



**SCHOOL OF ECONOMICS  
AND MANAGEMENT**  
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**Master Thesis**

**Effectiveness of education program conducted by Novo Nordisk: A study on the  
prescription behaviour of the doctors' in the treatment of diabetes disease**

*June 2006*

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# ABSTRACT

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<b>Title:</b>	Effectiveness of education program conducted by Novo Nordisk: A study on the prescription behaviour of the physicians in the treatment of diabetes disease.
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<b>Keywords:</b>	Relationship marketing, Pharmaceuticals, Education events, Prescription behaviour
<b>Thesis purpose:</b>	The purpose of this work is to do an investigation on the customers in the pharmaceutical sector; mainly general physicians who have taken part in the education events have any impact in their prescription behaviour after the participation in the program. The settings for this study are general practitioners in the Swedish market who have taken part in the education program held by Novo Nordisk in the treatment of diabetes disease.
<b>Methodology:</b>	The methodological approach adopted for this work is quantitative; using secondary data from the internal database from the company. The analytical model is tested through statistical analysis using the data's obtained from the databases.
<b>Theoretical perspective:</b>	The main theories used for this study are based upon relationship marketing in the pharmaceutical industry; from Scharitzer & Kollaritis, 2000. An analytical model is developed to measure the actual prescription behaviour of the physicians.
<b>Empirical data:</b>	This is a longitudinal study based on the data obtained through internal databases from Novo Nordisk. The sample of physicians was compared for two years (year 2004 & 2005) in order to see any changes in their prescription behaviour.
<b>Conclusion:</b>	From the analysis made on the items available in the database it was concluded that there is a tendency of change in the prescription behaviour among the doctors after the participation in the program. But comparing

with the control group the difference was negligible concluding that the specific program used in this study is not effective in terms of changing the physicians' behaviour. The results also infer from the theoretical framework that the high satisfaction scores expressed by the physicians may not necessarily bring change in behaviour.

## Foreword

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This Master Thesis work was carried out with Lund School of Economics & Management, Lund University, under the supervision of Ulf Elg and at Novo Nordisk Scandinavia AB, under the supervision of Rasmus Kofoed.

My sincere thanks to Ulf Elg for his observation and comments which has helped me in establishing the overall direction and to move forward with this investigation in-depth. I would like to express my sincere gratitude to Rasmus Kofoed for his complete support and assistance through out this thesis work. My sincere appreciation to David T. Hansen and Frederik H. Halberg, Novo Nordisk for their guidance in this work.

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Siddharth Balakrishnan

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# 1 Introduction

*In this chapter, I will give a short introduction on the background of the problem, the research problem and purpose of this work.*

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Even though relationship marketing first emerged in the services marketing literature in the 1980's and focussed mainly in this field, today it has been used in other industrial sectors as well including pharmaceutical industry, which is one of the largest and growing industry in the world. In this business sector, the most common and traditional remedy for success in selling was always been done by building a friendly relationships with the physicians by providing them with meaningful incentives (Mogelefsky, 2000). In the past, this has worked very well for many companies and has reaped huge benefits from this kind of relationships.

As the growth is escalating and the competition is getting intense in this business sector, companies are finding other channels for creating relationship with the customers rather just using sales persons for the marketing purpose. Relationship marketing has been defined in many ways in various literatures. One of the appropriate definitions which fit in this work context is as follows: Relationship marketing is

*“a business strategy that proactively builds a preference for an organization with its individual customers, channel partners, and employees, driving increased performance and sustainable business results” (Newell, 2000).*

From an academic as well as business perspective, researchers and managers are implying on how to create and maintain relationship with future potential customers and thus to attain profit as well loyalty on the products and services. The concept of relationship marketing is different than direct marketing, as the former requires an on-going, two way ideally interactive dialogue (Levins, 1998). Even both these methods use hi-tech database systems there is clear difference between them. Direct marketing is defined as a one way diffusion of information to an undifferentiated group of potential customers whereas relationship marketing can offer meaningful value at each and every encounter with the customers.

Relationships build through one-to-one relationship by sales representatives has been a focus for many pharmaceutical companies. In this way the companies try to personalise and customise the incentives offered to the physicians. But the more value the salesperson provides to the customer through the core products, the more likely the customer is to remain loyal to the salesperson than to the company (Harrison-Walker & Coppett, 2003).

One of the key drawbacks of using a salesperson is also that when he/she leaves, the consequences for the company can be severe because there is a high chance that some of the key customers also leave (Harrison-Walker & Coppett, 2003). Even the customer defection may be gradual in this case, the customers react in a way that there is a tendency for them to re-evaluate their relationship with the firm (Anderson & Robertson, 1995).

Relationship marketing programs which has increasingly becoming a part of marketing mix, is a key channel companies use today to develop a better understating about the needs and wants of the consumers and can maintain a direct communication with the consumers (Lazarus et al. 1992). The main idea of marketing mix is pursuing marketing activities in order to persuade the customers to use or buy the product (Gummesson, 2002). A value adding can be attained by giving the customers significant and suitable information that relates only to them and their needs (Levins, 1998).

Today, pharmaceutical companies use different kind of relationship marketing management campaigns and programs in order to move from “gaining” new customers like physicians and “retain” these customers by being loyal to their products (Levins, 1998; Mogelesky, 2000). Continuing Medical Educational (CME) programs offered by pharmaceutical companies in the healthcare are one among these different marketing management programs companies use to strengthen and cement the bonds between their customers and the products.

## **1.1 Why CME?**

Physician’s acceptance, compliance, and satisfaction are some of the critical factors a company need to fulfil in order to reach success in selling their products in the therapies particularly in the speciality disease state areas like chronic diseases. Doctors have their own life cycles similar to a product lifecycle management, moving in different speeds the way they

treat; for e.g.: from the awareness about a treatment to the adoption of treatments (Soto et al., 2005). Different communication channels should be implemented in order to move the target audience from one cycle to another, rather just using the traditional marketing tactics using the sales persons.

As the treatments are getting advance nowadays in the speciality areas it is crucial for the companies to update this information to the doctors about the new way of treating a disease. Especially, in the case of general physicians who would like to continue with the tradition therapies, it is fairly hard to convince them about the new treatment in the brief appointment the sales persons have with these doctors. Significant amount of money can be lost if the physicians do not know how to properly manage the right doses of injections, and are not aware on the side effects of the medicines (Soto et al., 2005). As the influence of physicians is a key factor in the decision making of the patients on the choice of therapy it is crucial that they are aware of the benefits on the right therapy and the superior products which can be used for this therapy.

In fact, the above issues can be manageable if the physicians are given the right training on the therapy and to ensure the upgrade in the treatment tradition of the doctors. The physicians who hold on to the traditional therapies needs to be communicated by the companies about how they can treat patients especially in the speciality disease areas by educating them on the latest treatment methods in the market. For this reason, companies invest huge sum in terms of designing the programs targeting specifically to the group of physicians who are not adapted towards the advance treatment methods. In this way, the doctors are well informed, when a patient needs to be treated of a severe chronic disease.

There are many benefits that can be reaped from this type of Continuing Medical Education (CME). Acquiring the new customers with non-personal marketing tactics is a pay off company can get using these kinds of programs. It helps the marketers to reach new prospects, by building trusting relationship with their customers and can secure more visits in order to provide the appropriate drug treatment information that matches their interest and needs (Doyle, 2006). Another advantage of conducting these types of events is that it can help the companies in upgrading the value of the company and its products among the customers. This assists the companies in gaining new customers thus leading to an increase in the market share. This exchange of value has recognized as the foundation of any customer relationship.



## 1.2 Approach

Often, the feedback from the CME events is quite positive from the customer's point of view. Physicians are predominantly enthusiastic to participate and often highly satisfied with the CME after the participation mainly in terms of the course contents, the instructions and lectures. In the past, a company has often taken it for granted that once an improvement is made in perceived quality of the service it will achieve an enhancement in the customer satisfaction (Gummesson, 2002). It also has led them to conclude that the customer satisfaction expressed from these programs can bring them benefits in terms of moving a physician from a laggard to an early adopter of the treatment.

However, this has not been the case all the time. A direct relationship between satisfaction and customer retention or increase sales could not be proven in many cases (Scharitzer & Kollarits, 2000). Previous studies have implied on the purchase intentions of the customers but not the real behaviour once an exchange of value has taken place between the buyer and the provider. Companies are getting more and more frustrated in their efforts in improving the quality and customer satisfaction due to the lack of certainty on the outcome of the events in terms of customer acquisition after investing lump sum for the CME programs. The satisfaction resulted from the programs has not given any measure on economic success as the economic success of a product is purely dependent on the prescription frequency or the real behaviour changes of the physicians towards the new treatment methods of disease. Not much attention was given in the past by the researchers to see whether the expected benefits from the CME events are fulfilled by the companies in the reality.

In this aspect, it is becoming more and more evident for the practitioners to monitor whether these kinds of programs are fruitful to reach new customer acquisition and then later retention. In a way, relevant feedback mechanisms or tool needs to be available today in order to track down whether these physicians who have taken the program are applying their knowledge in their practice.

The higher satisfaction scores expressed by the customers attained after their participation in these types of events needs thus to be questioned. On other words, whether the customer value achieved through this type of programs of high quality may bring higher customer satisfaction can necessarily bring a change in behaviour or attitude of the customers towards

the upgrading of their level in the treatment of disease or using the products needs to be addressed.

The field of study area I have chosen in this work is the pharmaceutical market in Sweden, based on the various relationship marketing offerings in terms of continuing medical education made by Novo Nordisk Scandinavia AB in the treatment of diabetes disease. A detail explanation about diabetes and different types of diabetes is enclosed in the appendix A. Since the physicians are the “decider” or the ones who actually write the prescription in a pharmaceutical industry, it is extremely important for the companies to create a long term relationship through different marketing activities with this group.

My approach for this work is to study a group of physicians who have participated in the CME and to examine whether there are any behavioural changes in their treatment methods for the disease. Less studies has been made in the past on the outcomes of these types of education events in terms of change in the behaviour of the customers towards the treatment methods and the products they use for the treatment. An empirical contribution in this area can helps in understanding whether this marketing phenomenon can bring the main association of perceived customer value resulting with customer satisfaction and thus acquiring benefits in terms of prescription behavioural changes of treatment among the doctors.

### **1.3 Purpose**

The purpose of the work is to do an investigation on the customers in the pharmaceuticals; mainly general physicians who have taken the education events have any impact in their prescription behaviour after the participation in the program. The setting for the study is general practitioners in the Swedish market who have taken part in the education program held by Novo Nordisk in the treatment of diabetes disease.

## **Structure of the Thesis**

### **Chapter 1: Introduction**

In this chapter the background, the research problem and the objectives of the work is described. A short introduction is made about the continuing medical education in and the main benefits about the program in terms of customer acquisition. The knowledge gap is discussed and the main objective of the work to investigate this gap is described.

