas Gallery in

Hong Kong to support this research that develops the proposed ECSM for the retail industry. In addition, meetings with the staff were required so as to facilitate the development of the proposed model with the support of the information and knowledge provided by the staff from Hunter Douglas Gallery.

### **3.3.3. *Challenges Faced by Hunter Douglas***

As a retailer, Hunter Douglas needs to:-

- (i) preserve the efficiency in product distribution,
- (ii) maintain services and products of highest quality, and
- (iii) remain cost-effective.

These are challenges faced by many companies in the retail industry including Hunter Douglas. To sustain the customer satisfaction with both product quality and customer service, Hunter Douglas is considering investing in CRM to enhance long-term customer relationships. In recent years Hunter Douglas Gallery has started analysing sales data and operation reports in order to identify the core factors that increase customer acquisitions, customer satisfaction, and customer loyalty in the hope of allocating more resources to such factors that may further maximise the profits. Besides, surveys concerning the factors that affect customer satisfaction and purchasing intentions are conducted on a regular basis so as to better understand the needs of its customers. As Hunter Douglas Gallery is an exemplar retailer, it is worthwhile to investigate more deeply into its CRM.

### **3.4. Data Collection and Analysis Methods**

#### **3.4.1. Survey Research**

As suggested by Groves *et al.* (2009), a survey is “a systematic method for gathering information from (a sample of) entities for the purpose of constructing quantitative descriptors of the attributes of the larger population of which the entities are members”. It is ideal in a research project to collect data on every element in a defined population but the task will be impractical if the population size is large or if there are limitations in the research project like resource constraint.

The main objective of carrying out survey is to be able to make generalisations about a defined population based on a scientifically selected subset of that particular population (Rea *et al.*, 2005). To better understand customers’ attitudes and behaviours towards the service and product qualities of Hunter Douglas Gallery and the level of customer satisfaction towards the retailer, customers’ views are important. However, it would not be practical to collect data from every customer of which there were thousands of them. A rigorous design of a survey was conducted to collect the required data.

#### **3.4.2. Questionnaire Design of Customer Survey**

For the sake of the ECSM development, a customer survey was carried out to study customers’ behaviour, their perspectives and satisfaction level. Before the survey, a questionnaire was designed and pilot tests were conducted to assess if the questions are properly interpreted by the respondents. The pilot group consists of three managerial staff from Hunter Douglas Gallery and seven customers,

ensuring that both the company and customers understand the meaning of each question, thereby increasing the number of valid questionnaires collected and accuracy of subsequent data analysis.

The finalised questionnaire is shown in Appendix 1. The questionnaire was designed to involve four main parts (i.e. general questions, customer purchasing experience, customer satisfaction and personal information), each serving a specific purpose. The first part is to study the linkage between a respondent and Hunter Douglas. It includes some general questions about customers' purchasing behaviour, such as why customers purchase the products from Hunter Douglas and how often they do so. The second part is to examine customers' opinions on retail service quality, product quality and customer loyalty based on their experience with Hunter Douglas. Customers were asked to assess the retail service quality and product quality of Hunter Douglas; their loyalty to Hunter Douglas was also investigated by questioning. The third part is to investigate customers' satisfaction with retail service quality, product quality, advertising strategies and efficiency to complete the order. Customers were asked to give ratings to indicate their satisfaction level. The last part is about the personal information of respondents for demographic analysis.

The second and third parts of the questionnaire are of great importance to the ECSM. There are three main questions that are to measure (a) retail service quality, (b) product quality, and (c) customer loyalty of Hunter Douglas in the second part of the questionnaire. To give a normal spread of observations (Siu and Cheung, 2001), a seven-point Likert-type scale ranging from one (strongly

disagree) to seven (strongly agree) was adopted. The details of the design of the question are discussed below:-

- (i) To measure the retail service quality of Hunter Douglas, twenty one variables were identified to form one part of the customer survey. Among these variables, seventeen were extracted from the SERVQUAL scale (Wong and Sohal, 2003) and Retail Service Quality Scale (RSQS) (Dabholkar, 1996) and four were customised to adapt to the situation of Hunter Douglas. Given that both SERVQUAL scale and RSQS are common to all industries but since the background of each industry varies, customising variables with reference to the industry background are sometimes necessary and helpful in improving the correctness of the measurement of retail service quality. The SERVQUAL scale has been proven to be highly reliable in previous research (Parasuraman *et al.*, 1988; Carman, 1990) and is regarded as the most widely used measure as far as service quality is concerned (Lam and Woo, 1997; Sivadas and Baker-Prewitt, 2002). Crucial variables in the SERVQUAL scale and RSQS are incorporated in this research. The twenty one variables of retail service quality are listed in Table 3.1 and can be classified into five dimensions, including personal interaction (under which six variables are involved), policy (three variables), physical aspects (four variables), reliability (two variables), and problem solving (six variables). Those variables that are listed in the SERVQUAL and RSQS scales but excluded in this research are stated and explained in Table 3.2.

Table 3.1 Variables of retail service quality

Dimension	Item No.	Variables	Reference to SERVQUAL	Reference to RSQS	Customised
Personal Interaction	4.1.1	Staff are courteous to customers	Assurance (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Personal interaction (Dabholkar, 1996; Siu and Cheung, 2001)	
	4.1.2	Staff provide prompt quotations	Responsiveness (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Personal interaction (Dabholkar, 1996; Siu and Cheung, 2001)	
	4.1.3	Staff provide accurate quotations	N/A	N/A	✓
	4.1.4	Staff can be easily approached and consulted	Responsiveness (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Personal interaction (Dabholkar, 1996; Siu and Cheung, 2001)	
	4.1.5	Staff provide accurate information about the company (e.g. history, opening hours and products)	Assurance (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Personal interaction (Dabholkar, 1996; Siu and Cheung, 2001)	
	4.1.6	Staff give personal attention	Empathy (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Personal interaction (Dabholkar, 1996; Siu and Cheung, 2001)	
Policy	4.2.1	Safety in transaction	Assurance (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Policy (Dabholkar, 1996; Siu and Cheung, 2001)	
	4.2.2	Accept most major payment methods	N/A	Policy (Dabholkar, 1996; Siu and Cheung, 2001)	
	4.2.3	Operating hours are convenient	Empathy (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Policy (Dabholkar, 1996; Siu and Cheung, 2001)	
Physical Aspects	4.3.1	There are visually-appealing physical facilities	Tangibles (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Physical Aspects (Dabholkar, 1996; Siu and Cheung, 2001)	
	4.3.2	There are visual-appealing service materials	Tangibles (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Physical Aspects (Dabholkar, 1996; Siu and Cheung, 2001)	

	4.3.3	Staff are dressed neatly and tidily	Tangibles (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	N/A	
	4.3.4	The store layout makes it easy for customers to find what they need	N/A	Physical Aspects (Dabholkar, 1996; Siu and Cheung, 2001)	
Reliability	4.4.1	Providing service at the time it promises to do so	Reliability (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Reliability (Dabholkar, 1996; Siu and Cheung, 2001)	
	4.4.2	When the store promises to do something by a certain time, it will do so	Reliability (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Reliability (Dabholkar, 1996; Siu and Cheung, 2001)	
Problem Solving	4.5.1 and 4.5.2	Handle Customer's complains directly and immediately	N/A	Problem Solving (Dabholkar, 1996; Siu and Cheung, 2001)	
	4.5.3	When customers have a problem, the stores show sincere interest in solving it	Reliability (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Problem Solving (Dabholkar, 1996; Siu and Cheung, 2001)	
	4.5.4	Hotlines are seldom busy	N/A	N/A	✓ (Remarks: It is related to the handling complaint procedures in Hunter Douglas)
	4.5.5	Customers are satisfied with leaving messages through the maintenance hotline	N/A	N/A	
	4.5.6	Maintenance hotline always responds promptly after your voice messages are left	N/A	N/A	

Table 3.2 Reasons for the exclusion of certain variables

<b>Variables</b>	<b>Reference to SERVQUAL</b>	<b>Reference to RSQS</b>	<b>Reasons to exclude variables</b>
Behaviours of employee instils confidence in customer	Assurance (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Personal Interaction (Dabholkar, 1996; Siu and Cheung, 2001)	Respondents pointed out that if the staff are courteous with customers and provide accurate information, they are instilling confidence in customers. Therefore, this variable is deemed to be very similar to questions 4.1.1 and 4.1.5.
Employees have the knowledge to answer questions	Assurance (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Personal Interaction (Dabholkar, 1996; Siu and Cheung, 2001)	Respondents thought it is very similar to question 4.1.5.
Employees are always willing to help	Responsiveness (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	N/A	Respondents thought it is very similar to question 4.1.4. When staff are easily approached and consulted, they are always willing to help customers.
Treat customers courteously on the telephone	N/A	Personal Interaction (Dabholkar, 1996; Siu and Cheung, 2001)	Customers of Hunter Douglas seldom interact with employees on the phone. Therefore, this variable is considered irrelevant.
Perform the appropriate service promptly	Reliability (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Personal Interaction (Dabholkar, 1996; Siu and Cheung, 2001)	Respondents thought there is a marked similarity between this question and question 4.1.6. If staff provided personal attention, they should also have provided proper services to customers.
Give individual attention	Empathy (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Personal Interaction (Dabholkar, 1996; Siu and Cheung, 2001)	Respondents could not distinguish personal attention from individual attention, and they found these two variables are the same.
Tell customers exactly when the services will be performed	Responsiveness (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Personal Interaction (Dabholkar, 1996; Siu and Cheung, 2001)	In Hunter Douglas, staff seldom tell customers exactly when the services will be performed. This variable is considered irrelevant.
Understand customers' specific needs	Empathy (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	N/A	Respondents thought this is very similar to question 4.1.6.
High-quality merchandise	N/A	Policy (Dabholkar, 1996; Siu and Cheung, 2001)	It refers to product quality that customers perceive and is thus not considered as a variable for retail service quality.
Error-free sales transactions and records	Reliability (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Policy (Dabholkar, 1996; Siu and Cheung, 2001)	Respondents thought it is similar to question 4.1.3. If staff provide accurate quotations, the sales transaction is usually free of errors.
Handle returns and exchange willingly	N/A	Policy (Dabholkar, 1996; Siu and Cheung, 2001)	It has been incorporated into question 4.4.1.



Provides plenty of convenient parking for customers	N/A	Policy (Dabholkar, 1996; Siu and Cheung, 2001)	No parking areas are provided for customers of Hunter Douglas. Therefore, this variable is deemed to be inappropriate for this research.
Equipment is modern	Tangibles(Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	N/A	In the case of Hunter Douglas, little equipment is needed and provided. Therefore, this variable is deemed to be inappropriate for this research.
Equipment is user friendly	Tangibles(Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	N/A	Ditto
Modern-looking equipment and fixtures	Tangibles (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	Physical Aspects (Dabholkar, 1996; Siu and Cheung, 2001)	This variable is integrated into question 4.3.2.
Clean, attractive and convenient public areas	N/A	Physical Aspects (Dabholkar, 1996; Siu and Cheung, 2001)	This variable is integrated with questions 4.3.1 and 4.3.2.
Keep its promises	Reliability (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	N/A	Respondents thought it is similar to questions 4.4.1 and 4.4.2.
Has customers' best interests in heart	Empathy (Gagliano and Hathcote, 1994; Wong and Sohal, 2003)	N/A	Respondents thought it is similar to the question 4.1.6. Staff provide personal attention to customers if they have customers' best interests in heart.
The store layout makes it easy for customers to move around	N/A	Physical Aspects (Dabholkar, 1996; Siu and Cheung, 2001)	Since the window blinds of Hunter Douglas are clearly displayed on walls, plenty of spaces are provided for customers to move around. Thus, this variable is comparatively less important in this research.
Availability of merchandise	N/A	Physical Aspects (Dabholkar, 1996; Siu and Cheung, 2001)	The window blinds of Hunter Douglas cannot be taken away immediately and customers need to wait for about one month to get the blinds. This variable is thus deemed to be inappropriate in this research.
The store offers its own credit card	N/A	Policy (Dabholkar, 1996; Siu and Cheung, 2001)	Hunter Douglas does not offer its own credit card. This variable is considered inappropriate for this research.

- (ii) To measure the product quality of Hunter Douglas, nine variables were customised with support from the literature review. These variables were defined according to the business environment of Hunter Douglas and based on the definition of product quality described by Garvin (1984). These variables are listed in Table 3.3 and can be classified in light of three dimensions, including product features (under which four variables are involved), aesthetics (three variables), and customer-perceived quality (two variables).

Table 3.3 Variables of product quality

Dimension	Item No	Variables	Reference	Remarks
Product features	5.1.1	Hunter Douglas provides diverse types of blinds for customers' selection	Customised	These variables are based on the definition of features in product quality (Garvin, 1984)
	5.1.2	Hunter Douglas collections have a range of differentiated colours to cater for customers' needs	Customised	
	5.1.3	Hunter Douglas collections have a range of differentiated materials to cater for customers' needs	Customised	
	5.1.4	Customers are satisfied with the functions of window blinds provided by Hunter Douglas (such as dust-resistance and UV-resistance)	Customised	
Product features	5.2.1	The window blinds provided by Hunter Douglas have an appealing appearance	Customised	These variables are based on the definition of aesthetics in product quality (Garvin, 1984)
	5.2.2	The window blinds provided by Hunter Douglas are stylish	Customised	
	5.2.3	The window blinds provided by Hunter Douglas are innovative	Customised	
Customer-perceived quality	5.3.1	Hunter Douglas provides products of high quality	Customised	These variables are based on the definition of customer-perceived quality in product quality (Garvin, 1984)
	5.3.2	The window blinds provided by Hunter Douglas have high durability	Customised	

In most studies, the assessment variables regarding customer loyalty are based on its definition (Parasuraman *et al.*, 1994). Customer loyalty is often assessed in terms of the willingness of customers to repurchase, to recommend products and stores to others, to encourage others to purchase, to establish public praise and price tolerance, and to build a good relationship with the company (Parasuraman *et al.*, 1994). Variables regarding customer loyalty in the questionnaire are thus measured on the basis of such a definition to measure customer loyalty. In this research there are two levels of customer loyalty, i.e. the store level (customer-to-store) and the employee level (customer-to-employee). With reference to the literature review discussed in Chapter 2 and suggestions from the managerial staff of Hunter Douglas Gallery, eight variables were identified to examine customer loyalty to the store. Among the eight variables, six were identified from the reconfigured behavioural-intentions battery (RBIB) developed by Parasuraman *et al.* (1994), one was selected from the Relationship Dimensions Scale (Barnes, 1997), and the remaining one was suggested by the managerial staff of Hunter Douglas Gallery. Furthermore, two variables were used to measure customer loyalty to employees; they were extracted from the Loyalty to Sales Associate Scale developed by Reynolds and Beatty (1999). Table 3.4 shows the eight variables of customer loyalty to the store and two variables of customer loyalty to employees. In order to increase the accuracy of data in the survey, two reverse-scored items were used to test if respondents read and answer the questions carefully. The reverse-scored items were re-coded prior to further analysis.

Table 3.4 Variables regarding customer loyalty

Dimension	Item No.	Variables	References
Customer Loyalty (the Store Level)	6.1.1	Customers have positive opinions about the retail store	Reconfigured Behavioural Intentions Battery (RBIB) (Parasuraman <i>et al.</i> , 1994; Wong and Sohal, 2003)
	6.1.2	Recommend the store to someone who seeks advice	
	6.1.3	Encourage relatives and friends to shop at the store	
	6.1.4	Consider the store as the first choice in the next few years	
	6.1.5	Do not patronise other stores (competitors) that offer products with more attractive prices	
	6.1.6	Have the thought that searching and switching to another new retail store is just not worth the time and effort	Loyalty Scale (Bettencourt, 1997; Wong and Sohal, 2003)
	6.1.7*	Switch to a competitor when the quality presently perceived at the retail store discontinues	RBIB (Parasuraman <i>et al.</i> , 1994; Wong and Sohal, 2003)
	6.1.8	Want to build a good relationship with Hunter Douglas Remarks: This variable was added after the pilot test	Customised
Customer Loyalty (the Employee Level)	6.2.1	Loyalty to a particular staff	Loyalty to Sales Associate Scale (Reynolds and Beatty, 1999; Wong and Sohal, 2003)
	6.2.2*	No intention to shop in the future because of a particular employee	

\*Denotes reverse-scored variables

In the third part of the questionnaire, the satisfaction level of customers with Hunter Douglas was investigated in terms of four major elements, including retail service quality, advertising, order completion efficiency, and product quality. These four elements were found to be vital for customer satisfaction in the literature. For example, Cronin and Taylor (1992) and Anderson and Sullivan (1993) contended that service quality is the most important factor affecting customer satisfaction; Rucci *et al.* (1998) advocated that advertising including positive word-of-mouth is another critical factor to maintain customer satisfaction; Chen and Chuang (2008) also stated that product quality is a key driver in motivating customers to purchase and increasing their

satisfaction level. Eleven variables regarding customer satisfaction are addressed in the questionnaire and are listed in Table 3.5.

In Table 3.5, customers' satisfaction with retail service quality involves five variables, which, as discussed previously in Chapter 2.4.1, correspond to the five dimensions in which retail service quality will be examined; the five dimensions are personal interaction, policy, physical aspects, reliability, and problem solving. Customers' satisfaction with product quality also covers three variables (item no. 7.2.1-7.2.3) and has already been identified through literature review. Another two variables (items no. 7.3 and 7.4) are concluded from interview with a focus group involving seven customers and three managerial staff of Hunter Douglas Gallery. The size of the focus group that serves as a sample is deemed appropriate as recommended by scholars (Howard *et al.*, 1989, Kitzinger, 1996), who found that this sample size is easier to be managed and is likely to maximise the interaction between respondents in the group and to widen the range of respondents' perceptions.

Changes of the variables shown in Table 3.5 will reflect changes of customer satisfaction. Customers were thus asked to indicate their satisfaction level on all of the variables. A seven-point Likert-type scale ranging from 1 (strongly dissatisfied) to 7 (strongly satisfied) is adopted to give a normal spread of observations (Siu and Cheung, 2001). The survey results would serve as the initial values for simulating the Dynamic Simulation Module.

Table 3.5 Variables of customer satisfaction

Elements	Item No.	Variables
Retail Service Quality	7.1.1	Personal interaction
	7.1.2	Policy
	7.1.3	Physical aspects
	7.1.4	Reliability
	7.1.5	Problem solving
Product Quality	7.2.1	Product features
	7.2.2	Aesthetics
	7.2.3	Customer-perceived quality
Advertising	7.3	How far are you satisfied with Hunter Douglas's marketing strategies including advertisements and promotions?
Efficiency of Order Completion	7.4	How far are you satisfied with the efficiency of Hunter Douglas in terms of the completion of your order?
Overall Satisfaction	7.5	To what degree does Hunter Douglas meet your purchasing expectations?

### ***3.4.3. The Sampling Process of the Customer Survey***

According to Lee (2007), a random selection of samples from a list can improve the external validity of the study, while clustering the samples together in different branches can increase internal validity. In addition, quota sampling can help measure the gender difference. To reduce the bias and improve the validity of the research, random sampling was adopted to select respondents for the survey.

Two data collection methods were adopted in the study, namely the phone survey and email survey. Each phone survey typically took around 20 minutes to conduct while the online questionnaire sent by email could be completed within 10 minutes. In both telephone survey and email survey, respondents were randomly selected from the customer list of Hunter Douglas Gallery.

The survey data were collected between March 2011 and June 2011. 100 phone calls

were made and 346 emails were sent. Only the questionnaires without any missing values and errors were used for further analysis in this research. Of the 446 questionnaires distributed to the existing Hunter Douglas's customers, 200 of them contributed to the final sample, indicating a response rate of 44.8% for this customer survey.

#### **3.4.4. *Statistical Methods***

In this research, all statistical analysis and tests are done at a confidence level of 95%, which is an arbitrary and commonly adopted confidence level (Zar, 1984). It represents a 95% assurance that the results obtained include the true value of the parameter(s). The various statistical methods used in this research are listed and explained in Table 3.6.

Table 3.6 Descriptions of the statistical methods used

Methods	Functions	Important Values
Factor Analysis	<ul style="list-style-type: none"> <li>To test the construct validity of all dimensions of retail service quality, product quality, and customer loyalty</li> <li>To provide a validated data construct for further analysis</li> </ul>	<ul style="list-style-type: none"> <li><b>Factor Loading:</b> It is the correlation coefficient between variables. For a sample size of 200, the variables with loading lower than 0.40 are not statistically significant. Therefore variables with loading less than 0.4 were deleted (Kaiser, 1974). Besides, all variables with cross loading were deleted (Kaiser, 1974).</li> <li><b>Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy:</b> Before factor analysis, KMO measure of sampling adequacy should be used to test whether the data is suitable for the purpose. The KMO value of the test is between 0 and 1. The closer the value is to 1, the higher correlation there is between variables, thus suitable for factor analysis (Kaiser, 1974). The accepting value should be greater than 0.5 and the recommended value is 0.7 or above. For those values below 0.5, it is necessary to consider either collecting more data or reconsidering which variables to include. Additionally, the test will be significant if the significance value is less than 0.05.</li> <li><b>Eigenvalue:</b> The sum of the eigenvalues equals the sum of the variables' variances. When variables are standardised, they have a variance of 1.0. This means that any components or factors whose eigenvalue is less than one retain less variance than one of the original variables. Consequently such components may be thought to convey less "information" than the original variables and should therefore be ignored (Kaiser, 1960).</li> <li><b>% of variance:</b> It is used to indicate how much total variance a factor can explain (Kaiser, 1960).</li> <li><b>Average variance extracted (AVE):</b> The AVE for each construct should exceed the variance that may be caused due to measurement errors for that construct (i.e. should exceed 0.5) so that the convergent validity of the measurement scales can be evaluated (Bagozzi and Yi, 1988). It is measured manually and the corresponding mathematical expression is:- <math>AVE = (X_1^2 + X_2^2 + X_3^2 + X_4^2 + \dots + X_n^2) / n</math> where <math>X_1, X_2, X_3, X_4, \dots, X_n</math> are the factor loading of the independent variables in each construct and <math>n</math> is the number of independent variables in the construct.</li> </ul>
Descriptive Statistics Analysis	<ul style="list-style-type: none"> <li>To provide a summary for the nominal variables</li> <li>To reveal the quantitative characteristics of the dataset</li> </ul>	<ul style="list-style-type: none"> <li><b>Arithmetic Mean:</b> Variables used were measured by a seven-point Likert scale in this research. The central tendency of respondents towards retail service quality, product quality, and customer loyalty can be determined by the mean values of different variables. A higher mean value represents a higher degree of agreement between the variables.</li> <li><b>Standard Deviation:</b> The variability of variables can be measured by the standard deviation. The smaller</li> </ul>



		the standard deviations, the more consistent the perspectives of the respondents.
Reliability Analysis	<ul style="list-style-type: none"> <li>● To test the internal reliability and consistency of the variables, including retail service quality, product quality, and customer loyalty</li> </ul>	<ul style="list-style-type: none"> <li>● <b>Cronbach's Alpha:</b> Cronbach's Alpha is to measure the level of internal reliability. The higher the value, the higher the level of internal reliability. To have a strong internal reliability, Cronbach's Alpha must not be smaller than 0.50, whereas the most desirable value is that it is equal to or higher than 0.70 (Cronbach, 1951).</li> </ul>
One Way Analysis of Variance (One Way ANOVA)	<ul style="list-style-type: none"> <li>● To find out the significant influence of gender difference gender on the dimensions regarding retail service and product qualities</li> </ul>	<ul style="list-style-type: none"> <li>● <b>P-value:</b> There is a significant difference between the two groups when the p-value is smaller than 0.05 (Levene, 1960).</li> </ul>
Multiple Regression	<ul style="list-style-type: none"> <li>● To explore the relationship between retail service quality and customer loyalty on both the store level and the employee level</li> </ul>	<ul style="list-style-type: none"> <li>● <b>P-value:</b> The independent variables have significant impact on the dependent variables if the p-value is less than 0.05.</li> <li>● <b>Beta:</b> It is a regression coefficient. The higher the value of the Beta is, the more influential the variable is. A negative beta value indicates a negative relationship.</li> <li>● <b>Variance Inflation Factor (VIF):</b> If the value of VIF is lower than 10, there is low multicollinearity among the independent variables and thus their inter-correlations are not high (Neter <i>et al.</i>, 1996).</li> <li>● <b>Coefficient of Determination (<math>R^2</math>):</b> The value ranges from 0 to 1. It represents how well the regression line approximates the real data points. It is a measure of how well the model is adopted. If <math>R^2</math> is 1, it means that all variations can be explained by the independent variable(s).</li> </ul>

### **3.4.5. *The System Dynamics Approach***

The system dynamics approach has been adopted to develop the dynamic simulation module in this research. The general approach of a dynamic modelling process involves five major steps, including problem articulation (boundary selection), dynamic hypothesis, formulation, testing, and policy formulation and evaluation (John, 2007). These steps can help identify problems existing in the CRM of the company and understand the causal relationships between customers and the company. A causal loop diagram and stock-and-flow diagram, which focus on solving the identified problems, can then be developed. Simulations of the dynamic simulation module can help the company effectively allocate resources, decide on better promotion strategies, and make important business decisions correctly with reference to the predicted outcomes, thus enhancing the CRM of the company and in turn drawing profitable insights. Computer software is often needed to create and simulate the dynamic simulation module based on the scenarios being studied. iThink is an easy-to-use and effective software, which is a system dynamics tool for communicating interdependencies between processes and problems. It facilitates the creation of models that simulate business processes and scenarios, pointing out the impacts of a new procedure or policy, and offering opportunities to fix undesirable outcomes (Kathy *et al.*, 1993).

To create the structure of the dynamic simulation module, the behavioural relationships are formulated through discussions with managers and stakeholders of Hunter Douglas Gallery as well as with the support of the literature review. Furthermore, historical data and survey results were, where appropriate, collected and used as the initial values in the dynamic simulation module when performing

simulations to estimate the behavioural relationships.

### **3.5. Computer Applications**

#### ***3.5.1. SPSS Used for Hypothesis Testing and Empirical***

In order to verify the hypotheses in the exploratory module, various statistical analysis and tests are required in this research as mentioned previously. To obtain better analysis results and facilitate the analysis process, the Statistical Package for Social Science (SPSS) was adopted. Data collected from the survey were coded by using SPSS, which then assists in performing the analytic tasks required in this research. SPSS is employed as the analytical tool in this research because of its easy availability and substantial power of statistical analysis and graphical presentations. It probably has been the most used comprehensive statistical computer package widely available to the marketing researchers (Forza, 2002). According to IBM (2011), SPSS is “a comprehensive, easy-to-use set of data and predictive analytics tools for business users, analysts, and statistical programmers”. Due to its ease-of-use features, it is suitable for beginners and experienced analysts. In addition, SPSS speeds and simplifies users’ analytic tasks to save time.

#### ***3.5.2. iThink Used for System Dynamics Modelling and Simulation***

Computer software application is needed for system dynamics modelling and simulation. Among different system dynamics software applications such as iThink, DYNAMO, Powersim, and Vensim, iThink is one of the most popular and effective simulation tool for system dynamics modeling released by High Performance Systems Inc. (Marzouk and Azab, 2014). The user-friendly interface

of iThink can facilitate the entire modelling process (Yuan, 2012). Studies using iThink for system dynamics have been increasingly popular (Marzouk and Azab, 2014; Thakker *et al.*, 2012; Yuan, 2012; Zhang *et al.*, 2014). Being a helpful and effective simulation tool, iThink was utilised for system dynamics modelling and simulation in this study. iThink uses a generic mapping language through a graphical interface that facilitates use by management level users. It can build simple graphical maps and simulation modules to associate the process structure with problematic process behaviour, and to illustrate the absolute necessity of adopting a high-level approach in process engineering (Kathy *et al.*, 1993). The models of iThink consist of two layers of operating environment, the high-level mapping layer and the model construction layer. The high-level mapping layer shows the main sectors in the potential simulation module, as well as the physical flows involved and information linkages between these sectors (Kambiz and Robert, 2000), whereas the model construction layer is used to construct graphical analysis which enables modelling building blocks to construct the formal model (Lai, 2002). Since iThink is designed on the basis of the system dynamics approach, it is useful to describe the structure and applications of system dynamics models in terms of different building blocks that represent different processes. The four basic building blocks are stocks, flows, converters, and connectors, which are the basic parts of speech in iThink language, as shown in Figure 3.4 and described below:-

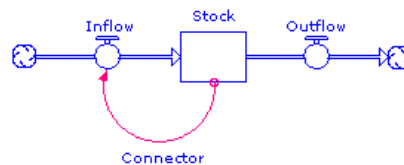


Figure 3.4 Symbols of building blocks of iThink

- Stocks: Stocks accumulate quantities within the system, such as cash, inventory, and population, which are tangible and physical accumulations. Intangible and non-physical stocks are also possible to be accumulated, such as skills, knowledge, and satisfaction. In system dynamics models, non-physical accumulations have to be quantifiable and included as they often are important factors in a system.
- Flows: Flows are the changes of stocks that occur during a period of time, such as revenue earned during the month. Examples of intangible flows associated with the intangible stocks include learning, building up satisfaction, and dissipating satisfaction. These flows will change the magnitude of stocks in a system.
- Converters: Converters are the other variable including constants, graphical relationships, and behavioural relationships. Converters are intermediate variables and can be substituted into flow equations if desired. They can contain equations that generate an output value in each time period. The advantages of converters are that they break complex flow equations into simpler components, making the model easier to be understood. Examples include birth fractions and life expectancy.
- Connectors: Connectors are used to transmit information and inputs that regulate flows. They can be connected to flows or converters but never to stocks. They serve as inputs to both inflows and outflows. For example, a connector could take information about the current number of employees and transmit that to the hiring flow, causing a change of the hiring rate and thus the number of employees.

In summary, using iThink software can help to plan, track, and predict the outcomes of a system. Going beyond spreadsheets and other linear approaches of business planning, iThink provides a whole system or big picture view of the entire operations (Kathy *et al.*, 1993). These views are based on dynamic modelling and systems thinking; all points of a system are included and can be examined or changed in any order, decisions that have negative impacts can be avoided, even including processes that may not appear to be immediately related. It is also helpful to use the system dynamics tool, iThink, to examine the customer relationship management of the company and then formulate strategic plans.

## **4. Derivation of the Exploratory Module**

The previous chapter discussed the research methodology, where hypothesis formulation of the exploratory module and statistical methods were explained. The development and analysis of the exploratory module based on the hypotheses stated in Chapter 3.2 are described and analysed in this chapter. This module can help decision makers identify major measures to improve retail service quality and product quality, as well as better understand their impacts on customer loyalty for strategy planning at a later stage.

### **4.1. The Framework of the Exploratory Module**

With the literature review, particularly that in Chapter 2.3, five major dimensions of retail service quality and three major dimensions of product quality were identified and they were found vital for customer loyalty. The exploratory module is constructed based on the following thirteen hypotheses described in Chapter 3.2, as shown in Figure 4.1.

H1a: Personal interaction exerts a positive influence on customer loyalty to the store.

H1b: Policy exerts a positive influence on customer loyalty to the store.

H1c: Physical aspects exert a positive influence on customer loyalty to the store.

H1d: Reliability exerts a positive influence on customer loyalty to the store.

H1e: Problem solving exerts a positive influence on customer loyalty to the store.

H2a: Feature exerts a positive influence on customer loyalty to the store.

H2b: Aesthetics exerts a positive influence on customer loyalty to the store.

H2c: Customer-perceived quality exerts a positive effect on customer loyalty to the store.

H3a: Personal interaction exerts a positive influence on customer loyalty to employees.

H3b: Policy exerts a positive influence on customer loyalty to employees.

H3c: Physical aspects exert a positive influence on customer loyalty to employees.

H3d: Reliability exerts a positive influence on customer loyalty to employees.

H3e: Problem solving exerts a positive influence on customer loyalty to employees.

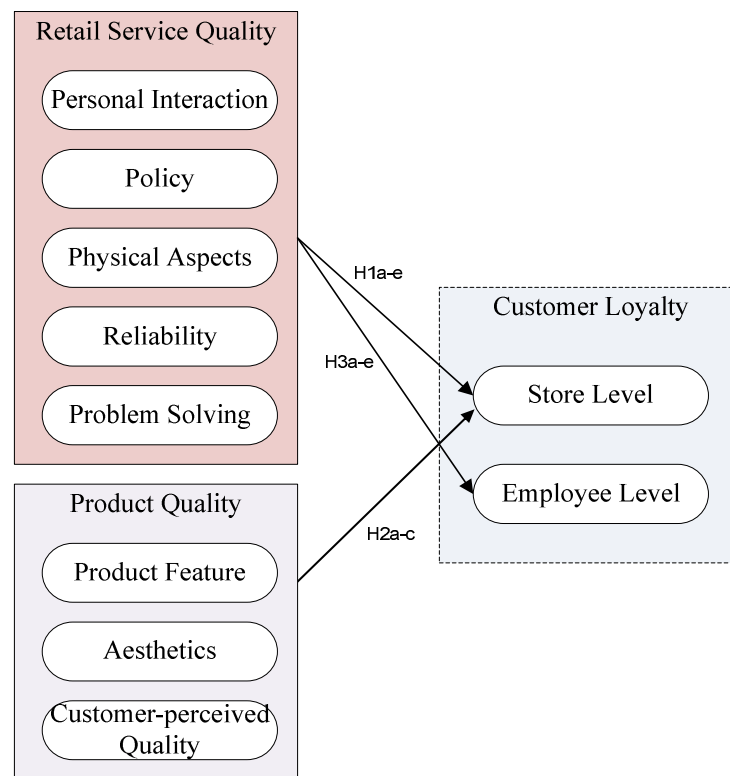


Figure 4.1 The framework of the exploratory module

Prior to evaluating the exploratory module, various statistical methods including factor analysis, calculation of average variance extracted (AVE) and calculation of Cronbach's alpha were used to assess the validity and reliability of the model framework. Such assessment tests could help identify major measures of retail service quality, product quality, and customer loyalty, making the post-analysis



meaningful and significant. Once the model framework is confirmed satisfactory, further investigation of the exploratory module could be performed. The analysis flowchart of the exploratory module is shown in Figure 4.2.

