THE IMPORTANCE OF DEMAND PLANNING IN THE MANAGEMENT OF A FAST MOVING CONSUMER GOODS SUPPLY CHAIN

By

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DISSERTATION

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TABLE OF ABBREVIATIONS:

The following abbreviations will be used throughout this study:

- **ABC** – Activity-based Costing
- **ASN** – Advanced Shipping Notice
- **CAO** – Computer-assisted ordering
- **CPFR** – Collaborative Planning, Forecasting and Replenishment
- **CRP** – Continuous Replenishment Program
- **DC** – Distribution Centre
- **DFU** – Demand Forecasting Unit
- **DRP** – Distribution Resource Planning
- **ECR** – Efficient Consumer Response
- **EDI** – Electronic Data Interchange
- **ERP** – Enterprise Resource Planning
- **FMCG** – Fast Moving Consumer Goods
- **JIT** – Just-in-time
- **MRP** – Material Resource Planning
- **OPT** – Optimised Production Technology
- **PoS** – Point of Sale
- **ROA** – Return on Assets
- **SCM** – Supply Chain Management
- **SKU** – Stock Keeping Unit
DECLARATION:

This thesis, unless specifically indicated to the contrary in the text, is my own original work. It has not been submitted for examination to, nor am I registered with any university other than the Rand Afrikaans University.

Gott Müller

UNIVERSITY
OF
JOHANNESBURG
DIE BELANGRIKHEID VAN VRAAGBEPLANING IN DIE BESTUUR VAN 'N VINNIG BEWEGENDE VERBRUIKERSGOEDERE VOORSIENINGS KETTING

SINOPSIS:

Die 'Vinnig Bewegende Gebruiksgoedere' (VBG) industrie vorm een van die mees dinamiese omgewings in hedendaagse besigheid. Die industrie kan gekarakteriseer word deur relatiewe goedkoop, nie-duursame verbruiksgoedere, wat verbruik word teen 'n hoë tempo. Verdere karaktertrekke uniek tot die hoogs mededingende industriie, is dat verkope baie wisselvallig en seisoenaal kan wees, en dat die verbruikersmark voortdurend verander. Die genoemde elemente vorm saam 'n hoogs dinamiese omgewing waarin vervaardigingsmaatskappye 'n voortdurende aanbod van produkte moet verseker om aan die steeds veranderende behoeftes van verbruikers te voldoen.

Meeste maatskappye in die VBG industrie het begin om die konsep van 'Voorsieningsketting Bestuur' aan te neem om die probleme van verbruikers-bevrediging in 'n hoogs mededingende omgewing aan te spreek. Voorsieningsketting bestuur fokus op die koördinasie van die vloei van alle inkomende materiale en grondstowwe, fabrieksprosesse, distribusie kanale, asook die inligtingsvloei wat daarmee gepaard gaan om te verseker dat die voorsieningsketting kan aanpas by veranderinge in die mark.

Een van die grootste uitdagings wat die VBG industrie in die gesig staar, is om produkte te voorsien vir die onmiddelike behoeftes van gebruikers, terwyl daar steeds met die probleem van lang leitye regdeur die vervaardigingsketting geworstel word. Een van die enigste maniere om die probleem te oorkom, is om markvooruitskattings te maak van die toekomstige aankope van verbruikers. Dit beklemtoon die belangrikheid van die insamel van verbruikers inligting om te verseker dat die beste besluite regdeur die voorsieningsketting gemaak kan word. Die hantering van
markvraag inligting, onder die term ‘Vraagbeplanning’, vorm een van die belangrikste konsepte in die VBG voorsieningsketting.

Die doel van die studie is eerstens om die konsep van vraagbeplanning, en die invloed daarvan op die sinchronisasie van ‘n VBG voorsieningsketting te ondersoek, en om aan te dui hoe die proses ‘n positiewe invloed op die bestuur van ‘n voorsieningsketting kan uitoefen. Tweedens het die studie ten doel, om die invloed van sekere voorsieningsketting strategieë op vraag beplanning te ondersoek, en hoe die twee prosesse saam ‘n geïntegreerde benadering kan vorm tot die synchronisasie van ‘n voorsieningsketting.

Die gevolgtrekkings van die studie is dat die effektiewe hantering van vraaginligting in ‘n gesstruktureerde vraag beplanningsproses, een van die belangrikste elemente van voorsieningsketting bestuur vorm. Die studie beskou die vooruitskattingproses as die kern van alle voorsieningsketting aktiviteite deurdat dit ‘n direkte invloed het op die effektiviteit van die voorsieningsketting in terme van die maksimering van klientediens teen die mees optimum koste. Die studie bewys verder dat die vraagbeplanningsproses nie in isolasie gesien kan word nie, maar eerder as ‘n integrale deel van die bestuur en sinchronisasie van ‘n voorsieningsketting.
1.1 INTRODUCTION

"It is bad enough to know the past; it would be intolerable to know the future."
- W Somerset Maugham

In this era of intensified global competition, manufacturers encounter the constant pressure of declining margins and higher customer expectations. As a manufacturer, a twofold dilemma is faced. First, customer expectations have changed radically in the past decade. Second, the nature of competition has changed. Not only do companies compete with imported goods that are produced under dramatically different labour and capital cost structures, but in addition, competition can come from unlikely sources. (SAPICS – Ken Titmuss 1998)

Customers are becoming more sophisticated. They demand more variety, better quality and greater service in terms of reliability and response time. Product life cycles are shortening and product proliferation is expanding. More and more, manufacturers must deliver mass customization, giving customers what they want, where they want it, when they want it and how they want it. And of course, customers don’t expect to pay more – they expect to pay less! (Fliedner and Vokurka 1997:56)

Technological developments are occurring at an ever increasing pace, providing both innovations and manufacturing process improvements. As a result, the model of a competitive world-class firm is changing, and the firms that will prosper in tomorrow’s dynamic competitive environment are those which become today's agile enterprises.
A decade ago manufacturing planning focused on materials, and the customer was seen as the end of the manufacturing and distribution process. This paradigm was turned around with the development of the terms 'Logistics' and 'Supply Chain Management' (SCM) that refer to the art of managing the flow of materials and products from the source to the user.