### **Chapter 2: Theory**

In this section the relevant constructs from the previous studies are described for the relationship marketing in the pharmaceutical industry is discussed. The constructs comprises the benefits in the company offerings, customer value, satisfaction, end-user loyalty, behavioural intentions. Finally, the variables in the analytical model to be tested are covered.

### **Chapter 3: Methodology**

The methodological approach adopted for this work is explained in this part. The chosen method of data collection and been used are discussed. The operationalisation of the variables in the analytical model is also covered with regards to the aim of the work.

### **Chapter 4: Analysis & Results**

In this chapter the procedure on the analysis of the data is explained. The items assigned under the variables in the analytical model is analysed statistically and the results are presented.

### **Chapter 5 Conclusions & Discussions**

The chapter consists of the main conclusion drawn from the analysis results. The future research work is also discussed in this section.

## 2 Theory

*In this chapter the theoretical framework used in the work will be explained in detail including all the constructs. I will also go through the analytical model derived from the previous theories.*

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### 2.1 Introduction

In this chapter, I will introduce the theoretical framework used in the work based on the previous literatures. All the necessary constructs included in the framework will be covered in this chapter. Theoretical considerations provide information on how the variables should be operationalised and measured and how the research design and sample should be selected (Malhotra & Birks, 2000). Finally, an analytical model is developed in the end in order to study the impact in terms of actual prescription behaviour of the physicians. In the following sections the framework as well as the necessary constructs and the analytical model developed are discussed in detail.

### 2.2 Background

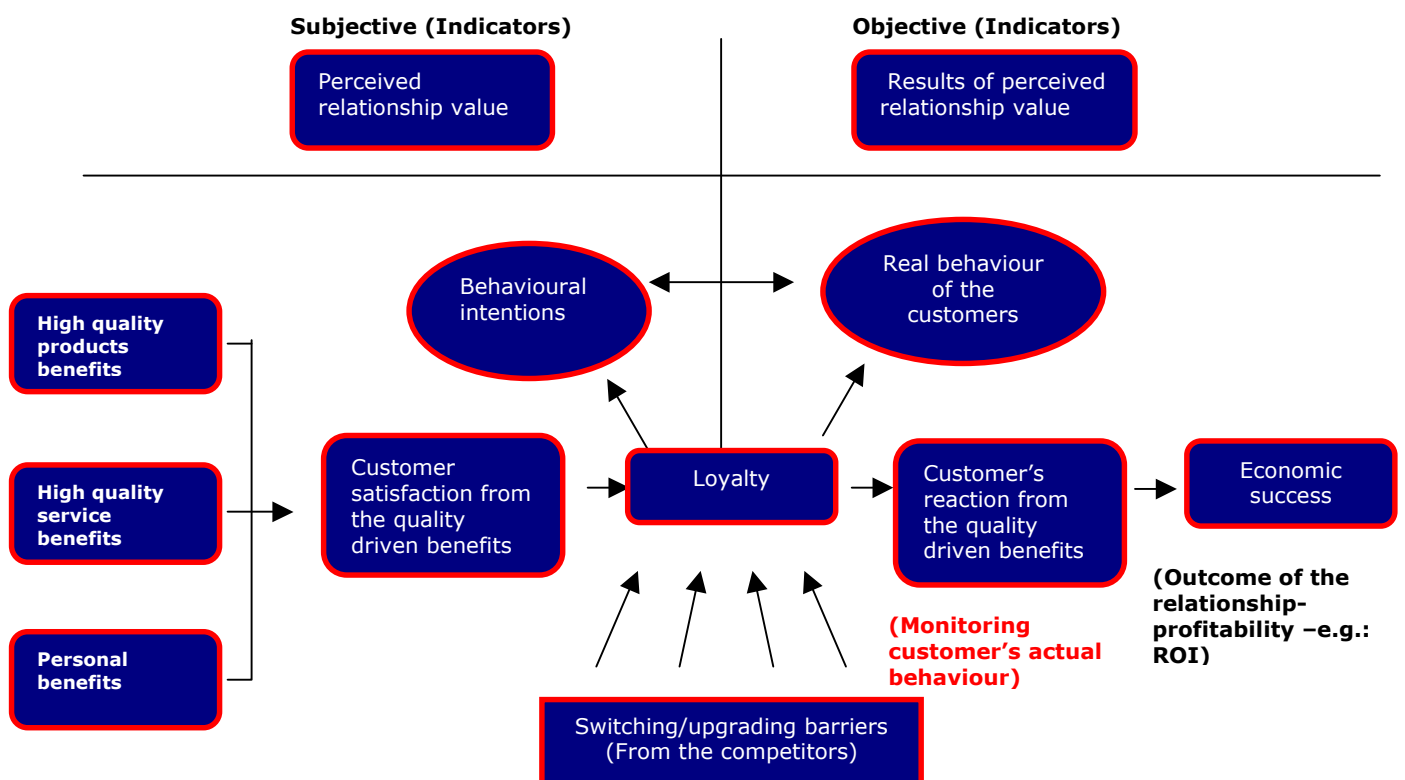
The theoretical framework in this work shown in the figure 2.1 contains mainly two parts; the subjective part, which is the perceived value mainly relating the constructs relationship value, relationship quality, customer satisfaction and end-user loyalty where as the objective part covers on how the end-user loyalty can be monitored by measuring the actual behaviour of the customers. I will use this framework as the base for this investigation. It is inspired from the previous literatures (Scharitzer & Kollaritis, 2000; Gruen et al., 2005; Gummesson, 2002) focus on the relationship marketing in the pharmaceutical industry, captures the important elements which can influence the actual behaviour or attitude of the physicians towards the products and purchase of the products.

Scharitzer & Kollaritis, 2000, used this model to conduct an empirical study in the pharmaceutical market to show the significant relationship between the satisfaction ratings from physicians referring to the pharma sales reps and their prescription behaviour. The study showed that there is a link exists between the economic success criteria's and the perceived

service quality. The actual behaviour of the doctors was tracked through various performance indicators (sales, market share etc.) in their study.

The intention of Scharitzer & Kollaritis, 2000 in their work was to study the performance of the company in terms of the significance relation between satisfaction rating of physicians on the company offerings and the performance of the products. I will use this model as the base to study the immediate outcome of the Novo Nordisk education program in terms of prescription behaviour change in the doctors. The theoretical underpinnings used in the model will be explicitly described in this chapter in order to encapsulate the relationship of the variables in the model.

Even though I will cover all the determinants involved in the both the parts of the framework and how they are related in this chapter, the focal point of the investigation will be only the second part of the framework – objective indicators where the actual behaviour of the physicians is implied. The satisfaction scores of the physicians from these programs have already been investigated by the company right after the programs and have positive scores on this.



(Characteristics of the service and the products)

**Figure-2.1:** Theoretical framework indicating the attitude of the customer satisfaction/ loyalty resulting in economic benefits in the pharmaceutical industry (inspired from Scharitzer & Kollaritis, 2000; Gruen, 2005;

The results from the customer satisfaction shows that customers are extremely satisfied with the programs in terms of the lectures and the course contents which are a positive indication for the firm to conclude they have met the expectations of their customers for that period of time. This indicates that the subjective part of the framework where value adding quality driven education program by the firm has met its customer's satisfaction. Hypothetically, this fulfilled customer satisfaction and thus can be maintained that it may have enhanced the purchase intention of the physicians.

As the subjective part of the part is already been tested through, and the interest would be to see whether this is bringing any actual behaviour changes among the physicians. Considering the nature of the research problem and aim of the study, a final analytical model is developed based on the framework concerning the actual behaviour and the core dependent elements identified from the previous theories. The model will be subjected to test using the empirical data collected in order to see whether these antecedents identified and used in the model are contributing towards the behaviour change in the doctors by acting as objective indicators. An-in depth discussion on the main identified antecedents will be covered in the later part of this chapter.

### ***2.2.1 End-user loyalty***

In the framework, loyalty is used as an interface between the subjective and objective view. In this section the role of end user loyalty as a function of customer satisfaction, and the impact of this relationship is discussed. As a central aspect in the model it is worth starting with this concept and how they are related to various constructs defined in the model. Previous studies has shown that customer satisfaction can bring loyalty among the customers towards the products and services if the company adds more value to their offerings in terms of high quality (Ravald & Gronroos,1996). The underlying fact for this is that the customer behaviour is associated with the satisfaction they enjoy from the company offerings (Söderlund, 1998).

For instance, a positive association has been observed between customer satisfaction and loyalty and between customer satisfaction and the propensity to recommend the supplier's offer to other customers (Anderson and Sullivan, 1993; Fornell, 1992). It has been a reasonable logic from the firm's point of view that the customers will be highly devoted towards the products and services if the company can meet or exceed the expectations of the

customers. On other words, if companies can emphasize on relationship value, it can bring end-user loyalty. Customer's loyalty intentions are also directly influenced by the overall product quality. An augmentation of this perception of value is crucial as it is one of the most effective ways of improving the purchase intentions of the customers (Sweeney et al., 1995).

However, as the positive association of the customer satisfaction and loyalty has been a well established theory recent empirical studies shows that it is not been the case all the time. The high satisfaction score always may not make a customer loyal towards the firm. But on the other hand the practitioners are still giving high priority on the relationship between the customer loyalty and value as the new competitors can make an easy entry if there is a lack of customer goodwill due to the low perception of value (Sweeney et al., 1995).

## **2.3 Subjective indicators**

Initially, the core components to acquire perceived customer value-the subjective view have been touched upon. The main criterion's to achieve customer satisfaction and their relationships are discussed in the following sections.

### **2.3.1 Value creation**

Value has always been the “the fundamental basis for any marketing activity” (Ulaga & Eggert, 2006). One standpoint is that the value of an organisation can be enhanced if a superior customer value can be created, maintained and delivered to high-value customers (Spiteri & Dion, 2004; Slywotzky, 1996). It is the main concept behind the exchange view of marketing (Hunt, 1991). Customer value, a comprehensive and complex construct researchers have often mentioned in the literature is the result of various legitimate antecedents. (Spiteri & Dion, 2004) has acknowledged 16 different influences of the customer value from previous studies.

Based on different assumptions customer value is looked upon as a subjective construct by many of the researchers (Kortge and Okonkwo 1993),). It has seen as a repeated characteristic in many of the studies. Customers have different perceptions on a product and it can be even more subjective in different segments of customers. On other words, the value perceived by the customers on the products changes very much depending upon how the customers perceive them. The customer value is also defined as a trade-off between the benefits i.e.

“what you get” and the sacrifices i.e. “what you give” (Zeithaml 1988, Ulaga & Eggert, 2005). Thus the perceived value can vary from customer to customer and can be seen only as subjective.