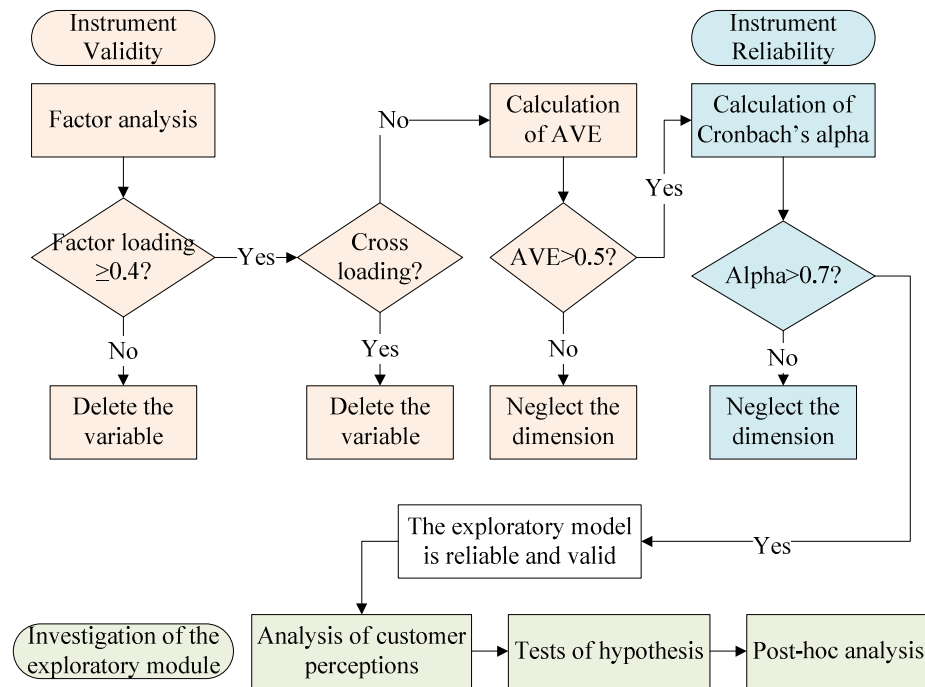


Figure 4.2 An analysis flowchart of the exploratory module

In order to test the exploratory module, data collection is necessary. A customer survey was therefore conducted and the data collected were then used for module testing. A description of the data collection and the customer survey can be found in Chapter 3. Statistical analyses such as regression analysis, one-way ANOVA, and post-hoc analysis, as discussed in Chapter 3, were also performed to evaluate the module. The impacts of retail service quality and product quality on customer loyalty were examined, while the impacts of gender differences on retail service and product quality are also explored. Moreover, customers' perceptions on retail service quality, product quality, and customer loyalty were also analysed.

## **4.2. Analysis and Results**

The analysis and results in regard to the exploratory module are presented in this section. The validity and reliability of the measurement instruments are assessed and discussed. Customers' perceptions on retail service quality, product quality, and customer loyalty are then investigated. Tests of the hypotheses are conducted, the results analysed and explained afterwards. In the last section, a post-hoc analysis is presented.

### ***4.2.1. Assessments of the Validity and Reliability of the Measurement Instruments***

The validity and reliability of the measurement instruments used in the proposed exploratory module are assessed. The results of the assessments show that it is meaningful to include the original five dimensions regarding retail service quality, three dimensions regarding product quality, and two dimensions regarding customer loyalty in the proposed exploratory module.

#### **4.2.1.1. Validity of the Instruments**

According to Fornell and Larcker (1981), there are two criteria to evaluate the convergent validity of the measurement scales. First, all the factor loadings of the indicators should be significant and exceed 0.70. Second, the average variance extracted (AVE) of each construct should exceed the variance caused by measurement errors in that dimension (i.e. AVE should exceed 0.5). In order to test the validity of the three major constructs (i.e. retail service quality, product quality, and customer loyalty) and their corresponding dimensions included in this study, factor analysis and the calculation of AVE are conducted.

A factor analysis is applied to evaluate the constructs by including relevant variables and excluding irrelevant variables so as to validate the module. In this research, 200 datasets were obtained from the customer survey and used. According to Kaiser (1974) and Janssens *et al.* (2008), a factor loading is statistically significant if it is equal to or greater than 0.4 for a sample size of 200 (see Table 4.1). Furthermore, Kaiser (1974) advocated that variables with cross loading are insignificant and require deletions. Therefore, variables with a factor loading lower than 0.4 and/or with cross loading had been removed in this study.

Table 4.1 Significant factor loadings for different sample sizes

<b>Factor loading</b>	<b>Sample size necessary to be significant (at the level of 0.50)</b>
0.3	350
0.35	250
0.4	200
0.45	150
0.5	120
0.55	100
0.6	85
0.65	70
0.7	60
0.75	50

The results of factor loading of all variables under the three constructs, i.e. retail service quality, product quality, and customer loyalty, are shown in Table 4.2, Table 4.3 and Table 4.4 respectively. Although the factor loadings of all variables are greater than 0.4 (Kaiser, 1974; Janssens *et al.*, 2008), cross loading is seen in some variables, thus have to be deleted. Regarding retail service quality (see Table 4.2), cross loading is seen in three variables - “Hunter Douglas handles your complaints immediately”, “Hunter Douglas handles your complaints directly”, and “Hunter Douglas shows sincere interest in solving your problems” - and therefore these three variables have been deleted. The resulting variables included in the construct of retail service quality are updated and shown in Table 4.5. In

regard to the variables under the construct of product quality, as no variables have a factor loading of less than 0.4 and/or cross loading, all variables remained (see Table 4.3). Concerning customer loyalty (see Table 4.4), the two variables – “You do not favour other department stores that offer curtains with more attractive prices” and “You do switch to other department stores when the quality of Hunter Douglas presently perceived discontinues” - were deleted due to cross loading. The resulting variables included in the construct of customer loyalty are shown in Table 4.6.

Table 4.2 The factor loading of all variables regarding retail service quality

Variables	Factor				
	1	2	3	4	5
Staff are courteous to customers	<b>.677</b>	.196	.171	.113	.195
Staff provide prompt quotations	<b>.692</b>	.189	.237	.207	.067
Staff provide accurate quotations	<b>.782</b>	.135	.140	.104	.233
Staff can be easily approached and consulted	<b>.843</b>	.106	.143	.022	.163
Staff provide accurate information about Hunter Douglas (e.g. history, opening hours and product information)	<b>.678</b>	.065	.119	.264	.042
Staff give personal attention	<b>.649</b>	.217	.113	.360	.136
You find the transactions with Hunter Douglas are safe	.207	<b>.838</b>	.194	.146	.059
Hunter Douglas accepts most major payment methods	.187	<b>.724</b>	.369	.093	.134
Operating hours of Hunter Douglas are convenient	.234	<b>.739</b>	.057	.177	.168
There are visually appealing physical facilities (such as display, shop decoration and tidiness) in Hunter Douglas	.199	.129	<b>.752</b>	.039	.094
There are visually appealing service materials (such as collection book and catalogue) in Hunter Douglas	.096	.284	<b>.744</b>	.065	.095
Staff of Hunter Douglas are dressed neatly and tidily	.204	.091	<b>.752</b>	.208	.172
Store layout makes it easy for you to find what you need	.197	.074	<b>.747</b>	.217	.181
The service promises (such as return, 3 years of warranty, and product quality) enhance the reliability of Hunter Douglas	.278	.211	.136	<b>.807</b>	.169
When Hunter Douglas promises to do something by certain time, it will do so (such as the delivery and installation time)	.322	.190	.149	<b>.769</b>	.164
Hunter Douglas handles your complaints immediately	.163	.081	.261	<b>.551</b>	<b>.503</b>
Hunter Douglas handles your complaints directly	.202	.056	.245	<b>.483</b>	<b>.650</b>
Hunter Douglas shows sincere interests in solving your problems	.173	.109	.263	<b>.509</b>	<b>.592</b>
The hotlines of Hunter Douglas are seldom busy	<b>.165</b>	.173	.123	.073	<b>.871</b>
You are satisfied with leaving message through the maintenance hotline	.163	.060	.127	.174	<b>.888</b>
Hunter Douglas quickly responds to your enquiries or complaints after you left voice messages via the maintenance hotline	.137	.099	.066	.050	<b>.909</b>

Deleted due to cross loading

Table 4.3 The factor loading of all variables regarding product quality

Variables	Factor		
	1	2	3
Hunter Douglas provides diverse types of blinds for your selection	<b>.795</b>	.196	.343
Hunter Douglas collections have a range of differentiated colours to cater for your needs	<b>.858</b>	.127	.281
Hunter Douglas collections have a range of differentiated materials to cater for your needs	<b>.888</b>	.080	.023
You are satisfied with the functions of blinds provided by Hunter Douglas (such as dust-resistance and UV-resistance)	<b>.754</b>	.323	.046
The blinds provided by Hunter Douglas have an appealing appearance	.203	<b>.917</b>	.170
The blinds provided by Hunter Douglas are stylish	.130	<b>.874</b>	.202
The blinds provided by Hunter Douglas are innovative	.222	<b>.924</b>	.170
Hunter Douglas provides products of high quality	.272	.379	<b>.752</b>
The blinds provided by Hunter Douglas have high durability	.128	.130	<b>.903</b>

Table 4.4 The factor loading of all variables regarding customer loyalty

Variables	Factor	
	1	2
You share positive opinions about Hunter Douglas with other people	<b>.700</b>	.378
You recommend Hunter Douglas to someone who seeks advice in curtains	<b>.727</b>	.385
You encourage relatives and friends to shop at Hunter Douglas	<b>.801</b>	.228
You consider Hunter Douglas as the first choice when buying curtain next few years	<b>.807</b>	.261
You do not favour other department stores that offer curtains with more attractive prices	<b>.770</b>	<b>.400</b>
Searching and switching to another new retail store is just not worth the time and effort	<b>.790</b>	.070
You do switch to other department stores when the quality presently perceived at Hunter Douglas discontinues	<b>.432</b>	<b>.414</b>
You want to build a good relationship with Hunter Douglas	<b>.685</b>	-.114
You are loyal to a particular staff	.276	<b>.760</b>
You have no intention to shop in the future because of a particular employee	-.024	<b>.889</b>

Deleted due to cross loading

Table 4.5 Resulting variables regarding retail service quality after the factor analysis

Variables	Factor				
	1	2	3	4	5
Staff are courteous to customers	<b>.688</b>	.203	.172	.079	.176
Staff provide prompt quotations	<b>.713</b>	.208	.235	.140	.033
Staff provide accurate quotations	<b>.782</b>	.134	.145	.101	.218
Staff can be easily approached and consulted	<b>.829</b>	.095	.145	.051	.156
Staff provide accurate information about Hunter Douglas (e.g. history, opening hours and product information)	<b>.700</b>	.085	.122	.201	.010
Staff give personal attention	<b>.662</b>	.222	.127	.335	.126
You find the transactions with Hunter Douglas are safe	.202	<b>.834</b>	.194	.157	.052
Hunter Douglas accepts most major payment methods	.211	<b>.747</b>	.360	.020	.098
Operating hours of Hunter Douglas are convenient	.236	<b>.740</b>	.060	.176	.161
There are visually appealing physical facilities (such as display, shop decoration and tidiness) in Hunter Douglas	.191	.125	<b>.757</b>	.040	.084
There are visually appealing service materials (such as collection book and catalogue) in Hunter Douglas	.097	.288	<b>.746</b>	.043	.076
Staff of Hunter Douglas are dressed neatly and tidily	.211	.095	<b>.766</b>	.182	.151
The store layout makes it easy for you to find what you need	.208	.082	<b>.761</b>	.181	.156
The service promises (such as return, 3 years of warranty, and product quality) enhance the reliability of Hunter Douglas	.271	.188	.185	<b>.863</b>	.192
When Hunter Douglas promises to do something by certain time, it will do so (such as the delivery and installation time)	.305	.158	.199	<b>.848</b>	.197
The hotlines of Hunter Douglas are seldom busy	.169	.163	.156	.098	<b>.887</b>
You are satisfied with leaving message through the maintenance hotline	.170	.055	.166	.191	<b>.893</b>
Hunter Douglas quickly responds to your enquiries or complaints after you left voice messages via the maintenance hotline	.135	.084	.102	.093	<b>.930</b>

Table 4.6 Resulting variables regarding customer loyalty after factor analysis

Variables	Factor	
	1	2
You share positive opinions about Hunter Douglas with other people	<b>.715</b>	.354
You recommend Hunter Douglas to someone who seeks advice in curtains	<b>.750</b>	.380
You encourage relatives and friends to shop at Hunter Douglas	<b>.806</b>	.215
You consider Hunter Douglas as the first choice when buying curtain next few years	<b>.809</b>	.243
Searching and switching to another new retail store is just not worth the time and effort	<b>.791</b>	.052
You want to build a good relationship with Hunter Douglas	<b>.689</b>	-.106
You are loyal to a particular employee	.306	<b>.788</b>
You have no intention to shop in the future because of a particular employee	-.010	<b>.890</b>

The validity of the factor analysis was tested using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy test and the Bartlett's test of Sphericity. The results of these two tests are exhibited in Table 4.7. First, applying the KMO measure of sampling adequacy test to retail service quality, product quality and customer loyalty resulted in values of 0.858, 0.819, and 0.878 respectively, which were greater than the recommended value of 0.7 (Kaiser, 1970; 1974) and indicated a meritorious degree of common variance (see Table 4.8). Second, the values ( $p = 0.000$ ) of the Bartlett's test of Sphericity for the three constructs are significant, thereby proving the factor analysis appropriate and valid. These results jointly indicated that the structural model has satisfactory fit and is meaningful.

Table 4.7 Results of KMO and Bartlett's test on retail service quality

	<b>Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy Test</b>	<b>Sig. of Bartlett's Test of Sphericity</b>
<b>Retail service quality</b>	0.858	0.000
<b>Product quality</b>	0.819	0.000
<b>Customer loyalty</b>	0.878	0.000

Table 4.8 An interpretation of the KMO measure (Janssens, 2008)

<b>KMO Value</b>	<b>Degree of Common Variance</b>
0.90 to 1.00	Marvellous
0.80 to 0.89	Meritorious
0.70 to 0.79	Middling
0.60 to 0.69	Mediocre
0.50 to 0.59	Miserable
0.00 to 0.49	Don't Factor

Apart from factor analysis, the calculation of AVE is also required to test the validity of the instrument. The correlation matrices of the datasets obtained from the customer survey and the results of the calculation of the AVEs are shown in Table 4.9, Table 4.10 and Table 4.11. The correlation matrices were used to examine all potentially overlapping constructs and to calculate the AVEs of the



corresponding dimensions. As shown in the tables, the AVEs of the dimensions all exceed 0.5, showing convergent validity for all the dimensions under the three constructs according to Fornell and Larcker (1981). Furthermore, the construct is confirmed valid if the AVE is greater than the squared correlation between the construct and other constructs (Fornell and Larcker, 1981). With reference to Table 4.9, Table 4.10 and Table 4.11, as all of the diagonal elements, which are the square root of the AVEs of the corresponding dimensions, are higher than the correlation coefficient between the target dimensions, the discriminant validity of all the dimensions in this study is assured. As a result, the three constructs are proved to be valid and in other words, the three constructs are relevant and there are no irrelevant constructs.

Table 4.9 The correlation matrix and resulted AVE regarding retail service quality

	<b>AVE</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Personal Interaction</b>	0.535	0.731	-	-	-	-
<b>Policy</b>	0.600	0.510**	0.775	-	-	-
<b>Physical Aspects</b>	0.619	0.471**	0.484**	0.787	-	-
<b>Reliability</b>	0.732	0.549**	0.430**	0.425**	0.856	-
<b>Problem Solving</b>	0.820	0.379**	0.310**	0.329**	0.406**	0.906

\*\* The correlation is significant at the level of 0.01.

Table 4.10 The correlation matrix and resulted AVE regarding product quality

	<b>AVE</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>Product Features</b>	0.681	0.825	-	-
<b>Aesthetics</b>	0.820	0.442**	0.672	-
<b>Customer-perceived Quality</b>	0.690	0.451**	0.483**	0.831

\*\* The correlation is significant at the level of 0.01.

Table 4.11 The correlation matrix and resulted AVE regarding customer loyalty

	<b>AVE</b>	<b>1</b>	<b>2</b>
<b>Customer Loyalty to the Store</b>	0.580	0.762	-
<b>Customer Loyalty to Employees</b>	0.707	0.376**	0.841

\*\* The correlation is significant at the level of 0.01.

#### **4.2.1.2. Reliability of the Instrument**

According to the results of the factor analysis, eighteen variables in regard to retail service quality are categorised into five dimensions (see Table 4.12), including personal interaction, policy, physical aspects, reliability, and problem solving. Nine variables with regard to product quality are classified into three dimensions (see Table 4.13), namely product features, aesthetics, and customer-perceived quality. Eight variables regarding customer loyalty are categorised into two dimensions, which are customer loyalty to staff and that to employees (see Table 4.14). After the structure of each construct is formed, its reliability should be tested.

Reliability refers to the extent to which a construct is free from errors and yields consistent results. Cronbach's alpha was used to measure the internal consistency of the multiple items used in this study. After carrying out the reliability tests for various dimensions of service quality, product quality and customer loyalty (see Table 4.12, Table 4.13 and Table 4.14), it was shown that the Cronbach's alpha values of all of the dimensions are over the acceptable value of 0.7 as suggested by Nunnally (1978), and it can be claimed that they are all reliable. Moreover, the content validity of the variables is acceptable as some variables had been used in past studies, and the questionnaire was validated by the managerial staff from Hunter Douglas Gallery before being administered. The eigenvalues for the three constructs are also in excess of 1.0 (as suggested by Kaiser, 1960), and accounted for 73.558%, 82.076% and 67.171% of the total variances respectively, indicating that the latest structural model is meaningful and incorporates as many reliable factors as possible. The results of the reliability tests confirm that there is good

internal consistency of the variables under each construct.

Table 4.12 Results of reliability tests for retail service quality

<b>Dimensions</b>
<b>Factor 1: Personal Interaction</b> (Cronbach's alpha = 0.826, Eigenvalue = 7.320, % of Variance = 40.668)
Staff are courteous to customers
Staff provide prompt quotations
Staff provide accurate quotations
Staff can be easily approached and consulted
Staff provide accurate information about Hunter Douglas (e.g. history, opening hours and product information)
Staff give personal attention
<b>Factor 2: Policy</b> (Cronbach's alpha = 0.804, Eigenvalue = 1.959, % of Variance = 10.884)
You find the transactions with Hunter Douglas are safe
Hunter Douglas accepts most major payment methods
Operating hours of Hunter Douglas are convenient
<b>Factor 3: Physical Aspects</b> (Cronbach's alpha = 0.824, Eigenvalue = 1.674, % of Variance = 9.301)
There are visually appealing physical facilities(such as display, shop decoration and tidiness) in Hunter Douglas
There are visually appealing service materials (such as collection book and catalogue) in Hunter Douglas.
Staff of Hunter Douglas are dressed neatly and tidily
The store layout makes it easy for you to find what you need
<b>Factor 4: Reliability</b> (Cronbach's alpha = 0.936, Eigenvalue = 1.213, % of Variance = 6.741)
The service promises (such as return, 3 years of warranty, and product quality) enhance the reliability of Hunter Douglas
When Hunter Douglas promises to do something by certain time, it will do so (such as the delivery and installation time)
<b>Factor 5: Problem Solving</b> (Cronbach's alpha = 0.939, Eigenvalue = 1.073, % of Variance = 5.964)
The hotlines of Hunter Douglas are seldom busy
You are satisfied with leaving message through maintenance hotline
Hunter Douglas quickly responds to your enquiries or complaints after you left voice messages via the maintenance hotline

Table 4.13 Results of reliability tests for product quality

<b>Dimensions</b>
<b>Factor 1 Product Features</b> (Cronbach's alpha = 0.883, Eigenvalue = 4.781, % of Variance = 52.423)
Hunter Douglas provides diverse types of blinds for your selection
Hunter Douglas collections have a range of differentiated colours to cater for your needs
Hunter Douglas collections have a range of differentiated materials to cater for your needs
You are satisfied with the functions of blinds provided by Hunter Douglas (such as dust-resistance and UV-resistance)
<b>Factor 2 Aesthetics</b> (Cronbach's alpha = 0.938, Eigenvalue = 1.651, % of Variance = 18.347)
The blinds provided by Hunter Douglas have an appealing appearance
The blinds provided by Hunter Douglas are stylish
The blinds provided by Hunter Douglas are innovative
<b>Factor 3 Customer-perceived Quality</b> (Cronbach's alpha = 0.760, Eigenvalue = 1.018, % of Variance = 11.306)
Hunter Douglas provides products of high quality
The blinds provided by Hunter Douglas have high durability

Table 4.14 Results of reliability tests for customer loyalty

<b>Dimensions</b>
<b>Factor 1 Customer Loyalty to Store</b> (Cronbach's alpha = 0.871, Eigenvalues = 4.105, % of Variance = 51.317)
You share positive opinions about Hunter Douglas with other people
You recommend Hunter Douglas to someone who seeks advice in curtains
You encourage relatives and friends to shop at Hunter Douglas
You consider Hunter Douglas as the first choice when buying curtain next few years
Searching and switching to another new retail store is just not worth the time and effort
You want to build a good relationship with Hunter Douglas
<b>Factor 2 Customer Loyalty to Employee</b> (Cronbach's alpha = 0.704, Eigenvalues = 1.268, % of Variance = 15.854)
You are loyal to a particular employee
You have no intention to shop in the future because of a particular employee

The details of the factor composition under each construct are explained below:

For retail service quality, eighteen variables were classified into five factors (see Table 4.12).

- Factor 1 represents “personal interaction”, which is composed of six variables. It accounts for 40.668% of the total variance, which is the largest possible part of the total variance. Variables in this factor reflect that the service provided by employees greatly influences the perceptions of customers.

- Factor 2 is “policy”, which is composed of three variables and accounted for an additional 10.884% of the variance. All variables in this factor are related to the company’s internal policies.
- Factor 3 is “physical aspects”, which consists of four variables. It accounts for an additional 9.301% of the variance. Variables in this factor are related to the design of the store layout and the physical appearance of the store. It helps establish the image of the store as it is a kind of intangible service which affects customers’ perceptions.
- Factor 4 represents “reliability”. This consists of two variables, accounting for an additional 6.741% of the variance. It refers to the promises made by the store and how much customers trust the store.
- Factor 5 represents “problem solving”, which originally contains six variables. However, some variables were deleted due to cross loading (see Table 4.2). The remaining three variables accounts for an additional 5.964% of the variance. These variables are related to problem solving skills and complaint handling skills of the store which both have a great influence on customers’ appraisal of retail service quality.

For product quality, nine variables are categorised into three factors (see Table 4.13).

- Factor 1 represents “product features”, which is composed of four variables. It accounts for 52.423% of total variance. All variables in this factor are related to the product features and the range of choices provided by Hunter Douglas.
- Factor 2 represents “aesthetics”, which includes three variables. It accounts

for an additional 18.347% of the total variance. Variables in this factor are related to a user-based approach on how a product looks and feels. They are clearly matters of personal judgment and reflections of individual preference (Garvin, 1984).

- Factor 3 represents “customer-perceived quality”, which includes three variables. It accounts for an additional 11.306% of the total variance. Variables in this factor are related to the customers’ perception on a product’s quality based on the reputation of Hunter Douglas. It frequently relies on indirect measures when comparing brands (Garvin, 1984).

For customer loyalty, eight variables were classified into two factors (see Table 4.14).

- Factor 1 represents “customer loyalty to the store”, which originally is composed of eight variables. However, some variables were deleted due to cross loading (see Table 4.4). After deleting these two variables, only six variables remain. This factor accounts for 51.317% of the total variance. Variables in this factor are used to evaluate the customers’ loyalty to the store.
- Factor 2 represents “customer loyalty to employees”, which includes two variables. It accounts for an additional 15.854% of the total variance. Variables in this factor are used to assess the customers’ loyalty to the sales associates in Hunter Douglas.

#### ***4.2.2. Rank Order of Customer Perceptions on Retail Service Quality, Product Quality, and Customer Loyalty***

Table 4.15 shows the mean scores of the five dimensions regarding retail service quality. As the mean scores of the five dimensions are all above four on a seven-point Likert scale, it is suggested that the respondents had a positive attitude towards the retail service quality of the store. Comparing the five dimensions, “personal interaction” acquired the highest mean score (mean=5.17), reflecting that the respondents were generally satisfied with the service provided by the sales associates from Hunter Douglas Gallery. Among all dimensions, respondents were most satisfied with the variable “Staff are courteous to customers” (mean 5.36). Furthermore, variables in the dimension of “personal interaction” all scored higher than 5. It is believed that customers are quite satisfied with the personal service provided by the staff in Hunter Douglas Gallery as staff do well in giving personal care and attention to customers. These results are in fact consistent to the survey on after-sales service carried out by Hunter Douglas Gallery in 2010, indicating that customers highly appreciate staff performance, in particular the courtesy of staff. It is therefore believed that the survey conducted and analysed in this study has a high degree of accuracy. The questionnaire of this survey and the analysis of its results are shown in Appendices 2 and 3 respectively.

Problem solving received the lowest mean score among the five dimensions. Within the dimension, the variable “You are satisfied with leaving messages through the maintenance hotline” scored the lowest (mean=4.28). Meanwhile, this variable was also by far the least satisfactory one among all individual variables

regarding retail service quality. The results suggested that the company would perform better if it focused more on its hotline policy.

Table 4.15 Mean scores of retail service quality

<b>Dimensions</b>	<b>Mean*</b>
<b>Factor 1 Personal Interaction</b>	<b>5.17</b>
Staff are courteous to customers	5.36
Staff provide prompt quotations	5.06
Staff provide accurate quotations	5.15
Staff can be easily approached and consulted	5.21
Staff provide accurate information about Hunter Douglas (e.g. history, opening hours and product information)	5.18
Staff give personal attention	5.07
<b>Factor 2 Policy</b>	<b>4.94</b>
You find the transactions with Hunter Douglas are safe	4.88
Hunter Douglas accepts most major payment methods	5.01
Operating hours of Hunter Douglas are convenient	4.92
<b>Factor 3 Physical Aspects</b>	<b>4.92</b>
There are visually appealing physical facilities (such as display, shop decoration and tidiness) in Hunter Douglas	4.69
There are visually appealing service materials (such as collection book and catalogue) in Hunter Douglas.	4.68
Staff of Hunter Douglas are dressed neatly and tidily	5.08
The store layout makes it easy for you to find what you need	5.21
<b>Factor 4 Reliability</b>	<b>4.72</b>
The service promises (such as return, 3 years of warranty, and product quality) enhances the reliability of Hunter Douglas	4.73
When Hunter Douglas promises to do something by a certain time, it will do so (such as the delivery and installation time)	4.7
<b>Factor 5 Problem Solving</b>	<b>4.33</b>
The hotlines of Hunter Douglas are seldom busy	4.4
You are satisfied with leaving messages through maintenance hotline	4.28
Hunter Douglas quickly responds to your enquiries or complaints after you left voice messages via the maintenance hotline	4.32

\* 1- strongly disagree and 7 - strongly agree

Table 4.16 shows the mean scores of the three dimensions regarding product quality. The mean scores of the three dimensions are all above 5 and indicated that respondents generally have a positive attitude towards the product quality of Hunter Douglas. Comparing the three dimensions regarding product quality, Aesthetics scored the highest (mean=5.52), reflecting that the respondents were generally satisfied with the window blinds provided by Hunter Douglas. Among the dimensions, respondents were most satisfied with the variable “The blinds provided by Hunter Douglas are innovative” (mean=5.59).



Table 4.16 Mean scores of product quality

<b>Dimensions</b>	<b>Mean*</b>
<b>Factor 1 Product Features</b>	<b>5.30</b>
Hunter Douglas provides diverse types of blinds for your selection	5.31
Hunter Douglas collections have a range of differentiated colours to cater for your needs	5.31
Hunter Douglas collections have a range of differentiated materials to cater for your needs	5.16
You are satisfied with the functions of Hunter Douglas blinds (such as dust-resistance and UV-resistance)	5.40
<b>Factor 2 Aesthetics</b>	<b>5.52</b>
The blinds provided by Hunter Douglas have an appealing appearance	5.43
The blinds provided by Hunter Douglas are stylish	5.53
The blinds provided by Hunter Douglas are innovative	5.59
<b>Factor 3 Customer-perceived Quality</b>	<b>5.40</b>
Hunter Douglas provides products of high quality	5.30
The blinds of Hunter Douglas have high durability	5.49

\* 1- strongly disagree and 7 - strongly agree

A summary of the respondents' ratings for customer loyalty is shown in Table 4.17. A mean score of 4.07 is resulted as far as customer loyalty to the company is concerned, slightly above the midpoint of 4. For customer loyalty to employees, the score was higher, at 4.88. This showed that the customers have a higher loyalty level to the employees than to the store. The results reinforced the importance of relationships between service or product providers and their customers (Barnes, 1997).

Table 4.17 Mean scores of customer loyalty

<b>Dimensions</b>	<b>Mean*</b>
<b>Factor 1 Customer Loyalty to the Store</b>	<b>4.07</b>
You share positive opinions about Hunter Douglas with other people	4.57
You recommend Hunter Douglas to someone who seeks advice in curtains	4.50
You encourage relatives and friends to shop at Hunter Douglas	4.27
You consider Hunter Douglas as the first choice when buying curtain next few years	4.03
Searching and switching to another new retail store is just not worth the time and effort	3.52
You want to build a good relationship with Hunter Douglas	3.55
<b>Factor 2 Customer Loyalty to the Employee</b>	<b>4.88</b>
You are loyal to a particular employee	5.08
You have no intention to shop in the future because of a particular employee	4.68

\* 1- strongly disagree and 7 - strongly agree

#### ***4.2.3. Discrepancy in Perception on Retail Service Quality, Product Quality, and Customer Loyalty Due to Gender Differences***

ANOVA was used in this research to find out the significant differences in perception on retail service quality, product quality, and customer loyalty between male and female customers.

For retail service quality, significant differences were found in the dimensions of “personal interaction” ( $p=0.035$ ) and “policy” ( $p=0.001$ ) (see Table 4.18). The mean scores are higher for female than male in these two dimensions. “Policy” was found to have the largest perception differences between male and female respondents. Within the dimension, significant difference was found in the variable “Operating hours of Hunter Douglas are convenient”.

Table 4.18 Difference of the results of retail service quality due to gender difference

<b>Dimensions</b>	<b>Male</b>	<b>Female</b>	<b>Sig. *</b>
<b>Personal Interaction</b>	<b>5.06</b>	<b>5.28</b>	<b>0.035*</b>
Staff are courteous to customers	5.25	5.47	0.98
Staff provide prompt quotations	4.84	5.28	0.001**
Staff provide accurate quotations	5.01	5.28	0.041*
Staff can be easily approached and consulted	5.10	5.31	0.113
Staff provide accurate information about Hunter Douglas (e.g. history, opening hours and product information)	5.15	5.21	0.676
Staff give personal attention	4.98	5.15	0.263
<b>Policy</b>	<b>4.69</b>	<b>5.17</b>	<b>0.001</b>
You find the transactions with Hunter Douglas are safe	4.63	5.12	0.003**
Hunter Douglas accepts most major payment methods	4.81	5.20	0.016*
Operating hours of Hunter Douglas are convenient	4.64	5.19	0.001**
<b>Physical Aspects</b>	<b>4.91</b>	<b>4.92</b>	<b>0.949</b>
There are visually appealing physical facilities (such as display, shop decoration and tidiness) in Hunter Douglas	4.73	4.65	0.602
There are visually appealing service materials (such as collection book and catalogue) in Hunter Douglas	4.59	4.77	0.237
Staff of Hunter Douglas are dressed neatly and tidily	5.14	5.01	0.363
Store layout makes it easy for you to find what you need	5.18	5.24	0.658
<b>Reliability</b>	<b>4.71</b>	<b>4.73</b>	<b>0.893</b>
The service promises (such as return, 3 years of warranty, and product quality) enhances the reliability of Hunter Douglas	4.74	4.72	0.897
When Hunter Douglas promises to do something by a certain time, it will do so (such as the delivery and installation time)	4.67	4.73	0.694
<b>Problem Solving</b>	<b>4.27</b>	<b>4.35</b>	<b>0.547</b>
The hotlines of Hunter Douglas are seldom busy	4.26	4.42	0.271
You are satisfied with leaving messages through the maintenance hotline	4.28	4.28	1
Hunter Douglas quickly responds to your enquiries or complaints after you left voice messages via the maintenance hotline	4.27	4.36	0.544

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

For product quality, a significant difference was found in Product Feature ( $p=0.046$ ) with reference to Table 4.19. The mean scores were higher for male than female in this dimension. Two variables in this factor show noticeable difference, and they are “Hunter Douglas collections have a range of differentiated colours to cater for your needs” (mean difference=0.38) and “Hunter Douglas collections have a range of differentiated materials to cater for your needs” (mean difference=0.38). The results indicated that male respondents are more satisfied with the choice of blinds provided by Hunter Douglas.