The logistics system includes the total flow of materials, from the acquisition of raw materials to delivery of finished products to the ultimate users (as well as the related counter-flows of information that both control and record material movement). As such it includes the activities of sourcing and purchasing; conversion (manufacturing) including capacity planning, technology solutions, operations management, production scheduling and materials resource planning (MRP 2); distribution planning and managing industry warehouse operations; inventory management and inbound and outbound transportation; and the linkage with customer service, sales, promotion, and marketing activities.

The supply chain, on the other hand, refers to the integrated set of activities completed by the full supply chain participants (suppliers, manufacturers, distributors, retailers/customers, and consumers/end users). SCM involves the co-ordination of the flow of incoming materials, manufacturing operations, and downstream distribution in a manner that responds to changes in customer demand without creating excess inventory, in a specific supply chain. This includes sourcing and procurement, production scheduling, order processing, inventory management, transportation, warehousing, and customer service. It effectively includes the logistics activity of each player in the whole supply chain.

An important part of this changed paradigm, is that both of these concepts recognized the consumer as the most important element in the company and supply chain. This more than emphasized the phrase:

---

1 The term 'Supply Chain Management' will be discussed in more detail in a further chapter.
2 The logistics concept refers to the mentioned activities that takes place within one company as part of a supply chain. This context will be followed throughout the study.
‘The customer (we want to be king), is king’

The supply chain characteristics must be based upon what the consumer wants, where he wants it, when he wants it and how he wants it. The consumer can thus be seen as the ‘driver’ or ‘activator’ of the supply chain process.

Today the emphasis is on time. The ability to speed up the supply chain process — from product concept to customer demand, to manufacturing to distribution — is now a major source of competitive advantage. The results are apparent. Manufacturers that redesign their processes to satisfy demand faster are also able to cut costs, raise quality, increase margins and grow their business faster than their less agile competitors.

These new paradigms placed enormous stress on the old production and distribution processes, and forced most companies to start adapting to the process of SCM. However, many companies are still caught in the production-focussed approach of the late 1970’s and early 1980’s. Without a change, most of these companies will probably become extinct.

1.2 PROBLEM FORMULATION

The opening quote of W Somerset Maugham seems very unrealistic in the structure of this study. For any type of business, it should rather read:

“It is good to know the past; it would be invaluable to know the future”

This restructured quote emphasizes the importance of information in any company and supply chain. Information forms the basis of all business decisions, and impact on the whole of the supply chain, as well as the individual company. The types of information are virtually endless, and the impact of it can clearly be seen in business

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3 This concept will be discussed in a later chapter.
decisions. It is generally accepted that the better the information, the better the
decision will be. This is why all companies strive to have 'perfect information'.

'Perfect information' not only refers to the quality and accuracy, but also to the timely
receipt of the required information. Accurate information means nothing if it is not
received when it is needed. This further emphasizes the need for 'Real Time
Information'. Real time information is even more important in an ever-changing
environment, where it has to activate and change the whole supply chain process to
ensure that the supply chain and dependant companies react immediately to any
changing situation. These elements are echoed in the following quote:

'The key to development in modern business has been the rapid progress made by
information technology and the fact that the cost of making information available to
more decision-makers has steadily decreased.' (Gattorna & Walters 1996:105)

The availability of information has moved the meaning of a competitive company or
supply chain into a league of its own. More companies are investing capital in
information generating systems to get as close to real time information as possible.
If the customer forms the activating point of the whole supply chain, then customer
information will be one of the most important elements in activating the supply chain.
Current real time information is however not enough. The supply chain needs to
produce goods for future customer demand, and this type of information needs to be
derived from some source. History can teach valuable lessons and forms the basis of
most future decisions. The one element that is lacking, is the knowledge of the future.
Unfortunately this element is unobtainable, and the only way to get this type of
information is to make some kind of estimate of future events. This estimate or
forecast then forms the core element in nearly all business decisions in a changing
world.

Forecasting in essence is an unsure science and never accurate. The supply chain
however needs the most accurate demand forecasts to produce a product in time for
consumer demand, of an acceptable cost to the producer. This points directly to the
logistical functions of having:
the right product,
of the right quality
in the right quantity,
at the right place,
at the right time,
at the right price,
to the right consumer.

These functions link directly with customer service, and emphasize the importance of accurate forecasting in every part of the supply chain. The better the supply of information, the better will the forecast and the business decisions be.

Inaccurate forecasts can cause major problems for a supply chain. If stock-outs occur on the shop floor, customers will simply buy something else or nothing at all, and lost sales will occur in the consumer goods sector. On the other hand, too high inventories throughout the supply chain will simply increase the working capital of the supply chain, and limit its success. High inventories will also hide true demand and will delay demand information from reaching the right places in time. Then there is the problem that the forecast changes as it goes through the supply chain, due to the different information needs of the different functionaries. This necessitates the use of multiple forecasts throughout the whole supply chain, which can cause bad business decisions due to differences in information.