Even though there are many dimension identified by the scholars today for the value construct which are common, the conceptualization vary one another. In a business-to business setting four main components has been realised to define the customer value (Spiteri & Dion, 2004; Ulaga & Eggert, 2005). These included the product-related benefits, strategic benefits, personal benefits, and relationship sacrifices. The concept of customer value lies both in the service and the business marketing.

In the business marketing, the value is attained when the company can provide product related benefits, economical benefits to the customers for the price they have paid for the product offerings. In addition to these, Anderson E et al., 1993, has found service and social benefits also plays a role in adding the value. But it is identified more as the relational dimensions of the value or in more specific –relationship value.

Although, the identified customer value indicators discussed on an episode basis are appropriate, in this work only the three main relevant dimensions will be discussed as the part of the framework; Product benefits, service benefits, and personal benefits. As these are the core dimensions identified for the customer value and will certainly fit in to the pharmaceutical industry which is the field of study in this work, it is of high significance to include them in the framework.

#### *Product benefits*

Of all the three benefits mentioned, the product offering has been found as the central and the basic component for the enhancement of value. Customers often emphasise on the product performance and how reliable the products are when it come to the usage (Ulaga & Chacour 2001). In this way the first priority should be in terms of product benefits in enhancing the customer value for any industry.

#### *Personal benefits*

Personal benefits are another important aspect in terms of how a company personal interact with the customers. Customers always look for personal satisfaction. The dealings of sales



force in the front end with the physicians are extremely crucial when they market their products. The fact is a company's reputation is inextricably wrapped up in the relationship between sales people and the customers (Bendapudi & Leone, 2001). In the pharmacy industry a sales person should be able to connect a customer in a personal level besides giving a good impression on the company and its products.

Another way of benefiting is by giving the physician one-stop shopping facility where the sales person can market a wide-range of product portfolio. This approach of the company can recognize the time constrain of the doctors by reducing the meetings with the sales representatives. And further, an executive have the opportunity to spend more time with the physicians and to get a good grasp on what the physicians would like to have for the treatment. Thus the benefit is a win-win situation for both the parties.

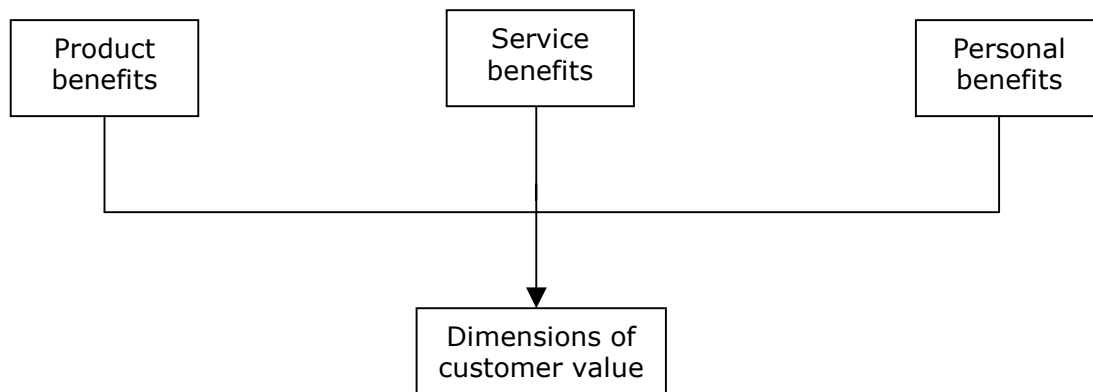
#### *Service benefits*

In most of the businesses, companies provide services and solutions for their customers. Unless the products are simple to use or rather someone is helping the customers to use them, it would be difficult for the company's to sell its products. In business markets, suppliers typically provide a blend of tangible products and a range of accompanying service elements (Hutt & Speh, 1998).

The services can be in the form of training or providing education to the customers gives an opportunity for them to learn more about how to use the products and get to know more on the application of the products. At the same time, the company also benefit by this kind of programs by bringing them closer to the customers and getting to know their needs. For example; a CME event held by a company is purely a service benefit which can help a physician in terms getting to know more about the innovative products and treatment methods happening in the medical field.

The concept of relationship value was introduced by Payne & Holt (1999) in their work viewing the construct value in the eye-glass of relationship marketing (Ulaga & Eggert, 2005). Even though the benefits discussed in the previous sections in the episode basis are key components in the value creation these benefits must be tailored in a way that it should be able to meet the needs of the customers rather than just being a company offering. The traditional approaches describing the firm's total offering or augmented product (Grönroos,

1990; Kotler, 1994; Levitt, 1983) as a core product supported by surrounding services or goods consider only one episode regarding the customer. A competitive value can be attained only through a thorough understanding of customers needs (Ravald & Gronroos, 1996) which is a central facet in the relationship marketing.



The value exchange is thus a way of building the relationship, thus contributing towards a long-term relationship with the customers, adding relationship value to the value chain. Thus by understanding the “right” needs of the customers and satisfying them by meeting those needs through the various benefits discussed could reduce the risk of customer- perceived sacrifices.

*Proposition: Even though episode level benefits companies offers will be able to create a relationship with the customers by adding value to the value chain, this relationship can be further enhanced in a long- term perspective by understanding and meeting the customers needs which can lead to the “relationship value”.*

### **2.3.2 Satisfaction and quality**

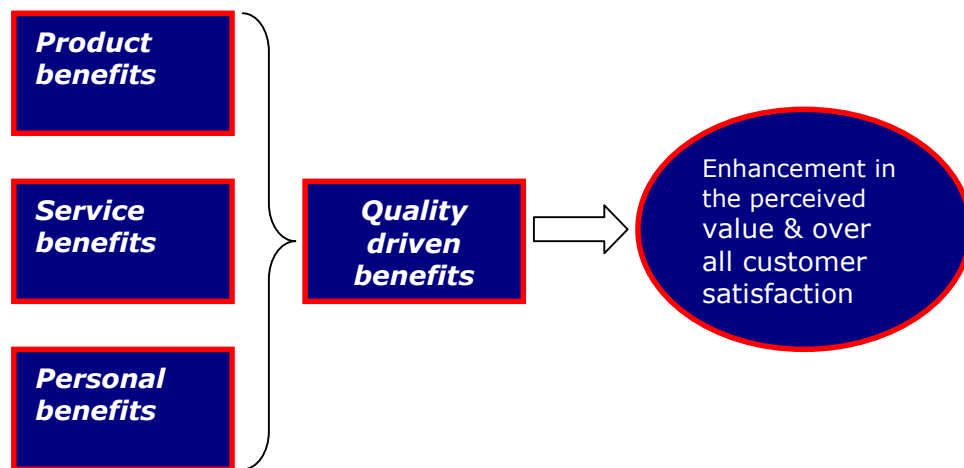
Customer satisfaction is widely accepted among researchers as a strong predictor for behavioural variables such as repurchase intentions, word-of-mouth, or loyalty (Ulaga & Eggert, 2006; Ravald & Gronroos, 1996; Liljander & Strandvik, 1995). The achievement of customer satisfaction relies on many factors including the company offerings or benefits. Recently studies have put more attention towards the customer value as a major determinant in creating customer satisfaction and thus contribute in relationship marketing in the business markets (Ulaga & Eggert, 2005). (Spiteri & Dion, 2004) shows the customer value variable can be a direct explanatory for predicting customer satisfaction.

In fact the perceived value of the products and services can lead to the formation of satisfaction (Churchill & Surprenant, 1982). (Scharitzer & Harald, 2000) quotes that customer satisfaction is not a one-dimensional subject and normally, a diverse set of criteria so-called 'quality drivers' is used in order to explain the customers' satisfaction or dissatisfaction in multi-attribute measurement approaches. Many previous studies also concludes that a strong relationship exist between the quality of the company offerings and customer satisfaction (Spiteri & Dion, 2004).

It has always been assumed that when customer satisfaction level is high the retention or gaining of new customers is possible. There is also a wide spread acceptance about the relationship between quality and overall customer satisfaction (Anderson et al., 1994). Often, a satisfied customer will come back to those who have provided the products and services of high quality (Fecikova, 2004). Previous researchers have been very much focusing on the service quality perception by the customers and how this can lead to customer satisfaction.

For this reason, high importance were also given to the total quality management- a management approach of an organisation emphasising on the quality of the products and service towards the customers (Fecikova, 2004). Studies have also shown that the main drive behind this concept itself is customer satisfaction. For example, Dorsch et al. (1998) conceptualise relationship quality as being indicated by trust, commitment, and satisfaction on the part of the buyers.

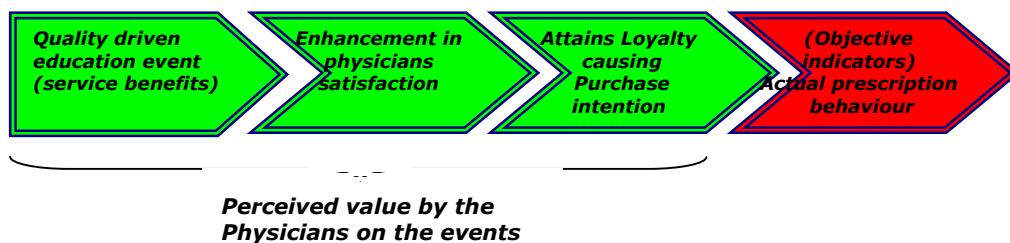
*Proposition: Even though emphasise should be given on the benefits through products, service and in the personal level can bring customer value which was discussed in the previous section, quality driven benefits can even more enhance the customer value; thus an high score of overall satisfaction as shown below in the fig.:.2.2.*



*Figure 2.2: Quality driven benefits leading to enhancement in satisfaction*

### 2.3.3 Frame work for Education Program

Based on the constructs explained in the previous section, the education program can be perceived as a service benefit offered to the physicians by a company. The framework used in this context is shown in the figure below.



The objective indicator, as the main study point for this work will be the actual behaviour of the physicians after their participation in the events. This is covered in the next section.

## 2.4 Objective indicators

As mentioned in the beginning of this chapter, aligning with the purpose of this work only the objective part of the model is only used in this work for the analysis part. The analytical model for a pharmaceutical industry is shown in the figure 2.4. The main variables which can contribute to the actual behaviour of the customers are featured in this section. There can be a purchase intention among the physicians from the loyalty they obtained from the highly valued education program. In the model, I have identified consumer adoption, attitude of customers towards innovation and brand importance as three main theoretical areas which

concerns in measuring the real behaviour of the physicians in order to validate this purchase intention is valid.