Table 4.19 Difference of the results of product quality due to gender difference

<b>Dimensions</b>	<b>Male</b>	<b>Female</b>	<b>Sig. *</b>
<b>Product Features</b>	<b>5.43</b>	<b>5.16</b>	<b>0.046*</b>
Hunter Douglas provides diverse types of blinds for your selection	5.47	5.15	0.043*
Hunter Douglas collections have a range of differentiated colours to cater for your needs	5.5	5.12	0.013*
Hunter Douglas collections have a range of differentiated materials to cater for your needs	5.35	4.97	0.027*
You are satisfied with the functions of the blinds provided by Hunter Douglas (such as dust-resistance and UV-resistance)	5.40	5.40	1
<b>Aesthetics</b>	<b>5.45</b>	<b>5.58</b>	<b>0.339</b>
The blinds provided by Hunter Douglas have an appealing appearance	5.54	5.63	0.51
The blinds provided by Hunter Douglas are stylish	5.34	5.52	0.219
The blinds provided by Hunter Douglas are innovative	5.47	5.58	0.425
<b>Customer-perceived Quality</b>	<b>5.46</b>	<b>5.33</b>	<b>0.339</b>
Hunter Douglas provides products of high quality	5.55	5.43	0.401
The blinds of Hunter Douglas have high durability	5.36	5.23	0.378

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

For customer loyalty, significant difference is found in “customer loyalty to the store” (p=0.026), referring to Table 4.20. The mean scores are higher for male than female in this dimension. One variable shows the most significant difference in this factor, namely “You want to build a good relationship with Hunter Douglas” (p=0.009). It indicated that male respondents are more willing to build a good relationship with Hunter Douglas than the females.

Table 4.20 Difference of the results of customer loyalty due to gender difference

<b>Dimensions</b>	<b>Male</b>	<b>Female</b>	<b>Sig. *</b>
<b>Customer Loyalty to Store</b>	<b>4.23</b>	<b>3.92</b>	<b>0.026*</b>
You share positive opinions about Hunter Douglas with other people	4.59	4.55	0.805
You recommend Hunter Douglas to someone who seeks advice in curtains	4.64	4.35	0.093
You encourage relatives and friends to shop at Hunter Douglas	4.45	4.09	0.035*
You consider Hunter Douglas as the first choice when buying curtain next few years	4.17	3.89	0.119
Searching and switching to another new retail store is just not worth the time and effort	3.17	3.32	0.048*
You want to build a good relationship with Hunter Douglas	3.8	3.29	0.009**
<b>Customer Loyalty to Employee</b>	<b>4.74</b>	<b>5.02</b>	<b>0.103</b>
You are loyal to a particular employee	4.94	5.21	0.141
You have no intention to shop in the future because of a particular employee	4.53	4.82	0.163

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

#### **4.2.4. Test of Hypothesis**

Multiple regression is a highly general and flexible data analytic method, particularly for analysing the strength of relationships (Cohen *et al.*, 2013) and handling interactions between quantitative variables (Cohen, 1968). Therefore, it is adopted in this research to explore the relationship between retail service quality and customer loyalty on both the store level and the employee level.

Multiple regression was employed with the five dimensions regarding retail service quality and the three dimensions regarding product quality that are used as independent variables, with customer loyalty to the store and to the staff as dependent variables. The confidence level for this empirical study was set at the level of 95%.

Previous studies reported that individual perceptions and behaviours may differ according to personal factors such as gender, education, and age (Agarwal and Prasad, 1999; Frankel, 1990; Gefen and Straub, 1997; Venkatesh and Morris, 2000; Venkatesh *et al.*, 2003). These factors (i.e., age, average monthly income and gender in the questionnaire shown in Appendix 1) are therefore included as the control variables in this study. Several regression analyses are conducted to study the relationships among retail service quality, product quality and customer loyalty, elucidated as follows:-

- (i) *A Regression analysis of the influence of retail service quality and product quality on customer loyalty to the store*

The influence of “retail service quality” and “product quality” on “customer loyalty to store” are shown in Table 4.21. In this regression analysis, potential confounding effects of age, income and gender had been included

as the control variables at the first step. At the second step, the five dimensions regarding retail service quality and three dimensions regarding product quality were introduced into the regression model. The  $R^2$  of attitudes towards customer loyalty for step one and step two (including the main effect) were 0.04 and 0.436 respectively. The  $R^2$  (being 0.436) was increased by 0.396 merely because of the control variables, which is a big jump for the explained variance, implying that the five dimensions regarding retail service quality and three dimensions regarding product quality were dominant factors that explain customer loyalty to the store.

Besides, referring to Table 4.22, the variance inflation factor (VIF) values of the eight dimensions ranged from 1.334 to 1.781, which were acceptable since all these values were lower than 10 (Neter *et al.*, 1996). It indicated that there is low multicollinearity among the dimensions and their inter-correlations are low. As they have low inter-correlations and are not similar to each other, it is appropriate to divide them into eight different dimensions when their impacts on customer loyalty are assessed.

From Table 4.21, the three dimensions regarding retail service quality, namely “physical aspects” ( $p=0.003$ ,  $Beta=0.206$ ), “reliability” ( $p=0.000$ ,  $Beta=0.369$ ) and “problem solving” ( $p=0.031$ ,  $Beta=0.138$ ), are found to have a significant impact on customer loyalty at the store level, as its regression model is significant at  $p<0.01$ . “Reliability” was by far the most significant dimension, followed by “physical aspect” and “problem solving”. For the value of Beta, the higher the value of Beta, the more influential the

variable. Among the significant dimensions, the Beta values of “physical aspects”, “reliability” and “problem solving” were 0.206, 0.369 and 0.138 respectively, indicating that their associations are moderate. As a result, hypotheses H1c, H1d, H1e are supported. On the other hand, as “personal interaction”, “policy”, “product feature”, “aesthetics” and “customer-perceived quality” do not have a significant impact on customer loyalty to the store, hypotheses H1a, H1b, H2a, H2b and H2c are rejected. The summarised relationship is shown in Figure 4.3 and Table 4.26.

With reference to Table 4.21, it is noted that one of the control variables, gender, had a significant impact on customer loyalty to the store. To further investigate, a post-hoc analysis was conducted to isolate exactly where the significant differences lie. Such an analysis will be discussed in the next section.

Table 4.21 Results of the regression analysis on customer loyalty to the store

	Step 1		Step 2	
	Beta	Sig.	Beta	Sig.
<b>Control Variables</b>				
Age	-1.24	0.086	-0.013	0.821
Income	0.006	0.939	0.030	0.617
Gender	-1.52	0.038*	-0.175	0.005*
<b>Dimensions</b>				
Personal Interaction			-0.023	0.753
Policy			0.113	0.110
Physical Aspects			0.206	0.003**
Reliability			0.369	0.000***
Problem Solving			0.138	0.031*
Features			-0.041	0.528
Aesthetics			-0.110	0.101
Customer-perceived Quality			0.100	0.147
<b>Model Information</b>				
R <sup>2</sup>		0.04		0.436
R <sup>2</sup> change from previous step				0.396

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

Table 4.22 VIF of the dimensions regarding retail service quality and product quality

<b>Dimensions</b>	<b>VIF</b>
Personal Interaction	1.781
Policy	1.659
Physical Aspects	1.601
Reliability	1.721
Problem Solving	1.334
Features	1.395
Aesthetics	1.477
Customer-perceived Quality	1.561

(ii) *A Regression analysis of retail service quality on customer loyalty to employees*

Table 4.23 shows the regression analysis on customer loyalty to staff. For this regression analysis, potential confounding effects of age, income and gender had been included as the control variables at the first step. At the second step, the five dimensions regarding retail service quality and three dimensions regarding product quality were introduced into the regression model. From Table 4.23, it indicates that the three dimensions regarding product quality did not have any significant impacts on customers' loyalty to employees. It provides additional evidence to support the accuracy of the hypothesis model proposed primarily, since the hypothesis model shown in Figure 3.2 suggested that product quality does not have positive influences on customer loyalty to employees. For this reason, a regression analysis on customer loyalty to employees, excluding the dimensions regarding product quality, was conducted and its results are presented in Table 4.24.

Furthermore, the  $R^2$  of attitude towards customer loyalty for steps one and two (including the main effect) were 0.013 and 0.217 respectively. The  $R^2$  (being 0.217) increased by 0.204, meaning that the five dimensions regarding retail service quality are the principal factors that explain customer loyalty to



employees.

- (iii) According to Table 4.25, the VIF values of the eight dimensions range from 1.311 to 1.774, which were acceptable since all these values are lower than 10 (Neter *et al.*, 1996). It implied that there is low multicollinearity among the dimensions and their inter-correlations are low. As they have low inter-correlations and are not similar to each other, it is meaningful and suitable to divide them into five different dimensions when customer loyalty to employees is assessed.

Referring to the results shown in Table 4.24, only the dimension “personal interaction” regarding retail service quality ( $p=0.000$ ) was positively related to customers’ loyalty to employees. The corresponding Beta value is 0.310, implying that the variable has a moderate relationship to customers’ loyalty to employees. In summary, only hypothesis H3a is supported while hypotheses H3b, H3c, H3d, and H3e have been rejected. The summarised relationship is shown in Figure 4.3 and Table 4.26. As seen from Table 4.24, none of the control variables have significant impacts on customers’ loyalty to employees. So, a post-hoc analysis is not conducted on any one of the control variables.

Table 4.23 Results of the regression analysis on customer loyalty to employees

	Step 1		Step 2	
	Beta	Sig.	Beta	Sig.
<b>Control Variables</b>				
Age	0.003	0.966	0.071	0.297
Income	-0.011	0.889	0.005	0.938
Gender	0.113	0.128	0.053	0.454
<b>Dimensions</b>				
Personal Interaction			0.317	0.000***
Policy			0.019	0.814
Physical Aspects			0.065	0.425
Reliability			0.133	0.115
Problem Solving			0.006	0.935
Features			-0.121	0.110
Aesthetics			-0.042	0.586
Customer-perceived Quality			0.093	0.246
<b>Model Information</b>				
R <sup>2</sup>	0.013		0.232	
R <sup>2</sup> change from previous step			0.219	

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

Table 4.24 Results of the regression analysis on customer loyalty to employees (Excluding the dimensions regarding product quality)

	Step 1		Step 2	
	Beta	Sig.	Beta	Sig.
<b>Control Variables</b>				
Age	0.003	0.966	0.083	0.220
Income	-0.011	0.889	0.011	0.878
Gender	0.113	0.128	0.065	0.356
<b>Dimensions</b>				
Personal Interaction			0.310	0.000***
Policy			0.014	0.863
Physical Aspects			0.075	0.351
Reliability			0.151	0.069
Problem Solving			-0.002	0.980
<b>Model Information</b>				
R <sup>2</sup>	0.103		0.217	
R <sup>2</sup> change from previous step			0.204	

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

Table 4.25 VIF of the dimensions regarding retail service quality

<b>Dimensions</b>	<b>VIF</b>
Personal Interaction	1.774
Policy	1.649
Physical Aspects	1.589
Reliability	1.654
Problem Solving	1.311

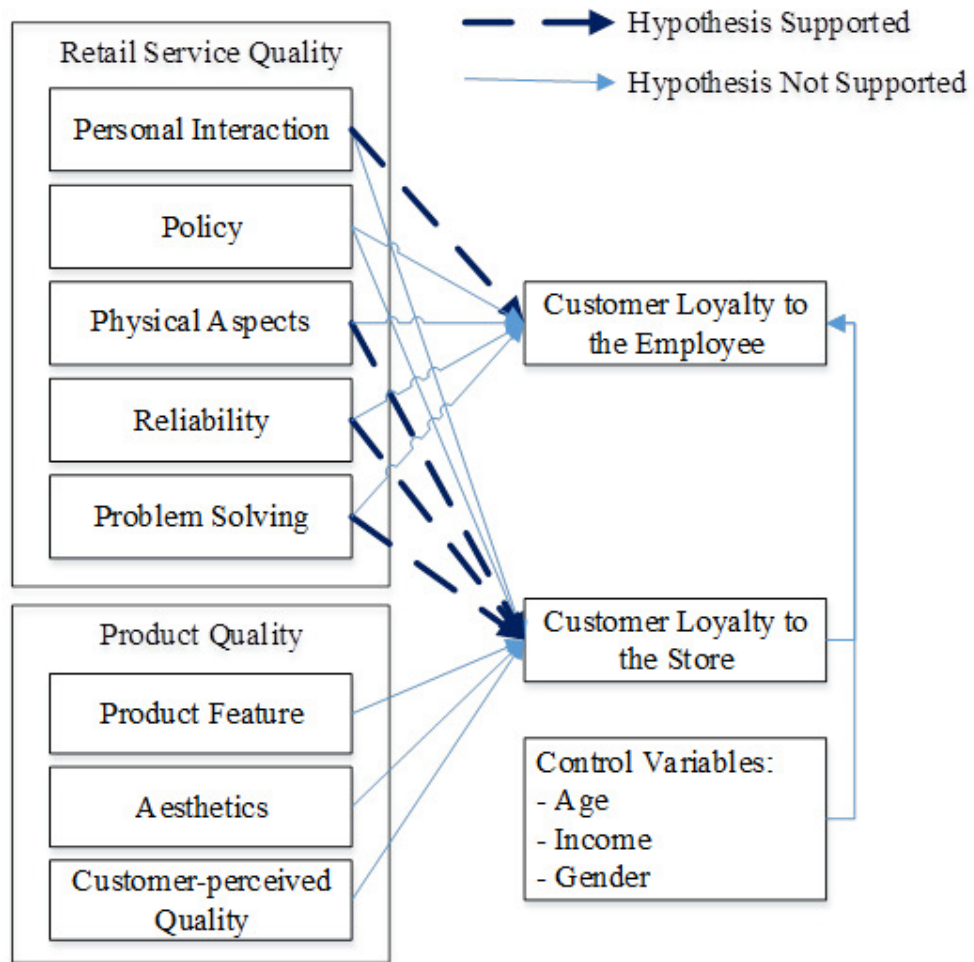


Figure 4.3 A summary of hypothesis results

Table 4.26 A summary of the results of hypothesis tests

Hypotheses	Descriptions	Beta	Hypothesis Supported?
H1a	Personal Interaction→loyalty (store level)	-0.023	No
H1b	Policy→loyalty (store level)	0.113	No
H1c	Physical Aspects→loyalty (store level)	0.206** <sup>(2<sup>nd</sup>)</sup>	Yes
H1d	Reliability→loyalty (store level)	0.369*** <sup>(1<sup>st</sup>)</sup>	Yes
H1e	Problem Solving→loyalty (store level)	0.138* <sup>(3<sup>rd</sup>)</sup>	Yes
H2a	Product Features→loyalty (store level)	-0.041	No
H2b	Aesthetics→loyalty (store level)	-0.110	No
H2c	Customer-perceived Quality→loyalty (store level)	0.100	No
H3a	Personal Interaction→loyalty (employee level)	0.310*** <sup>(1<sup>st</sup>)</sup>	Yes
H3b	Policy→loyalty (employee level)	0.014	No
H3c	Physical Aspects→loyalty (employee level)	0.075	No
H3d	Reliability→loyalty (employee level)	0.151	No
H3e	Problem Solving→loyalty (employee level)	-0.002	No

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

#### 4.2.5. Post-hoc Analysis

As mentioned earlier, one of the control variables, gender, had a significant impact on customer loyalty to the store (see Table 4.21). This could be an interesting area to explore. Past studies (Hall and Roter, 1995; Salter, 2000) pointed out that female are known to place more value on long-term relationships and have a tendency to reply more on feeling. It means they make decisions based on social values and impacts to the others. As a result, females exert stronger loyalty behaviour than male (O'Connor *et al.*, 1992; McColl-Kennedy *et al.*, 2003). The influence of gender on customer loyalty to a store is an interesting question and thus worth of further investigation. Therefore, a follow-up post-hoc test was conducted to examine exactly where the significant differences lay. To do so, the dataset was divided into two sets - male (group size =100) and female (group size =100).

From the regression results in Table 4.27, the “reliability” dimension is shown to have significant impacts on customers’ loyalty to the store for both genders, and our test shows that the association between “reliability” and “customer loyalty to the store” is stronger for men than for women. On the other hand, the significant dimensions of customer loyalty are found to be affected by gender differences. For men, “problem solving” had a significant impact on customer loyalty to the store, whereas for women, “physical aspects” and “aesthetics” had more significant impacts. For the “problem solving” dimension, the standardised coefficients for men and women are 0.223 and 0.022 respectively. This implies that the men are far more sensitive to “problem solving” issues than women. For the “physical aspects” dimension, the standardized coefficients for men and women were 0.175 and 0.271 respectively. This indicates that the women are relatively more concerned about the physical outlook of the store. Surprisingly, although “aesthetics” has a significant impact on customer loyalty to the store for the female group, their relationship reverses, meaning that when the respondents are more satisfied with the dimension of “aesthetics”, they are probably less loyal to the store. For men, the standardised coefficient of “aesthetics” is also negative, but the relationship between “aesthetics” and customer loyalty is weaker when compared to women.

It can be seen from Table 4.24 that none of the control variables has significant impacts on customer loyalty to the store. Therefore, a post-hoc analysis was not conducted on any one of the control variables.

Table 4.27 Results of the regression analysis of retail service quality and product quality on customer loyalty to the store: influence caused by gender difference

	Group 1(Male)		Group 2(Female)		Differences	
	Beta	Sig.	Beta	Sig.	Beta	Sig.
<b>Control Variables</b>						
Age	0.067	0.486	-0.061	0.437	-0.128	-0.049
Income	-0.091	0.322	0.119	0.157	0.210	-0.165
<b>Dimensions</b>						
Personal Interaction	-0.094	0.398	0.050	0.643	0.000	0.000
Policy	0.078	0.451	0.160	0.143	0.144	0.245
Physical Aspects	0.175	0.167	0.271	0.004**	0.082	-0.308
Reliability	0.426	0.000***	0.313	0.006**	0.096	-0.163
Problem Solving	0.223	0.028*	0.022	0.811	-0.113	0.006
Features	-0.056	0.581	0.020	0.831	-0.201	0.783 #
Aesthetics	-0.044	0.684	-0.199	0.042*	0.076	0.250
Customer-perceived Quality	0.028	0.779	0.120	0.287	-0.155	-0.642
<b>Model Information</b>						
R <sup>2</sup>	0.405		0.479			

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

# indicates the most significant difference

## **5. Development of the Dynamic Simulation Module**

After the development and analysis of the exploratory module in Chapter 4, this chapter explains the development of the dynamic simulation module, another key element of the ECSM. The process of developing this element, parameters involved in it and how this element was constructed and are described in this chapter.

### **5.1. Framework of the Dynamic Simulation Module**

The dynamic simulation module covers a number of factors as follows and the selection criteria of the factors are justified in Chapter 5.2.1:-

- (i) Retail service quality,
- (ii) Product quality,
- (iii) Advertising,
- (iv) Order lead time and completion efficiency,
- (v) Employee satisfaction,
- (vi) Customer satisfaction and loyalty,
- (vii) Customer acquisition and retention, and
- (viii) Sales volume

These factors significantly influence customer relationships and provide the decision makers with a full picture of CRM for scenario analysis and strategic planning. The dynamic simulation module has two major parts; one is modelling and the other is simulation. The development process for the dynamic simulation module is shown in Figure 5.1, in which the modelling starts with a selection of parameters and identification of the interrelationships between them, and then the simulation module is constructed (with assistance from iThink application). Data

from the company database, employees and customer surveys are necessary for the dynamic simulation module as well as for the subsequent system dynamics simulation. This will be followed by sensitivity analysis and policy analysis that can be conducted for strategic business planning. This chapter provides a discussion of the system dynamics modelling and data input for the dynamic simulation module, while Chapter 6 would focus on an examination on its simulation results and further analyses.

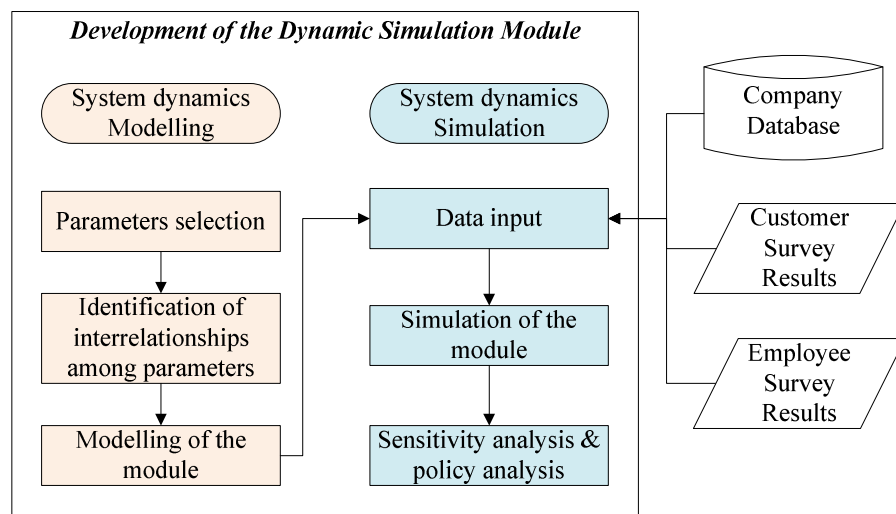


Figure 5.1 The development process of the dynamic simulation module

## 5.2. Modelling of the Dynamic Simulation Module

The parameters considered in the module and their interrelationships are described in this section to construct the module. The module can help visualise a full picture of these parameters related to CRM so that decision makers can have a better understanding of the problem. The data input that supports the module development will be discussed in Chapter 5.2.3.

### 5.2.1. Parameters and their Interrelationships

Existing studies on CRM have developed relationships among various parameters,



including employee satisfaction, product quality, retail service quality, customer satisfaction, and customer loyalty. Table 5.1 is a summary of key parameters considered in the literature. With reference to Table 5.1, it is found that there was a list of key parameters identified for CRM, but the existing models had not included all of them, thus are unable to provide an overview towards the whole picture of CRM. For example, Chen and Chuang (2008) focused on customer satisfaction and product quality but neglected retail service quality, order lead time and employee satisfaction. Yiannis and Denton (1997) considered employee and customer satisfaction as well as product and retail service quality, but overlooked the impacts of order lead time and advertising. Reinartz and Kumar (2003) related customer retention and loyalty to sales volume, yet they fail to show how other key parameters such as product and retail service quality affect customer relationship. To address the gap, all the key parameters identified in Table 5.1 are considered for the ECSM derived in this study so as to make this module more comprehensive and to distinguish it from the existing models. Since customer satisfaction is the essence of a CRM model, the major parameters affecting customer satisfaction are key considerations in this study towards constructing the ECSM.

Table 5.1 Parameters studied in the literature and the proposed model

Authors Parameters	The Proposed ECSM	Steven and Thoma s (1994)	Yiannis and Denton (1997)	Rucci <i>et al.</i> (1998)	Anderson and Narus (1998)	Reinartz and Kumar (2003)	Chen and Chuang (2008)
Employee satisfaction	✓		✓				
Customer satisfaction	✓	✓	✓	✓	✓		✓
Customer loyalty	✓		✓		✓	✓	
Retail service quality	✓	✓	✓		✓		
Advertising	✓			✓			
Product quality	✓		✓				✓
Order completion efficiency	✓						
Order lead time	✓						
Number of customers	✓			✓			
Customer acquisition	✓	✓					
Customer retention	✓				✓	✓	
Sales volume	✓					✓	

In many CRM models, customer satisfaction is a core part as it helps build customer relationship, retain customer loyalty, and bring profits to the company. For instance, Harness and Harness (2004), Steven and Thomas (1994), Yiannis and Denton (1997), Rucci *et al.* (1998), Chen and Chuang (2008) (see Table 5.1) identified it as the key element in building and maintaining the companies' competitiveness. In addition to key parameters identified in Table 5.1, the relationships among them are also needed to construct the ECSM for the window fashions retail industry.

Retail service quality is the customer's perception of how well their expectations are met during the service encounters (Zeithaml *et al.*, 1990). As discussed earlier, retail service quality is a key element of customer satisfaction (Bolton and Drew,

1991; Cronin and Taylor, 1992; Anderson and Sullivan, 1993; Buttle, 2004). These studies provide justifications to include retail service quality in CRM models. From the factor analysis conducted in Chapter 4, there are five key factors affecting retail service quality, which are personal interaction, reliability, physical aspects, policy, and problem solving. Thus these factors need to be taken into account when developing the proposed ECSM.

Product development is an essential starting point to deliver value to customers and thus delight customers (Eduardo *et al.*, 2008) while product quality plays an important role in satisfying customers. The positive relationship between product quality and customer satisfaction has been proved by many researchers (Brewton, 1990; Edwards, 1992; Hirst, 1992). They showed that products of high quality can enhance customer satisfaction and in turn result in increased profits. There are three factors influencing product quality, namely product features, aesthetics, and customer-perceived quality. These factors are justified by the factor analysis in Chapter 4 and are included in the ECSM derived.

Advertising is another element influencing customer satisfaction in the proposed CRM model. It raises customers' awareness of the products and thus motivates customers to make purchases, thereby satisfying their needs (Rucci *et al.*, 1998). Advertising is a critical part of the marketing strategies used to stimulate demand and aims to achieve three benefits:-

- (i) Increasing sales of the promoted products,
- (ii) Increasing sales of complementary products within a store, and
- (iii) Increasing in-store traffic (Blattberg *et al.*, 1990; Kim, 1992).

The effectiveness of advertising is often directly proportional to the spending on advertising and to customer satisfaction (Rajeev *et al.*, 1995). Spending on advertising is therefore considered when constructing the ECSM.

Suggested by the focus group consisting of customers and managers from Hunter Douglas Gallery, “order completion efficiency” is also identified as another key driver in creating happy customers. It was found that order completion efficiency will often increase when employees are satisfied with their jobs and thus will perform such operational tasks effectively. Nelson (1970) indicated that the efficiency with which employees are able to fulfil orders in the business-to-customer transactions is a significant determinant of customer satisfaction and retention. Heim and Sinba (2001) also found a significant positive association between order completion efficiency and customer satisfaction. In a similar vein, Lee and Whang (2001) suggested that the ability to fulfil and deliver orders on time could determine business success. In the light of the above, there is growing evidence to suggest the inclusion of order completion efficiency in the proposed ECSM.

To summarise, there are four key dimensions affecting customer satisfaction to be considered when developing the ECSM. These are retail service quality, product quality, advertising, and order completion efficiency (see Figure 5.2).

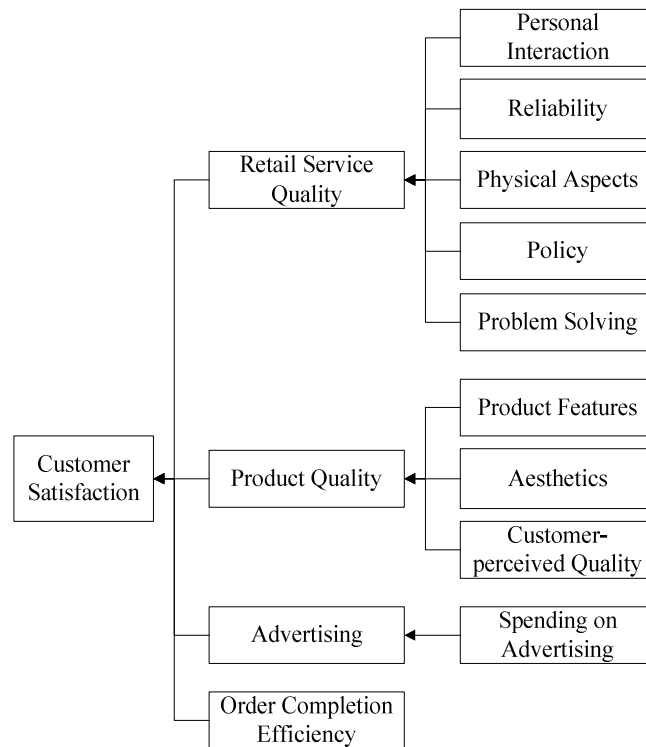


Figure 5.2 Key factors affecting customer satisfaction

For a window fashions retailer, employee satisfaction is a direct factor to influence order completion efficiency and interaction with customers; both link to customer satisfaction (see Figure 5.3). This is because when employees are not satisfied with their jobs, their working performance will be affected. For example, they will not take much initiative to interact with and take care of customers and this may affect their efficiency to deal with customer orders. As shown in Figure 5.2, order completion efficiency and personal interaction are the factors influencing customer satisfaction. If the order lead time is long and customers find the staff unhelpful and impolite, they will be unhappy. Therefore, employee satisfaction is an indirect factor in affecting customer satisfaction (see Figure 5.3). This viewpoint is supported by Berry (1981) and Coleman (1990) who identified that companies should pay special attention to employees' needs, which in turn

will help satisfy their customers' needs. Comm and Mathaisel (2000) suggested that employees' satisfaction with their jobs is an important contributor to customer satisfaction. The attitude that employees have is, in general, a key variable affecting customer satisfaction (Adsit *et al.*, 1996) and, more specifically, this satisfaction affects customers' perceptions of quality (Schneider and Bowen, 1985). Reichheld (1996), Heskett *et al.* (1997) and Tompkins (1992) indicated that higher levels of employee satisfaction and motivation yield greater customer satisfaction. These studies showed that employees' motivations are particularly a key factor in a repurchase decision. The managers of the focus group from Hunter Douglas Gallery identified three factors, namely training, working environment, and monetary issues, which are the keys to employees' satisfaction. The relationship between employee satisfaction and customer satisfaction is shown in Figure 5.3.

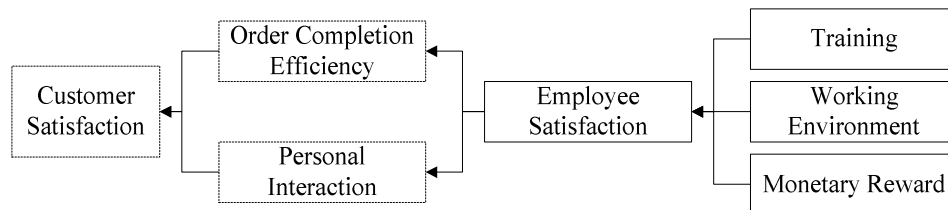


Figure 5.3 The relationship between employee satisfaction and customer satisfaction

Does customer satisfaction then automatically lead to intentions to purchase? The link between customer satisfaction and customer acquisition has been researched by Bearden and Teal (1983), Oliver and Swan (1989), and Yi (1990). Others (Woodside *et al.* (1989) and Cronin and Taylor (1994)) directly identified that retail service quality is an antecedent of customer satisfaction, and will lead to customer acquisition. It is understood that customers who are satisfied are more likely to make repeated purchases and also word-of-mouth referral, building

customer loyalty and expanding the customer base. Building customer loyalty helps secure future revenue streams, create barriers to competitive efforts, inhibit customer defections, and reduce future transaction costs (Homburg and Rudolph, 2001). In fact, customer loyalty is the direct result of customer satisfaction (Bolton, 1998; Lam *et al.*, 2004; Jones *et al.*, 1994; Estelami and Hurley, 2003). Customer satisfaction and customer loyalty therefore become the essence of CRM and are included in the proposed ECSM. The relationship among customer acquisition, customer retention, customer satisfaction and customer loyalty is shown in Figure 5.4.

From Figure 5.4, both customer acquisition and retention could increase sales volume and finally generate profits for the company. More specifically, customer loyalty leads to greater profitability year after year (Reicheld and Sasser, 1990) and the cost of customer retention is much less than that of customer acquisition (Reinartz and Kumar, 2003; Chan *et al.*, 2010). The importance of customer retention and customer loyalty is highlighted as they can maintain business growth. In return, the company would be more competitive and allocate more resources to further enhance customer satisfaction through the continuous improvements of retail service quality, product quality, advertising, and employee satisfaction (in terms of working environment, training, and monetary reward). The above discussion explains the linkage among sales volume, customer acquisition and customer retention, as well as how the company makes use of the profit gained from sales to boost customer satisfaction in return so that better customer loyalty is achieved (see Figure 5.4).

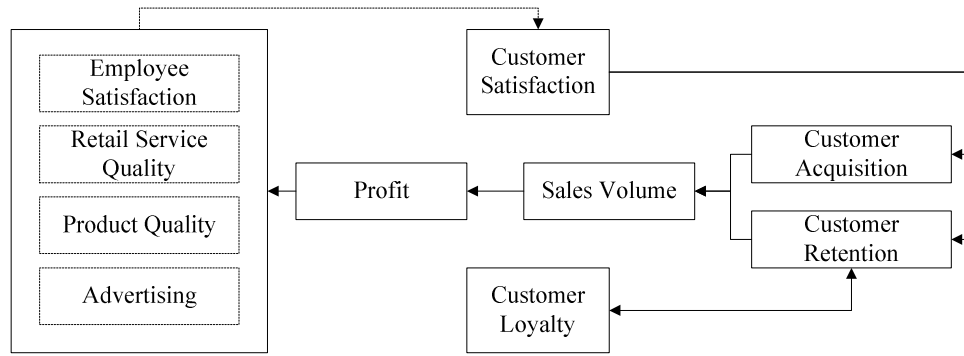


Figure 5.4 The relationship among customer satisfaction, customer acquisition, customer retention, sales volume, and customer loyalty

### 5.2.2. Visualisation of the Dynamic Simulation Module

Based on the identification of key parameters and their relationships for CRM, the proposed ECSM can be constructed. To aid the construction, iThink, a system dynamics tool for communicating interdependencies between processes and problems, was utilised. iThink is a computer application which is used for modelling, simulating, and redesigning business; it provides a multi-level, hierarchical environment for constructing and interacting with models (Towill, 1993). It facilitates the creation of models that simulate business processes and scenarios, highlighting the impact(s) of a new procedure or policy and offering opportunities to alleviate undesirable outcomes (Kathy *et al.*, 1993). The dynamics simulation module was developed with the stock-and-flow structure and based on the discussion in Chapter 5.2.1. The parameters which have a potential influence on the CRM of the window fashions retailer are selected and translated into stocks and flows according to their corresponding relationships. The dynamic simulation module includes two layers; one is the high-level mapping layer which gives an overview of the system and relationship among different parties while another is the model construction layer that shows a complete and detailed diagram of the relationship among all parameters in a CRM environment.