Demand information needs to be managed in such a way that the right forecast reaches the right function in the supply chain. The process of understanding the market and customer base, as well as the management of demand information derived from this knowledge, can be seen as the process of ‘Demand Planning’. This process of forecasting the interpretation and management of demand information forms one of the most important elements in the supply chain. Unfortunately, many companies do not recognize the importance of ‘Demand Planning’\(^4\), and do not realize how essential

\(^4\) Demand Planning can be seen as the process of managing demand information that’s needed to power the forecasting system, the forecasting process and the outputs of the forecasting process. This concept will be discussed in Chapter 5.
it is in the running of a supply chain. The process of demand planning needs to manage all demand information as the activating element of the supply chain, to strive towards the supply chain's goal of profit and optimal customer service. In not recognizing this fact, a company will find it hard to compete in this ever-changing environment.

1.3 PURPOSE OF STUDY

As part of supply chain management, the handling of market demand information forms one of the most important concepts in any supply chain. One of the specific goals of supply chain management is to manage and co-ordinate the flow of information from the original source to the final customer. If consumer demand forms the activating element in the supply chain, it becomes clear that the process of demand planning can play an active role in improving the effectiveness of a supply chain. The correct management of information can thus greatly influence the level of integration, the responsiveness, level of customer service and value added to the end product. This is however not a one-sided approach where demand planning can be used as the tool to facilitate supply chain synchronization. The opposite effect can also be found that certain efforts to synchronize the supply chain can greatly improve the demand planning process.

The fast moving consumer goods (FMCG) industry relies heavily on forecasted demand figures due to the structure of this industry. Developing demand forecasts forms a great part of the demand planning process and the accuracy, timely flow, interpretation and final format of the information is of the utmost importance. A well controlled forecasting process can form a solid foundation to address supply chain problems, reduce the level of wastage, increase the product value to the customer and improve the level of supply chain agility.

With this background, the aim of this study will be:
To explore the subject of Demand Planning in the synchronization of a FMCG supply chain. It will aim to show how an effective demand planning process can positively influence the supply chain management process and form an active element in supply chain synchronization.

To investigate certain supply chain strategies on demand planning to indicate the level of integration between these two processes. In order to do this, a theoretical study needs to be done on Demand Planning and into the elements thereof.

Within this structure it will be possible to formulate a structure to evaluate the concept of Demand Planning.

1.4 RESEARCH METHODOLOGY

1.4.1 Approach

The following research methodology will be followed throughout this study:

- Literature analysis - An extensive analysis will be undertaken of available material. The Internet will also be used as a source of information covering currently used practices.
- Practical experience in the field of study will be undertaken to analyze currently used practices and map the study to comply with industrial standards.
- Interviews with specialists in the field of study.

1.4.2 Definitions and classifications

Certain key concepts and definitions will be defined throughout the study to give a better understanding of subjects studied and researched.

\[\text{This concept will be discussed throughout this study.}\]
1.4.3 **Analysis and results of the research**

The latest available information relevant to this study, as obtained from literature, practical field study and consultation has been processed into a structured and descriptive format to provide the reader with insight into the problem as well as a comprehensive background.

The results and recommendations are by no means the foundations of forecasting, but will fit the studied situation, and vary according to the industry or company involved. What the study will do however, is show the integrated relationship between forecasts and the daily running of a FMCG supply chain.

1.5 **OUTLINE OF THE STUDY**

The study contains the following chapters in which the study objective is discussed:

**Chapter 2:**
An overview will be given of the importance of consumers and customers in the supply chain process, and how a change in the consumer and customer base has given rise to an increased focus on supply chain management, and a more customer-focussed approach. Issues like customer response, value addition, and the dynamics of customer behavior will be discussed.

**Chapter 3:**
This chapter provides an overview of the supply chain structure and SCM. This will form a background to the integrated structure of forecasting and the importance of this process in a FMCG supply chain. This in turn will set the scene for the discussion of the demand planning process.
Chapter 4:
This chapter discusses the theory of forecasting and the elements involved in the forecasting process. The different forecasting methods will be discussed as a background to the concept of forecasting.

Chapter 5:
This chapter focuses on the process of Demand Planning and how this process manages demand information to activate the supply chain. It will also focus on the forecasting process and the communication of demand information throughout the supply chain.

Chapter 6:
This chapter focuses on specific issues that can influence the processes of demand planning, supply chain management and customer service. The concept of Lead-time management will be discussed, and specifically how this can influence supply chain management and demand planning. Efficient Consumer Response (ECR) as an extension of supply chain management and demand management will be discussed briefly, to provide an indication of how specific industry characteristics can create a new approach to satisfying consumer demand. A future view concerning the industrial Internet will also be discussed, as an attempt to get closer to the customer.

Chapter 7:
This chapter will formulate a conclusion about the practice of Demand Planning and the importance of this process to ensure the competitive nature of a FMCG supply chain in a more competitive world.
REFERENCES:


3. Titmuss, K., 1998 SAPICS Conference
CHAPTER 2: CUSTOMER SERVICE

2.1 INTRODUCTION

With the turn of this century, consumers will be demanding better and faster service, and more customized products at a lower cost. As Regis McKenna in his book "Real-Time" puts it:

‘New consumers voice their expectations as: Right here. Right now. Tailored to me. Dished up the way I like it.' (SAPICS — JF Mendes & E Joubert 1998:204)

In this new dynamic environment it is becoming more and more important to listen carefully to the voice of the consumer. Research has proved that consumers will choose the product that has the highest utility. This suggests that consumers buy more than just a product or a service: They buy benefits. Consumers are more interested in what they perceive as the value received rather than just the product or service itself. This gives customer service a whole new meaning. Customer service activities must go beyond responding to consumer and customer problems. A company must now be prepared to offer customers outstanding value before, during and after sales by helping them to solve whatever problems they may have and, in addition, for those customers that have customers of their own, by helping them to solve their customers' problems.