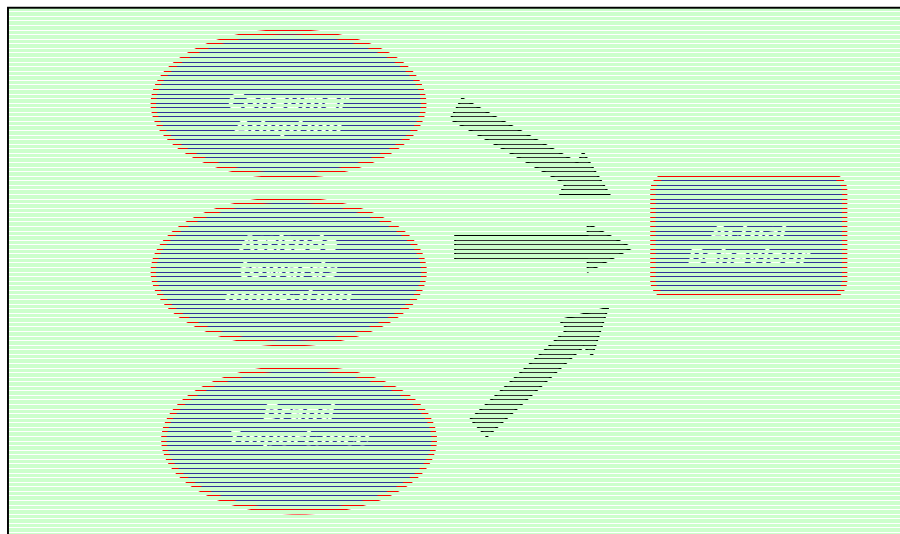
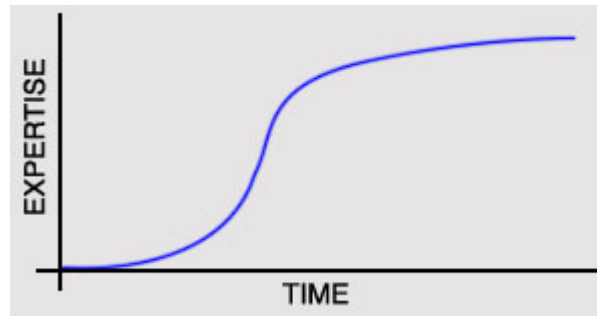


Figure 2.4: Analytical model to measure actual behaviour

### 2.4.1 Customer adoption

A product or service must be relevant (Herbig & Day, 1992), have demonstrated value and meet specific needs in order to prosper. New technology is often necessary but in itself is not sufficient; the consumer's need is the key to success (Herbig & Day, 1992). The adoption; i.e. if the physicians are really using the products depends on different factors. This may include the nature of the customers, the products and the treatment situation of the physicians where he should make a choice on what kind of treatment he should adopt on the disease. According to Kotler & Armstrong, 2003, adoption process “is a mental process where an individual passes from knowing or learning about an innovation to adoption of the process”. For a physician, it will be more or less learning about a new treatment method and then adapting to this method. If the adoption is achieved among the physicians, then it can indicate that the one of the goals of company on providing an education program is at least partially fulfilled.

Customer adoption has been shown to occur through a consistent and fairly predictable adoption process--the classic "S" curve (Herbig & Day, 1992) as shown in the figure 2.4.1. The awareness of the product will be very less in the beginning and this keeps increasing until it can be concluded that the customer has fully adapted to the innovations.



*Figure 2.4.1: S-curve*

The sponsor of an innovation cannot influence potential adopters unless communication takes place; and communication, in turn depends on a sharing of meaning between interacting parties. In its effect on eventual success, the recognition of a demand or want is far greater than the recognition of technological potential (Herbig & Day, 1992).

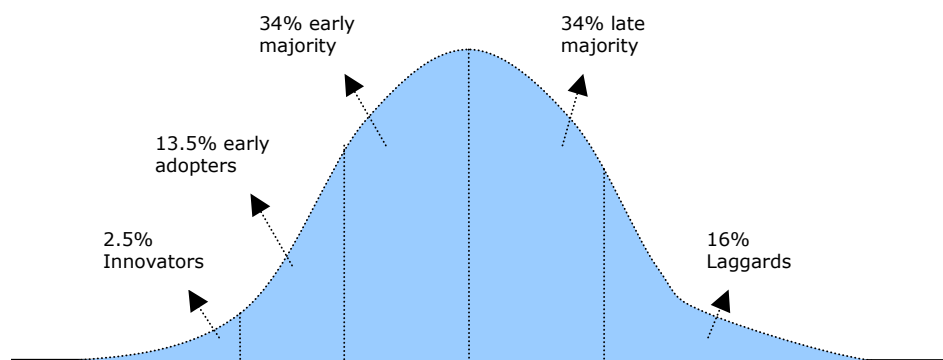
Customers go through five stages in the adoption process in adapting to a product or service which is also called as the classical adoption process. The five steps are described below for the physicians to adopt new products for treatment methods.

- *Awareness:* The physicians are aware of the new products for treatment but do not have any necessary information about it.
- *Interest:* Physicians are interested to get involved with the treatment and seek more information.
- *Evaluation:* The customer considers whether the new information obtained is making any sense in treating using the new method and products.
- *Trial:* The doctors start testing the new products in order to see if there is any upgrade in the value.
- *Adoption:* The decision is made to use the products on a regular basis.

*Proposition: As the education program provided by the companies are meant to move the physicians from being aware to regular use of the products, investigation of adoption of the physicians can be a factor to understand the actual behaviour of the doctors.*

### 2.4.2 *Opposition towards innovation*

When a new product arrives in the market consumers can differ significantly in using this new product. In the pharmaceutical sector, physicians are categorised into different groups depending upon the prescription of the new treatment methods available in the market. They can be innovators, early adopters or laggards. There is also this late and early majority in between these groups. A graphical representation of this is shown in the figure 2.4.2



**Figure 2.4.2: Time of adoption of innovations (Kotler & Armstrong, 2003)**

The early adopters and the innovators are the ones who adopt the new products much quicker than the other groups. *Innovators* are venturesome- they try new ideas at some risk (Kotler & Armstrong, 2003). *Early adopters* are key opinion leader in their group and start using the new ways at an early stage in a careful manner. *Early majority* are the ones adopt new ideas before an average person but and they are not leaders. The most sceptical group would be the *late majority* and they start using the method only when majority are using the products in the market. The *laggards* are the ones who stick on to the traditional method and they adopt an innovation only when it has become a tradition to use (Kotler & Armstrong, 2003).

Generally, specialist doctors who treat one particular kind of disease can be the ones who belong to the innovators. Whereas a general physician can reach this status only if he/she took a lot of interest in gaining information about the disease and the treatment. In a way, the doctors should be willing to take a risk to adopt the new products to upgrade their treatment method. It can be assumed that a doctor who is interested in taking a highly valued education program will be motivated in learning about the new methods in the science and they will do this only with a partner they can rely on. Consumers' degree of resistance to innovations is

inversely related to the timing of adoption, i.e. the earlier a customer adapts, the less is his/her resistance to innovations (Hoyer & MacInnis, 1997). The main reason for the time of adoption of innovation pattern is due to the barriers; Functional and psychological barriers (Ram and Sheth, 1989). In the case of pharmaceutical sector, the psychological barriers play a major role among the physicians when it comes to the adoption of innovative treatments.

Ram & Sheth, 1989 identified, the psychological barriers are made up of *tradition barrier* and *image barrier*. The consumer sometimes has to deviate from the established traditional treatment methods to the innovative which can be difficult in achieving. In this way a tradition barrier exists. In addition, the image barrier hinders consumers for developing favourable associations for an innovation due to consumers' selective perception and stereotyped thinking of an innovation (Tankred, 1995).

The functional barriers consist of *usage barrier*, *value barrier* and *risk barrier*. If the customers perception on the innovation is not well-matched with his/her existing practices and habits then a usage barrier prevail. If the consumers have to change their habits or the way of treating the patients in a bigger way it can be huge challenge for the companies to facilitate them by clarifying them how to pursue this in a very simple manner. A value barrier occurs if the consumers perceive the product performance not up to the expectation in terms of price.

*Proposition: As the physicians participate in the education program, it should be possible for them to overcome these barriers and upgrade their treatment method by adopting the innovative method; or on other words by reducing the resistance to the innovation.*

### **2.4.3 Brand Importance**

The third dimension to be studied in the model is the importance of brand. Companies use brands as an integral part in marketing strategy and they are increasingly seen as valuable assets and sources of differentiation. To the consumer, a brand is argued to identify the source of the product, which in turn assigns legal responsibility to the product maker, and provides a promise or bond with the producer (Lassar et al., 1995).



A consumer can receive information from different sources about a product or a brand. It can be *personal* sources (family, friends, neighbours etc.), *commercial* sources (advertising, sales people, dealers, packaging, displays), *public* sources and *experiential sources* (handling, examining, and using the products) (Kotler & Armstrong, 2003). Out of these sources the most important source of information could be the commercial aspect. For example: in the pharmaceutical business the physicians mostly know about the brands through a sales person, through different marketing mix programs like education, conferences etc.

When a customer is attached to a brand it may not be due to the satisfaction he/she gained from the brand. The six sources identified which can bring attachment towards a brand are attachment based on *hedonistic satisfaction*, *quality*, *shared values*, *increased self image*, *brand's association with the people*. Different types of behaviour can result from this above attachments. This includes (Kapferer, 2004);

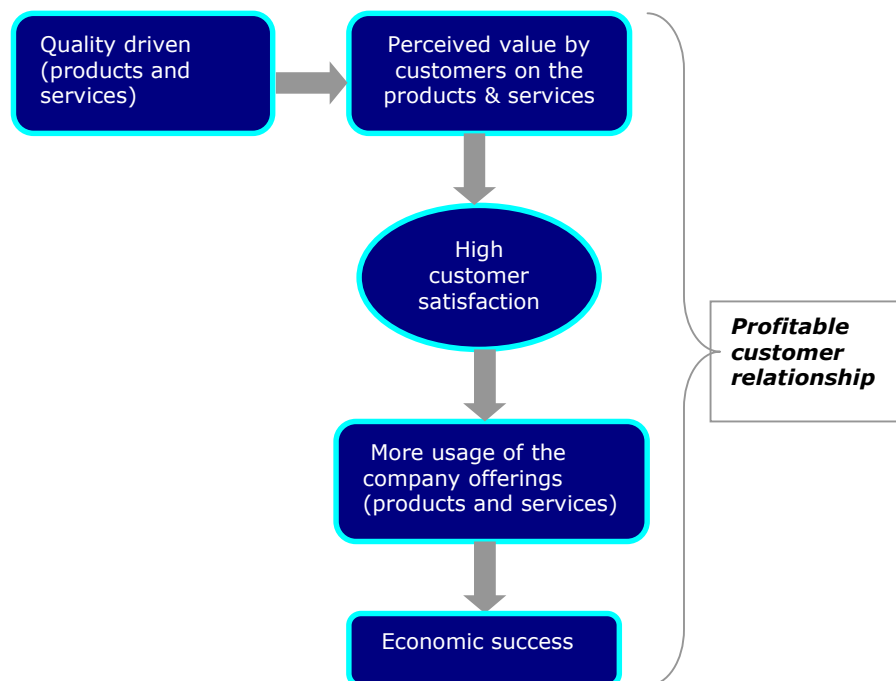
- *A desire for information*
- *Automatic repeat purchasing of the products*
- *A desire for participation in the life of the brand and community*
- *A desire for customer involvement with the brand*

The purchase intentions can be made by the consumers by making an individual evaluation themselves by ranking the brands. Consumers can do this ranking based on the requirements and the chances are very high there can be a tendency to switch the brands if their requirements are simply changed (Kapferer, 2004). If an education program is tailored for the physicians, there should be a clear alignment on the physicians' needs and what is presented in the program. When a company tailors and pursues its marketing mix programs it should be able to make prospects aware of and knowledgeable about its brand (Kotler & Armstrong, 2003). Consumer's awareness and importance in choosing the brand will enhance when the consumer gets more knowledge and information about the brand through this type of programs. In this way the real purchase behaviour of the brand by the customer can be influenced.