### 5.2.2.1. The High-Level Mapping Layer

Three main parties are involved in the dynamic simulation module. They are the company, employees, and customers, as visualised in Figure 5.5, which shows the three parties as individual sectors and links them using arrows. The three sectors are interrelated and there are information flows between them. For example, after customers request services, the employees will serve them to satisfy their needs. This explains why customers and employees are linked together. Employees work for the company to achieve business goals in return for benefits and rewards provided by the company. Such an employer-employee relationship is apparent. The company launches its products, such as window blinds, in the market to fulfil the demand. When customers make purchases, their needs are satisfied and a relationship between customers and the company is built. At this moment, the company gains profits from the relationship with the customers. Hence, the three parties are inter-linked and will interact with each other, forming the high-level mapping layer presented in Figure 5.5. This layer provides a brief concept and an overview of the relationships among the three parties in the CRM model. For further details, the model construction layer of the module is required.

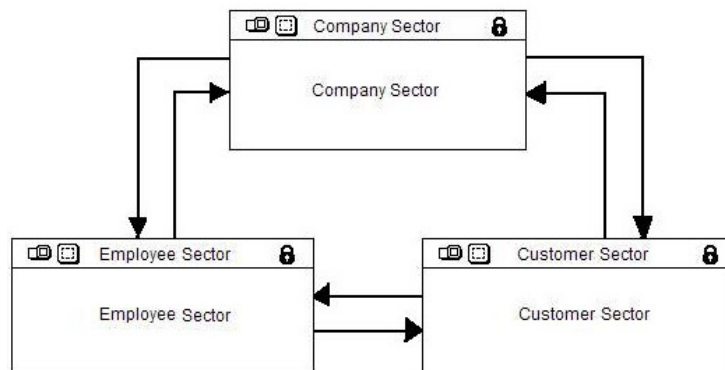


Figure 5.5 The high-level mapping layer of the dynamic simulation module

#### **5.2.2.2. The Model Construction Layer**

Figure 5.6 shows the model construction layer of the dynamic simulation module.

The model construction layer is developed based on the discussion of the inclusion and relationship of parameters in Chapter 5.2.1. In Figure 5.6, the three sectors can be seen clearly and each of them covers different and numerous parameters. For example, the sales volume, order backlog, and customer base belong to the company sector; employee satisfaction and training are included in the employees sector; product quality, retail service quality, customer satisfaction, and customer loyalty contribute to the customers sector. For the sake of clarity, Figure 5.7, Figure 5.8, and Figure 5.9 are extracted from Figure 5.6 to represent the company, employees, and customers sectors of the module respectively. The variables, their parameters and relationships under each sector are described in detail below.

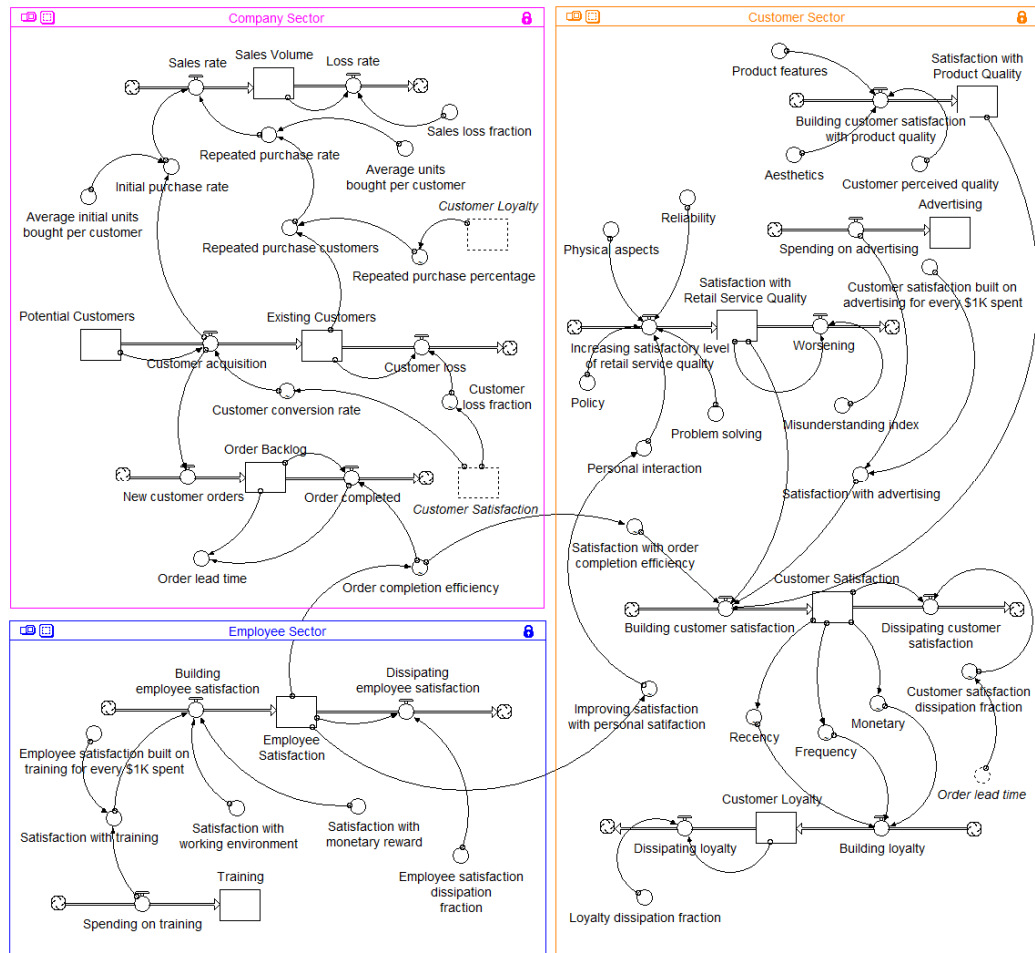


Figure 5.6 The model construction layer of the dynamic simulation module

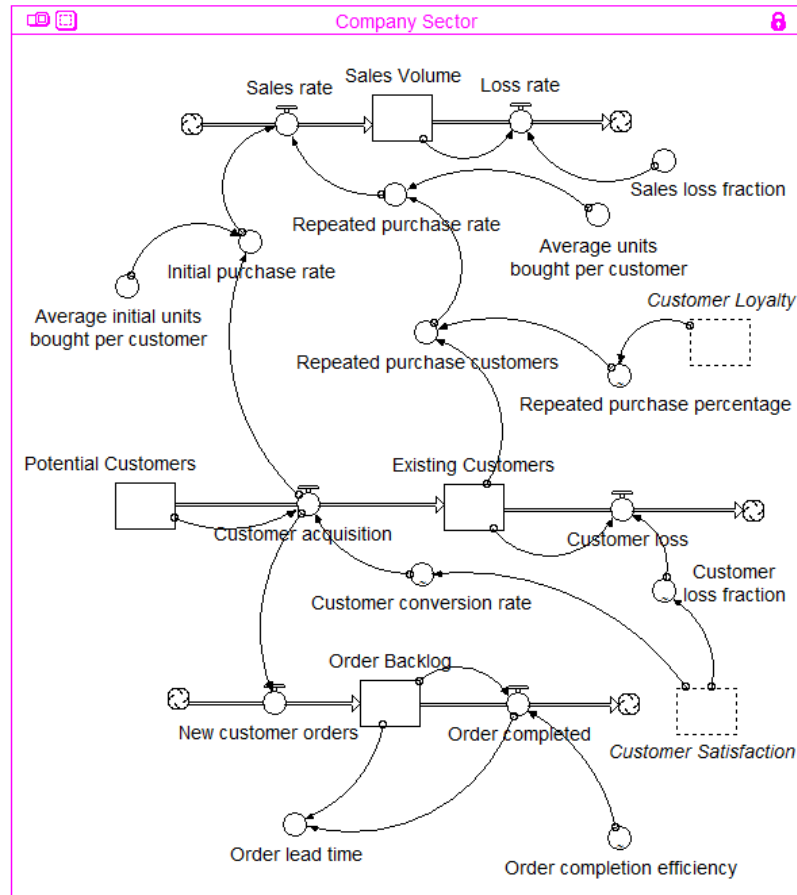


Figure 5.7 The company sector of the dynamic simulation module

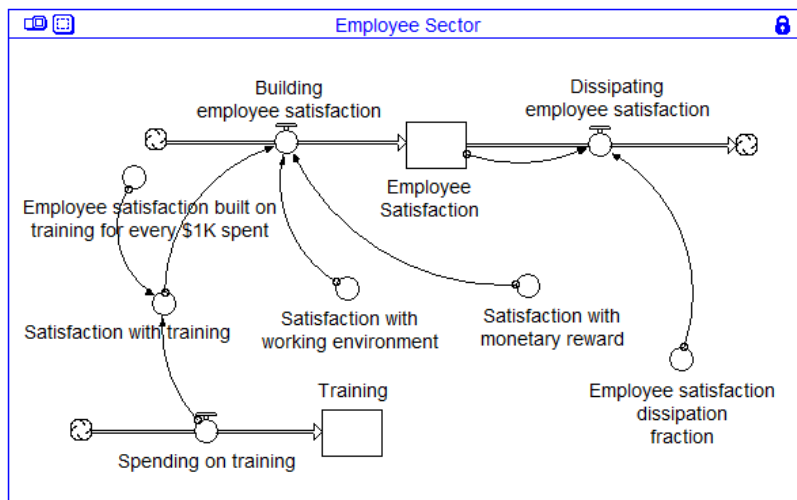


Figure 5.8 The employee sector of the dynamic simulation module

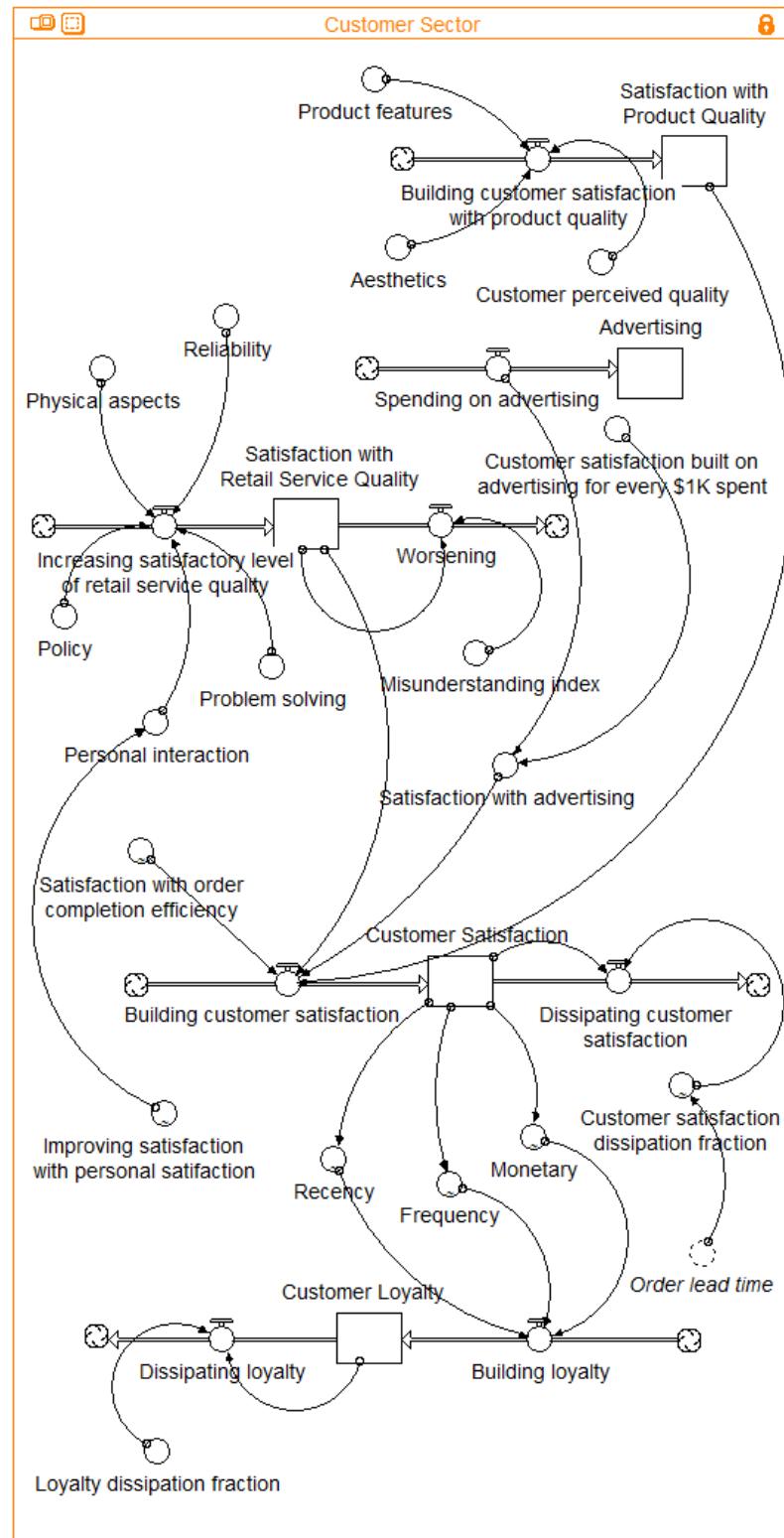


Figure 5.9 The customer sector of the dynamic simulation module

In the customers sector, customer satisfaction and customer loyalty are the core parts in this module as they are the essence of CRM. Only satisfied customers could possibly make repeated purchases from the window fashions retailer and thus become loyal customers. Customer satisfaction is of vital importance, and therefore variables affecting it have to be identified and linked. As shown in Figure 5.9, there are four main variables, including “satisfaction with retail service quality”, “satisfaction with product quality”, “satisfaction with advertising”, and “satisfaction with order completion efficiency” (see Figure 5.2). According to the results of the factor analysis mentioned in Chapter 4, “satisfaction with retail service quality” is measured by five factors while “satisfaction with product quality” is measured by three factors. Since personal interaction is significantly and positively related to customers’ loyalty to employees (refer to the results of regression mentioned in Table 4.23, Table 4.24 and Table 4.26 and the relevant discussion in Chapter 4) and it is the most important factor as far as retail service quality is concerned (refer to the results of mean scores shown in Table 4.15 and the relevant discussion in Chapter 4), special attention should be drawn to the importance of personal interaction when developing the ECSM. Therefore, “improving satisfaction with personal interaction” is also highlighted in the module. Besides, as mentioned earlier, advertising plays a vital role in building and maintaining customers’ awareness of products, thus attracting them to make (repeated) purchases and satisfying their needs (Srinivasan and Kesavan, 1976; Blattberg *et al.*, 1990; Kim, 1992; Rucci *et al.*, 1998). “Advertising satisfaction” is hence taken into account in this module to evaluate its influence upon the level of customer satisfaction. As stated by the marketing manager of Hunter Douglas Gallery, the advertising effectiveness of the company is positively proportional to

its spending on advertising in most circumstances. “Customer satisfaction built on advertising for every \$1,000 spent” is therefore necessary in the module to determine “advertising satisfaction”. In addition, order completion efficiency and order lead time, which concern the time taken from customers’ patronage to the time of product delivery, are other key drivers to make their customers happy, as suggested by a focus group of customers and managers from Hunter Douglas Gallery (Nelson, 1970; Heim and Sinba, 2001). Some researchers also expressed support to relate order completion efficiency and order lead time to customer satisfaction. “Order lead time” is included in the CRM model to evaluate its influence on the level of customer satisfaction. According to the customers from Hunter Douglas Gallery, they will be unhappy and may probably switch to competitors to make new orders if the order lead time is too long, say over two months. In contrary, a short order lead time could not be regarded as a factor to build customer satisfaction and customers would not patronise owing to a short order lead time. “Order lead time” therefore serves to determine the customer satisfaction dissipation fraction. As stated before, customer loyalty is the ultimate goal of CRM. Satisfying customers is insufficient but is of prime concern. To quantify customer loyalty, the behavioural loyalty approach is performed. Behavioural loyalty is measured with reference to customers’ purchasing behaviour, which is expressed in continued patronage and buying. More loyal customers often result in higher indexes on three variables – recentness of purchase (R), frequency of purchase (F), and the monetary value of purchase (M), as suggested by Buttle (2004). R refers to the time elapsed since the last purchase; F is defined as the number of purchases in a given period; and M means the monetary value of purchases in a given period (Buttle, 2004). Furthermore, Buttle

(2004) indicated that most of the marketing companies find the RFM measure useful and appropriate in respect of behavioural loyalty. Therefore, the RFM measure is adopted to quantify customers' loyalty in this module, as shown in Figure 5.9.

In the employee sector, "employee satisfaction" is the core element (see Figure 5.8). It is important for employees to be satisfied with their jobs as they affect customers' satisfaction of a company (Comm and Mathaisel, 2000). As discussed earlier, employees' working performance and attitude often affect retail service quality in terms of personal interaction and order completion efficiency, which directly relate to the customer satisfaction level (see Figure 5.3). According to an internal interview and survey conducted by Hunter Douglas Gallery with its employees in August 2010, the most important factors that affect its employees' satisfaction are related to training, working environment, and monetary rewards. In order to yield higher customer satisfaction, it is necessary to fulfil and satisfy employees' needs in terms of these three factors. These three major factors are hence included as "satisfaction with training", "satisfaction with working environment", and "satisfaction with monetary rewards" respectively in the CRM model to determine the level of "employee satisfaction".

In the company sector, order backlog, sales volume and customer purchasing behaviour are covered in the module in terms of "customer acquisition", "initial purchase rate", "repeated purchase rate", and so on (see Figure 5.7). In Figure 5.7, "potential customers" are acquired when they make initial purchase. "Existing customers" are retained and regarded as "repeated purchase customers" when they



make repeated purchases; customer loyalty is built. Furthermore, loyal customers are often willing to spend more and make purchases more frequently and in larger amount. This could possibly increase the “repeated purchase rate”. “Sales volume” increases when purchases are made, regardless of whether it is an initial or repeated purchase. Meanwhile, the amount of “new customer orders” increases and accumulates at the “order backlog”. Only when the order is completed, the amount of the “order backlog” will decrease. “Order lead time” and “order completion efficiency” are often the determinants of the “order backlog”. “Customer satisfaction” is the determinant of “customer acquisition” and “customer loss” in the module. Customers will make purchases and be attached to the window fashions retailer when they are delighted, leading to an increase in the customer base of the company. On the contrary, customers who are dissatisfied will make no purchases and switch to competitors, causing a reduction in the customer base of the company. The company sector of the module is thus structured and shown in Figure 5.7.

### ***5.2.3. Data Input of the Dynamic Simulation Module***

After the dynamic simulation module is developed, equations are set up and relevant values have to be input into the module for simulation and analysis. The value input and setting up of the equations are presented in detail in the equation layer, which is shown in Appendix 4. As stocks, which are connected with flows and variables, are the focus of the module, an explanation of their value input is provided below:-

- (i) Employee satisfaction: There are three main variables affecting “employee satisfaction”, according to the results of internal interview and survey

conducted by Hunter Douglas Gallery in August 2010. These are employees' "satisfaction with training", "satisfaction with working environment", and "satisfaction with monetary rewards". These three variables are included in the employee sector. The initial value of "satisfaction with working environment" is six and that of "satisfaction with monetary rewards" is five. The input values of these variables are obtained from the results of the employee survey conducted in 2010. According to the survey results, the average level of employee satisfaction is sixty three, which also serves as the initial value of "employee satisfaction" in the module.

- (ii) Training: "Spending on training" and "employee satisfaction built on training for every \$1,000 spent" determine the level of employees' "satisfaction with training". "Satisfaction with training" is one of the important variables that affects "employee satisfaction". The initial value of "spending on training" is \$2,000 per month and "employee satisfaction built on training for every \$1,000 spent" is two. These data are provided by the accounting manager of the Hunter Douglas Gallery.
- (iii) Customer satisfaction: From Figure 5.6, "customer satisfaction" is affected by four main factors, namely "satisfaction with order completion efficiency", "satisfaction with retail service quality", "satisfaction with advertising" and "satisfaction with product quality". Changes in value of any of these factors will lead to changes in customer satisfaction. The initial value of customer satisfaction is 50 out of 100. It is assumed that potential customers, who do not have any buying experience at the window fashions retailer, are neither dissatisfied nor satisfied with the company.
- (iv) Satisfaction with retail service quality: In order to evaluate customers'

“satisfaction with retail service quality”, the results of the customer survey mentioned previously (see Appendix 1 for the questionnaire) are used. As the survey is based on a seven-point Likert scale where seven represent “strongly satisfied” and one “strongly dissatisfied”, it is necessary to convert the survey results into a 0-10 scale in order to be consistent with the module. From the survey results, personal interaction scores 5.27, policy scores 5.06, physical aspects scores 5.02, reliability scores 4.92, and problem solving scores 4.53. These scores are converted into 7.53, 7.23, 7.17, 7.03, and 6.47 respectively. It is assumed that the five variables are of equal importance. Hence, the “satisfaction level of retail service quality” is equivalent to the mean of the total values of these five variables. The initial value of “satisfaction with retail service quality” is assumed to be five.

- (v) Satisfaction with product quality: In order to evaluate customers’ “satisfaction with product quality”, again, the results of the customer survey mentioned previously (see Appendix 1 for the questionnaire) are used. The survey is based on the seven-point Likert scale where seven represent “strongly satisfied” one represent “strongly dissatisfied”. In order to be consistent with the module, the survey results of “product features”, “aesthetics”, and “customer-perceived quality” are converted into a 0-10 scale. Hence, their input values in the module are 7.65, 7.98, and 7.75 respectively. The three variables are supposed to be equally important to build customers’ “satisfaction with product quality”. As the blinds provided by Hunter Douglas are famous for being innovative and multi-functional, the initial value of “satisfaction with product quality” is suggested to be six.

- (vi) Advertising: “Satisfaction with advertising” is determined by “spending on

advertising” and “customer satisfaction built on advertising for every \$1,000 spent”. Spending on advertising refers to Hunter Douglas Gallery’s expenditure on marketing and promotions, such as advertising on newspapers or magazines, sending letters or coupons, and distributing brochures, and so on. The data for these two variables are retrieved from the database of Hunter Douglas Gallery and provided by its marketing and accounting managers. The input value of “spending on advertising” is \$5,000 per month and that of “customer satisfaction built on advertising for every \$1K spent” is 0.62.

(vii) Customer loyalty: As discussed before, the RMF approach is adopted in the module to measure “customer loyalty”. Hence, “recentness” (R), frequency” (F), and monetary” (M) are included. The relationship between RMF and “customer loyalty” is calculated according to this equation:  $customer\ loyalty = F \times M \div R$ . The historical records, archives and operation reports of Hunter Douglas Gallery were studied in order to retrieve the relevant data that are used as the input values of the module.

(viii) Potential customers: Potential customers are defined as the ones who are interested in purchasing the blinds of the window fashions retailer but have not yet made any purchases. The initial value of “potential customer” is estimated by counting the total number of people visiting and passing through Hunter Douglas Gallery. This type of customers will become existing customers once they make purchases. Customer satisfaction often affects the customer acquisition rate.

(ix) Existing customers: This is the customer base of Hunter Douglas Gallery and it is equivalent to the total number of existing customers possessed by Hunter Douglas Gallery. The initial value of the number of existing customers is

2,000, which is concluded from the company's records and provided by the marketing managers. This type of customers is retained by Hunter Douglas Gallery and they are more loyal to the company when they make repeated purchases. Customer loyalty could encourage existing customers to make repeated purchases.

- (x) Order backlog: It refers to the total number of pending or incomplete orders. The initial value of the order backlog is forty, which is mainly concluded from the company's records as well as operation reports. Once customers make purchases, new customer orders will be created and accumulated at the "order backlog". "Order completion efficiency" is the key variable to shorten the order lead time, which is the time needed to complete customers' orders.
- (xi) Sales volume: Sales volume refers to the total units of products. It is the sum of initial units and repeated purchase units within the company. The initial value of the sales volume is 8,000, which is concluded from the company records as well as operation reports.

## **6. Simulation and Analysis of the Dynamic Simulation Module**

After the development of the dynamic simulation module, simulation of such a module can be performed. This chapter presents the simulation results of this module and explains its behaviour. After that, a sensitivity analysis and a policy analysis are performed to test different scenarios for policy making. The results of simulation and analyses could improve the CRM practice of the window fashions retailer.

### **6.1. Simulation Results**

All simulation data are shown in Appendix 5. Simulations were carried out for twelve months, with an interval of a quarter of a year. With the value input mentioned in the previous chapter, the simulation results are provided below in graphical presentations.

#### ***6.1.1. The Impact of Employee Satisfaction***

Figure 6.1 shows the relationship among employee satisfaction, personal interaction, order completion efficiency, and satisfaction with retail service quality. The four lines in the graph represent employee satisfaction, personal interaction, order completion efficiency, and satisfaction with retail service quality show an upward trend, meaning that their values increase throughout the year. It is found that enhancing employee satisfaction (line 1) leads to a leap in personal interaction (line 2) and order completion efficiency (line 3). This is consistent with the discussion of Figure 5.3 shown in Chapter 5. It is easily understood that employees who are satisfied with their jobs are always more willing to take the

initiatives to provide customers with services of higher quality. As the quality and frequency of personal interaction improved, customers are more satisfied and it thereby leads to an increase in customer satisfaction with retail service quality (line 4). Furthermore, with higher employee satisfaction, the morale of employees and the working atmosphere can be improved. This drives employees to work and complete orders in a more efficient manner. To conclude, employee satisfaction has a significant and positive impact on order completion efficiency and personal interaction.

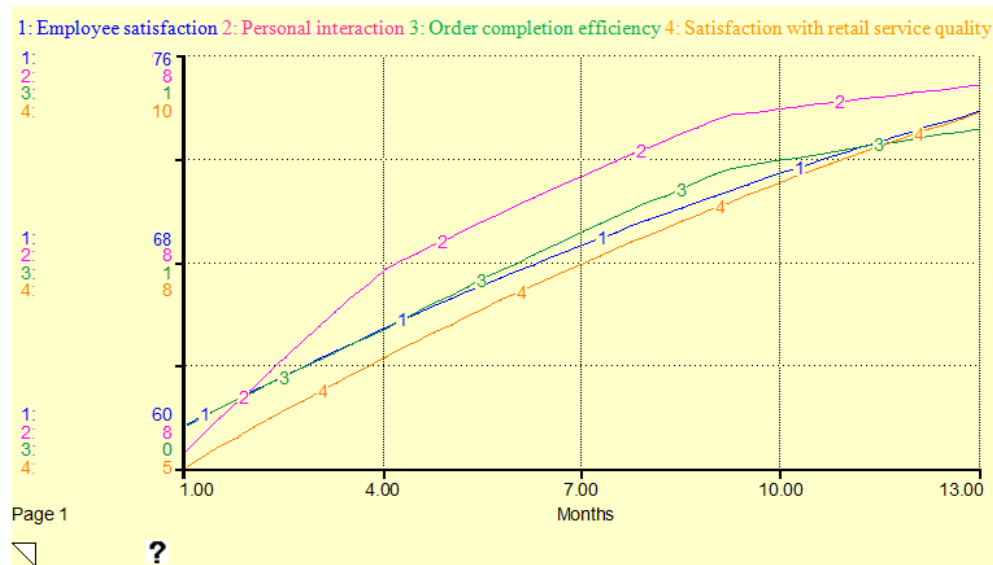


Figure 6.1 A simulation graph showing employee satisfaction, personal interaction, order completion efficiency, and satisfaction with retail service quality

### 6.1.2. Factors Influencing Customer Satisfaction

Figure 6.2 shows the relationship among customer satisfaction with retail service quality, product quality, advertising and order completion efficiency. According to the dynamic simulation module described in Figure 5.2, four factors, namely order completion efficiency (line 1), satisfaction with product quality (line 2), satisfaction with retail service quality (line 3), and satisfaction with advertising

(line 4), contribute to the level of customer satisfaction (line 5). Such relationship is also modelled and displayed in Figure 5.6. Figure 6.2 further reveals that an improvement in order completion efficiency (line 1), satisfaction with product quality (line 2), and satisfaction with retail services quality (line 3) leads to an increase in the level of customer satisfaction (line 5). Order completion efficiency, satisfaction with product quality, and satisfaction with retail service quality will change over time as they are constantly affected by their connected converters, such as employee satisfaction, reliability, and product features. In addition, satisfaction with advertising is constant at a level of 8.1 throughout the year, as spending on advertising remains unchanged throughout the year.

The simulation results are consistent with previous studies. Cronin and Taylor (1992) indicated that retail service quality is significantly influential in customer satisfaction. Brewton (1990), Edwards (1992) and Hirst (1992) agreed that product quality is important to satisfy customers. Rucci *et al.* (1998) stated that advertising is critical to the maintenance of a customer base and customer satisfaction. From Figure 6.2, satisfaction with retail service quality and satisfaction with product quality increase over time and satisfaction with advertising remains unchanged; both these factors boost customer satisfaction over time. Obviously, the results of the dynamic simulation module are in accord with the findings of the previous studies. In Figure 6.2, customer satisfaction increases gradually from an initial value of 50 to about 77 at the end of the year. This customer satisfaction level is fair to attract and acquire customers.





Figure 6.2 A simulation graph showing satisfaction with retail service quality, satisfaction with product quality, satisfaction with advertising, order completion efficiency, and customer satisfaction

### 6.1.3. The Impact of Order Completion Efficiency

Figure 6.3 shows the relationship among employee satisfaction, order lead time, order completion efficiency, and customer satisfaction dissipation fraction. The figure shows that increasing employee satisfaction leads to a reduction in order lead time, which then minimises customer satisfaction dissipation fraction. Furthermore, an increase in employee satisfaction enhances order completion efficiency. According to Figure 5.6, employee satisfaction (line 1) has a direct impact on order completions efficiency (line 3). When employees are more satisfied with their job, their overall performance will be improved, thus increasing order completion efficiency. Once order completion efficiency improves, the number of orders completed per month will increase and which shorten the order lead time (line 2). With reference to Figure 5.6, order lead time influences the dissipation fraction of customer satisfaction (line 4), which could lower the level of customer satisfaction in general. This explains why minimising

order lead time causes a decrease in customer satisfaction dissipation fraction as shown in Figure 6.3. A decline in the dissipation fraction can thus help maintain the level of customer satisfaction and prevent customers from leaving.

Figure 6.3 shows that when the order lead time drops from 2.22 months to 1.24 months (i.e. 44%), customer satisfaction dissipation fraction decreases from 0.05 to 0.01 (i.e. 80%). The change in the order lead time leads to a noticeable alteration of customer satisfaction dissipation fraction. This implies that the order lead time can be an important factor influencing customer satisfaction. This provides further and solid evidence to support the statement made by Comm and Mathaisel (2000), who suggested that employee satisfaction is important as it affects customer satisfaction. Overall, Figure 6.3 demonstrates that employee satisfaction is the primary booster to order completion efficiency and order lead time, which would in turn affect customer satisfaction.

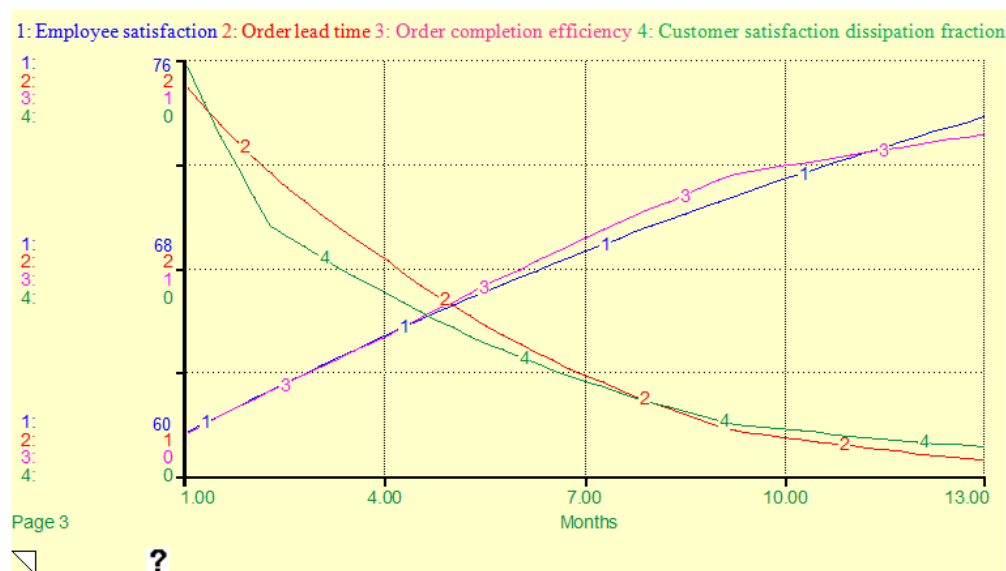


Figure 6.3 A simulation graph showing employee satisfaction, order lead time, order completion efficiency, and customer satisfaction dissipation fraction

#### **6.1.4. Factors Influencing Customer Loyalty**

Figure 6.4 shows the relationship among customer satisfaction, customer loyalty, frequency, monetary, and recency. Buttle (2004) stated that recency of purchase (R), frequency of purchase (F), and monetary values of purchase (M), also known as RFM measures of behavioural loyalty, can be used to evaluate customer loyalty. This relationship is modelled in Figure 5.6. The three variables contribute to customer loyalty and affect customer loyalty over time. Customer satisfaction is the major factor that affects the value of these three variables, thus leading to an impact on customer loyalty. As stated by Jones *et al.* (1994) and Estelami and Hurley (2003), customer loyalty is a direct result of customer satisfaction. This statement matches the findings of this study and is supported by the simulation results in Figure 6.4, from which it is found that when customer satisfaction (line 1) increases, customers make purchases at a higher frequency (line 3 showing an upward trend), higher monetary value (line 4 showing an upward trend), and lower recency (line 5 showing a downward trend). In other words, customers with higher satisfaction level are willing to spend more money to make purchases more frequently and within a period of shorter time after the last purchase. As customers are retained by the window fashions retailer and become more reliable, customer loyalty (line 2) increases over time. With reference to Figure 6.4, when customer satisfaction increases to about 77, the monetary value and frequency of purchase reach about 50,000 and 2 times respectively whereas the recency of purchase decreases to eighteen months. This causes customer loyalty to approximately reach 22 at the end of the simulation period (i.e. the 12<sup>th</sup> month).