As companies have focussed on improving their internal efficiencies, a much larger leverage opportunity is unraveling today: that of increasing the effectiveness of the entire supply chain, through collaboration and shared visibility amongst its various players. The age of inter-company competition is moving in the direction of inter-supply chain competition. The successful companies of tomorrow are those that will be part of the best supply chains. Ultimately, the aim of these best-in-the-class supply chains is to offer higher levels of customer service while simultaneously decreasing costs, increasing revenue and therefore increasing return on assets (ROA) for all the players of the supply chain.

The consumer is one of the most important links in the supply chain process. It is actually consumer demand that activates this whole process through their needs. A company's
actions, and ultimately that of the entire supply chain, must be based upon what the customer wants, where he wants it, when he wants it and how he wants it. Product availability forms one of the elements of customer service. Customer service in turn forms one of the goals of supply chain management. To enable the fast moving consumer goods (FMCG) supply chain to have stock available in the quantities that the consumer wants, they need to make use of demand forecasts to fulfil customer orders. The process of managing demand information, (i.e. demand planning), will form a key element to achieving the customer service goal of supply chain management.

This chapter will explore the importance of the consumer and the customer, as well as the importance of customer demand\(^2\) in the supply chain process. It will also attempt to define some of the changes in customer expectations that influence the supply chain approach to the FMCG industry. A detailed study of customer service will fall outside the scope of this chapter and will rather attempt to establish links with the subjects of ‘Supply Chain Synchronization’ and ‘Demand Planning’, using the customer as the activator of the supply chain process.

Throughout this chapter, reference will be made to the concepts of ‘customer’ and ‘consumer’. It is necessary to explain the difference between these concepts before the chapter goals are explored. These concepts differ in the sense that the consumer can be seen as the final user of a product, whereas the customer is normally regarded as the final interface (wholesale or retail dealer) between the rest of the supply chain and the consumer. This can be presented by Figure 2.1:

FMCG companies can use the term ‘customer’ in 3 different ways:

- Indicating the real customer, as shown at 1 in Figure 2.1. The manufacturing chain focuses on his relationship with the customer — i.e. retailer and wholesaler. This focus aims to optimize the relationship between the manufacturing chain and the trade. The transfer of goods to the consumer will be the responsibility of the customer. The manufacturing chain can also see the consumer as an extension of their downward supply

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1 This concept will be defined in section 4.1 of this chapter.
2 For the purpose of this study, customer demand refers to the demand of the wholesale / retailer as well as for the individual consumer. In essence, customer demand will be compiled out of consumer demand and thus more or less the same except for timing and grouping difference.
chain and customers can be assisted by a consumer marketing department from the manufacturing chain.

- Indicating the consumer and customer as a combined unit, as indicated with 2. This approach assumes that both the customer and the consumer can be seen as outbound units with more or less the same characteristics. Reference will be made to both these elements as 'customers'.

- Indicating a direct link with the consumer as indicated with 3. This approach can be followed where the product is marketed directly to the end user. The consumer/ end user can be referenced as the customer of the manufacturing supply chain. This approach is not generally followed by the FMCG supply chains due to the nature of this industry.

This study views the consumer as one of the most important links in the supply chain. Reference will be made to both the concepts of 'consumer and customer', and in each case it will mean the true definition. Most of the supply chains studied in this study, focus mainly on the customer interface with the consumer as a 'shaded' secondary focus. This approach assumes that the true nature of the consumer is passed on to the manufacturing chain by the customer, and by the supporting role of a consumer marketing department in the supply chain. This approach will be followed throughout the study.
2.2 THE CONSUMER

The consumer can be seen as the final user of a product or service and thus the source of product or service demand. This is where the whole supply chain process actually begins. A consumer may have a specific need for a product, and will attempt to satisfy this need by buying this item. So will thousands of other consumers. The product can normally be acquired from some type of retail store, and quite soon the retailer will also experience the need to replace the products sold to consumers. The retailer will approach a wholesaler or the manufacturing company to replace these products. It is in this way that the wholesaler or manufacturer gets to know what the demand for his product is, and will attempt to produce the product according to the needs of the wholesaler or retailer (his customers), and indirectly the consumer. The consumer can thus be seen as the activator of the supply chain process by firstly showing the need for a certain product, and secondly passing this need on to another supply chain member.

Consumer behaviour changes from day to day, due to the human element that forms the most unpredictable input into the supply chain process. To survive in a competitive environment, a supply chain must provide the consumer with more value than its competitors. Consumer or customer value can be seen as the difference between all the benefits derived from a ‘total’ product and all the cost of acquiring those benefits. Providing superior consumer or customer value requires the supply chain to do a better job of anticipating and reacting to consumer demand than the competition does. An important element of this can be seen in the change in consumer needs over the past few decades, that needs to be anticipated in the supply chain's reaction to consumer demand. The following section aims to describe some of the main underlying elements that causes change in customer expectations.