*Proposition: The marketing mix programs can have a positive influence on the brand importance or choice of brand while physicians prescribe the treatment procedure*

## 2.5 Profitable relationship

The final part of the framework (figure 2.1) is the economic success the company can achieve by providing different types of benefits. A strong link is evident between the perceived value, customer satisfaction and profitability. This has increasingly led for the managers and practitioners in many organisations to investigate the link between customer satisfaction and profitable customer relationships (Scharitzer & Kollarits, 2000). (Fecikova, 2004) quotes that the relationship between perceived value and satisfaction can guide to profitability in the organisation. An outline for customer relationship profitability model developed from (Gummesson, 2002) is shown in the figure 2.5. The outline shows the different stages in achieving profitability from a customer relationship.



**Figure 2.5:** Relationship profitability model for pharmaceutical industry

As the companies invest huge amounts on the improvement of quality of the services and products it has become extremely important for the organisation to measure whether this investment give return benefits for example, in terms of Return of Investment (ROI). This measurement as an objective indicator can enable in understanding how customers perceive the organisation as well the services and products provided to the customers compared to other organisations, whether the performance of the services and products meet the customers expectations.

### 3 Methodology

*In this chapter, the methodological approach adopted for this work will be discussed. The method of data collection and the operationalisation of the variables in the analytical model are also covered.*

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In order to ensure objectivity, according to Bristor et al. (1993) established norms are to be followed while conducting research. When it comes to the treatment of serious chronic disease it is important for the doctors to follow strict medical procedures. Considering the nature of this research problem I will consider ontology as objectivism in nature, where the phenomenon is considered as more structured in nature (Bryman & Bell, 2003). Physicians may have the tendency to follow the medical procedures and can be more conservative in changing the treatment after getting used to the old treatment ways. Even though they might have different perceptions and views about the treatment there can be a possibility that they would like to stay with the old treatment methods they have used before instead of upgrading it even after the participation in the program. This can be due the psychological barriers physicians have while choosing the treatment. With this reasoning and the research problem depicts the prescription behaviour of the doctors I would argue that the nature of the phenomena is objectivism.

A research design is a framework or blue print of conducting a marketing research project (Malhotra & Birks, 2000). While choosing a research design in marketing research the role of the potential respondents is extremely important. Based on this factor, a feasible research design can be used. Research design used for this method is a more formal and structured conclusive approach than an exploratory one - where the marketing phenomena is understood through more deep insights from the respondents.

Since the work is mainly focussing on measuring the attitude of the general physicians towards the diabetes disease after taking part in the education programs it would be more appropriate to choose a conclusive research design in this research set up where a large representative sample can be used to extract information and subjected to quantitative

analysis. The theoretical framework used in the work can be examined more thoroughly by using this approach by studying the relationship between various constructs defined.

Generally conclusive researches design maybe either a descriptive or a casual research designs (Malhotra & Birks, 2000). A *casual* research design normally fits where information is needed on the cause-and-effect relationships. It can give a good understanding on the dependent variables (cause) and independent variables (effect) of marketing phenomena (Malhotra & Birks, 2000). A *descriptive* research design is normally used in elaborating up on the characteristics of certain consumers or certain form of behaviour. This can help in measuring the marketing phenomena to represent larger population of target markets (Malhotra & Birks, 2000). In this aspect the methodological approach I have adopted for this study is a conclusive- descriptive research approach, thus aiming to provide an accurate and valid depiction of the variables which are dimensions of behaviour I have used in the analytical model.

### **3.1 Methodological approach**

To undergo a research work includes a lot of complexity, the objectives of the work can be fulfilled in many ways. In terms of choosing the research strategy is mainly dependent on the purpose of the work. Normally, two research strategies are employed while conducting a research work; quantitative and qualitative. After the consideration of the data analysis and as the aim of the work employs measurement of the behaviour changes a quantitative approach is adopted to proceed with this work. In a quantitative method normally a large number of observations are chosen for the data collection, which can facilitate in establishing statistical significance in the results. The observations for the study can be easily obtained since there is a large group of physicians participating for the programs offered by Novo Nordisk every year. The results can be obtained after subjecting the data gathered to statistical analysis and conclusion can be drawn from the analysis results.

An alternative approach obviously would be to apply a qualitative approach, where emphasize is given to more words rather than quantification (Bryman & Bell, 2003). In this case aim would be to get deep insights of the physicians about the education programs by interviewing the doctors who have taken the program and to see they have made any re-consideration in the way they treat diabetes patients after the program. The importance of the variables which leads to the perception of the physicians towards the change in the way they treat patients

could have been extracted by interviewing them using open-ended questions. In this way well-heeled information from the doctors would have been obtained to get good insights and an understanding about the phenomena. But as mentioned previously in the beginning of this chapter, the psychological barriers might stop the doctors in adapting to the new methods even though they have different opinion on the new way of treating the disease. In this case it is not sensible in knowing their perceptions to study the actual behaviour. For this reason and considering the time limitation and the difficulties in getting an appointment with the doctors to make interviews, I decided not choose the qualitative research strategy.

## **3.2 Data Collection**

In this section, the approaches considered and used for the data collection for this study is covered. Initially, I did design a survey for the primary data collection which I could not use for this study due to the legal issues in the pharmaceutical sector in the Swedish market. For this reason the alternative method I have used in this work is mainly secondary data; internal database. In the following sections all the steps I have gone through for the design of the survey as well as the database technique are explained in detail.

### ***3.2.1 Design of survey***

Primary data are the data originated by the researcher for the specific purpose of addressing the problem at hand (Malhotra & Birks, 2000). After deciding upon the strategy; quantitative in this case, my initial plan was to design a survey to conduct among the doctors who have participated in the program in order obtain the primary data for the study. A survey method is one of the major methods employed in descriptive research design (Malhotra & Birks, 2000). As there are other methods which can also be used, considering the information requirements in terms of characteristics, and also description of the observations-physicians in this case, a survey would be the appropriate method. The methodology has been proven successful in many of the cases in terms of studying the behaviour of customers (Malhotra & Birks, 2000).

Since the study was focussed only one specific program conducted by the program, I decided to use the participants who have taken this specific program for a particular year. For this reason a single cross-sectional survey was designed where only one sample of respondents will be chosen by giving information only once. Based on the nature of the research problem a longitudinal design would have been the most suitable approach in this case by measuring

the doctors repeatedly before and after the program. This would have made it possible to study the same respondents over a period of time by conducting a follow up study. This time period can be too long to conduct this work; hence it is not a feasible solution.

The questions used in the survey were well structured and were prepared based on the variables used in the analytical model, thus able to examine the connection between the constructs linking to actual prescription behaviour. Questions were prepared in a scientific way in such a way that response can be captured through an ordinal rating scale from a larger observation who has taken the program (see Appendix B). Since the data's were not available to study the physician's treatment methods before they take the program the questions were framed to capture their status before and after the participation in the program. For the same reason it was more structured and divided in to two parts, where the general behaviour of the physicians towards the disease captured in the first part and more precise change in attitude in the treatment methods in the second part . Ordinal scales are used in marketing research to measure relative attitudes, opinions, perceptions and preferences (Malhotra & Birks, 2000). I prefer to adopt and ordinal scaling in the survey which can enable me in doing a correlation study to see whether the observations have re-considered the way they treat the patients over a period of time after attending the program.

Two ways of conducting the surveys has been considered for this work in order to get a quick feedback; Via Internet and telephone. Since the doctors spent most of their working hours in the hospitals and their offices, using these two means would be the two optimum ways to reach them. Thus it was planned to create and post the survey in internet and informing the respondents through E-mails for their participation. Simultaneously, it was also decided to conduct the survey via telephone in order to get a commitment from the respondents and thus increasing the response rate for the study.

### *Limitation*

The planned survey for collecting the primary data was not able to pursue due the legal issues regarding the access to the physicians for this type of surveys. Since I am pursuing this work in co-operation with a company I had limitations in accessing the physicians in order to pursue the survey. After an investigation on this it was learned that, a survey of this type could be made to a doctor only after getting the approval from the chief of all the Vårdcentralens (Health Care Centres) unit where he/she is working (Source: Kristina

Nerbränd, R&D Skåne Region). Since the observations I have chosen were spread over the whole country and considering the limited amount of time to get the approval of all the Health Care Centres it was not possible to execute this method.

### ***3.2.2 Alternative approach: Secondary data***

The alternative approach chosen to accomplish the research objective was using the secondary data. Secondary data are data that have already been collected for purposes other than problem at hand (Malhotra & Birks, 2000). The data in this case have been generated for previous projects and can be used for a new project. The method of using as a database being a conclusive research approach is one among the secondary data collection methods and is more feasible and rapid in getting the necessary details about the customers to study other marketing phenomena. Companies use databases to confine and track customers' profile and their purchase details and thus can act as an important source for the decision makers to tailor various marketing programmes (Malhotra & Birks, 2000).

Since the plan to conduct the survey was discontinued, I have decided to use secondary internal databases as the source of data collection in this work. Novo Nordisk itself has databases for the potential general physician's which are updated every year on the customer information and their purchase details. Since the details are already available and accessible this could be an optimum alternative to fulfil the objective of this research in the limited amount of time left. Exploring these databases can help in analysing the information in terms of customer activity over the life of the business relationship (Malhotra & Birks, 2000). In this way it can facilitate in studying the customers' preferences and buying behaviour over a time period. This technique has also been popular by acting as tool in creating and maintaining customer relationship. It has to be mentioned that the personal information about the physicians from the database used for this research work will remain confidential.