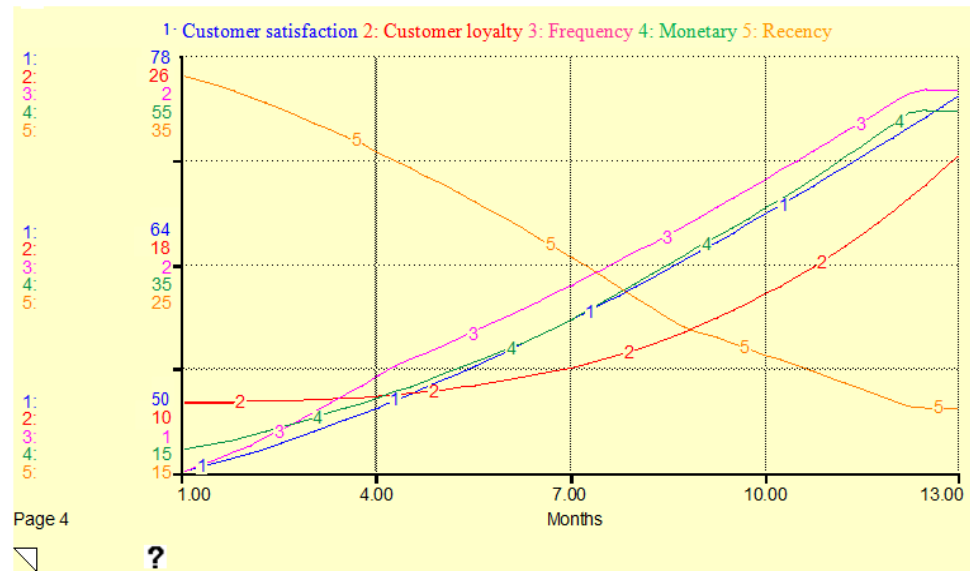


Figure 6.4 A simulation graph showing customer satisfaction, loyalty, frequency, monetary, and recency

#### 6.1.5. Customer Loyalty and Customer Retention

Figure 6.5 shows the relationship among customer loyalty, repeated purchase rate, and customers who make repeated purchase. Buttle (2004) stated that the most loyal customers are those who have got high indexes for the three variables, namely recency of purchase, frequency of purchase, and monetary values of purchase. As loyal customers will make repeated purchases, the customer loyalty (line 1) and repeated purchase rate (line 2) in Figure 6.5 are in the same pattern. When customers are more loyal to the window fashions retailer, they will make repeated purchases, making the repeated purchase rate increases and thus brings more customers that make repeated purchase (line 3) in the company. It is believed that customer loyalty has a positive influence on customers' intention to make purchases again. When the customer loyalty reaches a level of 22 approximately at the 12<sup>th</sup> month, the repeated purchase rate and the number of repeated purchase customers are about 43.9% and 14 respectively. These figures demonstrate that the repeated purchase rate of the window fashions retailer is

relatively low and hence the number of repeated purchase customers is limited. It is suggested that the window fashions retailer should pay greater attention to customer loyalty when formulating business and marketing strategies, so as to increase the repeated purchase rate and expand its customer base.

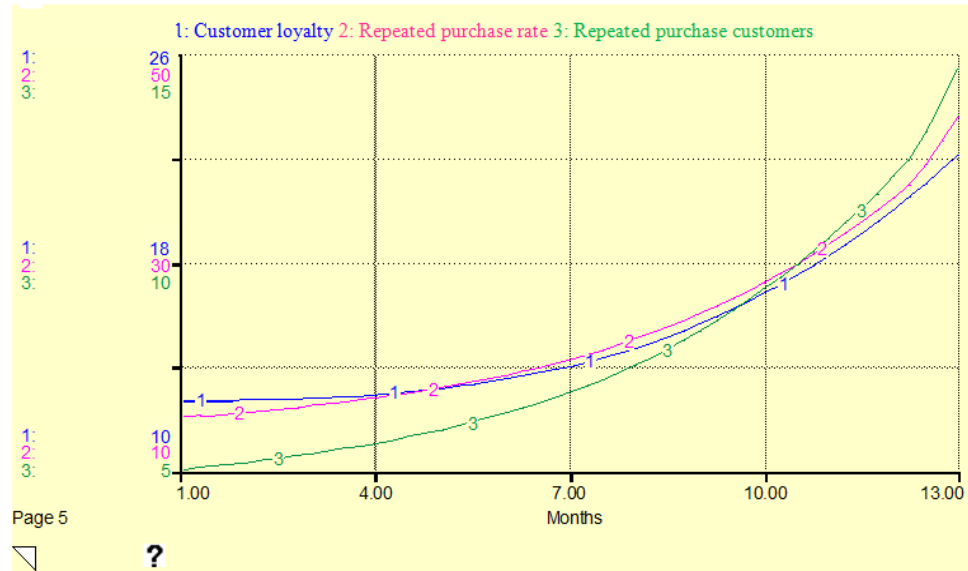


Figure 6.5 A simulation graph showing customer loyalty, repeated purchase rate, and customers

#### 6.1.6. Customer Satisfaction and Acquisition

Figure 6.6 shows the relationship among customer satisfaction, customer acquisition, potential customers and existing customers. Customer acquisition (line 2) refers to the act of attracting potential customers (line 3) to the window fashions retailer so as to expand its customer base by increasing the number of existing customers (line 4). According to Figure 5.6, customer acquisition is influenced by customer satisfaction which is also supported by researchers (LaBarbera and Mazursky, 1983).

In the dynamic simulation module, customer satisfaction is proportional to the customer conversion rate, which refers to potential customers switching to

become existing customers. Increasing customer satisfaction (line 1) enhances the customer conversion rate and therefore results in larger customer acquisition (line 2). Table 6.6 shows that over the twelve months (i.e. the simulation period), customer satisfaction increases from 50 to about 75 and customer acquisition increases from around 73 to 122, i.e. an increase of 54% and 67% respectively. The percentage change in customer satisfaction is smaller than that in customer acquisition, revealing that an increase in customer satisfaction probably leads to a greater increase in customer acquisition. It is suggested that the window fashions retailer should continuously improve customer satisfaction in order to facilitate customer acquisition. Maintaining a constant level of customer satisfaction is inadequate in this competitive and dynamic marketplace. This explains the drop in customer acquisition at the 10<sup>th</sup> month. From Figure 6.6, the increase in customer satisfaction over the twelve months causes the number of existing customers to increase from 2,000 to 3,229, i.e. 61.45%. The number of potential customers decreases from 3,000 to 1,738 as they become existing customers of the window fashions retailer after purchases are made. It is rational that customer satisfaction is a key driver for the window fashions retailer to attract and acquire potential customers, causing the potential customers to change to existing customers or even loyal customers.

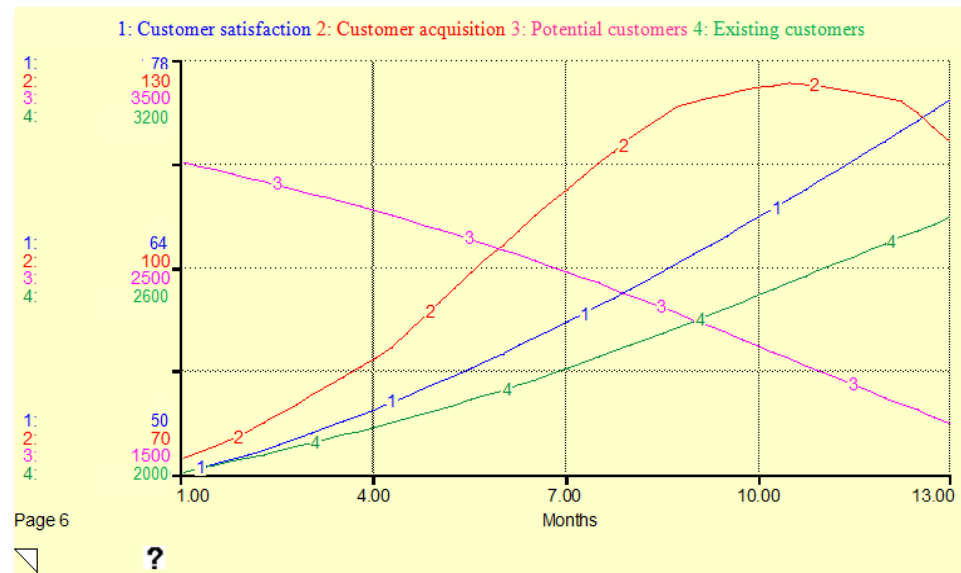


Figure 6.6 A simulation graph showing customer satisfaction, acquisition, potential and existing customers

#### 6.1.7. Purchase Rate and Sales Rate

Figure 6.7 shows the relationship among the sales volume, sales rate, initial purchase rate, and repeated purchase rate. With reference to the dynamic simulation module shown in Figure 5.6, the sales rate (line 2) is equal to the sum of the initial purchase rate (line 3) and the repeated purchase rate (line 4). The repeated purchase rate is relatively low compared with the initial purchase rate. The initial purchase rate therefore contributes to a larger portion of the sales rate. According to Figure 6.7, at the 12<sup>th</sup> month, the repeated purchase rate is about 43 units whereas the initial purchase rate is about 472 units; the sales rate reaches nearly 529 units. Since the sales rate is the inflow of the sales volume (see Figure 5.6), increasing sales rate will definitely cause a rise in the sales volume (line 1). The sales volume increases from 8,000 units to around 11,381 units at the 12<sup>th</sup> month, i.e. 42.3%. Rising in sales volume will bring greater revenue to the window fashions retailer, provided that all costs remain unchanged. As mentioned above, the company should continuously improve customer satisfaction so as to

stimulate more potential customers to make purchase, thereby increasing the initial purchase rate and the sales rate.

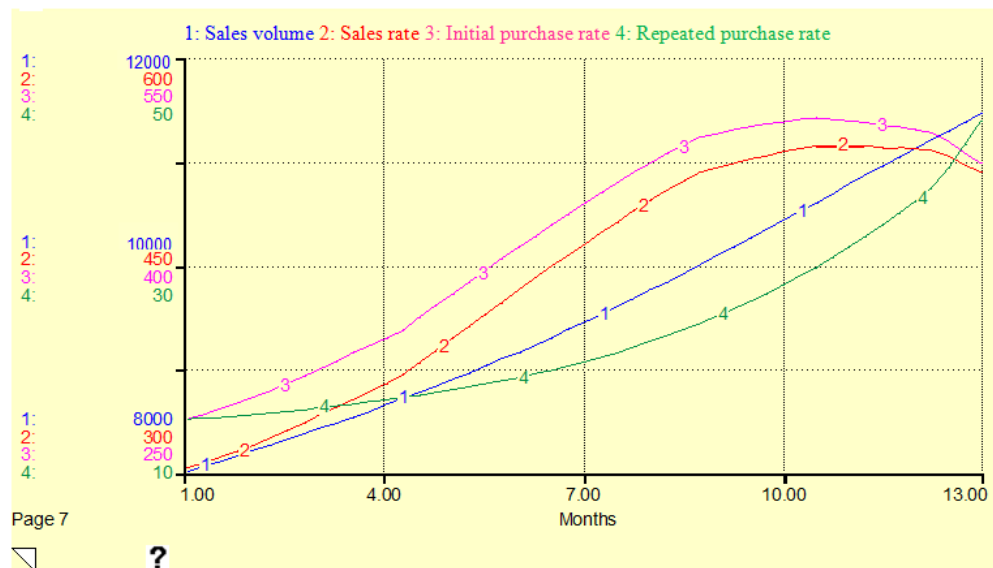


Figure 6.7 A simulation graph showing sales volume and rates of sales, initial and repeated purchase

## 6.2. Sensitivity and Policy Analyses

The dynamic simulation module contains various variables. The simulation results could help Hunter Douglas Gallery better understand the relationship between different variables and their general impacts on each other. However, this perhaps is not adequate for the company to formulate better business policies and strategies. For this reason, the sensitivity analysis and the policy analysis should be useful. The former determines how responsive the variable is to certain changes of another variable. This helps Hunter Douglas Gallery test the module, and thus better understand the behavioural patterns of the variables. The latter evaluates various policy alternatives to determine which one will most likely achieve a given set of objectives. The results of the sensitivity and policy analyses regarding the CRM model are provided in this chapter.



### **6.2.1. Sensitivity Analysis**

The main purposes of the sensitivity analysis in this research are to test the model behaviours and to find out the key leverage point in the dynamic simulation module, where small changes of the parameter values will cause considerable alteration to the model behaviour or to the values of the measures. According to Sterman (2000), a parameter that strongly affects the model behaviour may be a good candidate for additional data collection as it can lead to a better and more reliable estimate. In this research, the sensitivity analysis involves five parameters and this helps us determine their impacts on customer satisfaction, the number of existing customers, and the sales volume. The five parameters selected to perform sensitivity analysis are employee satisfaction, satisfaction with retail service quality, satisfaction with product quality, spending on advertising, and spending on training. The dynamic simulation is carried out by altering one parameter at a time and the data extracted is displayed in Appendix 6. After that, the graphical behaviour and numerical results regarding the main variables of interest are examined.

For the sensitivity analysis, each parameter is set to run through its full possible range. Among the five parameters, three (i.e. “employee satisfaction”, “satisfaction with retail service quality”, and “satisfaction with product quality”) are set to run from a level of 0 to 100 with an interval of twenty-five, while two (i.e. “spending on advertising” and “spending on training”) are set to run from a range of \$0/month to \$10,000/month with an interval of \$2,500/month. Their influences on customer satisfaction, the number of existing customers, and the sales volume are measured and studied.

### 6.2.1.1. Varying Employee Satisfaction from 0 to 100 Level

Sensitivity analysis is performed against employee satisfaction so as to examine how responsive three parameters (i.e. customer satisfaction, the number of existing customers, and the sales volume) are to the changes of employee satisfaction. Table 6.1 shows the incremental variation on the value of employee satisfaction. Figure 6.8, Figure 6.9, and Figure 6.10 show the results of the sensitivity analysis of customer satisfaction, the number of existing customers, and the sales volume respectively, with regard to modifications of the employee satisfaction level from 0 to 100 with an interval of 25. The five lines with numbers 1 to 5 shown in the graphs (see Figure 6.8, Figure 6.9, and Figure 6.10) represent different outputs with respect to variations in the employee satisfaction level (see Table 6.1).

Table 6.1 Values of employee satisfaction and their representative lines

Line	Employee Satisfaction
1	0
2	25
3	50
4	75
5	100

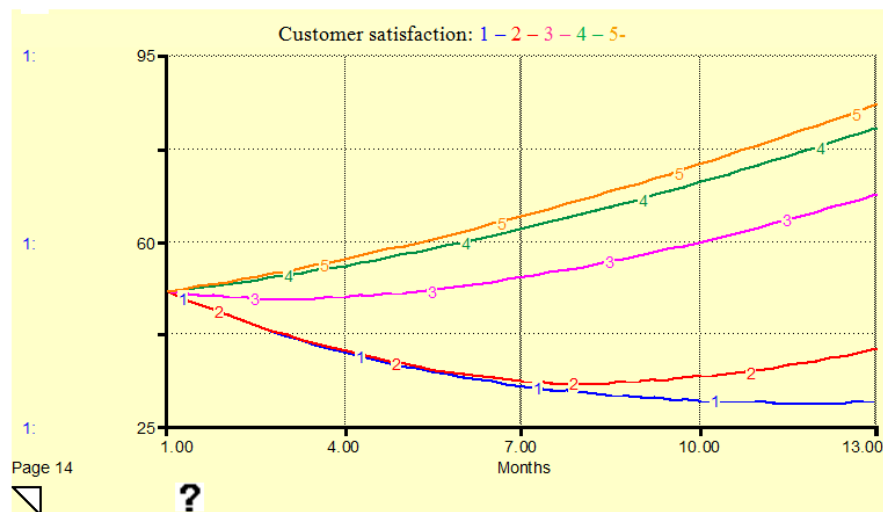


Figure 6.8 Results of the sensitivity analysis of customer satisfaction by varying employee satisfaction

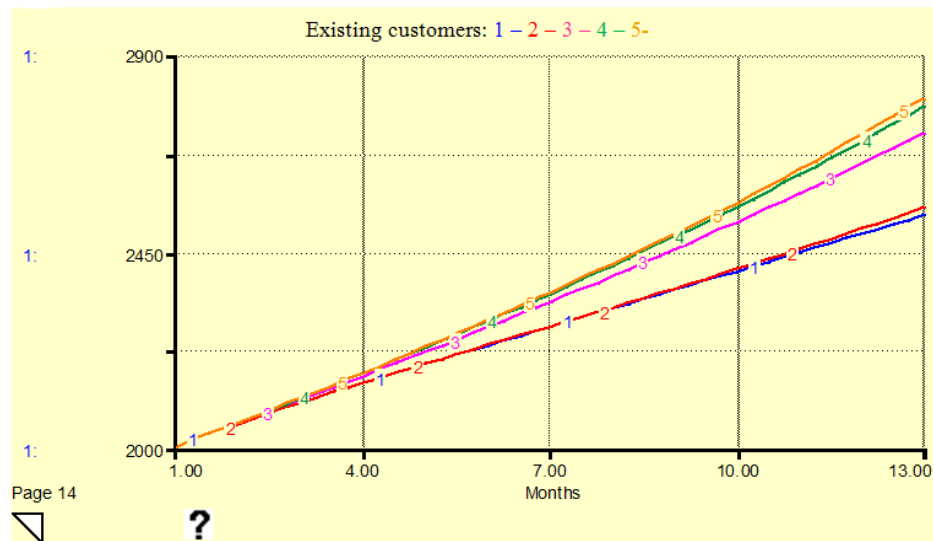


Figure 6.9 Results of Sensitivity Analysis of the number of existing customers by varying employee satisfaction

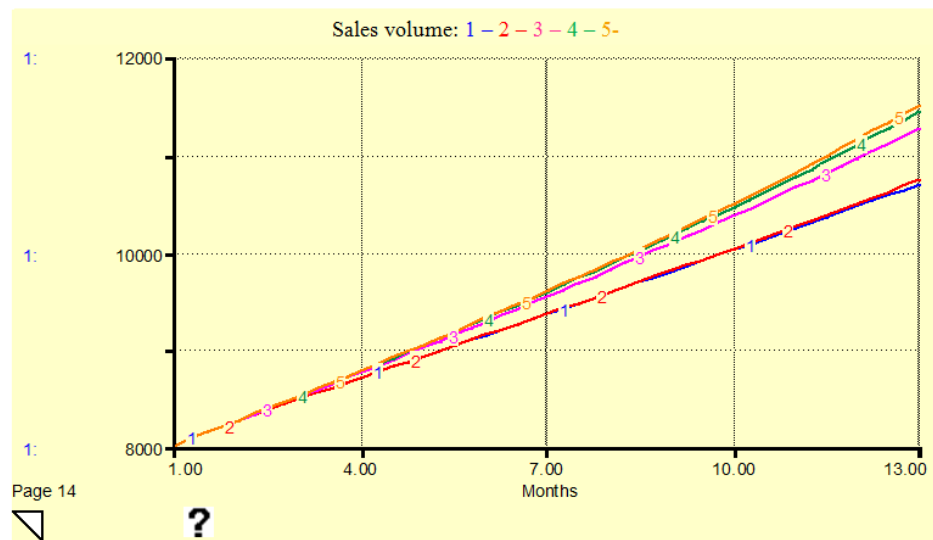


Figure 6.10 Results of sensitivity analysis of the sales volume by varying employee satisfaction

There is a significant increase in customer satisfaction, i.e. 74.26% when employee satisfaction increases from a level of 25 to 50 (see Table 6.2). This is mainly due to a major improvement of personal interaction and order completion efficiency which is directly driven by increasing employee satisfaction. Such an improvement could enhance employees' performance of dealing with customers'

orders and of serving customers, hence boosting customer satisfaction. Furthermore, an increase in employee satisfaction improves not only order completion efficiency but also order lead time, which helps reduce customer satisfaction dissipation fraction. Obviously, employee satisfaction influences the level of customer satisfaction through multiple channels. From Table 6.2, customer satisfaction reaches a level of 67.91, an acceptable level, when employee satisfaction increases up to a level of 50. This implies that maintaining employee satisfaction up to standard (i.e. 50) is the basic requirement for the window fashions retailer to satisfy customers. Otherwise, customer satisfaction will drop significantly to a level of 38.97 by 74.26% if employee satisfaction reduces to a level to 25. When employees are dissatisfied, their working performance is poor and far below standard. This could probably cause an unacceptable level of customer satisfaction and thus bring a great loss of customers to the window fashions retailer.

The percentage changes in customer satisfaction increase gradually when employee satisfaction increases from a level of 50 to 100. There are about 19% and 8% increases when employee satisfaction increases from a level of 50 to 75 and then 75 to 100 respectively. This is because personal interaction and order completion efficiency approach their maximal level when employees are trying their best. The results suggest that maintaining employee satisfaction at a level of 75 or slightly higher is optimum as further increases in employee satisfaction only slightly improve customer satisfaction. Thus it appears to be not economical to spend much more on training, working environment, and monetary rewards for such a small gain.

Table 6.2 Percentage changes in customer satisfaction by varying employee satisfaction

Employee Satisfaction	Customer Satisfaction	% Change in Customer Satisfaction
0	29.21	N/A
25	38.97	+33.41%
50	67.91	+74.26%
75	80.96	+19.21%
100	87.63	+8.24%

Same as customer satisfaction, the number of existing customers and sales volume have a significant increase (i.e. 6.69% and 4.88% respectively) when employee satisfaction increases from a level of 25 to 50 (see Table 6.3 and Table 6.34). Since customer satisfaction is a key driver to change potential customers to existing customers (see Figure 5.6), it is reasonable to achieve the greatest increase in customer satisfaction which can bring about the most significant increase in the number of existing customers. Besides, a higher customer acquisition rate can stimulate a higher initial purchase rate and can therefore increase sales volume. With the most significant increase in the customer acquisition rate, sales volume increases to the greatest extent. Apparently, the three parameters (customer satisfaction, existing customers, and sales volume) have a chain effect, meaning that customer satisfaction affects the number of existing customers and then influences sales volume. This, with reference to the trend of the percentage changes in customer satisfaction shown in Table 6.2, explains why the percentage changes in the number of existing customers and in sales volume become insignificant when employee satisfaction increases from a level of 50 to 75 and then to 100. These results also confirm that maintaining employee satisfaction at a level of 50 is necessary but may not be adequate. It is suggested that increasing it to a level of 75 is more reasonable.

Table 6.3 Percentage changes in the number of existing customers by varying employee satisfaction

Employee Satisfaction	Number of Existing Customers	% Change in Number of Existing Customers
0	2531.93	N/A
25	2548.15	+0.64%
50	2718.57	+6.69%
75	2781.51	+2.32%
100	2801.15	+0.71%

Table 6.4 Percentage changes in sales volume by varying employee satisfaction

Employee Satisfaction	Sales Volume	% Change in Sales Volume
0	10684.15	N/A
25	10728.50	+0.42%
50	11251.71	+4.88%
75	11433.84	+1.62%
100	11497.96	+0.56%

#### 6.2.1.2. Varying Satisfaction with Retail Service Quality from 0 to 100 Level

A sensitivity analysis is performed to look further into satisfaction with retail service quality. It is to investigate how responsive the three parameters (i.e. customer satisfaction, the number of existing customers, and the sales volume) are to the changes of satisfaction with retail service quality. Table 6.5 shows the incremental variation on the value of satisfaction with retail service quality for the sensitivity analysis. Figure 6.11, Figure 6.12, and Figure 6.13 show the results of the sensitivity analysis of customer satisfaction, the number of existing customers, and the sales volume respectively with reference to modifications of the level of satisfaction with retail service quality from 0 to 100 with an interval of 25. The five lines with numbers 1 to 5 shown in the graphs (see Figure 6.11, Figure 6.12, and Figure 6.13) represent different outputs with respect to variations of satisfaction with retail service quality (see Table 6.5).

Table 6.5 Values of satisfaction with retail service quality and their representative lines

Line	Satisfaction with Retail Service Quality
1	0
2	25
3	50
4	75
5	100



Figure 6.11 Sensitivity results of customer satisfaction by varying satisfaction with service quality



Figure 6.12 Sensitivity results of customer number by varying satisfaction with service quality

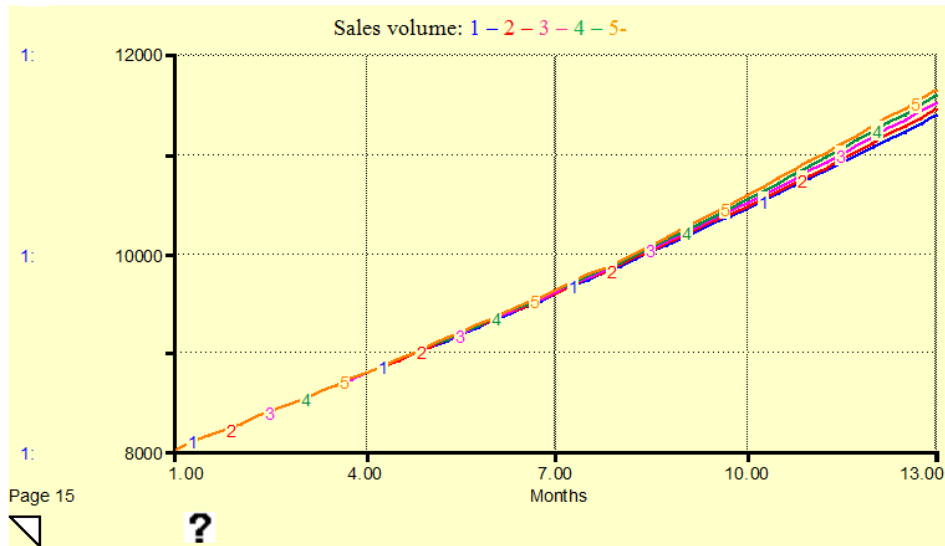


Figure 6.13 Sensitivity results of sales volume by varying satisfaction with retail service quality

With reference to Figure 6.11, Figure 6.12, and Figure 6.13, customer satisfaction, the number of existing customers, and the sales volume show a steady growth when satisfaction with retail service quality varies from a level of 0 to 100. Since satisfaction with retail service quality is one of the major factors directly affecting customer satisfaction, its changes is closely associated with and proportional to the changes of customer satisfaction. Table 6.6 shows that the percentage changes in customer satisfaction are insignificant, being around 5% on average when satisfaction with retail service quality increases from a level of 0 to 100. As mentioned previously, the three parameters show a chain effect. Therefore, an increase in satisfaction with retail service quality not only causes an increase in customer satisfaction but is also a boost to the number of existing customers and sales volumes (see Table 6.6, Table 6.7, and Table 6.8). However, as satisfaction with retail service quality contributes directly to customer satisfaction but is indirectly associated with the number of existing customers and sales volume (see Figure 5.6), the percentage increases in the number of existing customers and



sales volume are lower than that of customer satisfaction. From Table 6.7 and Table 6.8, the average percentage changes in the number of existing customers and in sales volume are about 0.7% and 0.6% respectively. These results show that the number of existing customers and sales volume are not too sensitive to the changes of satisfaction with retail service quality. In conclusion, compared with the sensitivity analysis against employee satisfaction discussed above, customer satisfaction is less sensitive to satisfaction with retail service quality owing to its slighter percentage changes.

Table 6.6 Percentage changes in customer satisfaction by varying satisfaction with service quality

Satisfaction with Retail Service Quality	Customer Satisfaction	% Change in Customer Satisfaction
0	76.78	N/A
25	81.18	+5.73%
50	85.57	+5.41%
75	89.97	+5.14%
100	94.36	+4.88%

Table 6.7 Percentage changes in customer number by varying satisfaction with service quality

Satisfaction with Retail Service Quality	Number of Existing Customers	% Change in Number of Existing Customers
0	2760.63	N/A
25	2781.73	+0.76%
50	2802.58	+0.75%
75	2822.06	+0.70%
100	2841.70	+0.70%

Table 6.8 Percentage changes in sales volume by varying satisfaction with retail service quality

Satisfaction with Retail Service Quality	Sales Volume	% Change in Sales Volume
0	11368.17	N/A
25	11434.62	+0.58%
50	11502.60	+0.59%
75	11567.11	+0.56%
100	11630.72	+0.55%

### 6.2.1.3. Varying Satisfaction with Product Quality from 0 to 100 Level

In order to examine the responsiveness of customer satisfaction, the number of existing customers, and the sales volume to the changes of satisfaction with

product quality, a sensitivity analysis is performed to look further into satisfaction with product quality. Table 6.9 shows the incremental variation on the value of satisfaction with product quality for the sensitivity analysis. Figure 6.14, Figure 6.15, and Figure 6.16 show the results of the sensitivity analysis of customer satisfaction, the number of existing customers, and the sales volume respectively with reference to modifications of the level of satisfaction with product quality from 0 to 100 with an interval of 25. The five lines with numbers 1 to 5 shown in the graphs (see Figure 6.14, Figure 6.15, and Figure 6.16) represent different outputs with respect to variations of satisfaction with product quality (see Table 6.9).

Table 6.9 Values of satisfaction with product quality and their representative lines

Line	Satisfaction with Product Quality
1	0
2	25
3	50
4	75
5	100

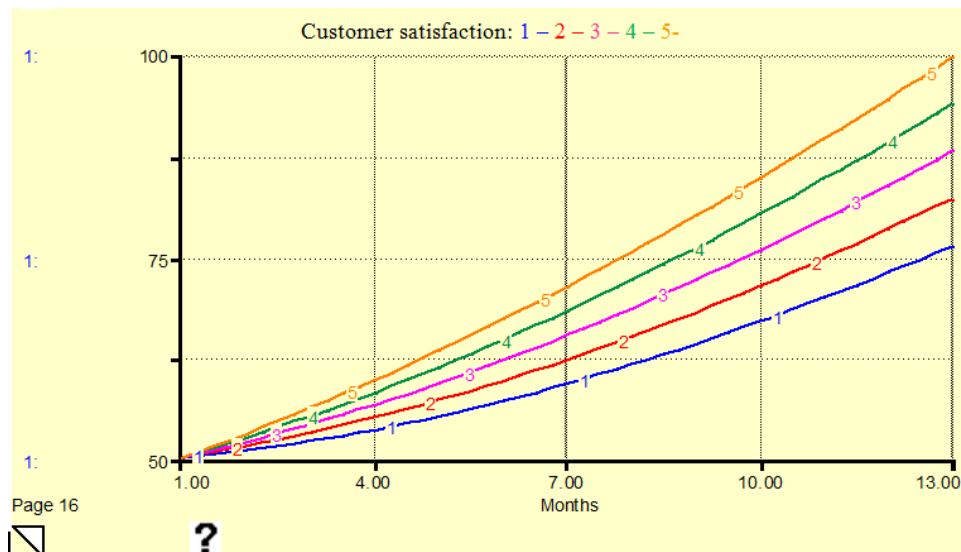


Figure 6.14 Sensitivity results of customer satisfaction by varying satisfaction with product quality



Figure 6.15 Sensitivity results of customer number by varying satisfaction with product quality

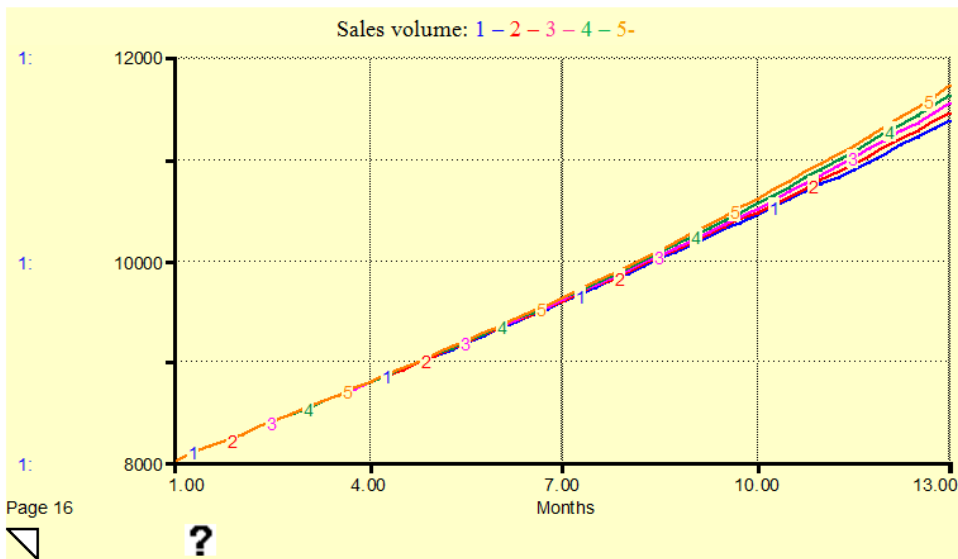


Figure 6.16 Sensitivity results of sales volume by varying satisfaction with product quality

Same as the sensitivity analysis results of satisfaction with retail service quality, the three parameters show a steady growth when satisfaction with product quality varies from a level of 0 to 100, with an incremental increase of 25 at every interval. This is due to the chain effect among customer satisfaction, existing customers, and sales volume mentioned previously. Since satisfaction with

product quality is one of the major factors contributing to customer satisfaction directly, customer satisfaction is more sensitive to the variation of satisfaction with product quality in comparison with the number of existing customers and the sales volume. The average percentage increase in customer satisfaction is greater than that in the number of existing customers and that in the sales volume (see Table 6.10, Table 6.11, and Table 6.12). According to Table 6.10, the average percentage increase in customer satisfaction is about 7% when satisfaction with product quality increases from a level of 0 to 100. Similarly, the number of existing customers and sales volumes increase by about 0.9% and 0.7% on average respectively, as shown in Table 6.11 and Table 6.12. These results show that increasing satisfaction with product quality will lead to a stable growth of customer satisfaction, the number of existing customers, and sales volume.