2.2.1 Consumer needs

Consumers of the 90's are enlightened, well informed, extremely price conscious and their demands will grow with time. Now, more than ever, they are aware of the products they buy, the variety thereof and the opportunities for comparison. This results in consumers that want better quality, variety, information, convenience and service for less money, time effort and risk.
Market research shows that it is not the new customers themselves who have become more contradictory, but rather that they are trying to unite certain contradictions. In this sense consumers have not become more unpredictable, but rather more comprehensive in their needs. The behaviour is an attempt to integrate professional and leisure interests, emotional and rational viewpoints, nature and technology, modesty and status, quality and quantity, simplicity and sophistication. This increased acceptance of 'paradoxes' also serves as a protection mechanism, to prevent consumers from being torn apart by the growing range of options, the avalanche of information and by their restricted ability to process these, both physically and mentally. (ECR Europe 1999:48)

2.2.2 Orientations in consumer behaviour

The consultancy firm, Roland Berger & Partners describe this paradoxical behaviour as the following: (ECR Europe 1999:49)

- 'Function' — represents rational demands, meaning that products must satisfy such criteria as price, availability and quality;
- 'Emotion' — covers the need for excitement sense and value;
- 'Extension' — implies the desire for maximum variety;
- 'Reduction' — expresses the need for qualitative concentration and / or qualitative limitation, believing that 'less is more'.

These behavioural elements of the modern consumer can be divided into the following main orientations: (ECR Europe 1999:49-57)

2.2.2.1 Orientation towards trends and excitement

Consumers expect a larger variety and will experiment with products until they have found something that suits their lifestyle. Consumption is a form of expression as well as a component of their lifestyle. Consumer behaviour is characterised by individual style but also by the influences of fashion, cultural grouping and social scene.

Affluence and a change in values have caused a rearrangement of consumer priorities. Excitement and experience have become more important than customer goods and increasingly are equated with quality of life. The decisive motivation is no longer any
material need, but rather the wish for self-realization and stimulation in terms of a psychological experience.

This orientation will have a definite impact on the way that the consumer makes a choice about products. Not just in the marketing presentation of it but also in the element of availability. If a consumer wants a certain product, it must be available at the right time and place to satisfy that need.

2.2.2.2 Orientation towards service and solutions

Consumers expect practical user-friendly solutions and international service standards. Speed, variety and individual convenience are of major importance. They even want to be involved in the optimization of offers and ideally prefer tailor-made solutions.

The time budget is becoming just as important as the financial one, and this trend is creating a multi-optioned society that needs unlimited individual solutions. This development is nourished by demographic trends such as the growth in the number of single households and the sharp increase of women in full-time employment. Other elements such as the psychographic trends in the desire to save time, the move to more flexible living habits and the desire for a higher standard of living and thus optimum customer service, will add to the need for personal solutions.

One of the best factors is 'convenience': Quick, stress-free shopping, cash-less payment, flexible opening times, competent and personal customer advice as well as pleasant and effective service. The future of meeting demand for companies may mean going to the market and selling product directly to consumers. Manufacturing supply chains will have to open their web sites and allow consumers to order direct. As more knowledge is gained about an individual's personal buying preferences, the supply chain can react by creating personal shopping lists and sending a monthly package of a repeat order purchased by mail. Companies like Proctor & Gamble and Unifoods may include their products in one direct shipment to the customer each month.
2.2.2.3 Orientation towards sense and value

Consumers behave reservedly and tend to adopt a post-materialistic attitude. They have a mature need for regeneration. Of particular interest are health promoting, environmentally friendly, long-lasting and authentic products and brands. Consumption is a part of a holistic lifestyle and is measured in terms of its sensible purpose.

Consumers are increasingly looking for a balance between existing experience and orientation towards sense, and the emerging attitude seems to be one of conservative consumer behaviour. It is better to buy fewer things and to concentrate on quality, function and durability. For example, Acumins creates custom vitamins for consumers based on their health and dietary needs and Levi’s Personal Pair program can customize customer’s measurements electronically to the factory for custom sized jeans (Anon).

Brands and companies will increasingly be measured in terms of how ‘fair’ they are with regard to social, ecological or human value they represent. In contrast with the mid-80’s, aspirations to influence and critical awareness are no longer irreconcilable opposites.

For the consumer it is a question of an integrated overall concept and sustainable solutions. Environmentally friendly products, which are advantageous to health, are of particular interest. This shows that consumers are particularly interested in making the best buy for themselves in terms of price, quality, their own health as well as environmental well being.

2.2.2.4 Orientation towards price and performance

Consumers are enlightened, well informed, and thus generally cautious when buying products and services. Price consciousness and improved possibilities of comparison lead to emancipated consumer behaviour. They take advantage of price battles and are, in some cases, actively intervening in the composition of the offer and the pricing.

Consumers are not only increasingly making their purchase decision at the point of sale, but they are also much more concerned about the price and have started restricting themselves to only the essentials. Notably it is not only the lower income consumers who are forced to save money, but it is also the so-called ‘smart-shoppers’, who want more value for less money.
In the light of price battles, the consumer concept of value has been transformed into a high degree of awareness. ‘Smart’ shoppers have developed strategies to purchase the right product at the right time at the right place. They have learnt how, when, where and how much to spend in order to manage their budgets optimally. The customer who is not consistently being convinced looks around for something new elsewhere. Competitive prices can be achieved with highly innovative distribution and production strategies.