### ***3.2.3 Choice of observation from database***

Different types of programs are conducted by the Novo Nordisk every year and the participation in these programs is voluntary for the physicians. The programs are held in different venues all over Sweden through out the year. The formats for these programs also vary in terms of contents, the type of diabetes disease and also to which category of physicians they are targeted.

The study has been narrowed down to program called “*När Var Hur?*” which has been targeted only on general physicians and nurses. The sample was picked from the list of participants who have attended the education events organised by the company in the year 2005. The choice of this particular program for the study was mainly due to the high frequency of this program throughout the year compared to the other programs and also because of the target segments; general physicians and nurses. In this way a large sample can be investigated.

Another reason is that it is more sensible to conduct an investigation on the doctors who treat all kind of disease, rather than a specialist doctors who will deal only with one kind of disease. A general physician or a nurse is more conservative when it comes to the treatment of diabetes and the tendency is often to refer a patient towards a specialist at a certain stage when the patient becomes severe in the disease. This is mainly due to the less awareness of the treatment among these segments. Since the focus is mainly on the initial stages in the treatment of the disease it is also hard to convince these segments about the new or upgraded treatment methods.

On other words, moving a general physician or a nurse from a referrer status to an initiator status, thus changing their attitude towards the treatment of disease is extremely difficult task. But also, it is significantly important to see whether the program has an impact on this group in terms of behaviour change. To add up, it is of less interest in including a specialist doctor who treats diabetes for this study since they will be already well aware of the new or upgraded treatment methods for the disease.

Initially the plan was to conduct the study on both nurses and general physicians in order to see behaviour changes in both the groups. As the database accessible to the author contained only details of general physicians, nurses are not included even though there are nurses participated for this type of program. Thus the sample of study comprises only general physicians (GP's). For the reader's information when I mention the general physicians, for Swedish health care there are different designations used for the general physicians. For further information I refer to the appendix C.



Since it is important to study the behaviour of these customers in a short period of time the sample was chosen from the list of participants who have taken the program in the year 2005. There were a total of approximately 196 doctors who participated in the chosen program for this study in the year 2005. The percentage ratio of these doctors was also approximately fifty percent in terms of region South and North of the country. Therefore the population distribution was spread out in the whole country.

As the objective was to measure the behaviour it is crucial to see the status of these doctors in terms of treating diabetes disease before they have been to this program and thus to compare it with the database in the end of the next year after the program. For this reason the internal databases for the year 2004 and year 2005 has been chosen for this purpose. In this way, the immediate outcome for the program can be learned in terms of whether the observations have upgraded the way they treat prior and after the program. The study would thus have a longitudinal approach where physicians are studied over a period of time.

The drawback was that the customers' data vary from year to year for the chosen internal database. On other words, a physician who was in the database in the year 2004 may not be present in the database of the year 2005. The reason being that; the database is built based on the market research questions and some of the physician may not reply the market research questions every year end. Thus the challenge lies in whether chosen observations are present in the database of both the years. After a strenuous data mining a sample of 24 respondents was present in the databases from both the years out of 196 respondents who have been to the program. Out of these approximately 50% were male doctors.

Since the initial planned survey was cancelled and the obtained participant sample size from the database was small it was decided to choose a second sample who has not participated in the program. In order to strengthen the research results and to study whether the programs are making a real difference it would of interest to see if the program benefits the physicians by comparing to a sample of physicians who have not been to the program with the participant sample. For this reason a sample of doctors who have not been to the program was randomly picked from the same databases. It was ensured that the customers profile match in both the databases and are also from the same years chosen as in the previous sample for the participants in the program. The sample size in the case of non-participants was 46 approximately twice that of the sample for observations who have participated in the program.

The reason for choosing a bigger sample size for non-participants was in order to get a higher significance in the results and to get a tangible understanding of the change in behaviour. The observations has been cross-checked and confirmed that these observations have not been to any of the programs conducted by the company in the same year. Using the two samples picked a comparison study on both the sample can be made by studying whether the programs make any immediate outcomes. A brief overview on the sample information is shown in the table 3.1.

<i>Sample for participants of the program (Participant sample)</i>	<i>Samples for non-participants of the program(Non-Participant sample)</i>
24	46

**Table 3.1: Sample size overview**

All the items in the database considered for this study are included in the Appendix (See appendix D) under the relevant dimensions used to study the actual behaviour of the doctors in the treatment of disease. Since the scaling used for the items vary for different items, it is also mentioned under different items. The operationalisation of the dimensions for measures the actual behaviour are explained are explained in the further sections.

### **3.3 Operationalisation**

#### **3.3.1 Operationalisation of customer adoption**

In order to measure the consumer adoption, items (5 to 7) are considered. As the sample used in this case is general physicians, it would be relevant in this aspect to see whether there is any change in the number of patients who have been newly initiated with insulin treatment. This is because, as the doctors are general physicians and many of their tradition of treatment is to stay on with the old treatment method like prescribing tablets or sending the patients to the specialist doctors the patients becomes worse in his/her disease. In addition, the aim of the program is to encourage doctors to prescribe insulin and to educate them on under what circumstances and when they should prescribe insulin for the patient. An increase in the number of new prescriptions and change in treatment of the disease also would be able to give

an indication on whether they are adopting to the treatment methods. Another indicator is that to see the interest level of the doctors in the diabetes treatment.

### ***3.3.2 Operationalisation of opposition towards innovation***

In this section the focus is more on the innovative products from the company in the diabetes treatment. The section covers the items 1 through 4 in order to see if there is any difference in the observations in terms of the risk taken by the doctors in adopting towards the new treatment methods. This can give an indication on whether the doctors' status has changed after participating in the program from a referrer to an initiator or to an intensifier. The frequency of prescribing the treatment methods like for e.g. treatment using OAD (Oral-Anti-Diabetes or the tablets form) or Insulin treatment can give their tendency to adapt towards the innovative treatment methods or their resistance towards the innovation has changed or not. The tendency to take more number of types 1 and 2 diabetic patients is another indicator where by measuring this numbers can give an indication that whether there is any increment in the patients' number before and after the programs. If the doctors are willing to accept the advanced treatment methods there tendency and to treat the patients will be higher as well. For the items 3 and 4 (a, b &d) options are not taken in to consideration for the analysis since they were irrelevant for this case.

### ***3.3.3 Operationalisation of brand importance***

The brand importance indicates on to what extent the brand influence the doctors in the choice of their treatment. A change in the choice would be able to predict whether the programs have influenced the purchase intention of the physicians and item 8 has been used to measure this variable. However, in this study since the measurement was only available on an overall basis i.e. all types of brand available in the market is included in the ratings it could give only an indication on the choice of the physicians.

## **3.4 Limitations of methodology**

Since I have adopted database technique to continue with this study the main challenge was to the inter-link the nature of the items present in the database and the theoretical model I have used. As the items used in the database were not focussed on the concept of education

program; I have the limitation of exposing the direct relation between the physicians' treatment methods and the influence of education programs in their treatment using the database technique. In the analytical model one of the intention was to test whether the high satisfaction score expressed by the doctors from the programs is giving any changes in their behaviour. In this way there was limitation in the operationalising the variables due to the limited information available in the database. It would have been more feasible to capture the general behavioural attitude towards the disease before and after the programs conducting a survey than using the items in the database.

Another disadvantage of using the database was the choice of observations. Since not all the doctors participate in the survey items stored in the database, it was difficult to match the population in databases for both the years. In this way I had difficulties in choosing a big sample from the 196 participants in the program and have restricted my studies for a smaller sample size of 24 observations. By pursuing a survey there was a possibility to have a larger sample size for analysis. Every year a large percentage of nurses also participate in the programs and it would have been interesting to include them in the studies. This would have also increased the sample size in doing the analysis. There was also a possibility to study the behaviour in different groups (doctors, nurses). Since the nurses are not included in the database used in the study it had limited the study in this direction.

A careful choice has been made while choosing the sample for non-participants to make sure that they have not been to any of the programs conducted by Novo Nordisk. However, the chances that the observations in the sample chosen for non-participants might have attended program from other companies in terms of seminars, conferences can influence the data and this will limit the study.

### **3.5 Validation of data**

In order to evaluate whether the data obtained have accuracy and applicability it is assessed for reliability and validity. Since the data used in this case is from secondary source- database; there may be possibility that errors might have occurred while collecting this data even though it has been done by an external agency consisting of marketing experts. The mechanical factors involved would be the design of the items as well as the clarity in the

items used in collecting the data. This could have made some systematic errors while the physicians responded to these items.

Since there was large number of items present in the database, there is also a risk that the doctors might not have the time to commit themselves in answering all the items in a serious manner. This could have influenced the measurement in a constant way while the physicians responded the items. There is a chance of random error as well where some of the responses might be flawed due to the situational or personal factors. These errors might have affected the reliability of the data.

There could be also a possibility that some of the physicians might have exaggerated while answering the items which can lead to some minor fluctuations when it comes to the validity of the response for every items present in the database. In terms of the contents, the database did not cover all the aspects of behaviour change in the physicians in the context of their education program and it rather give some of the information on their status in the way they treat diabetes. Thus the validity in terms of content would have been improved further with the help of a survey. In this way a more thorough understanding about the physician's attitude towards the education and the impact would have been obtained. The construct validity is also evaluated in such a way that the characteristics measured using the items converge to a large extents to the constructs used in the analytical model.

## 4 Data analysis and results

*The procedure used to analyse the data statistically and the results obtained are presented in this chapter.*

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### 4.1 Procedure

In this section the selection of data analysis strategy used to proceed with the analysis of the items used in the study will be presented. The statistical technique appropriate in this work will be *univariate* technique, since there are several measurements of each element in the sample used and the variable being analysed in isolation (Malhotra & Birks, 2000). For the testing procedure to examine the differences in the samples, parametric test has been used. Parametric tests provide inferences for making statements about the means of parent populations (Malhotra & Birks, 2000). As the measurement scale used is in an interval basis is the main reason to choose this method. As the items used were from the database, coding was done on the scale for some of the items in order to convert in to an interval scale (see Appendix D). The most common parametric test, *t-test* is used in this method for the analysis.

Since the objective would be to see how the items under different parameters differ from the two different sample selected, a two tailed independent sample t-test is used for the analysis. The constructs in this case; customer adoption, resistance towards innovation and brand importance need to be investigated for both the participant and non-participant samples.

Initially the mean values for the items for the sample who have taken the program are calculated for both the years; i.e. for the year 2004 and year 2005. Based on this results the validation is been done using an independent sample t- test for both the participant and non-participant sample. The significance value,  $\alpha = 0.05$  is set for all the items. In the following sections the items used for the constructs are analysed:

### 4.2 Analysis of customer adoption

The items considered in the case of customer adoption are items 5 & 6. Item 5 which indicated the interest of doctors showed that all the observations in the participant sample and

non-participant samples were interested in treating the diabetes disease. For this reason item 5 is not subjected to any analysis since both the sample did not show any variations in their response.