From Table 6.11 and Table 6.12, the percentage changes in the number of existing customers and sales volume become smaller gradually when satisfaction with product quality increases from a level of 0 to 75. However, when satisfaction with product quality increases from a level of 75 to 100, the percentage changes in the number of existing customers and sales volume become bigger. The former increases from 0.83% to 0.94% while the latter increases from 0.69% to 0.83%. These results encourage the window fashions retailer to engage in improving product quality so as to effectively gain more existing customers and amplify the sales volume. Compared with the results of sensitivity analysis of satisfaction with retail service quality, customer satisfaction is less sensitive to the variation of satisfaction with product quality but the number of existing customers and sales volume are more sensitive to it.

Table 6.10 Percentage changes in customer satisfaction by varying satisfaction with product quality

Satisfaction with Product Quality	Customer Satisfaction	% Change in Customer Satisfaction
0	76.26	N/A
25	82.11	+7.67%
50	87.97	+7.14%
75	93.83	+6.66%
100	99.69	+6.25%

Table 6.11 Percentage changes in existing customer number by satisfaction with product quality

Satisfaction with Product Quality	Number of Existing Customers	% Change in Number of Existing Customers
0	2758.75	N/A
25	2784.58	+0.94%
50	2809.23	+0.89%
75	2832.65	+0.83%
100	2859.25	+0.94%

Table 6.12 Percentage changes in sales volume by varying satisfaction with product quality

Satisfaction with Product Quality	Sales Volume	% Change in Sales Volume
0	11362.34	N/A
25	11444.29	+0.72%
50	11525.02	+0.71%
75	11603.99	+0.69%
100	11700.87	+0.83%

#### 6.2.1.4. Varying Spending on Advertising from 0 to 10 (\$,000/month)

A sensitivity analysis is performed to look further into spending on advertising so as to examine how responsive customer satisfaction, the number of existing customers, and the sales volume are to the changes of spending on advertising. Table 6.13 shows the incremental variation on the value of spending on advertising for the sensitivity analysis. Figure 6.17, Figure 6.18, and Figure 6.19 show the results of the sensitivity analysis of customer satisfaction, the number of existing customers, and the sales volume respectively with reference to modifications of spending on advertising from 0 to 10 (\$,000/month) with an interval of 2.5. The five lines with numbers 1 to 5 shown in the graphs (see Figure 6.17, Figure 6.18, and Figure 6.19) represent different outputs with respect to

variations of spending on advertising (see Table 6.13).

Table 6.13 Values of spending on advertising and their representative lines

Line	Spending on Advertising (\$,000/month)
1	0
2	2.5
3	5.0
4	7.5
5	10



Figure 6.17 Sensitivity results of customer satisfaction by varying spending on advertising

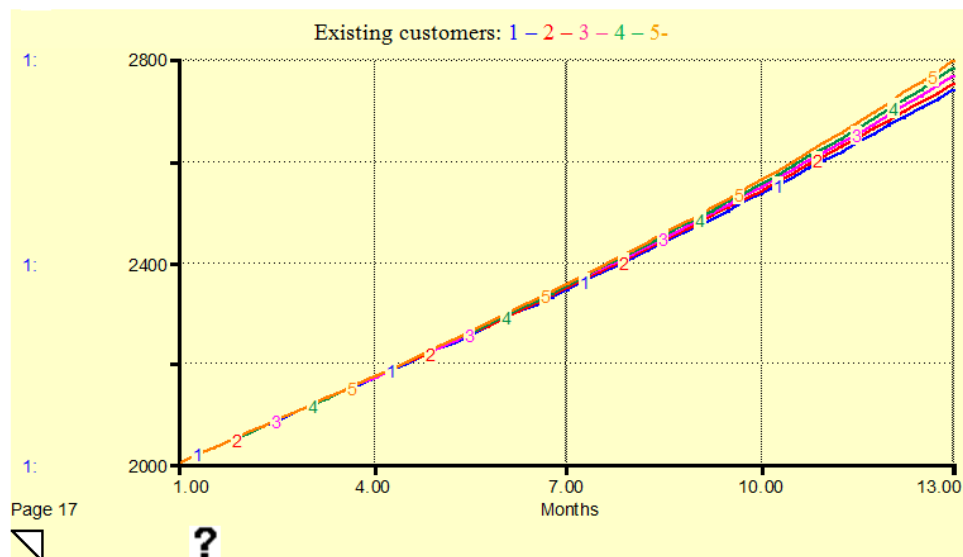


Figure 6.18 Sensitivity results of existing customer number by varying spending on advertising

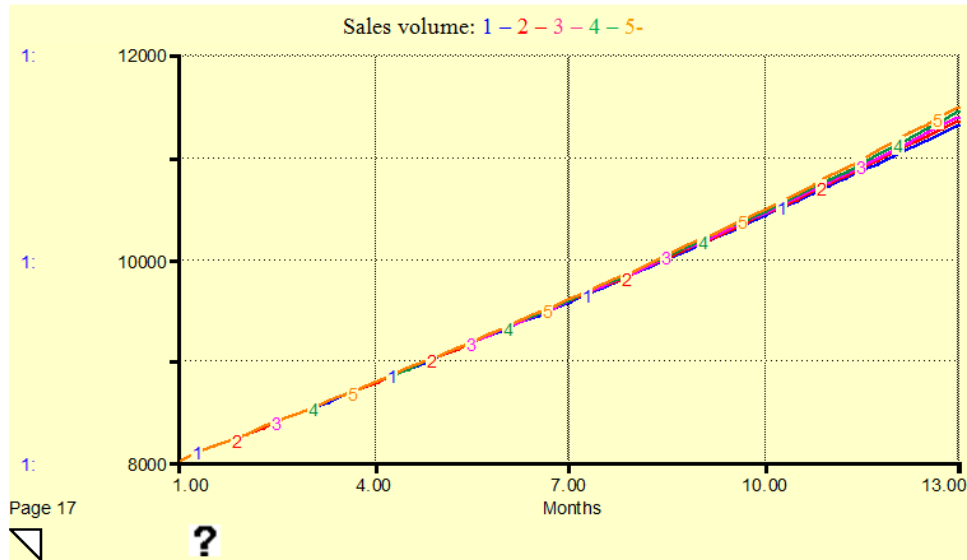


Figure 6.19 Sensitivity results of sales volume by varying spending on advertising

In the dynamic simulation module, satisfaction with advertising, which contributes to customer satisfaction, is directly affected by spending on advertising (see Figure 5.6). For this reason, increasing expenditure on advertising leads to an increase in customer satisfaction (see Table 6.14). Due to the chain effect discussed earlier, an increase in customer satisfaction will lead to an increase in the number of existing customers and sales volume. From Table 6.14, Table 6.15 and Table 6.16, the average percentage increase in customer satisfaction is about 5% while that of the number of existing customers and that of the sales volume are 0.6% and 0.4% respectively. It is found that the percentage increase in customer satisfaction is greater than that in the number of existing customers and that in the sales volume. This means customer satisfaction is more sensitive to the variation of spending on advertising, compared with the number of existing customers and the sales volume. On average, around 5% increase in customer satisfaction is resulted through increasing spending on advertising by

\$2,500 every month. The window fashions retailer can take these results into account to decide the resource allocation for advertising.

Table 6.14 Percentage changes in customer satisfaction by varying spending on advertising

Spending on Advertising (\$,000/month)	Customer Satisfaction	% Change in Customer Satisfaction
0	70.63	N/A
2.5	74.15	+4.98%
5	77.66	+4.73%
7.5	81.18	+4.53%
10	84.69	+4.32%

Table 6.15 Percentage changes in the existing customer number by varying spending on advertising

Spending on Advertising (\$,000/month)	Number of Existing Customers	% Change in Number of Existing Customers
0	2,737.58	N/A
2.5	2,750.28	+0.65%
5	2,764.69	+0.52%
7.5	2,780.39	+0.57%
10	2,795.74	+0.55%

Table 6.16 Percentage changes in sales volume by varying spending on advertising

Spending on Advertising (\$,000/month)	Sales Volume	% Change in Sales Volume
0	11,302.74	N/A
2.5	11,337.27	+0.31%
5	11,380.57	+0.38%
7.5	11,430.66	+0.44%
10	11,480.67	+0.43%

#### 6.2.1.5. Varying Spending on Training from 0 to 10 (\$,000/month)

A sensitivity analysis is carried out to look into spending on training. This is to examine how responsive customer satisfaction, number of existing customers, and sales volume are to the changes of spending on training. Table 6.17 shows the incremental variation on the value of spending on training for the sensitivity analysis. Figure 6.20, Figure 6.21, and Figure 6.22 show the results of the sensitivity analysis of customer satisfaction, the number of existing customers, and the sales volume respectively with reference to modifications of spending on



training from 0 to 10 (\$,000/month) with an interval of 2.5. The five lines with numbers 1 to 5 shown in the graphs (see Figure 6.20, Figure 6.21, and Figure 6.22) represent different outputs with respect to variations of spending on training (see Table 6.17).

Table 6.17 Values of spending on training and their representative lines

Line	Spending on Training (\$K/month)
1	0
2	2.5
3	5.0
4	7.5
5	10



Figure 6.20 Sensitivity results of customer satisfaction by varying spending on training



Figure 6.21 Sensitivity results of the number of existing customers by varying spending on training

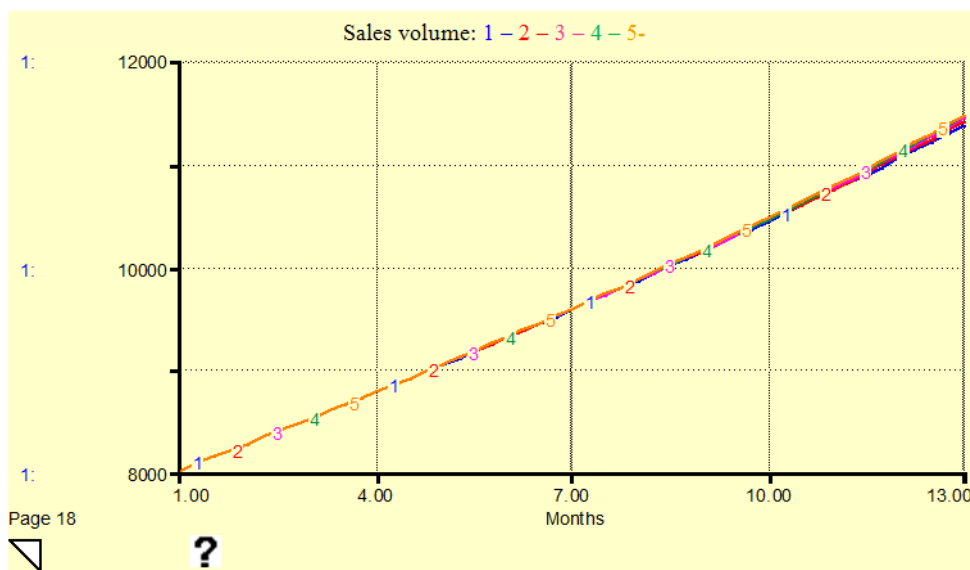


Figure 6.22 Sensitivity results of sales volume by varying spending on training

According to Table 6.18, Table 6.19, and Table 6.20, customer satisfaction, the number of existing customers and sales volume are slightly sensitive to the variation of spending on training. The three parameters show steady growth when spending on training increases from \$0/month to \$10,000/month (see Figure 6.20, Figure 6.21, and Figure 6.22). On average, customer satisfaction increases by

2.5%, the number of existing customers increases by 0.3%, and sales volume increases by 0.2% when spending on training increases from \$0/month to \$10,000/month with an incremental increase of \$2,500/month. From the dynamic simulation module shown in Figure 5.6, spending on training is closely linked employee satisfaction; for increasing spending on training will improve employee satisfaction. However, spending on training is only regarded as an indirect factor influencing customer satisfaction. Therefore, compared with the variation on employee satisfaction (see Table 6.2), customer satisfaction is much less sensitive to the variation of spending on training. While customer satisfaction increases by about 34% on average when employee satisfaction increases from a level of 0 to 100, it only increases by 2.5% on average with respect to an increase in spending on training from \$0/month to \$10,000/month.

From Table 6.18, the percentage increases of customer satisfaction drop from 4.6% to 0.7% when spending on training increases from \$0/month to \$10,000/month. This implies that even though the window fashions retailer spends more on staff training, the improvements in customer satisfaction would be less significant. The same applies to the number of existing customers and sales volume (see Table 6.19 and Table 6.20). This does not mean that spending on training is unimportant, for equipping employees with knowledge and skills is necessary to improve employee satisfaction and their working performance, which in turn is beneficial to the company. To sum up, these results suggest that the window fashions retailer should control the resources allocated to staff training and focus on the quality of training so that it can be provided in a cost-effective manner.

Table 6.18 Percentage changes in customer satisfaction by varying spending on training

Spending on Training (\$,000/month)	Customer Satisfaction	% Change in Customer Satisfaction
0	76.01	N/A
2.5	79.49	+4.58%
5	81.95	+3.09%
7.5	83.18	+1.50%
10	83.79	+0.73%

Table 6.19 Percentage changes in number of customers by varying spending on training

Spending on Training (\$,000/month)	Number of Existing Customers	% Change in Number of Existing Customers
0	2,759.16	N/A
2.5	2,771.07	+0.43%
5	2,780.10	+0.33%
7.5	2,785.88	+0.21%
10	2,789.29	+0.12%

Table 6.20 Percentage changes in sales volume by varying spending on training

Spending on Training (\$,000/month)	Sales Volume	% Change in Sales Volume
0	11,363.19	N/A
2.5	11,401.12	+0.33%
5	11,430.88	+0.26%
7.5	11,449.62	+0.16%
10	11,460.57	+0.10%

### 6.2.2. Policy Analysis

Policy analysis plays an important role in evaluating various policy alternatives and determining which one will most likely achieve a given set of objectives. In this research, a policy analysis is used to evaluate the impact of a key factor, which is order lead time, on the behaviour of the dynamic simulation module. The dynamic simulation is carried out by varying the policy parameter, which is order lead time, but keeping the CRM model structure unchanged.

As stated earlier, the module is aimed at investigating the interrelationship among factors affecting customer satisfaction. In the model, order lead time is a major factor that affects customer satisfaction dissipation fraction, which influences the

level of customer satisfaction. It is thus worth investigating the impact of order lead time on different variables, particularly customer satisfaction, customer loyalty, the number of existing customers, and sales volume. Besides, since order lead time is a converter controlled by the stock of the order backlog and the outflow of order, both completed in the dynamic simulation module (see Figure 5.6), a sensitivity analysis cannot be applied to it. A policy analysis is thus specifically performed to examine the model behaviour in respect of order lead time. The impacts of order lead time on customer satisfaction, customer loyalty, the number of existing customers, and the sales volume are evaluated using the policy analysis. The data of Figure 6.23, Figure 6.24 and Figure 6.25 are extracted and shown in Appendix 7.

#### **6.2.2.1. The Reference Model (Order Lead Time=2 Months)**

With order lead time being two months as shown in Figure 6.3, customer satisfaction, customer loyalty, the number of existing customers and sales volume are demonstrated in Figure 6.23. This figure acts as a reference model for comparing the differences between the four variables (i.e. customer satisfaction, customer loyalty, the number of existing customers, and sales volume) when order lead time varies.

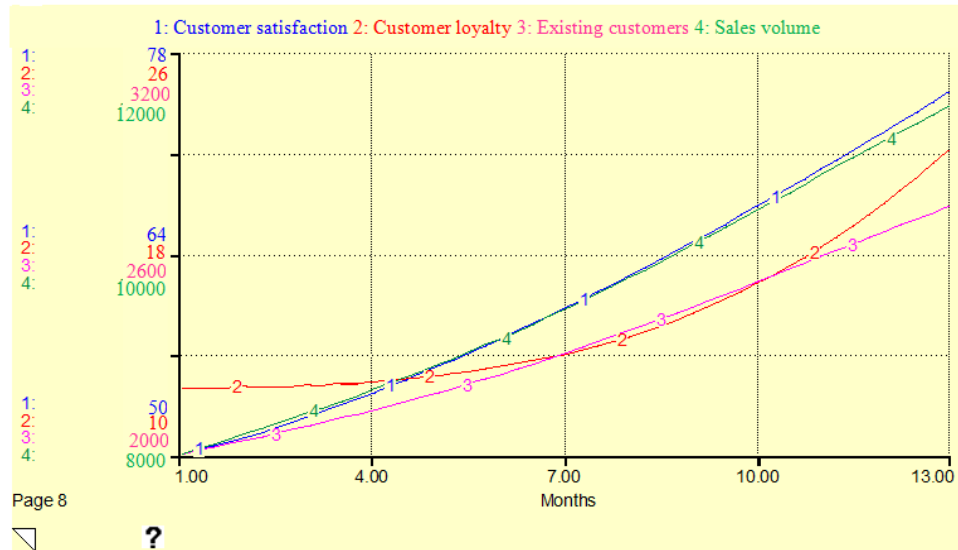


Figure 6.23 The model behaviour of the reference model (order lead time=2 months)

According to the reference model, the level of customer satisfaction level is about 77 and customer loyalty is about 21 at the end of the simulation period. As discussed previously, customer loyalty is driven by customer satisfaction, so increasing customer satisfaction will lead to improvements in customer loyalty. Furthermore, customer satisfaction affects the customer conversion rate, which influences the number of existing customers. The number of existing customers in the reference model is about 2,768 customers at the end of the simulation period. Due to the chain effect discussed earlier, the sales volume increases to around 11,381.

#### 6.2.2.2. The Policy Experiment I (Order Lead Time=1.5 Months)

In the policy experiment I, order lead time is set to be one and a half months regardless of what values the order completion efficiency and order backlog are. Its impact on the four variables (i.e. customer satisfaction, customer loyalty, the number of existing customers, and sales volume) is investigated. Figure 6.24

shows the model behaviour of the policy experiment I.

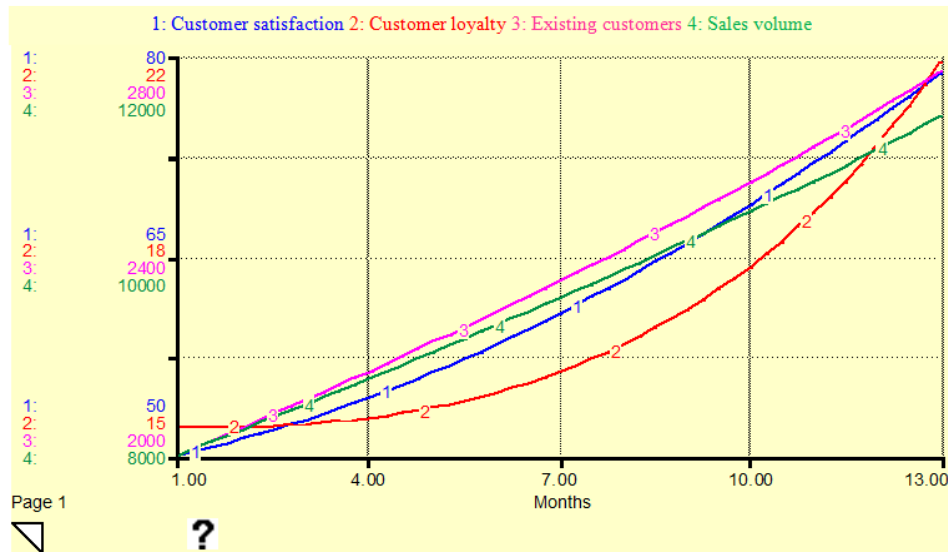


Figure 6.24 The model behaviour of policy experiment I (order lead time=1.5 months)

With reference to Figure 6.24, there is an increase in the four variables, among which the percentage increase in customer satisfaction (i.e. 57.5%) is the most significant. Order lead time decreases from two months (in the reference model) to one and a half months (in the policy experiment I). Such a decrease in order lead time lowers the customer satisfaction dissipation fraction. This is because a reduction in order lead time means that the order completion efficiency is improved and customer satisfaction enhanced. Besides, it is found that decreasing the order lead time by 0.5 month helps increase the level of customer satisfaction by about 2. Due to the chain effect, custom loyalty, the number of existing customers and the sales volume are improved with an increase in customer satisfaction. Customer loyalty increases to a level of 22, the number of existing customers to 2,770 and the sales volume to 11,398.

#### **6.2.2.3. Policy Experiment II (Order Lead Time=1 Month)**

In policy experiment II, the order lead time is set to be one month that is shorter than that in policy experiment I. It normally takes about three weeks for Hunter Douglas to manufacture the window blinds. It is challenging for the company to reduce the order lead time to one month. Improving employee satisfaction may not be helpful while increasing order completion efficiency is not an effective way because there is limited manpower. In most circumstances, the ordering process as well as the information communication between the retailers and manufactures in Hunter Douglas are complicated and time-consuming. A possible way to the reduce order lead time to one month is to focus on improving the workflow. Once the workflow of the ordering process is improved, information shared is easily accessed by both retailers and manufacturers in Hunter Douglas, the problems of order delay and communication errors can be alleviated between different parties. Therefore, the order lead time can be further shortened. Shortening the order lead time is crucial as it affects the level of customer satisfaction. Figure 6.25 shows the model behaviours of policy experiment II where the order lead time is further decreased to one month.





Figure 6.25 The model behaviour of policy experiment II (order lead time=1 month)

Regarding Figure 6.25, the four variables increase to a greater extent in response to a shorter order lead time. The results show that an additional shortening of the order lead time can further decrease the customer satisfaction dissipation fraction and hence lead to a further increase in customer satisfaction. Customer satisfaction increases to a level of about 82 in the 13<sup>th</sup> month. This outstanding level of customer satisfaction motivates more potential customers to become existing customers and thus, increasing their loyalty. There are 2,785 existing customers and customer loyalty reaches a level of 23. Due to the chain effect, the sales volume also increases to 11,447 at the 13<sup>th</sup> month.

#### 6.2.2.4. Comparison between Reference Model and Policy Experiments

Table 6.21, Table 6.22, Table 6.23, and Table 6.24 demonstrate changes in customer satisfaction, customer loyalty, the number of existing customers, and sales volume respectively when the order lead time varies from two months to one month. These tables show a comparison between the reference model (where the

order lead time is two months) and policy experiments I (where the order lead time is 1.5 months) and II (where the order lead time is one month).

Table 6.21 Percentage changes in customer satisfaction by varying order lead time

Order Lead Time (month)	Customer Satisfaction	% Change in Customer Satisfaction
2	76.83	N/A
1.5	78.75	+2.50%
1	82.34	+4.56%

Table 6.22 Percentage changes in customer loyalty by varying order lead time

Order Lead Time (month)	Customer Loyalty	% Change in Customer Loyalty
2	20.59	N/A
1.5	21.40	+3.93%
1	22.76	+6.36%

Table 6.23 Percentage changes in the number of existing customers by varying order lead time

Order Lead Time (month)	The Number of Existing Customers	% Change in the Number of Existing Customers
2	2,767.82	N/A
1.5	2,770.41	+0.09%
1	2,785.40	+0.54%

Table 6.24 Percentage changes in sales volume by varying order lead time

Order Lead Time (month)	Sales Volume	% Change in Sales Volume
2	11,380.57	N/A
1.5	11,398.23	+0.16%
1	11,446.89	+0.43%

With reference to the above tables, a decrease in order lead time causes an increase in customer satisfaction, customer loyalty, the number of existing customers, and the sales volume. Such impacts are magnified when the order lead time further decreases from 1.5 months to one month. More specifically, when the order lead time is one month, the impacts on the four variables are approximately a doubling of when order lead time is 1.5 months. For instance, the percentage increase in customer satisfaction is 2.5% (when the order lead time is reduced from two months to 1.5 months) and 4.7% (when the order lead time is further reduced from 1.5 months to one month). These results suggest that it is more

effective to shorten the order lead time to 1 month for the sake of improving customer satisfaction (4.7%) and customer loyalty (6.36%). Increasing customer satisfaction and loyalty could probably bring more customers to the window fashions retailer, leading to higher sales volume and profits. Hence, it is suggested that the window fashions retailer should review and improve its workflow so as to take the advantages that are brought about when the order lead time is reduced to 1 month. Otherwise, the window fashions retailer should focus its efforts and resources on other variables which can significantly improve customer satisfaction. For example, employee satisfaction is one of the key variables, for customer satisfaction is relatively sensitive to the changes of employee satisfaction as discussed above (see Table 6.2).

## **7. Findings and Discussions of the Exploratory-based CRM Simulation Model**

After the development of both the exploratory module and the dynamic simulation module, this chapter provides discussions on the results and implications of the ECSM.

### **7.1. The Exploratory Module**

#### ***7.1.1. Importance of Retail Service Quality to Customer Loyalty***

The results of the exploratory module suggest that retail service quality is positively associated with customer loyalty. Regarding retail service quality, three dimensions, namely physical aspects, reliability and problem solving, are found to have positive impacts on customer loyalty to the store, whereas only one dimension (i.e. personal interaction) is found to have a positive impact on customer loyalty to employees. The reasons for such positive effects are as follows:-

First, for physical aspects a good store layout and attractive service materials give customers a good impression and attitude towards the store. Once a good image of the store is built, customers will stick to the store and make purchases to get the blinds from Hunter Douglas Gallery. Based on the data collected, it is suggested that in order to improve the physical aspects of Hunter Douglas Gallery, it would be useful to renovate the store, for example, in order to make it more modern and fashionable, giving the customers a change of perception and a brand new image. Staff uniforms and service materials such as catalogues should also be improved

so that a better impression can be provided to customers. This could help Hunter Douglas Gallery delight customers and increase loyalty.

Second, reliability refers to the promises given by the store. Being reliable by keeping promises often helps create customers' confidence in the store. This encourages customers to make repeated purchases and establish long-term relationships with the store. In contrast, if the store breaks the promises, customers will be dissatisfied. This will cause a loss of customers and negative word-of-mouth; customer loyalty will hence be negatively affected. To improve the dimension of reliability, Hunter Douglas Gallery should establish a set of company policies as well as a reward and penalty scheme for staff in order to guide and encourage staff to honour the promises given by the company. There are several complaints about the staff being late for installing the blinds. Hunter Douglas Gallery should therefore track and manage the staff through monitoring and recording their working routine. This is important because, according to the exploratory module, the reliability dimension has the strongest impact on customer loyalty. Practitioners in the retail services industry should thus place greater emphasis on continually tracking their customers' perceptions on this dimension when formulating their retail service strategies. Even though other dimensions regarding retail service quality (personal interaction, physical aspects, and problem solving) are found to be positively related to customer loyalty, their associations are only moderate.

Furthermore, if the store does not respond to customers' enquiries and solve the problems encountered by customers when they patronise (i.e. the problem solving

dimension), customers will be disappointed and hesitate to make purchase. On the contrary, customers are more likely to make purchase and spread positive word-of-mouth to others if they get prompt response, such as advice on selecting the blinds, from the store. Regarding Hunter Douglas Gallery, there are often some complaints about the policy of leaving messages and the delay in response to the messages left. As customer loyalty is positively associated with the store's ability to solve problem, it is suggested that the store should change its policy from leaving messages to using a direct contact hotline. This would help customers solve their problems more directly and immediately.

It is also important to provide personal interaction and attention to customers. When employees deal with customers well and courteously, there will be a lot of praise from customers. In these circumstances, being more willing and pleased to make purchases, customers may also recommend others to do so. This benefits the store in acquiring and retaining customers. It is suggested that the staff can be empowered by attending various training programmes on product knowledge and selling techniques for the sake of improving the dimension regarding personal interaction.

#### ***7.1.2. Different Focus on the Needs of the Male and Female Customers***

The results of the post hoc analysis show that physical aspects, reliability, problem solving and aesthetics dimensions have significant impacts on customer loyalty to the store under the influence of gender difference. For physical aspects, the standardised coefficient for female customers is higher than that for male, meaning that the impact of physical aspects on customer loyalty to the store is

stronger for women than men. When female customers are satisfied with the store layout and the staff's neatness, they are more loyal than the male counterparts are. For reliability, the standardised coefficient is higher for men than that for women, showing that the impact of reliability on customer loyalty to the store is higher for men than for women. As most of the male respondents were professionals or executive/managers (75%) accounting for a higher percentage than women (35%), well-educated and knowledgeable male respondents are concerned about the promises given by the store. If the store keeps its promises of services, male customers will be more loyal in comparison to female. For problem solving, again, the standardised coefficient is higher for men than for women. This implies that the impact of problem solving on customer loyalty to the store is higher for men than women. There are often significant differences between the ways women and men tackle problems. When men encounter problems, they are keen to resolve them in a more direct and immediate manner compared with women. Once the male customers are satisfied with the store's problem-solving ability, they are more loyal than the female customers. Surprisingly, although aesthetics has a significant impact on customer loyalty to the store for female customers, the standardised coefficient of aesthetics is negative. This suggests that the relationship between aesthetics and customer loyalty to the store is negatively associated. The female customers prefer traditional blinds rather than stylish and innovative ones. They are more loyal than male if the blinds provided by the store are traditional. This could probably be because most of the respondents are aged between 41 and 50 (of which 41% of them are female respondents) and they are less willing to change and to try new things. It is therefore suggested that Hunter Douglas should design blinds with traditional design so as to satisfy such a

segment of customers, thereby increasing customer loyalty.

## **7.2. The Dynamic Simulation Module**

### ***7.2.1. Resources Allocated for Improving Employee Satisfaction***

With reference to the results of the sensitivity analysis, the key leverage point in the dynamic simulation module is found to be the employee satisfaction, since small changes to employee satisfaction will cause considerable changes to the behaviour of the model. It is also found that varying employee satisfaction from a level of 0 to 100 with an incremental increase of 25 causes a greater percentage changes in customer satisfaction, the number of existing customers as well as the sales volume, compared with varying other parameters such as satisfaction with retail service quality, satisfaction with product quality, spending on advertising, and spending on training. This suggests that Hunter Douglas Gallery should allocate more resources for improving employee satisfaction so as to achieve greater improvements in different aspects such as customer satisfaction and the sales volume. Furthermore, Hunter Douglas Gallery should maintain employee satisfaction at a minimal level of 50 but it is highly recommended to improve it to a level of 75. This is because a relatively small effort made to improve employee satisfaction from a level of 50 to 75 could cause a leap in enhancing customer satisfaction, the number of existing customers and the sales volume in Hunter Douglas Gallery. This is considered the most effective and economical way to increase customer satisfaction, and thus worthy of the store's investment. Maintaining employee satisfaction at a level of 75 is good enough; further improvement would not be considered effective in increasing customer satisfaction based on the results of the sensitivity analysis. Such findings provide



Hunter Douglas Gallery with references to allocate the resources for improving employee satisfaction for the sake of increasing customer satisfaction and profits to a greater extent. In order to improve employee satisfaction, Hunter Douglas Gallery should allocate resources for enhancing monetary rewards, working environment, and employee training, which, according to the dynamic simulation module, are the three core components affecting employee satisfaction.

### ***7.2.2. The Focus on Improving Satisfaction with Product Quality***

Despite the importance of employee satisfaction, merely improving it is not enough for the window fashions retailer to gain long-term business growth and customer relationships. This is because there are still other factors influencing customer satisfaction, the number of existing customers and the sales volume. From the results of the sensitivity analysis, customer satisfaction with product quality is another significant factor after employee satisfaction. It is found that the percentage changes of customer satisfaction, the number of existing customers and the sales volume are considerably higher when customer satisfaction with product quality increases from a level of 75 to 100, compared with increasing that from a level of 50 to 75. Once the window fashions retailer achieves the employee satisfaction at a level of 75, it is recommended that the next focus of improving customer satisfaction is to enhance satisfaction with product quality. Achieving a breakthrough in the satisfaction with product quality at the level of 75 helps Hunter Douglas Gallery maximise customer satisfaction, acquire more existing customers and increase the sales volume to a greater extent. Furthermore, comparing the results of the sensitivity analysis, it is found that the percentage increase in customer satisfaction, the number of existing customers and the sales

volume by varying satisfaction with product quality is greater than the percentage change by varying satisfaction with retail service quality. Satisfaction with product quality is thus considered to be more crucial to achieve business growth and to generate more profits than satisfaction with retail service quality is. To improve customer satisfaction with product quality, Hunter Douglas has to focus on product features, aesthetics, and customer-perceived quality, as they are the three core components influencing satisfaction with product quality. Generally speaking, the findings suggest Hunter Douglas spending efforts and resources on continuously improving its product quality, apart from employee satisfaction, so as to enhance customer satisfaction and loyalty as well as to gain long-term profits.