2.2.3 Conclusion

It’s quite obvious that the consumer market has undergone a massive development since the 60’s and 70’s. This trend is making it increasingly more difficult for supply chains to compete against each other for a specific market. Even though most of the consumer characteristics mentioned form part of the initial product design and marketing strategy, the distribution and full supply chain approach will still need to abide by these ‘rules’ of the end consumer. As mentioned before, the supply chain is about satisfying the customer and consumer.

The aforementioned characteristics of the consumer have forced companies and supply chains to align themselves with these critical consumer elements. The following key elements can be mentioned:

- Consumers want conveniently placed products. This points to the concept of availability, to have the right product, at the right place, at the right time, within easy reach of the consumer.
- The right price forms the next important concept. Not the lowest price, but rather the price that allows the consumer to get the best value for his money.
- The role of information is getting more and more important. Product information and an effective grievance procedure form the most important elements for the consumer.

These elements will form part of increasing the consumer value for a product, and will in the end determine the success of the supply chain’s approach to its customers. If one returns to the flow of demand information from the consumer throughout the supply chain, another element of change can be identified. Wholesalers and retailers that form a direct interface with the consumer, copy consumer behaviour. This behaviour is reflected in the way that they deal with the manufacturer. It is here where the ‘customer perspective’ comes in, and takes
on a wider meaning than just the ultimate user. This concept of customer satisfaction will be discussed in section 2.4 of this chapter.

Synchronizing the supply chain in line with consumer and customer demand can put the supply chain in the position of achieving a competitive advantage through the understanding of the underlying consumer and customer needs. Consumer demand information needs to be driven by a successful demand planning process that can ensure the correct handling, reworking and forecasting of future information, to ensure that the supply chain can comply with the needs of the consumer.

2.3 CHANGES IN THE FAST MOVING CONSUMER GOODS INDUSTRY

Consumer expectations for a certain product range or group of products give a specific homogeneous character to an industry. The Fast Moving Customer Goods (FMCG) industry is by no means any different. This section will explore the characteristics of the FMCG industry, focusing on how the consumer characteristics have made a change in the industry.

FMCG can be defined as relatively low priced, non-durable, consumable, traded products that are consumed at a rapid or fast rate by consumers. These products may include food products, home and healthcare products, or any type of product used at a rapid rate in the daily life of consumers/customers. This industry is characterised by continuous sales that can be very erratic or seasonal, and waiting times for products are generally not acceptable. This implies that a consumer will not be willing to wait a few days for a product he can’t get, but will rather buy something different. It is thus of vital importance that the supply chain ensures product availability at all times and reacts immediately to any changes that occur in the market. More demanding consumers make supply chain integration important. This will enable the company or supply chain to gain a competitive advantage above other competitors in the same market. Changing consumer behaviour and the increase in competition are having a huge impact of the FMCG industry.

Many reasons can be found for this new trend. Consumers have experienced a decline in purchasing power due to the stagnation of real income. This has changed consumer attitude to be thriftier and more price conscious. At the same time, the burden of growing social contributions is having a counter-productive effect on the spending habits of households. The
significant reduction in the consumer's disposable income has been caused mainly by increased expenses on services such as health care, nursing, rents, transport or telecommunications, and such economic impacts such as unemployment, high interest rates etc. This increase in expenditure can be shown in the following table:

<table>
<thead>
<tr>
<th>ITEM OF EXPENDITURE</th>
<th>1990</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food, Drinks, Clothing, Footwear</td>
<td>28.25%</td>
<td>24.75%</td>
</tr>
<tr>
<td>Housing</td>
<td>14%</td>
<td>17.5%</td>
</tr>
<tr>
<td>Medical services and requirements</td>
<td>3%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Transport</td>
<td>6.25%</td>
<td>11%</td>
</tr>
<tr>
<td>Communication</td>
<td>1.5%</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

In addition to demand creation opportunities, companies generate through marketing activities more varieties of a product as requested by consumers. For example, beer manufacturers in America have responded to beer drinkers demands and have given them over four hundred brands to choose from. These market shifts have created excellent revenues for companies, but also more problems for traditional FMCG manufacturing and supply chain practices, because they were not designed to handle and deliver such variety and complexity. (R. R. Lummus & K. L. Alber)

These factors demonstrate the impact of politics and society on the climate of consumption. The search for a competitive advantage is no longer enough in the FMCG industry, and pressure is increasing to create favourable macro-economic conditions by concerted action. The creation of an environment aimed at encouraging consumption, by means of tax reforms, creation of new jobs, privatization, or deregulation, is necessary at the macro-economic level to increase the consumer's willingness to spend. (ECR Europe 1999:5)

Although traditional FMCG companies are losing their share in consumer budgets, other industries such as the lifestyle-driven industries (beauty, catering and recreation) are experiencing above-average growth. This can be a testimony to Maslow's Pyramid of Needs,
which the satisfaction of fundamental human needs gives rise to further non-material needs. ‘Self-esteem’ and ‘self-fulfilment’ is thus becoming more important to the consumer.

The macro-economic conditions, the change in consumer spending habits and the dynamic growth of lifestyle-driven enterprises are all having a damaging effect on the growth prospects of the traditional FMCG industries. It is no longer the case that the application of marketing tools is sufficient to achieve a competitive edge. Other measures need to be taken. It is here at this point that synchronizing the supply chain forms an important part of the solution to satisfy consumers and customers in the way that they like. Availability forms the key issue to them.