#### 4.2.1 Item 6: Insulin treatment

In the case of insulin treatment, the measurement was to see the number of patients who have been newly initiated with insulin. The mean value obtained for the participant sample for both the years are shown in the table 4.1.

**Table 4.1**

<i>Mean value for the number of patients who have been newly initiated with insulin (n=24)</i>	
<b>year 2004</b>	<b>year 2005</b>
5.54	5.75

The mean values in this case are different and the value in the case of number of patients who have been newly initiated with insulin for the year 2005 is slightly different than the year 2004. This slightly greater value obtained could be a reason that the doctors have shown an improvement in initiating insulin for the year 2005 compared to the previous year. In order to validate this improvement made among the doctors t-test has been conducted by comparing with the non-participant sample. The degree of freedom was,  $df = 68$  and  $\alpha$ -value = 0.05. The results obtained are shown in the table 4.2.

**Table 4.2**

<b>Item 6</b>	<b>Participant sample (n=24)</b>		<b>Non-participant sample (n=46)</b>	
	<b>Mean</b>	<b>Standard deviation</b>	<b>Mean</b>	<b>Standard Deviation</b>
<i>Number of patients newly initiated with insulin</i>	,1667	,70196	-,0217	,57693

The results obtained gave a  $p\text{-value}=0,233$ , which indicates that the results are not significantly different. On other words, the number of patients newly initiated with insulin almost remains same for both the samples of participants and non-participants.

### 4.3 Analysis of resistance towards innovation

In order to measure if the doctors have reduced their resistance towards innovation the items 1 through 4 is used. The results obtained from the analysis for each items are given below. By measuring the number of patients the physicians have treated

#### 4.3.1 Item 1: Number of patients' treated who had diabetes disease of Type 1

The mean values found for the number of patients who has been treated by the participant sample for diabetes disease of type 1 for both the years are shown in the table 4.3.

**Table 4.3**

<i>Mean value for the number of patients' treated for diabetes disease of Type 1 (n=24)</i>	
<b>year 2004</b>	<b>year 2005</b>
1,33	0,83

The values obtained are different in this case and the value for 2004 is somewhat smaller than the year 2005. The results from the t-test made for the samples are shown in the table 5.3.  $\alpha\text{-value}$  is set as 0.05 and the  $df= 68$ . The  $p\text{-value} =0.38$ , indicates that the difference in the number of the patients treated for diabetes disease of type 1 is not significantly different for both the participant and non-participant samples.

**Table 4.4**

<b>Item 1</b>	<b>Participant sample(n=24)</b>		<b>Non- participant sample (n=46)</b>	
	<b>Mean</b>	<b>Standard Deviation</b>	<b>Mean</b>	<b>Standard Deviation</b>
<i>Number of patients' treated for diabetes disease of Type 1</i>	-,5417	1,178	-,3261	,84471



#### 4.3.2 Item 2: Number of patients' treated for diabetes disease of Type 2

The number of patients who was treated for diabetes of type 2 was the next item measured and the mean values calculated for the samples are shown in table 4.5.

**Table 4.5**

<i>Mean value for the number of patients' treated for diabetes disease of Type 2 (n=24)</i>	
<b>year 2004</b>	<b>year 2005</b>
2,625	2,541

The mean values in this case is approximately same for both the years for the participant sample and no major influence is seen among the number in the year 2004 compared to the year 2005. The t-test results conducted in this case with set  $\alpha$ -value= 0.05 and the degree of freedom (DF)= 68 is shown in table 4.6. The  $p$ -value=0.819 greater than the set  $\alpha$ -value which shows the difference in number of patients treated for diabetes disease of type 2 by the participant sample are not significantly different from the non-participants.

**Table 4.6**

<b>Item 2</b>	<b>Participant sample(n=24)</b>		<b>Non- participant sample (n=46)</b>	
	<b>Mean</b>	<b>Standard Deviation</b>	<b>Mean</b>	<b>Standard deviation</b>
<i>Number of patients' treated for diabetes disease of Type 2</i>	-,0833	1,017	-,1304	,6866

#### 4.3.3 Item 3c: Total number of OAD (Oral Anti-Diabetes) prescriptions

In this case the calculated mean value for the year 2005 is lesser than the one in the year 2004. This indicates the prescriptions in OAD are decreased for the year 2005 compared to the year 2004. The aim would be to reduce these types of prescriptions and to encourage more insulin treatment the values obtained can be a positive indication that the sample changed in the way they were treating during the year 2005 compared to 2004. However, the t-test conducted in

order to validate this gave a  $p\text{-value}=0.943$ , which is greater than the set  $\alpha\text{-value}= 0.05$ . This indicates that there is no high significance difference between the participants and non-participants for this item. The standard deviation and mean values from the test for both the participants and non-participants are given in the table 4.8. The degree of freedom (DF) was chosen 68.

**Table 4.7**

<i>Mean value for the total number of OAD (Oral Anti-Diabetes) prescriptions (n=24)</i>	
<b>year 2004</b>	<b>year 2005</b>
16,4583	11,33333

**Table 4.8**

<b>Item 3c</b>	<b>Participant sample(n=24)</b>		<b>Non- participant sample (n=46)</b>	
	<b>Mean</b>	<b>Standard Deviation</b>	<b>Mean</b>	<b>Standard Deviation</b>
<i>Total number of OAD (Oral Anti-Diabetes) prescriptions</i>	-,3750	,92372	-,3913	,88137

#### 4.3.4 Item 4c: Total number of insulin prescriptions

The mean values calculated for the total number of prescriptions made by the participants sample is shown in the table 4.9. It clearly indicates the insulin prescription rate has increased among the participants sample, which can infer there is change in their prescription behaviour in terms of giving more insulin in the year 2005 than compared to the previous year. The t-test conducted for this case is displayed in the table 4.10. The degree of freedom was chosen 68 and  $\alpha\text{-value}= 0.05$ .

**Table 4.9**

<i>Mean value for the total number of insulin prescriptions (n=24)</i>	
<b>year 2004</b>	<b>year 2005</b>
11.60417	14.1041

The results shows that,  $p\text{-value}=0.120$  is higher then the set significance value thus giving no big significance difference between the participants and the non-participants sample. The standard deviation (SD) and Mean from the test is shown in the table 4.10.

**Table 4.10**

Item 4c	Participant sample( $n=24$ )		Non- participant sample ( $n=46$ )	
	Mean	Standard deviation	Mean	Standard deviation
<i>Total number of insulin prescriptions</i>	,1667	,70196	-,0217	,57693

## 4.4 Analysis of brand importance

### 4.4.1 Item 8: Brand Importance

The last construct discussed in this chapter would be the brand importance of the doctors; i.e. how big influence the brand has in the choice of treatment. The mean values calculated for the participant sample for different years are shown in the table 4.11. The parameter results are approximately for both the years. The t-test has conducted with  $DF=68$  and  $\alpha\text{-value}= 0.05$ , for both the samples. The standard deviation and the mean values are given in the table 4.12. The  $p\text{-value} =0.286$  calculated is larger than the set significance value which means that the importance of brand among the participants are not significantly different from the non-participants sample.

**Table 4.11**

<i>Mean value for the Brand importance (<math>n=24</math>)</i>	
<b>year 2004</b>	<b>year 2005</b>
5,54	5,75

**Table 4.12**

<b>Item 8</b>	<b>Participant sample(<i>n</i>=24)</b>		<b>Non- participant sample (<i>n</i>=46)</b>	
	<b>Mean</b>	<b>Standard deviation</b>	<b>Mean</b>	<b>Standard Deviation</b>
<i>Brand Importance</i>	,2083	2,57039	-,5217	2,75471

## 5 Conclusion and discussion

*In this chapter the main conclusion drawn from the results are discussed. Suggestions are also made for the future research work.*

---

The objective of this work was to study the actual prescription of the doctors who have taken the specific education program- *När Var Hur?* from Novo Nordisk Scandinavia AB. The sample chosen is studied by analysing the information on the items collected from the databases.

In the case of variable- customer adoption, the results showed that the items showed a slight difference in comparing the years 2004 and 2005. The item - number of insulin initiated newly by the doctors was marginally higher in the year 2005 than the previous year. Thus a small tendency of positive change can be noticed in the doctors after the participation in the program. But the significance was not that high when it was compared with the control group; or on other words, the difference between the participant sample and non-participant sample in initiating insulin newly did not showed any big difference in the results for the same years.

In the item 5, which showed all the physicians from both the participant sample and non-participant sample were interested in the treatment of disease; As the program can be attended by the physicians voluntarily there could be other intentions or motives that the physicians participated in the program rather than to learn and apply the advance treatment methods. In this case it cannot be inferred that all the participants will adopt to the optimum treatment methods which was covered in the event.

Under the construct resistance towards innovation, the items 3c and 4c gave a positive indication in terms of change in behaviour. The item 3c-the total number of OAD prescriptions has decreased considerably among the doctors who have participated in the program for the year 2005 compared to 2004. At the same time a drastic increase in the total number of insulin prescriptions is noticed among this group for the same years. As one of the aims of the education event is to put patients in the insulin in the early stages of the treatment to have a better control, it is an indication that there is a tendency in change among the physicians prescription behaviour in their resistance towards the innovation. However, the

results showed no significance difference in any of these items when it has been compared with the control group or the non-participant sample; meaning the tendency in change is negligible with reference to the group who have not been to the education.

The final construct measured - brand importance also showed a slight increase for the year 2005 among the participant sample in terms of importance of how big influence the brand has in the choice of treatment. Since the data covers all the brands in the market it can be also other reasons for this increment. For e.g.: a good sales technique used by a sales person may be a reason for this. Even though there is a tendency in change, the significance was not high when the comparison is made between the participant sample and non-participant sample for both the years when it comes to the influence the brand has in the physician's choice of treatment.

As the significance difference is not very high comparing both the participants and non-participants samples in the case of all the items measured, it could be concluded that this specific program (När Var hur?) conducted by Novo Nordisk for the year 2005 has not made any major impact in terms of their behaviour change among the physicians. This is inferred by comparing the participant sample with a group of doctors who have not attended the program for the same year even there is a slight tendency in change between the years is noticed in the case of participant sample for most of the items. The study also gather that, in the theoretical framework the high customer satisfaction scores gained from the physicians' right after their participation in the program may not necessarily bring a huge impact in terms of behaviour change among the doctors.

But it has to be implied that the inference is made based on the limited information obtained from the database. The choice of sample might have also influenced the results. The probability of an impact in terms of change in behaviour may not happen to all the 196 participants who have been to the program. And this way there can be a coincidence that the choice of participant sample for this study may be the ones who have not shown any dramatic changes in the population. Also, the results from a sample size of 24 observations may not be used a representative sample in generalising the results for all the programs held by the company.