### ***7.2.3. Importance of Satisfaction with Retail Service Quality and Spending on Advertising***

In regard to the results of the sensitivity analysis, satisfaction with retail service quality and spending on advertising are positively associated with customer satisfaction, the number of existing customers and the sales volumes. Improving satisfaction with service quality and spending on advertising could result in a steady increase in customer satisfaction, the number of existing customers and the sales volume. Moreover, satisfaction with retail service quality and spending on advertising are ranked after satisfaction with product quality in terms of their sensitivity. This suggests that these two parameters should not be neglected when Hunter Douglas Gallery formulates marketing strategies to improve customer satisfaction and profits. The findings help Hunter Douglas Gallery easily predict and control the expected outcomes of increasing satisfaction with retail service

quality and spending on advertising. This would be beneficial for Hunter Douglas Gallery to decide appropriate strategies in order to increase customer satisfaction.

#### ***7.2.4. Importance of Spending on Training***

Although spending on training is the least sensitive parameter, it does not mean that it is unimportant, for it can also increase customer satisfaction, the number of existing customers and the sales volume when an incremental increase of \$2,500/month is made on the spending on training. From the dynamic simulation module, spending on training is an indirect parameter that affects employee satisfaction with training, which in turn affects employee satisfaction and thus customer satisfaction. This explains why spending on training is less sensitive to customer satisfaction. However, as mentioned previously, employees often require knowledge to serve customers in a better way. Regular training is essential for maintaining employee satisfaction, in particular when introducing new products. Therefore, spending on training should not be overlooked when Hunter Douglas Gallery attempts to improve employee satisfaction to a level of 75 so as to maximise customer satisfaction. These findings suggest Hunter Douglas Gallery be aware of the importance of spending on training when considering to improve employee satisfaction and customer satisfaction.

#### ***7.2.5. Workflow Improvement to Shorten the Order Lead Time***

Regarding the results of policy analysis, shortening the order lead time is found to be an effective way to improve customer satisfaction. Customer satisfaction, customer loyalty, the number of existing customers and sales volume are greatly improved with a leap in percentage when the order lead time is further decreased

from one and a half months to one month. Regarding Hunter Douglas, the average order lead time is about two months. Decreasing the order lead time from two months to one and a half months is possible in Hunter Douglas by improving employee satisfaction and thus the order completion efficiency. However, decreasing the order lead time from one and a half months to one month becomes difficult due to the time needed (at least three weeks) to manufacture the blinds. In this circumstance, improvement on workflow is suggested to facilitate the manufacturing and ordering process so as to shorten the order lead time to about one month. Such improvement may hinder the normal operation of the window fashions retailer. It is therefore suggested that Hunter Douglas Gallery should create a detailed plan for the changes, such as describing the office routine and providing training to employees, so that employees can adapt quickly to the new workflow. However, decreasing the order lead time to one month is perhaps a challenging task and requires lots of efforts and investments, and so it is also recommended that Hunter Douglas Gallery should evaluate all possible means of increasing customer satisfaction before deciding to adopt a strategy for maximising customer loyalty and profits.

### **7.3. Difficulties Encountered**

The major difficulty of carrying out this research was the collection of genuine data. While data collected from small companies can hardly represent the industry, large companies with brand name products are reluctant to disclose any sensitive information to outsiders to carry out any research, in particular when the sales and marketing figures are involved. This type of research is usually carried out internally or via large consultancy firms where all data and results are kept highly

confidential and the results seldom been published. Other researchers may have no idea of such research has ever been carried out even though they may be aware that changes are gradually implemented by these companies on their retail approach.

In order to carry out the research, company may sponsor internal staff to carry out a company-based project in pursuing his or her higher degrees such as Engineering Doctorate degree at a University. Unfortunately, only the Innovation Report can be accessed publicly after a certain period of time and furthermore, the data have been filtered or disguised. Although some researches have been carried out in this area in different industries, limited research works can be located publicly. Thus, there is little accumulative knowledge or research result database that can be built for reference for future comers. This paper uses genuine data to explore CRM by using simulation modelling in the retail sector to build up a skeleton for research in this area and to form a platform for the future comers to further investigate.

Another major difficulty in carrying this research was the ever-changing purchasing pattern in the retail sector. There are increasing numbers of customers who prefer to shop online and the impact of online shopping behaviour should have been studied. During the study, online shopping for window blinds was not yet the preferred way of shopping by most customers as high level of service is required for tailor-made products and customers still enjoy the shopping experience of “feel and touch” for tailor-made products. However, the increasing trend of online shopping cannot be ignored in any future research work.

## **8. Originality and Contributions**

### **8.1. A Two-step Modelling Approach to Customer Relationship Management**

Analysing CRM has long been an important and popular topic in different industries. It helps identify customer-company relationships and manage those relationships in more effective ways, thereby maximising the profitability. Methods used in the published studies on CRM vary but most concern data mining techniques without any simulation modelling and scenario analysis. For example, Ngai *et al.* (2009) classified CRM elements and suggested that more research attention should be paid on customer retention. Richards and Jones (2008) established a framework of CRM by identifying a core group of elements relating to CRM. These studies, however, provide no insight of how these elements influence each other and any associated CRM policies. There are some studies (Steven and Thomas, 1994; Kisang, 2008) that examines the causal relationships among CRM elements using quantitative analysis, they provide neither a comprehensive picture of the feedback mechanism in CRM nor insightful feedback about any changes in the mechanism. The dynamic relationships among variables over time cannot be determined; as a result, meaningful behavioural patterns of the feedback mechanism in CRM cannot be generated for better decision making.

To better explore and improve CRM for use in the retail industry, a two-step modelling approach is adopted in this study. This study covers all of the major variables for CRM when analysing customer services and product quality with both empirical analysis and simulation modelling; this is a novel addition to the

literature and the industry practice. Qualitative and quantitative methods are combined in this study. This provides the retail industry with a more complete picture of CRM and recognises the impact of various variables, including retail service quality and product quality, on customer satisfaction and loyalty. Strategies for CRM can then be formulated better by making use of the results of this study. This work allows decision makers to gain insights into how to craft an appropriate and competitive CRM strategy. This research presents guidelines on how to select important variables, structure their relationships, measure their impacts on CRM, and proceed to implement improvements in CRM. The exploratory module involves various statistical methods and analyses, including factor analysis, calculation of average variance extracted (AVE), calculation of Cronbach's alpha, regression analysis, one-way ANOVA, and a post-hoc analysis. The application of these techniques with the system dynamics based variability analysis forms the core research methodology in this study. The resulting approach to CRM in the retail industry provides a systematic tool for the allocation of priorities and resources to increasing customer satisfaction.

This research incorporates of all the key variables pertaining to customer satisfaction and loyalty from previous literature. Table 8.1 compares the parameters investigated in prior studies with those examined in this study. The ECSM approach devised covers all the key variables extracted from previous studies and includes several new variables which have been overlooked in previous studies. These new variables, including order completion efficiency, order lead time and advertising, are added to the model to better reflect the nature of the retail industry and provide a more comprehensive model of the CRM. Table

8.1 also highlights how this work has correlated a much greater number of key variables, twelve, when the previous research has not addressed more than four.

Table 8.1 Parameters studied in the prior literature and in the proposed ECSM

Authors Parameters	Steven and Thomas (1994)	Yiannis and Denton (1997)	Rucci <i>et al.</i> (1998)	Anderson and Narus (1998)	Reinartz and Kumar (2003)	Chen and Chuang (2008)	The ECSM
Employee Satisfaction		✓					✓
Order Completion Efficiency							✓
Order Lead Time							✓
Retail Service Quality	✓	✓					✓
Advertising							✓
Product Quality		✓				✓	✓
Customer Satisfaction	✓	✓	✓	✓		✓	✓
Customer Loyalty		✓		✓	✓		✓
No. of Customers							✓
Initial Purchase	✓						✓
Repeated Purchase				✓	✓		✓
Sales Volume					✓		✓

### **8.1.1 Missing Parameter - Social media sentiment**

Social media, a new trend in company-customer communication, has a big role to play nowadays and is regarded as “a game changer in the marketplace” (Ang, 2010). Social media holds enormous potential for companies to get closer to customers and, by doing so, increase revenue, cost reduction and efficiencies (Baird and Parasnis, 2011).

Despite the growth of social media, managers are still uncertain as to how to monetise social media (Mckay, 2009) and how to manage and incorporate a



community of online users into their existing CRM system (Band *et al.*, 2010), given that users of social media are not necessarily customers of one's organisation.

The impact of social media on traditional customer behaviour and relationship may need further and more extensive research. However, at the time of conducting this study, the impact of social media on customer relationship management in retail industry has not been systematically discussed in literature, and this factor was not included in the development of the ECSM. Focusing on service and product qualities, this study has neglected this factor but further research to extend the ECSM by considering the impact of social media in future research is suggested. Details will be discussed in Chapter 9.3.

## **8.2. Research Contributions**

Successful CRM has long been a key strategy for enhancing customer satisfaction, retention and loyalty and thus helps companies survive and be distinctive in the competitive market. In achieving the research objectives, this comprehensive study made the following contributions to the research literature and industry practice.

### ***8.2.1. Contributions to the Literature***

A customer survey was designed and conducted to measure customer satisfaction with retail service quality, customer satisfaction with product quality, and customer loyalty. Based on the literature review (Steven and Thomas, 1994; Yiannis and Denton, 1997; Rucci *et al.*, 1998; Anderson and Narus, 1998;

Reinartz and Kumar, 2003; Chen and Chuang, 2008) and discussion with experts from the retail industry, forty variables that are considered in this study were identified as potential factors influencing CRM. The identification of these variables is critical to this comprehensive study. Furthermore, the systematic exploratory module constructed in this study helps structure all the major factors influencing CRM from the forty variables. The combination of factors selected is unique in the literature for strategic CRM and are not found in previous studies. Moreover, the inclusion of other factors, namely order completion efficiency, order lead time and advertising, have not been addressed in previous literature but are important in the window fashions retail industry. These three new factors make this study broader in scope and more significant. This comprehensive study therefore fills the gap in the literature.

The combination of variable identification and analysis through the dynamic simulation module created in this study is innovative and original. As found in the literature, the existing analytical methods commonly used for CRM are the balanced scorecard (Buttle, 2004), data mining (Chu, 2007), as well as statistical and empirical analyses (Becker *et al.*, 2009; Stefanou *et al.*, 2003). This study adopts a two-step modelling approach to CRM by using qualitative (survey) and quantitative (simulation modelling) methods to reveal the patterns and causal relationships among service quality, product quality and customer satisfaction in retail industry which enable decision makers to better understand the dynamic behaviour of customer relationships and to estimate the future outcomes through the scenario analysis. The methodology adopted in this study is novel in this area of study, and also provides new insights into the problem.

### ***8.2.2. Contributions to the Retail Industry***

The ECSM developed not only benefits the window fashions retailers but also helps forming the CRM framework for other retail sectors. The retail service industry involves complex human behaviour. Different retail sectors face challenges in formulating the appropriate CRM for their companies. Competition means that there is no absolute identical CRM strategy among retailers. This study, however, generalises the key factors of the ECSM for a typical retailer – a window fashions retailer, that other retailers could get insights in formulating their own CRM strategies.

Referring to Figure 3.3 and the discussion in Chapter 3.3.1, the scope of retail industry is very broad, ranging from selling tangible products to intangible products, from mass production products to job production products, etc. Service quality does not necessarily co-exist with product quality and in equal weighting in the retail industry. There are retailers who only provide service to customers (i.e. on the right side of Figure 3.3) while some retailers focus more on products (i.e. on the left side of Figure 3.3). The focus of service quality and product quality varies among different retailers. Thus, it is probably impossible to form a universal CRM model which suits every retailer. This study develops a generalised CRM model for a typical retailer (which lies in the centre of Figure 3.3 and to a certain extent strikes a balance between product and service) and thus gives different types of retailers an insight into the key factors and dynamic mechanisms in CRM. The exploratory module and the dynamic simulation module presented are flexible enough to be operated by decision makers from other retail sectors. They can formulate CRM strategies to best serve their

businesses through adopting appropriate changes in parameters of the modules for simulation according to their own company weightings. They can then identify the key leverage point in CRM and examine the relationships among factors influencing CRM particularly for their own retail sectors, thereby getting insight into strategic business planning based on the results and estimations. This could facilitate business growth through maximising customer satisfaction and loyalty.

Overall, the ECSM developed in this study provides support for retailers not only in the window fashions industry but also of other retail sectors to make effective decisions on CRM. Applying the ECSM, Hunter Douglas Gallery's sales volume went up with a leap of 36% from 2011 to 2012 and its customer base expanded by 34%. From 2011 to 2012, the numbers of repeated purchases significantly increased by 214% while its customer satisfaction rate increased by 58%. The ECSM has proved to be an effective model, providing a framework for retailers to devise their own tailor-made CRM strategies.

## **9. Conclusions**

It is believed that companies in the retail sector can benefit from the comprehensive analysis of the factors contributing to CRM, and the application of system dynamics based modelling to understanding the relationships between these factors presented by this report. This chapter highlights these achievements and discusses areas where further research would be of benefit to build upon this work.

### **9.1. Objectives Achieved and Major Findings**

This study examines customer relationship management in the retail industry from both quantitative and qualitative perspectives. It achieves the two specific objectives identified in Chapter 1. First, it constructed an exploratory module, in which (a) major dimensions of retail service quality and product quality are identified, (b) the impacts of retail service quality and product quality on customer loyalty are examined, and (c) the influence of gender differences in various dimensions of retail service quality and product quality are explored. The exploratory module is verified to be quantitatively significant and meaningful. Second, it also developed a dynamic simulation module. This module covers various factors that significantly influence customer relationships and provides the retail industry with a fuller picture of CRM for scenario analysis and strategic planning.

With reference to the exploratory module and the dynamic simulation module, key findings in this study are summarised as below:-

- Out of the eight dimensions, three have positive impacts on customer loyalty

to the store; they are reliability, physical aspects, and problem solving. The degree of their impacts on customer loyalty is, in descending order, reliability, physical aspects, and problem solving. The results are shown in Table 4.29. On the other hand, the only dimension significantly influencing customers' loyalty to employee is personal interaction. Consistent with previous research (Bloemer *et al.*, 1999; Mehta *et al.*, 2000; Siu and Chow, 2002), customer behaviour and purchasing intention are largely determined by these dimensions regarding retail service quality, i.e. personal interaction, physical aspects, reliability and problem solving.

- With reference to the post-hoc analysis, gender differences have an influence on the four dimensions retail service quality and product quality, i.e. physical aspects, reliability, problem solving and aesthetics, on customer loyalty to the store. For men, “problem solving” has a significant impact on customers' loyalty to the store, whereas for women, “physical aspects” and “aesthetics” had significant impacts on it. Furthermore, the “reliability” dimension has significant impact on customers' loyalty to the store for both genders and the association between “reliability” and customer loyalty to the store was stronger for men than for women.
- The results of the sensitivity analysis generated from the dynamic simulation module suggested that keeping employee satisfaction to a level of about 75 or slightly higher is good enough. Further improvement on employee satisfaction will not be effective and will not make greater achievement as expected. Retailers should therefore shift the focus from improving employee satisfaction to other aspects which could significantly improve customer satisfaction and loyalty. Besides, improving product quality can be an

effective way to enhance customer satisfaction and thus customer loyalty. A further increase in product quality reaching the maximum level of 100 will lead to a considerable increase in the number of customers and the sales volume.

- From the results of the policy analysis, shortening the order lead time to one month is very effective to improve customer satisfaction by 4.7% and customer loyalty by 6.36%. Improvements in the workflow and the ordering process could be effective ways in the retail industry as well as the window fashions retailer. Increasing customer satisfaction and loyalty could probably bring more customers to the window fashions retailer for higher sales volume and profits. Hence, it is suggested that the window fashions retailer should review and improve its workflow so as to take the advantages of reducing the order lead time to 1 month.
- Both the exploratory module and the dynamic simulation module are useful in the retail industry. Hunter Douglas is a typical example in the retail industry that achieved fruitful results through formulating better business strategies which retain existing customers and attract more new customers. Customer satisfaction and loyalty to Hunter Douglas Gallery are improved with the support of the models. Using these two modules, Hunter Douglas's sales volume increased with a leap of 36% from 2011 to 2012. During that period, its customer base expanded by 34% and the number of repeated purchases made by its existing customers significantly increased by 214%. Furthermore, its customer satisfaction rate has improved by 58%. These results are an indicator that the model developed through the research can be an effective tool in designing CRM processes.

## **10. Future Research**

Though this study achieved fruitful results, future research is suggested to improve and extend this study. First, the two developed models could be applied in other retailers and other industries to test its applicability. Case studies could be carried out in a variety of industries to test the model's capability. Customisations could be made to cater for companies with different backgrounds and needs. To examine their differences, comparative research could then be conducted. Second, the developed ECSM, particularly its dynamic simulation module, could be extended by incorporating other factors such as competitors, suppliers and brands that are not considered in this study but may be significant, or may exert an influence on other industries and companies. Therefore, it would be valuable if the model could be extended as such.

A key area is to consider the effect of non-company managed customer relationships. These have grown rapidly in the last 10 years through the growth of social media. Sentiment monitoring of particular sales channels is increasingly popular. This technique could provide an effective way to make the simulation module more dynamic by taking current sentiment measures in each new simulation. The exploratory module also needs to be enhanced by taking customer feedback in social media channels into account.



## Appendices

### Appendix 1: Questionnaire for Customer Survey

#### Survey on Customer Behaviour towards Hunter Douglas

The purpose of this survey is to investigate the influence of various factors on customers' repeated purchasing behaviour towards Hunter Douglas and customers' satisfaction level to Hunter Douglas. You are cordially invited to participate in this survey, which will only take you about 10 minutes. The information collected will be kept strictly confidential and served solely for academic purpose.

#### *Part 1: General Questions*

1. Why do you buy the blinds of Hunter Douglas? (You may choose 3 items in maximum.)

- |                                                   |                                         |                                              |
|---------------------------------------------------|-----------------------------------------|----------------------------------------------|
| <input type="checkbox"/> Quality of merchandise   | <input type="checkbox"/> Advertising    | <input type="checkbox"/> Brand               |
| <input type="checkbox"/> Service quality of staff | <input type="checkbox"/> Location       | <input type="checkbox"/> Price               |
| <input type="checkbox"/> Kinds of merchandise     | <input type="checkbox"/> Peer influence | <input type="checkbox"/> After-sales service |
| <input type="checkbox"/> Others: _____            |                                         |                                              |

2. What factors do stimulate you to change your blinds? (You may choose 3 items in maximum.)

- |                                           |                                       |                                           |
|-------------------------------------------|---------------------------------------|-------------------------------------------|
| <input type="checkbox"/> Promotion price  | <input type="checkbox"/> Coupon       | <input type="checkbox"/> Special festival |
| <input type="checkbox"/> Trend of fashion | <input type="checkbox"/> Advertising  | <input type="checkbox"/> New house        |
| <input type="checkbox"/> Peer influence   | <input type="checkbox"/> Special gift | <input type="checkbox"/> Removal          |
| <input type="checkbox"/> Others: _____    |                                       |                                           |

3. How often do you think you will purchase the blinds of Hunter Douglas again?

- |                                      |                                    |                                                  |                                      |
|--------------------------------------|------------------------------------|--------------------------------------------------|--------------------------------------|
| <input type="checkbox"/> <1 year     | <input type="checkbox"/> 1-5 years | <input type="checkbox"/> 6-10 years              | <input type="checkbox"/> 11-15 years |
| <input type="checkbox"/> 16-20 years | <input type="checkbox"/> >21 years | <input type="checkbox"/> Will not purchase again |                                      |

## Part 2: Customer Buying Experience

4. Please indicate your opinions on the following statements (on Retail Service Quality) according to your experiences in patronizing Hunter Douglas.  
(1: Strongly disagree; 7: Strongly agree)

4.1 Personal Interaction								
4.1.1	Staff are courteous with customers	1	2	3	4	5	6	7
4.1.2	Staff provide prompt quotations	1	2	3	4	5	6	7
4.1.3	Staff provide accurate quotations	1	2	3	4	5	6	7
4.1.4	Staff can be easily approached and consulted	1	2	3	4	5	6	7
4.1.5	Staff provide accurate information about Hunter Douglas (e.g. history, opening hours and product information)	1	2	3	4	5	6	7
4.1.6	Staff give personal attention	1	2	3	4	5	6	7
4.2 Policy								
4.2.1	You find the transactions with Hunter Douglas are safe	1	2	3	4	5	6	7
4.2.2	Hunter Douglas accepts most major payment methods	1	2	3	4	5	6	7
4.2.3	Operating hours of Hunter Douglas is convenient	1	2	3	4	5	6	7
4.3 Physical Aspects								
4.3.1	Hunter Douglas has visually appealing physical facilities (such as display, shop decoration and tidiness)	1	2	3	4	5	6	7
4.3.2	Hunter Douglas has visually appealing service materials (such as collection book and catalogue)	1	2	3	4	5	6	7
4.3.3	Staff of Hunter Douglas are neat and tidy	1	2	3	4	5	6	7
4.3.4	Store layout makes it easy for you to find what you need	1	2	3	4	5	6	7
4.4 Reliability								
4.4.1	The service promises (such as return, 3 years of warranty, and product quality) enhances the reliability of Hunter Douglas	1	2	3	4	5	6	7
4.4.2	When Hunter Douglas promises to do something by certain time, it will do so (such as the delivery and installation time)	1	2	3	4	5	6	7
4.5 Problem Solving								
4.5.1	Hunter Douglas handles your complaints immediately	1	2	3	4	5	6	7
4.5.2	Hunter Douglas handles your complaints directly	1	2	3	4	5	6	7

4.5.3	Hunter Douglas shows sincere interest in solving your problems	1	2	3	4	5	6	7
4.5.4	The hotlines of Hunter Douglas are seldom busy	1	2	3	4	5	6	7
4.5.5	You are satisfied with the leaving message policy of maintenance hotline	1	2	3	4	5	6	7
4.5.6	Hunter Douglas quickly responds to your enquiries or complaints after you left voice messages via the maintenance hotline	1	2	3	4	5	6	7

5. Please indicate your opinions on the following statements (on Product Quality) according to your experiences in patronizing Hunter Douglas.  
(1 = Strongly disagree; 7 = Strongly agree)

5.1 Product Features								
5.1.1	Hunter Douglas provides diverse types of blinds for your selection	1	2	3	4	5	6	7
5.1.2	Hunter Douglas collections have a range of differentiated colours to fit your needs	1	2	3	4	5	6	7
5.1.3	Hunter Douglas collections have a range of differentiated materials to fit your needs	1	2	3	4	5	6	7
5.1.4	You are satisfied with the functions of Hunter Douglas blinds (such as dust-resistance and UV-resistance)	1	2	3	4	5	6	7
5.2 Aesthetics								
5.2.1	The blinds of Hunter Douglas have an appealing appearance	1	2	3	4	5	6	7
5.2.2	The blinds of Hunter Douglas are stylish	1	2	3	4	5	6	7
5.2.3	The blinds of Hunter Douglas are innovative	1	2	3	4	5	6	7
5.3 Customer-perceived Quality								
5.3.1	Hunter Douglas provides high quality of product	1	2	3	4	5	6	7
5.3.2	The blinds of Hunter Douglas have high durability	1	2	3	4	5	6	7

6. Please indicate your opinions on the following statements (on Customer Loyalty) according to your experiences in patronizing Hunter Douglas.  
(1 = Strongly disagree; 7 = Strongly agree)

6.1 Customer Loyalty (Store Level)								
6.1.1	You share positive opinions about Hunter Douglas with other people	1	2	3	4	5	6	7
6.1.2	You recommend Hunter Douglas to someone who seeks advice in curtains	1	2	3	4	5	6	7
6.1.3	You encourage relatives and friends to shop at Hunter Douglas	1	2	3	4	5	6	7
6.1.4	You consider Hunter Douglas as the first choice when buying curtain next few years	1	2	3	4	5	6	7
6.1.5	You do not favour other department stores that offer curtains with more attractive prices	1	2	3	4	5	6	7
6.1.6	Searching and switching to another new retail store is just not worth the time and effort	1	2	3	4	5	6	7

6.1.7	You do switch to other department stores when the present perceived quality of Hunter Douglas discontinues	1	2	3	4	5	6	7
6.1.8	You want to build a good relationship with Hunter Douglas	1	2	3	4	5	6	7
6.2 Customer Loyalty (Employee Level)								
6.2.1	You are loyal to a particular staff	1	2	3	4	5	6	7
6.2.2	You have no intention to shop in the future because of a particular employee	1	2	3	4	5	6	7

### ***Part 3: Customer Satisfaction***

**7. Please rate your satisfaction level to the following items of Hunter Douglas.**  
(1 = Strongly dissatisfied; 7 = Strongly satisfied)

7.1 Retail Service Quality								
7.1.1	Personal interaction	1	2	3	4	5	6	7
7.1.2	Policy	1	2	3	4	5	6	7
7.1.3	Physical aspects	1	2	3	4	5	6	7
7.1.4	Reliability	1	2	3	4	5	6	7
7.1.5	Problem solving	1	2	3	4	5	6	7
7.2 Product Quality								
7.2.1	Product features	1	2	3	4	5	6	7
7.2.2	Aesthetics	1	2	3	4	5	6	7
7.2.3	Customer-perceived quality	1	2	3	4	5	6	7
7.3	Advertising: How do you satisfied with Hunter Douglas's marketing strategies including advertisements and promotions?	1	2	3	4	5	6	7
7.4	Order completion efficiency: How do you satisfied with the efficiency of order completed by Hunter Douglas?	1	2	3	4	5	6	7
7.5	Overall satisfaction: To what degree does Hunter Douglas meet your purchasing expectation?	1	2	3	4	5	6	7

***Part 4: Personal Information***

Gender:	<input type="checkbox"/> Male	<input type="checkbox"/> Female	
Age:	<input type="checkbox"/> below 20	<input type="checkbox"/> 21-30	<input type="checkbox"/> 31-40
	<input type="checkbox"/> 41-50	<input type="checkbox"/> 51-60	<input type="checkbox"/> 61 or above
Occupation:	<input type="checkbox"/> Student	<input type="checkbox"/> Unemployed	<input type="checkbox"/> Service worker
	<input type="checkbox"/> Clerk	<input type="checkbox"/> Salesperson	<input type="checkbox"/> Technician
	<input type="checkbox"/> Housewife	<input type="checkbox"/> Self-employed	<input type="checkbox"/> Executive/Manager
	<input type="checkbox"/> Retired	<input type="checkbox"/> Professionals	<input type="checkbox"/> Others: _____
Average monthly income:	<input type="checkbox"/> Below \$20K	<input type="checkbox"/> \$20001-\$40K	<input type="checkbox"/> \$40001-\$60K
	<input type="checkbox"/> \$60001-\$80K	<input type="checkbox"/> \$80001-100K	<input type="checkbox"/> \$100001 or above

**End of the questionnaire. Thank you.**

## Appendix 2: After-sales Service Questionnaire Conducted by Hunter Douglas in 2010

**樂思富窗飾專門店售後服務問卷調查**  
**Hunter Douglas Window Fashions (Luxaflex)**  
**After-sales Service Questionnaire**

**HunterDouglas Gallery**  
WINDOW FASHIONS

日期 Date: \_\_\_\_\_ 客戶編號 Client no.: \_\_\_\_\_

閣下曾於以下哪一間樂思富分店選購窗飾? Which shop did you purchase your Hunter Douglas window fashions?

☐ 灣仔越秀大廈 Yiu Xue Building      ☐ 九龍灣 MegaBox      ☐ 九龍灣國際展貿中心 EMax  
☐ 沙田新中央廣場 Grand Central Plaza      ☐ 海怡工貿中心 Horizon Plaza

請問閣下對我們的服務及分店有何意見? 請評分。  
How would you rate our service level and shop environment?

**第一部份 Part I**  
我們的員工 Our Staff

		非常滿意 Excellent	滿意 Good	普通 Fair	不滿意 Poor	非常不滿意 Very bad
1) 儀表	Appearance & Attire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) 禮貌及態度	Courtesy & Attitude	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) 產品知識	Product Knowledge & Expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) 主動性	Proactiveness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) 工作效率	Efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) 表達能力	Presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**第二部份 Part II**  
我們的分店 Shop Environment

		非常滿意 Excellent	滿意 Good	普通 Fair	不滿意 Poor	非常不滿意 Very bad
1) 店舖整體環境	General Environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) 產品陳列	Product Display	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) 店舖整潔	Cleanliness & Tidiness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

閣下對其他服務之寶貴意見:  
Any suggestions on how services?

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對個別員工的評價 (如適用) Comment on particular staff (if appropriate):

員工名稱 Name of staff member: \_\_\_\_\_

意見 Comment: \_\_\_\_\_

**第三部份 Part III (歡迎填寫) (Optional)**  
個人資料 Personal Information:

姓名 Name: \_\_\_\_\_ 聯絡電話 Contact Tel. No.: \_\_\_\_\_

電郵地址 Email Address: \_\_\_\_\_

謝謝閣下的寶貴意見! 煩請閣下將填妥之問卷傳真至 2598 6968 或郵寄至 "香港灣仔駱克道160-174號越秀大廈2201室"  
Thank you very much. Please send the questionnaire back to us by fax at 2598 6968 or by post to "Unit 2201, 22/F., Yue Xiu Building, 160-174 Lockhart Road, Wanchai, Hong Kong".

Head Office  
Unit 2201, 22/F., Yue Xiu Building, 160-174 Lockhart Road, Wanchai, Hong Kong  
Tel: (852) 25274321 Fax: (852) 25986968 Email: info@hdgallery.com.hk Website: www.hdgallery.com.hk

### Appendix 3: Results of After-sales Service Survey Conducted by Hunter Douglas in 2010

There were 46 customers took part in the after-sales service survey between April and September 2010. The results are shown below.

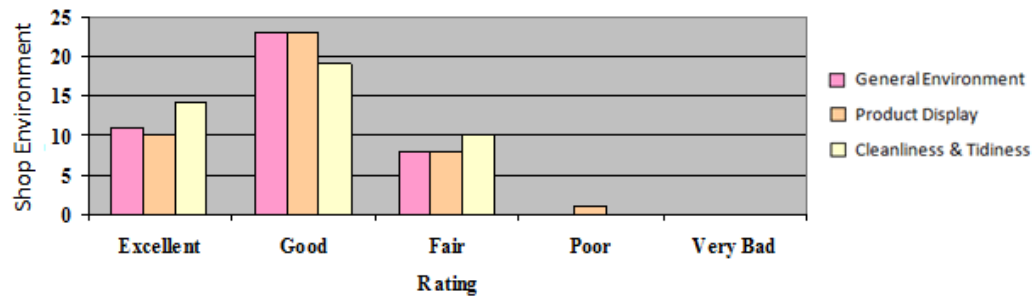


Figure A: Customer rating for shop environment

Figure A shows the results of the survey which indicates that most of the customers had good impression towards the shop environment. More than 70% of the customers rated the shop environment as good or excellent while 5% of the customers rated the shop environment as poor or very bad. Thus, it indicates that customers were generally satisfied with the shop environment. Customers commented that the main reason of rating the shop environment as poor was due to poor product display. Limited shop area and the location of the display were the two main reasons of poor product display. To better improve the overall shop environment, it was suggested to have a better mix and match of different product types and to place the popular types of products in a more prominent area.

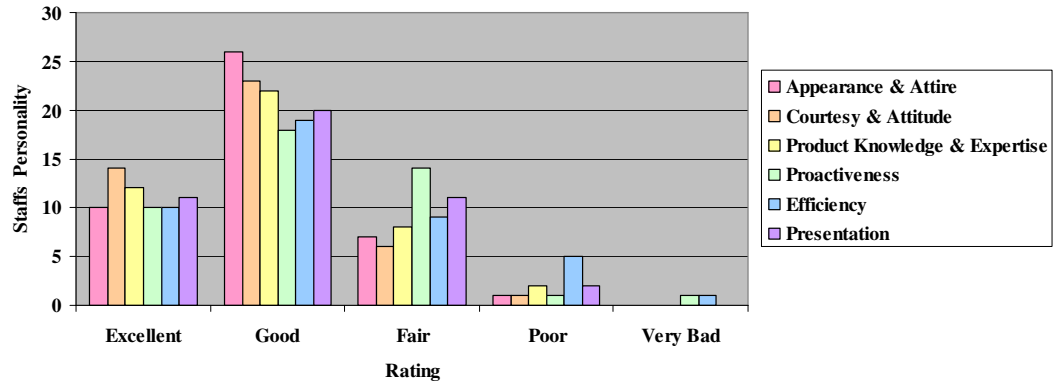


Figure B: Customer rating for the staff

With reference to Figure B, it is found that more than 70% of the customers were satisfied with the staff performance of Hunter Douglas Gallery, in particular, staff members received good comments from customers on their courtesy and attitude which is of prime importance in service industry. However, around 5% of the customers thought that the overall personality of the staff was poor or very bad and staff efficiency, in particular, needs further improvement.