2.4 THE CONCEPT OF CUSTOMER SERVICE

One of the concepts of customer service is concerned with making the product available to the customer. In essence, there is no value in a product or service until it is in the hands of the consumer. ‘Availability’ in itself is a complex concept, impacted by many factors, which might include delivery frequency and reliability, stock levels and order cycle time. Ultimately customer service is determined by the interaction of all those factors that affect the process of making products and services available to the buyer (Coyle, Bardi, Langley 1996:106 & Christopher 1990).

Customer service is really the fuel that drives the logistics and supply chain engine. Having the right product show up at the right time, in the right quantity, without damage or loss, to the right customer is the underlying principle of logistics systems that recognizes the importance of customer service.

2.4.1 Typical definitions of Customer Service

‘Customer Service’ is a difficult term to explain and different people will have different interpretations of its meaning. It can be seen as something that a firm provides to those who purchase its products or services. According to marketers there are three kinds of products (Coyle, Bardi, Langley 1996:111):
• The core benefit or service, which constitutes what the buyer is really buying;
• The tangible product, or the physical product or service itself;
• The augmented product, which includes benefits that are secondary to, but an integral enhancement to, the tangible product the customer is purchasing.

These elements indicate that the definition of customer service can be approached from two viewpoints, namely from a logistical and also a supply chain view. These two viewpoints are more or less the same, but will be visible in the following descriptions.

In the logistical context, customer service can be thought of as a feature of the augmented product that adds value to the buyer. It can follow that a firm could achieve a competitive advantage by providing superior levels of logistical service, where a potential benefit exists in viewing customer service as a product that may add significant value for the buyer. Furthermore, vendors and their customers often view the concept quite differently. In broad terms, customer service can be considered the measure of how well the logistics system is performing in creating time and place utilities, such as delivering the correct product to the right place in a timely manner. In this sense, the role of customer service is to provide 'time and place' utility in the transfer of goods and services between the buyer and the seller. There is no value in the product or service until it is in the hands of the customer or consumer. This can clearly be seen in the following definitions of customer service as:

'The timely and accurate delivery of products ordered by customers with accurate follow-up and inquiry response, including timely delivery of the invoice.' (LaLonde and Zinszer, 1976)

A more recent supply chain focussed definition views customer service as:

'a process that takes place between buyers, sellers, and third parties. The process results in a value added to the product or service exchanged. This value added to the product or service exchange process might be short-term, as a single transaction, or long-term, as a contractual relationship. The value added is also shared, in that each of the parties to the contract is better off at the completion of the transaction than he/she was before the transaction took place. Thus in a process view: customer service is a process for providing significant value-added benefits to the supply chain in a cost-effective way.' (Lambert & Sterling 1994)
Customer service can thus also be seen as a way in which value is added to the product-service package purchased by the customer. Value becomes the amount a customer is willing to pay for the products/service provided by the supplier and ‘value added’ is the difference between what the consumer pays and the cost of providing the service.

This definition indicates a few key elements of supply chain strategy:

- Customer service is a process involving all channel members;
- This relationship may span over a few companies in a supply chain;
- Value added forms the key concept in determining customer service;
- Value added to customers must result in cost effective benefits for the entire supply chain.

Customer satisfaction has often been explained in terms of being satisfied with the quality of a product, where the quality is defined as “anything the customer says it is”. By providing customer satisfaction, another benefit results. Every customer that is satisfied tells four or five others about the product or service, while every one that is dissatisfied tells nine or ten others about what they perceive the problems were.

Figure 2.2 shows two ways of creating value in the supply chain. This approach is followed by Becton Dickinson to provide the highest service to its partners in the supply chain, as well as to create the highest level of value for the entire supply chain. It suggests that customer service consists of two elements in their business:

- Physical product service;
- Supply chain service.

These elements take into account all the physical product aspects as well as all the channel elements that the product follows to the customer. The process further suggests that all elements of the customer expectations are investigated and an approach developed to fit each customer. This process relies heavily on information technology throughout the supply chain to ensure that all operations are in line of the ultimate goal of servicing the customer. The final interfaces of this process will be the Sales and Marketing departments, attracting customers and making the sale, and finally the Logistics department tending to the physical distribution of the product. In this way, they will ensure that their customers needs are met.
2.5 WHY CUSTOMER SERVICE?

As discussed in section 2.2, consumer characteristics have changed dramatically over the past decade influencing customer service as a total concept. The following factors are considered to be moulding the customer base, and give a good indication of exactly why companies and supply chains should focus on the concept of customer service (C. Wilson 1996:14)
• Customers are more powerful - Customers have buying power and can choose what they buy, from whom they buy and when they need to. Markets have developed so much in the past few decades that customers now have a wide range of products to choose from. Previously monopolistic markets now suddenly find themselves in a highly competitive environment, where customers have the choice to buy their products or not. Companies now have to go out of their way to ensure that their products are bought. Customer service can create product differentiation.

• The customer base is fragmenting - When a company formally reviews the income it receives from each account and apportions the cost of serving that customer, it will probably get a shock. It is likely to find that a core group of customers account for a disproportionately large slice of profits. The company would receive a bigger shock if it compared the profitability of the customer base today with that of a decade ago. Profits within the customer base have shifted, and a typically smaller percentage of customers now account for a large share in profits. There is nothing wrong with being dependent on few, large customers. However, there is serious danger if the firm is highly dependent upon a small group of customers it has not identified. The common assumption is that the biggest customers are the biggest earners, but this is not necessarily the case. This will also be true for the consumer.