It is also a common view among practitioners that if there is no immediate results on this type of programs the chances are very less that it can be effective in a long- term. This is because normally this type of education events should create an immediate impact on their behaviour right after the program since the knowledge is fresh and the doctors can make a big change in the way they treat the disease. On the contrary it can also be argued that the participant sample in the study comprises of late adopters or laggards where the doctors will show changes gradually in a longer period of time. Another implication related to the same issue is that targeting the right physicians would be a way to make this type of events effective. As the company is investing large amount to conduct these events it is crucial that the company have to implement a targeting procedure with in the education events. Today, as any doctors can voluntarily participate in the program it can be possible that these participants are not highly potential in treating the disease. Even though it can be a good way to create a better image for the company, for a short term it would be more sensible for the company if the right customers are identified and to design programs which are specifically targeting these groups and thus encouraging them to participate in these type of events.

## **5.1 Future research work**

Using the limited amount of items available in the database has restricted my studies and therefore pursuing the survey could be one way to proceed with this research. Initially, my intention was to pursue a survey on the doctors in order to capture their interest and attitude in treating the disease after their participation in the program. The survey designed cross-sectional in nature, based on these factors could be used as a future research work in studying the immediate impact of the program. Studying the doctors in a long-term; meaning to follow up after longer period after the participation in the program assuming that the physicians gradually change their treatment methods is an alternative for future research. Adopting a longitudinally designed survey would be able to fulfil this objective.

Measuring the Return of Investment (ROI) from this type of program is certainly an area needs to be addressed in the future in order to see whether they are giving any economic benefits for the company. As explained in the theoretical framework in this work, this could be a way to measure the relationship between the physicians and the company and to see whether the relationship is profitable. Measuring the performance indicators like sales and

market shares in the different regions where education is held would be a way to see whether there is any economic success or return of relationship ROR is achieved through this program.

Another possibility is to pursue studies on the patient's case files by measuring various parameters on the disease. By tracking these parameters on the patients' case files before and after a doctor participates in the program can give a conclusion that whether there is any impact in their prescription behaviour after their participation in the program.



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Kristina Nerbränd R&D chef, Skåne region (telephone conversation).

## Appendix A

Diabetes occurs when a body is unable to produce or respond properly to insulin which is needed to regulate glucose (sugar)<sup>1</sup>.

There are three type of diabetes<sup>2</sup>:

- Type I is insulin dependent and often called juvenile onset diabetes.
- Type II is non-insulin dependent and often called adult onset.
- Gestational diabetes.

Medical professionals recognize three strata associated with diabetes: people who are not diabetic; those with Impaired Glucose Tolerance (IGT); and those with diabetes as shown in the table below<sup>2</sup>.

*Source*<sup>2</sup>

	<i>Blood Glucose (g/dL)</i>		
	fasting	30-90'	120'
Normal	<115	<200	<140
Diabetic	>140	>200	>200
Impaired glucose tolerance	<140	>200	140-199

*Type 1* diabetes mellitus is characterized by loss of the insulin-producing beta cells of the islets of Langerhans of the pancreas. Sensitivity and responsiveness to insulin are usually normal, especially in the early stages<sup>3</sup>.

*Type 2* diabetes mellitus is due to a combination of defective insulin secretion and defective responsiveness to insulin (often termed reduced insulin sensitivity)<sup>3</sup>.

<sup>1</sup> <http://www.fi.edu/biosci/healthy/diabetes.html>

<sup>2</sup> <http://darwin.nmsu.edu/~molbio/diabetes/disease.html>

<sup>3</sup> <http://en.wikipedia.org/wiki/Diabetes>

## **Appendix B**

### **Survey**

#### **Part: 1**

1. **General Behaviour of the customer towards diabetic disease**

What is your profile?

a. GP

b. Nurse

c. Diabetic Nurse

2. What is your age?

3. How long have you been practicing as a physician?

4. How long did you get your medical license?

5. I am interested in treating diabetes.

Strongly Disagree  
0 1 2 3 4 5 Strongly Agree  
6

6. I dedicate more time towards treating diabetes today than a year ago (in the year 2004)?

Strongly Disagree  
0 1 2 3 4 5 Strongly Agree  
6

7. I am interested in seeking more information (e.g.: to participate in educational programs/seminars) about the diabetes today than a year ago (in the year 2004)?

Strongly Disagree  
0 1 2 3 4 5 Strongly Agree  
6

8. I have re-considered the way of treating diabetes today compared to a year ago (in the year 2004)?

Strongly Disagree  
0 1 2 3 4 5 Strongly Agree  
6

9. I am treating more patients in diabetes today than one year ago (in the year 2004)?

Strongly Disagree  
0 1 2 3 4 5 Strongly Agree  
6

10. How many years have you been initiating insulin in the treatment of diabetes?

Answer: \_\_\_\_\_

**Part: 2**

**Behaviour towards NN educational events and products**

1) Have you been to any education program for treating diabetes recently?

- a. Yes
- b. No
- c. Do not know/cannot answer

If yes, please mention which programs \_\_\_\_\_

And when \_\_\_\_\_

2) Have you been to a Novo Nordisk education program for diabetics in the year 2005?

- a. Yes
- b. No
- c. Do not know

3) Which of the following programs of Novo Nordisk you have participated in the year 2005?

- a. Insulin När Var Hur
- b. DIP vuxen
- c. DIP open
- d. DIP Nurse

4) I have participated in a Novo Nordisk education event in the year 2005, and I was satisfied with the event in terms of course contents and lecture?

Not satisfied at all  
a. 0 1 2 3 4 5 6 Highly satisfied

b. I did not participate/do not know.

5) I believe that the Novo Nordisk education program has had changed the way I treat the diabetic patients today than before I took part in the program.

Strongly Disagree  
0 1 2 3 4 5 6 Strongly Agree

6) I am confident in treating diabetes patients after participating in the education program of Novo Nordisk?

Strongly Disagree  
0 1 2 3 4 5 6 Strongly Agree





- a. 0-20%                      b. 20-50%                      c. 50-80%                      d. > 80%  
e. Do not know

12) When a Type 2 patient is not well regulated on one or two OAD (Oral Anti-diabetic agent) what do you most often prescribe?

- a. Add one more OAD                      b. Send the patient to a diabetic specialist                      c. Add Basal insulin  
d. Add Premix insulin                      e. Add Bolus insulin                      f. Do not know

---

If you have any comments and suggestions you would like to add on, both in general or related to your interest towards the treatment of diabetes disease you are very welcome to do so in the below section.

Comments:

## **Appendix C**

### Designation used for general physicians (in Swedish)

*ST läkare*

*Distrikts- och husläkare*

*Sjukhemsläkare*

*Företagsläkare*

*Vårdcentralchef*

*Privatpraktiker*

## Appendix D

### Items from the internal database: (*English version*)

#### Resistance to innovation

Item 1: Number of patients the doctor had with diabetes type 1 disease?

Scale used: <1 per week =1, 1-3 per week=2, 4-10 per week=3, >10 per week=4

Item 2: Number of patients the doctor had with diabetes type 2 disease?

Scale used: <1 per week =1, 1-3 per week=2, 4-10 per week=3, >10 per week=4

Item 3: *Oral anti-diabetes treatment-OAD (tablets form):*

- a. The products preferred/prescribed in OAD?
- b. How many is prescribed a week through out the year?

Scale used: <1 per week =0, 1-3 per week=2, 4-7 per week=5.5, 8-10 per week =12, 13-20 =16.5, >20per week=23

- c. What is the total number of prescription in the OAD in a year?

Scale used: Sum of the scale used for item 3b.

- d. What is the potential of these customers?

Scale used: Top-20%= High potential, Middle – 50%= Medium potential, Low-20%= Low potential.

Item 4: *Insulin treatment:*

- a. Products preferred/prescribed as insulin?
- b. How many is prescribed a week through out the year?

Scale used: <1 per week =0, 1-3 per week=2, 4-7 per week=5.5, 8-10 per week =12, 13-20 =16.5, >20per week=23

- c. What is the total number of prescription in the insulin in a year?

Scale used: Sum of the scale used for item 4b.

- d. What is the potential of these customers?

Scale used: Top-20%= High potential, Middle – 50%= Medium potential, Low-20%= Low potential.

#### Consumer adoption

Item 5: Are the doctors interested in the treatment of diabetes? => Interested or not interested

Item 6: *Insulin treatment:*

Number of patients who have been newly initiated with insulin

Scale used: <1 per week =1, 1-3 per week=2, 4-10 per week=3, >10 per week=4

Item 7: *Percentage of diabetes patients' doctors had:*

- a. Received new/change treatment
- b. Referred to specialist without new/change in treatment

### **Brand importance**

Item 8: *Brand Importance:*

How big influence the brand has in the choice of treatment?  
Scale of 1-10; with 1 being very less influence and 10 being strong influence.

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**Items from the internal database: (Swedish version)**

### **Resistance to innovation**

Item 1: *Har antal diabetespatienter med diabetes typ 1*

Scale used: <1 per week =1, 1-3 per week=2, 4-10 per week=3, >10 per week=4

Item 2: *Har antal diabetespatienter med diabetes typ 1*

Scale used: <1 per week =1, 1-3 per week=2, 4-10 per week=3, >10 per week=4

Item 3: *Peroralt diabetesmedel:*

- a. Produkter
- b. Förskriver antal recept/vecka?

Scale used: <1 per week =0, 1-3 per week=2, 4-7 per week=5.5, 8-10 per week =12, 13-20 =16.5, >20per week=23

- c. Totalt antal recept/år?

Scale used: Sum of the scale used for item 3b.

- d. Potential?

Scale used: Top-20%= High potential, Middle – 50%= Medium potential, Low-20%= Low potential.

Item 4: *Insulin*:

- a. Produkter?
- b. Förskriver antal recept/vecka?

Scale used: <1 per week =0, 1-3 per week=2, 4-7 per week=5.5, 8-10 per week =12, 13-20 =16.5, >20per week=23

- c. Totalt antal recept/år?

Scale used: Sum of the scale used for item 3b.

- d. Potential?

Scale used: Top-20%= High potential, Middle – 50%= Medium potential, Low-20%= Low potential.

### **Consumer adoption**

Item 5: Intresse i diabetes? => Intressant eller ej Intressant

Item 6: *Insulin behandling*:

Initierar behandling antal gånger per månad

Scale used: <1 per month =1, 1-3 per month=2, 4-10 per month=3, >10 per month=4

Item 7: Behandlingstradition

- a. Andel diabetespatienter nyförskrivning/ byte av behandling
- b. Andel diabetespatienter remiss utan ny eller förändrad behandling

### **Brand importance**

Item 8: *Brand Importance*:

Inflytande vid val av Im-varumärke vid förskrivning  
Scale of 1-10; with 1 being very less influence and 10 being strong influence.

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