## Appendix 4: Equation Layer of the Dynamic simulation module

The equations and values of all variables presented in the equation layer of the dynamic simulation module are shown below.

### *Company Sector:*

$$\text{Existing\_Customers}(t) = \text{Existing\_Customers}(t - dt) + (\text{Customer\_acquisition} - \text{Customer\_loss}) * dt$$

$$\text{INIT Existing\_Customers} = 2000 \text{ \{customers\}}$$

#### INFLOWS:

$$\text{Customer\_acquisition} = \text{Potential\_Customers} * \text{Customer\_conversion\_rate}$$

#### OUTFLOWS:

$$\text{Customer\_loss} = \text{Existing\_Customers} * \text{Customer\_loss\_fraction}$$

$$\text{Order\_Backlog}(t) = \text{Order\_Backlog}(t - dt) + (\text{New\_customer\_orders} - \text{Order\_completed}) * dt$$

$$\text{INIT Order\_Backlog} = 40 \text{ \{orders\}}$$

#### INFLOWS:

$$\text{New\_customer\_orders} = \text{Customer\_acquisition}$$

#### OUTFLOWS:

$$\text{Order\_completed} = \text{Order\_Backlog} * \text{Order\_completion\_efficiency}$$

$$\text{Potential\_Customers}(t) = \text{Potential\_Customers}(t - dt) + (- \text{Customer\_acquisition}) * dt$$

$$\text{INIT Potential\_Customers} = 3000 \text{ \{customers\}}$$

#### OUTFLOWS:

$$\text{Customer\_acquisition} = \text{Potential\_Customers} * \text{Customer\_conversion\_rate}$$

$Sales\_Volume(t) = Sales\_Volume(t - dt) + (Sales\_rate - Loss\_rate) * dt$

INIT Sales\_Volume = 8000 {units}

INFLOWS:

$Sales\_rate = Initial\_purchase\_rate + Repeated\_purchase\_rate$

OUTFLOWS:

$Loss\_rate = Sales\_Volume * Sales\_loss\_fraction$

Average\_initial\_units\_bought\_per\_customer = 4 {units}

Average\_units\_bought\_per\_customer = 3 {units}

Initial\_purchase\_rate =

$Customer\_acquisition * Average\_initial\_units\_bought\_per\_customer$

$Order\_lead\_time = Order\_Backlog / Order\_completed$

Repeated\_purchase\_customers =

$Existing\_Customers * Repeated\_purchase\_percentage$

Repeated\_purchase\_rate =

$Average\_units\_bought\_per\_customer * Repeated\_purchase\_customers$

Sales\_loss\_fraction = 0.001 {unitless}

Customer\_conversion\_rate = GRAPH(Customer\_Satisfaction)

(0.00, 0.012), (10.0, 0.013), (20.0, 0.014), (30.0, 0.016), (40.0, 0.017), (50.0, 0.02),

(60.0, 0.021), (70.0, 0.022), (80.0, 0.025), (90.0, 0.026), (100, 0.03)

Customer\_loss\_fraction = GRAPH(Customer\_Satisfaction)

(0.00, 0.00675), (10.0, 0.00625), (20.0, 0.00575), (30.0, 0.00475), (40.0, 0.004),

(50.0, 0.003), (60.0, 0.002), (70.0, 0.001), (80.0, 0.0005), (90.0, 0.00), (100, 0.00)

Order\_completion\_efficiency = GRAPH(Employee\_Satisfaction)

(0.00, 0.00), (10.0, 0.03), (20.0, 0.075), (30.0, 0.14), (40.0, 0.215), (50.0, 0.3),

(60.0, 0.415), (70.0, 0.6), (80.0, 0.65), (90.0, 0.7), (100, 0.7)

Repeated\_purchase\_percentage = GRAPH(Customer\_Loyalty)  
 (0.00, 0.001), (10.0, 0.002), (20.0, 0.003), (30.0, 0.004), (40.0, 0.006), (50.0,  
 0.007), (60.0, 0.008), (70.0, 0.009), (80.0, 0.01), (90.0, 0.011), (100, 0.012)

***Customer Sector:***

Advertising(t) = Advertising(t - dt) + (Spending\_on\_advertising) \* dt

INIT Advertising = 10 {thousands}

INFLOWS:

Spending\_on\_advertising = 5 {thousands per month}

Customer\_Loyalty(t) = Customer\_Loyalty(t - dt) + (Building\_loyalty -  
 Dissipating\_loyalty) \* dt

INIT Customer\_Loyalty = 15 {level}

INFLOWS:

Building\_loyalty = (Frequency\*Monetary)/Recency

OUTFLOWS:

Dissipating\_loyalty = Customer\_Loyalty\*Loyalty\_dissipation\_fraction

Customer\_Satisfaction(t) = Customer\_Satisfaction(t - dt) +  
 (Building\_customer\_satisfaction - Dissipating\_customer\_satisfaction) \* dt

INIT Customer\_Satisfaction = 50 {level}

INFLOWS:

Building\_customer\_satisfaction =  
 mean(Satisfaction\_with\_advertising,Satisfaction\_with\_product\_quality/10,Satisfac  
 tion\_with\_retail\_service\_quality/10,Satisfaction\_with\_order\_completion\_efficie  
 ncy)

OUTFLOWS:

$\text{Dissipating\_customer\_satisfaction} =$   
 $\text{Customer\_Satisfaction} * \text{Customer\_satisfaction\_dissipation\_fraction}$   
 $\text{Satisfaction\_with\_Product\_Quality}(t) = \text{Satisfaction\_with\_Product\_Quality}(t - dt)$   
 $+ (\text{Building\_customer\_satisfaction\_with\_product\_quality}) * dt$   
 $\text{INIT Satisfaction\_with\_Product\_Quality} = 6 \text{ \{level\}}$   
**INFLOWS:**  
 $\text{Building\_customer\_satisfaction\_with\_product\_quality} = \text{MEAN}(\text{Aesthetics},$   
 $\text{Product\_features}, \text{Customer\_perceived\_quality})$   
 $\text{Satisfaction\_with\_Retail\_Service\_Quality}(t) =$   
 $\text{Satisfaction\_with\_Retail\_Service\_Quality}(t - dt) +$   
 $(\text{Increasing\_satisfactory\_level\_of\_retail\_service\_quality} - \text{Worsening}) * dt$   
 $\text{INIT Satisfaction\_with\_Retail\_Service\_Quality} = 5 \text{ \{level\}}$   
**INFLOWS:**  
 $\text{Increasing\_satisfactory\_level\_of\_retail\_service\_quality} =$   
 $\text{MEAN}(\text{Physical\_aspects}, \text{Reliability}, \text{Policy}, \text{Personal\_interaction},$   
 $\text{Problem\_solving})$   
**OUTFLOWS:**  
 $\text{Worsening} = \text{Satisfaction\_with\_Retail\_Service\_Quality} * \text{Misunderstanding\_index}$   
 $\text{Aesthetics} = 7.98 \text{ \{level\}}$   
 $\text{Customer\_perceived\_quality} = 7.75 \text{ \{level\}}$   
 $\text{Customer\_satisfaction\_built\_per\_thousand\_spent\_on\_advertising} = 0.62$   
 $\text{Loyalty\_dissipation\_fraction} = 0.05 \text{ \{unitless\}}$   
 $\text{Misunderstanding\_index} = 0.05 \text{ \{unitless\}}$   
 $\text{Personal\_interaction} =$   
 $7.53 * (1 + \text{Improving\_satisfaction\_with\_personal\_satisfaction} / 100)$

Physical\_aspects = 7.17 {level}

Policy = 7.23 {level}

Problem\_solving = 6.47 {level}

Product\_features = 7.65 {level}

Reliability = 7.03 {level}

Satisfaction\_with\_advertising =

Spending\_on\_advertising\*(1+Customer\_satisfaction\_built\_per\_thousand\_spent\_o  
n\_advertising)

Customer\_satisfaction\_dissipation\_fraction = GRAPH(Order\_lead\_time)

(0.00, 0.00), (0.5, 0.00), (1.00, 0.005), (1.50, 0.01), (2.00, 0.013), (2.50, 0.02),  
(3.00, 0.04), (3.50, 0.06), (4.00, 0.08), (4.50, 0.1), (5.00, 0.12)

Frequency = GRAPH(Customer\_Satisfaction)

(0.00, 0.9), (10.0, 1.00), (20.0, 1.10), (30.0, 1.20), (40.0, 1.35), (50.0, 1.45), (60.0,  
1.60), (70.0, 1.70), (80.0, 1.80), (90.0, 1.90), (100, 2.00)

Improving\_satisfaction\_with\_personal\_satisfaction =

GRAPH(Employee\_Satisfaction)

(0.00, 0.00), (10.0, 0.9), (20.0, 2.00), (30.0, 3.65), (40.0, 5.60), (50.0, 7.15), (60.0,  
8.45), (70.0, 9.20), (80.0, 9.65), (90.0, 9.80), (100, 10.0)

Monetary = GRAPH(Customer\_Satisfaction)

(0.00, 0.25), (10.0, 1.75), (20.0, 4.75), (30.0, 8.25), (40.0, 12.0), (50.0, 17.0),  
(60.0, 22.5), (70.0, 28.3), (80.0, 35.5), (90.0, 42.3), (100, 49.8)

Recency = GRAPH(Customer\_Satisfaction)

(0.00, 58.0), (10.0, 52.0), (20.0, 47.0), (30.0, 43.0), (40.0, 39.0), (50.0, 34.0),  
(60.0, 30.0), (70.0, 26.0), (80.0, 22.0), (90.0, 20.0), (100, 18.0)

Satisfaction\_with\_order\_completion\_efficiency =

GRAPH(Order\_completion\_efficiency)

(0.00, 0.00), (10.0, 0.00), (20.0, 3.00), (30.0, 10.0), (40.0, 16.5), (50.0, 32.5),  
(60.0, 57.5), (70.0, 80.0), (80.0, 88.5), (90.0, 97.5), (100, 100)

***Employee Sector:***

Employee\_Satisfaction(t) = Employee\_Satisfaction(t - dt) +

(Building\_employee\_satisfaction - Dissipating\_employee\_satisfaction) \* dt

INIT Employee\_Satisfaction = 63 {level}

INFLOWS:

Building\_employee\_satisfaction = MEAN(Satisfaction\_with\_monetary\_reward,  
Satisfaction\_with\_training, Satisfaction\_with\_working\_environment)

OUTFLOWS:

Dissipating\_employee\_satisfaction =

Employee\_Satisfaction\*Employee\_satisfaction\_\_dissipation\_fraction

Training(t) = Training(t - dt) + (Spending\_on\_training) \* dt

INIT Training = 1 {thousands}

INFLOWS:

Spending\_on\_training = 2 {thousands per month}

Employee\_satisfaction\_built\_per\_thousand\_spent\_on\_training = 2 {level}

Employee\_satisfaction\_dissipation\_fraction = 0.05 {unitless}

Satisfaction\_with\_monetary\_reward = 5 {level}

Satisfaction\_with\_training =

Spending\_on\_training\*(1+Employee\_satisfaction\_built\_per\_thousand\_spent\_on\_t  
raining)

Satisfaction\_with\_working\_environment = 6 {level}

## Appendix 5: Simulation Data Extracted from the Dynamic Simulation Module

The simulation data of the dynamic simulation module are shown below. They are extracted from Figures 6.1 to 6.7 in Chapter 6.

Data extracted from Figure 6.1:

Month	Employee Satisfaction	Personal Interaction	Order Completion Efficiency	Satisfaction with Retail Service Quality
1	63.00	8.18	0.45	5.00
2	64.16	8.20	0.49	5.46
3	65.27	8.21	0.53	5.90
4	66.32	8.22	0.57	6.32
5	67.31	8.23	0.61	6.72
6	68.26	8.24	0.65	7.10
7	69.17	8.24	0.68	7.46
8	70.03	8.25	0.72	7.81
9	70.84	8.26	0.75	8.13
10	71.62	8.26	0.77	8.44
11	72.36	8.26	0.78	8.74
12	73.06	8.26	0.80	9.02
13	73.73	8.26	0.81	9.29

Data extracted from Figure 6.2:

Month	Order Completion Efficiency	Satisfaction with Product Quality	Satisfaction with Retail Service Quality	Satisfaction with Advertising	Customer Satisfaction
1	0.45	6.00	5.00	8.10	50.00
2	0.49	6.31	5.46	8.10	50.89
3	0.53	6.62	5.9	8.10	52.06
4	0.57	6.94	6.32	8.10	53.51
5	0.61	7.25	6.72	8.10	55.22
6	0.65	7.56	7.10	8.10	57.18
7	0.68	7.87	7.46	8.10	59.37
8	0.72	8.18	7.81	8.10	61.77
9	0.75	8.49	8.13	8.10	64.38
10	0.77	8.81	8.44	8.10	67.20
11	0.78	9.12	8.74	8.10	70.22
12	0.80	9.43	9.02	8.10	73.43
13	0.81	9.74	9.29	8.10	76.83

Data extracted from Figure 6.3:

Month	Employee Satisfaction	Order Lead Time	Order Completion Efficiency	Customer Satisfaction Dissipation Fraction
1	63.00	2.22	0.45	0.05
2	64.16	2.16	0.49	0.04
3	65.27	2.10	0.53	0.03
4	66.32	2.05	0.57	0.03
5	67.31	2.00	0.61	0.02
6	68.26	1.96	0.65	0.02
7	69.17	1.92	0.68	0.02
8	70.03	1.89	0.72	0.01
9	70.84	1.85	0.75	0.01
10	71.62	1.82	0.77	0.01
11	72.36	1.79	0.78	0.01
12	73.06	1.76	0.80	0.01
13	73.73	1.74	0.81	0.01

Data extracted from Figure 6.4:

Month	Customer Satisfaction	Customer Loyalty	Frequency	Monetary	Recency
1	50.00	15.00	1.45	17.00	34.00
2	50.89	14.99	1.49	18.33	33.03
3	52.06	15.02	1.53	20.07	31.76
4	53.51	15.10	1.59	22.03	30.34
5	55.22	15.24	1.63	24.24	28.79
6	57.18	15.46	1.67	26.66	27.11
7	59.37	15.77	1.72	29.52	25.30
8	61.77	16.19	1.77	33.00	23.38
9	64.38	16.73	1.82	36.6	21.67
10	67.20	17.40	1.87	40.20	20.61
11	70.22	18.24	1.92	44.09	19.51
12	73.43	19.28	1.98	48.34	18.38
13	76.83	21.59	2.00	49.75	18.00



Data extracted from Figure 6.5:

Month	Customer Loyalty	Repeated Purchase Rate	Repeated Purchase Customers
1	15.00	15.00	5.00
2	14.99	15.51	5.17
3	15.02	16.13	5.38
4	15.10	16.90	5.63
5	15.24	17.86	5.95
6	15.46	19.07	6.36
7	15.77	20.59	6.86
8	16.19	22.52	7.51
9	16.73	24.97	8.32
10	17.40	28.00	9.33
11	18.24	31.67	10.56
12	19.28	36.10	12.03
13	21.59	43.9	14.63

Data extracted from Figure 6.6:

Month	Customer Satisfaction	Customer Acquisition	Potential Customers	Existing Customers
1	50.00	-	3,000.00	2,000.00
2	50.89	73.32	2,926.68	2051.53
3	52.06	77.80	2,848.88	2102.57
4	53.51	83.16	2,765.71	2154.29
5	55.22	89.31	2,676.41	2207.62
6	57.18	97.75	2,578.66	2263.36
7	59.37	106.09	2,472.57	2322.10
8	61.77	113.90	2,358.67	2384.28
9	64.38	120.86	2,237.81	2450.24
10	67.20	124.63	2,113.19	2520.24
11	70.22	126.29	1,986.89	2594.46
12	73.43	125.54	1,861.35	2675.90
13	76.83	122.76	1,738.58	2767.82

Data extracted from Figure 6.7:

Month	Sales Volume	Sales Rate	Initial Purchase Rate	Repeated Purchase Rate
1	8,000.00	-	288.00	15.00
2	8248.66	308.47	303.57	15.51
3	8501.94	326.95	324.45	16.13
4	8760.19	349.05	346.39	16.9
5	9023.70	374.48	378.15	17.86
6	9292.78	409.29	412.12	19.07
7	9567.76	443.98	444.30	20.59
8	9848.96	476.86	473.71	22.52
9	10136.71	506.84	495.07	24.97
10	10431.35	524.57	503.51	28.00
11	10733.31	534.50	504.46	31.67
12	11048.51	535.43	497.88	36.10
13	11380.57	529.65	472.89	43.9

## Appendix 6: Sensitivity Analysis Data Extracted from the Dynamic Simulation Module

The sensitivity analysis data related to the dynamic simulation module are displayed below. The data are extracted from Figures 6.8 to 6.22 shown in Chapter 6.

Data extracted from Figure 6.8:

Month	1: Customer Satisfaction	2: Customer Satisfaction	3: Customer Satisfaction	4: Customer Satisfaction	5: Customer Satisfaction
1	50.00	50.00	50.00	50.00	50.00
2	45.45	45.53	49.05	51.39	52.03
3	41.62	41.81	48.76	53.02	54.28
4	38.45	38.75	49.05	54.88	56.75
5	35.85	36.25	49.83	56.96	59.42
6	33.75	34.27	51.07	59.26	62.30
7	32.10	33.09	52.71	61.78	65.37
8	30.86	32.74	54.62	64.50	68.63
9	29.97	33.04	56.79	67.42	72.08
10	29.40	33.88	59.22	70.53	75.71
11	29.10	35.17	61.88	73.83	79.52
12	29.03	36.86	64.78	77.31	83.49
13	29.21	38.97	67.91	80.96	87.63

Data extracted from Figure 6.9:

Month	1: Existing Customers	2: Existing Customers	3: Existing Customers	4: Existing Customers	5: Existing Customers
1	2000.00	2000.00	2000.00	2000.00	2000.00
2	2052.28	2052.32	2053.78	2054.50	2054.58
3	2100.43	2100.60	2107.41	2110.39	2110.77
4	2145.29	2145.67	2161.58	2167.79	2168.69
5	2188.97	2189.51	2216.90	2226.83	2228.47
6	2232.09	2232.83	2273.73	2287.63	2290.21
7	2274.85	2275.90	2331.89	2350.32	2354.05
8	2317.43	2319.12	2391.58	2415.01	2420.10
9	2360.02	2362.85	2452.93	2481.85	2488.50
10	2402.64	2407.38	2516.14	2550.96	2560.38
11	2445.35	2452.96	2581.37	2623.47	2636.68
12	2488.39	2499.81	2648.80	2700.27	2717.48
13	2531.93	2548.15	2718.57	2781.51	2801.15

Data extracted from Figure 6.10:

Month	1: Sales Volume	2: Sales Volume	3: Sales Volume	4: Sales Volume	5: Sales Volume
1	8000.00	8000.00	8000.00	8000.00	8000.00
2	8241.85	8241.96	8246.75	8248.87	8249.07
3	8471.38	8471.96	8494.26	8502.88	8503.81
4	8691.41	8692.65	8744.77	8762.32	8764.50
5	8909.34	8911.00	9000.25	9027.48	9031.43
6	9127.22	9129.43	9261.71	9298.64	9304.90
7	9345.54	9348.59	9528.12	9576.12	9585.19
8	9564.77	9569.51	9799.83	9860.21	9872.64
9	9785.34	9793.12	10077.22	10151.24	10167.56
10	10007.28	10020.21	10360.70	10449.55	10475.33
11	10230.63	10251.42	10650.66	10760.50	10800.48
12	10456.07	10487.33	10947.54	11088.36	11143.48
13	10684.15	10728.50	11251.71	11433.84	11497.96

Data extracted from Figure 6.11:

Month	1: Customer Satisfaction	2: Customer Satisfaction	3: Customer Satisfaction	4: Customer Satisfaction	5: Customer Satisfaction
1	50.00	50.00	50.00	50.00	50.00
2	50.87	51.37	51.88	52.39	52.90
3	52.04	53.02	54.01	54.99	55.98
4	53.48	54.91	56.35	57.78	59.21
5	55.17	57.03	58.88	60.73	62.59
6	57.11	59.36	61.61	63.86	66.10
7	59.29	61.91	64.53	67.14	69.76
8	61.69	64.66	67.63	70.59	73.56
9	64.32	67.61	70.90	74.19	77.48
10	67.14	70.74	74.33	77.93	81.52
11	70.17	74.05	77.93	81.81	85.69
12	73.38	77.53	81.67	85.82	89.97
13	76.78	81.18	85.57	89.97	94.36

Data extracted from Figure 6.12:

Month	1: Existing Customers	2: Existing Customers	3: Existing Customers	4: Existing Customers	5: Existing Customers
1	2000.00	2000.00	2000.00	2000.00	2000.00
2	2054.39	2054.49	2054.58	2054.68	2054.78
3	2109.91	2110.35	2110.80	2111.25	2111.70
4	2166.69	2167.74	2168.78	2169.82	2170.87
5	2224.89	2226.76	2228.63	2230.50	2232.38
6	2284.63	2287.55	2290.48	2293.40	2296.33
7	2346.05	2350.24	2354.43	2358.62	2362.82
8	2409.28	2414.95	2420.61	2426.28	2432.60
9	2474.47	2481.81	2489.16	2497.51	2507.10
10	2541.75	2550.95	2561.31	2573.29	2586.36
11	2611.24	2623.54	2637.87	2653.61	2668.66
12	2683.82	2700.42	2718.86	2736.70	2753.30
13	2760.63	2781.73	2802.58	2822.06	2841.70

Data extracted from Figure 6.13:

Month	1: Sales Volume	2: Sales Volume	3: Sales Volume	4: Sales Volume	5: Sales Volume
1	8000.00	8000.00	8000.00	8000.00	8000.00
2	8248.61	8248.85	8249.08	8249.31	8249.55
3	8501.73	8502.81	8503.89	8504.96	8506.04
4	8759.68	8762.20	8764.71	8767.23	8769.74
5	9022.79	9027.31	9031.84	9036.36	9040.89
6	9291.36	9298.45	9305.54	9312.65	9319.75
7	9565.72	9575.92	9586.13	9596.35	9606.59
8	9846.20	9860.03	9873.90	9887.79	9904.89
9	10133.12	10151.12	10169.21	10192.28	10221.54
10	10426.81	10449.50	10478.02	10514.63	10556.99
11	10727.64	10760.74	10804.15	10854.98	10904.49
12	11039.58	11088.90	11147.87	11206.40	11261.44
13	11368.17	11434.62	11502.60	11567.11	11634.72

Data extracted from Figure 6.14:

Month	1: Customer Satisfaction	2: Customer Satisfaction	3: Customer Satisfaction	4: Customer Satisfaction	5: Customer Satisfaction
1	50.00	50.00	50.00	50.00	50.00
2	50.84	51.36	51.88	52.40	52.92
3	51.99	53.02	54.05	55.08	56.11
4	53.40	54.93	56.47	58.00	59.54
5	55.06	57.09	59.13	61.16	63.20
6	56.96	59.49	62.02	64.55	67.08
7	59.09	62.11	65.13	68.15	71.17
8	61.45	64.95	68.46	71.96	75.47
9	64.02	68.00	71.99	75.97	79.96
10	66.79	71.25	75.71	80.17	84.63
11	69.76	74.69	79.62	84.55	89.48
12	72.92	78.31	83.71	89.11	94.50
13	76.26	82.11	87.97	93.83	99.69

Data extracted from Figure 6.15:

Month	1: Existing Customers	2: Existing Customers	3: Existing Customers	4: Existing Customers	5: Existing Customers
1	2000.00	2000.00	2000.00	2000.00	2000.00
2	2054.39	2054.48	2054.58	2054.68	2054.78
3	2109.89	2110.34	2110.80	2111.26	2111.72
4	2166.64	2167.73	2168.82	2169.90	2170.99
5	2224.79	2226.77	2228.76	2230.74	2232.73
6	2284.46	2287.61	2290.76	2293.92	2297.07
7	2345.78	2350.38	2354.97	2359.57	2364.19
8	2408.90	2415.22	2421.53	2427.99	2435.63
9	2473.94	2482.26	2490.75	2500.85	2512.38
10	2541.04	2551.70	2564.20	2578.71	2593.48
11	2610.33	2624.91	2642.37	2660.57	2677.17
12	2682.47	2702.55	2724.61	2744.88	2764.77
13	2758.75	2784.58	2809.23	2832.65	2859.25

Data extracted from Figure 6.16:

Month	1: Sales Volume	2: Sales Volume	3: Sales Volume	4: Sales Volume	5: Sales Volume
1	8000.00	8000.00	8000.00	8000.00	8000.00
2	8248.60	8248.84	8249.07	8249.31	8249.55
3	8501.68	8502.78	8503.89	8505.00	8506.10
4	8759.56	8762.18	8764.80	8767.42	8770.04
5	9022.55	9027.34	9032.13	9036.93	9041.73
6	9290.95	9298.58	9306.23	9313.88	9321.54
7	9565.08	9576.25	9587.43	9598.63	9609.93
8	9845.27	9860.67	9876.10	9892.23	9914.26
9	10131.83	10152.19	10173.46	10202.70	10239.16
10	10425.10	10451.46	10487.01	10532.74	10581.11
11	10725.40	10764.94	10819.09	10878.50	10933.15
12	11035.75	11095.90	11167.29	11233.96	11301.67
13	11362.34	11444.29	11525.02	11603.99	11700.87

Data extracted from Figure 6.17:

Month	1: Customer Satisfaction	2: Customer Satisfaction	3: Customer Satisfaction	4: Customer Satisfaction	5: Customer Satisfaction
1	50.00	50.00	50.00	50.00	50.00
2	50.35	50.66	50.97	51.28	51.59
3	51.00	51.62	52.24	52.85	53.47
4	51.92	52.84	53.77	54.69	55.61
5	53.10	54.32	55.54	56.77	57.99
6	54.53	56.04	57.56	59.08	60.60
7	56.19	58.00	59.81	61.63	63.44
8	58.08	60.19	62.29	64.39	66.49
9	60.19	62.58	64.98	67.37	69.76
10	62.51	65.19	67.86	70.54	73.21
11	65.02	67.98	70.94	73.90	76.86
12	67.73	70.97	74.21	77.45	80.69
13	70.63	74.15	77.66	81.18	84.69

Data extracted from Figure 6.18:

Month	1: Existing Customers	2: Existing Customers	3: Existing Customers	4: Existing Customers	5: Existing Customers
1	2000.00	2000.00	2000.00	2000.00	2000.00
2	2054.29	2054.35	2054.41	2054.47	2054.53
3	2109.44	2109.72	2110.00	2110.27	2110.55
4	2165.60	2166.25	2166.90	2167.56	2168.21
5	2222.88	2224.07	2225.26	2226.46	2227.65
6	2281.43	2283.32	2285.21	2287.11	2289.00
7	2341.38	2344.13	2346.89	2349.64	2352.40
8	2402.84	2406.63	2410.42	2414.20	2417.99
9	2465.96	2470.95	2475.94	2480.93	2485.92
10	2530.87	2537.22	2543.59	2549.95	2556.90
11	2597.69	2605.59	2613.51	2622.35	2632.30
12	2666.55	2676.19	2686.96	2699.12	2712.34
13	2737.58	2750.28	2764.69	2780.39	2795.74

Data extracted from Figure 6.19:

Month	1: Sales Volume	2: Sales Volume	3: Sales Volume	4: Sales Volume	5: Sales Volume
1	8000.00	8000.00	8000.00	8000.00	8000.00
2	8248.38	8248.52	8248.66	8248.80	8248.94
3	8500.62	8501.28	8501.94	8502.61	8503.27
4	8757.04	8758.62	8760.19	8761.76	8763.33
5	9017.95	9020.82	9023.70	9026.57	9029.45
6	9283.63	9288.20	9292.78	9297.36	9301.95
7	9554.38	9561.07	9567.76	9574.46	9581.17
8	9830.52	9839.73	9848.96	9858.20	9867.46
9	10112.34	10124.51	10136.71	10148.93	10161.17
10	10400.15	10415.73	10431.35	10447.00	10465.58
11	10694.28	10713.71	10733.31	10757.49	10787.27
12	10995.03	11018.94	11048.51	11085.14	11127.28
13	11302.74	11337.27	11380.57	11430.66	11480.67



Data extracted from Figure 6.20:

Month	1: Customer Satisfaction	2: Customer Satisfaction	3: Customer Satisfaction	4: Customer Satisfaction	5: Customer Satisfaction
1	50.00	50.00	50.00	50.00	50.00
2	50.95	51.00	51.03	51.06	51.09
3	52.15	52.33	52.45	52.56	52.65
4	53.60	53.95	54.21	54.41	54.61
5	55.29	55.86	56.26	56.60	56.92
6	57.19	58.02	58.59	59.11	59.57
7	59.30	60.42	61.21	61.92	62.46
8	61.61	63.05	64.08	64.98	65.56
9	64.12	65.91	67.22	68.25	68.85
10	66.82	68.99	70.61	71.72	72.32
11	69.71	72.29	74.20	75.37	75.97
12	72.77	75.79	77.98	79.19	79.80
13	76.01	79.49	81.95	83.18	83.79

Data extracted from Figure 6.21:

Month	1: Existing Customers	2: Existing Customers	3: Existing Customers	4: Existing Customers	5: Existing Customers
1	2000.00	2000.00	2000.00	2000.00	2000.00
2	2054.41	2054.41	2054.41	2054.42	2054.42
3	2109.97	2110.02	2110.06	2110.09	2110.12
4	2166.82	2167.00	2167.12	2167.23	2167.32
5	2225.08	2225.48	2225.77	2226.01	2226.22
6	2284.87	2285.62	2286.15	2286.61	2287.03
7	2346.31	2347.57	2348.45	2349.22	2349.91
8	2409.53	2411.46	2412.82	2414.02	2415.00
9	2474.64	2477.43	2479.42	2481.14	2482.44
10	2541.78	2545.64	2548.42	2550.84	2552.63
11	2611.06	2616.50	2621.02	2624.67	2627.11
12	2683.10	2691.52	2698.24	2703.15	2706.24
13	2759.16	2771.07	2780.10	2785.88	2789.29

Data extracted from Figure 6.22:

Month	1: Sales Volume	2: Sales Volume	3: Sales Volume	4: Sales Volume	5: Sales Volume
1	8000.00	8000.00	8000.00	8000.00	8000.00
2	8248.66	8248.66	8248.67	8248.68	8248.69
3	8501.89	8502.01	8502.10	8502.18	8502.25
4	8759.99	8760.41	8760.71	8760.97	8761.19
5	9023.25	9024.21	9024.90	9025.48	9026.00
6	9291.95	9293.76	9295.04	9296.14	9297.14
7	9566.38	9569.40	9571.53	9573.39	9575.04
8	9846.83	9851.47	9854.76	9857.65	9860.04
9	10133.58	10140.33	10145.14	10149.30	10152.48
10	10426.96	10436.33	10443.09	10449.25	10454.05
11	10727.28	10741.25	10754.17	10764.91	10772.15
12	11037.33	11062.27	11083.35	11098.87	11108.57
13	11363.19	11401.12	11430.88	11449.62	11460.57

## Appendix 7: Policy Analysis Data Extracted from the Dynamic Simulation Module

The policy analysis data in relation to the dynamic simulation module are shown below. The data are extracted from Figures 6.23 to 6.25 shown in Chapter 6.

Data extracted from Figure 6.23:

Month	Customer Satisfactions	Customer Loyalty	Existing Customers	Sales Volume
1	50.00	15.00	2000.00	8000.00
2	50.89	14.99	2051.53	8248.66
3	52.06	15.02	2102.57	8501.94
4	53.51	15.10	2154.29	8760.19
5	55.22	15.24	2207.62	9023.70
6	57.18	15.46	2263.36	9292.78
7	59.37	15.77	2322.10	9567.76
8	61.77	16.19	2384.28	9848.96
9	64.38	16.73	2450.24	10136.71
10	67.20	17.40	2520.24	10431.35
11	70.22	18.24	2594.46	10733.31
12	73.43	19.28	2675.90	11048.51
13	76.83	20.59	2767.82	11380.57

Data extracted from Figure 6.24:

Month	Customer Satisfactions	Customer Loyalty	Existing Customers	Sales Volume
1	50.00	15.00	2000.00	8000.00
2	51.18	14.99	2054.45	8248.76
3	52.60	15.04	2110.18	8502.38
4	54.26	15.14	2167.30	8761.15
5	56.15	15.32	2225.94	9025.34
6	58.27	15.59	2286.23	9295.26
7	60.59	15.95	2348.29	9571.19
8	63.13	16.43	2412.25	9853.46
9	65.87	17.04	2478.24	10142.38
10	68.81	17.80	2546.38	10438.27
11	71.94	18.74	2617.02	10742.49
12	75.25	19.93	2691.56	11061.83
13	78.75	21.40	2770.41	11398.23

Data extracted from Figure 6.25:

Month	Customer Satisfaction	Customer Loyalty	Existing Customers	Sales Volume
1	50.00	15.00	2000.00	8000.00
2	51.43	15.00	2054.50	8248.88
3	53.11	15.05	2110.40	8502.92
4	55.04	15.19	2167.84	8762.44
5	57.20	15.40	2226.93	9027.73
6	59.59	15.72	2287.83	9299.11
7	62.20	16.16	2350.65	9576.91
8	65.04	16.73	2415.53	9861.45
9	68.09	17.45	2482.62	10153.10
10	71.35	18.36	2552.12	10452.55
11	74.82	19.51	2625.44	10766.47
12	78.48	20.96	2703.23	11098.00
13	82.34	22.76	2785.40	11446.89

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