• The costs of serving the customer are increasing ahead of inflation - There are a number of very important reasons why companies should do everything they can to keep existing customers, but one in particular stands out: Studies have indicated that it costs more to attract new customers and consumers than to keep old ones, and that loyal customers and consumers, purchase more products and services on a regular basis. They are willing to pay premium prices because they are satisfied, are less expensive to service since they represent repeat business, and become excellent references for attracting new customers. Based on these observations, a very important customer service objective should be to do whatever is necessary to maintain ongoing customer relationships.

• Distribution channel management is becoming more complex. Today, providing satisfaction as a means of keeping customers may not be adequate, since competitors are becoming very adept at duplicating their competitors' product and service and offering their own excellent service before, during and after sales are made. As a result of this competitive environment, customers are already accustomed to receiving excellent service, but they are to expect more in future, and not even in the distant future.
As customers and consumers obtain access to all sorts of information from a variety of sources such as the Internet, they are becoming aware of new products and services that are being offered, new technologies, environmental hazards, government product warnings, what is available or not, and what to watch out for. Armed with this newly acquired knowledge, customers now see the different factors between competing companies. These factors include:

- How companies provide their products and services, i.e., the degree to which products can be customized to meet customer requirements;
- The availability of the company’s and competitor’s products;
- How companies deliver on their promises, with or without problems;
- The degree of service excellence provided in all areas, including price, delivery, quantity, reliability, after sales support and so on;
- The extent to which customer loyalty to the company exists.

These elements show the impact that the changes in consumer characteristics have made on the way customers approach manufacturers in a supply chain. This has placed tremendous stress on inter-supply chain relationships and further emphasizes the need for channel integration. It is only in a synchronized environment that customer needs can be satisfied in the best possible way.

2.6 THE CUSTOMER SERVICE DIMENSION

Companies are beginning to recognize that customer service is now becoming a strategic (survival) factor in determining how a company should be managed. It goes beyond the product or service’s price, delivery, reliability and quality issues. Outstanding service is now recognized as one of the major distinguishing strategic factors that separates a company from its competitors. As such, it becomes a significant contributor to the achievement of the company’s profitability, return on investment, and market share goals. (C. Wilson – Profitable Customers)
2.6.1 Elements of customer service

The following elements are generally associated with customer service and form part of every supply chain. The importance of these elements will differ from supply chain to supply chain, according to the industry involved: (Peter Gilmour 1977:145)

- **Availability of item** – This represents the time limit in which a supplier can satisfy the customer's demand for a specific product, in a specific industry. This time limit needs to be acceptable for both parties according to the general limit accepted in the industry.
- **After-sales service and back-up** – This represents the service associated with the product and more specifically, the replacement of defective or damaged items, commissioning of equipment if the customer experiences difficulties and follow-up inspections of purchase.
- **Effective telephone handling of orders and queries** – Personnel need to be available for the handling of any customer orders or queries, irrespective of the nature of the query. This can also include the training of personnel to handle or transfer queries to the correct information source.
- **Order convenience** – This represents the accurate, efficient and most simple method of conforming legal requirements for the purchase or related action into a contractual document acceptable to the buyer and seller's business systems.
- **Competent technical representatives** – These persons should be involved with the training, background information and presentation of representatives calling on customers.
- **Delivery time** – This forms the elapsed time for the normal ordering procedure between the receipt of the order by the supplier and the receipt of the goods by the customer.
- **Reliability** – The reliability of a supplier in terms of a promised delivery schedule is important and customers need to be advised if any change in the schedule will take place.
- **Demonstrations** – The demonstration of equipment and products is needed to allow future customers to examine the equipment or product before purchasing it. The sales staff need to be competent to demonstrate the product or equipment in the best possible way.
- **Availability of published material** – Product information needs to be available to educate customers, or as general information about the product or service being sold.

These elements indicate some of the basic elements and the comprehensive nature of customer service. Customer service can in fact be anything the customer wants it to be. The new consumer trend of being more involved in the supply chain process of servicing the customer, shows that information is getting more important to them. Service, the handling of
order and queries, convenience, etc forms part of this dynamic, and all point to the concept of
the consumer wanting to be personally involved in the process of buying a product, and the
benefits associated with it. The company and supply chain interfaces that deal directly or
indirectly with the customer, need to focus on these elements to maximize satisfaction.

2.6.2 The marketing and supply chain interface

The ultimate purpose of any supply chain is to satisfy customers. It is generally recognized
that the power of customer service is a potential means of differentiation. In more and more
markets the power of the brand has declined and customers are willing to accept substitutes;
even technological differences between products have been removed so that it is harder to
maintain a competitive edge through the product itself. In situations like this it is customer
service that can provide the distinctive difference between one company’s offer and that of its
competitors. (Martin Christopher 1992:25)

Two factors have perhaps contributed more than anything else to the growing importance of
customer service as a corporate strategy: (Martin Christopher 1992:25)

• The continual development of customer expectations; in almost every market the
  consumer is now more demanding and sophisticated than a few years ago. Likewise, in
  industrial purchasing situations we find that buyers expect higher levels of service from
  vendors, particularly as more manufacturers convert to Just-in-time (JIT)\textsuperscript{3} manufacturing
  systems.

• The slow but inexorable transition towards ‘commodity’ type markets. By this is meant
  that the power of the ‘brand’ is diminishing, as the technologies of competing product
  ranges are increasing, thus making product differences difficult to perceive. All products
  will become more similar, at least to the average buyer.

\textsuperscript{3} ‘Just-in-time’ can be seen as a manufacturing and inventory system where no extra inventory is carried for any
activities. The arrival of Raw and Packing materials are scheduled in such a way that they arrive ‘just-in-time
for the production process. The result is that no buffer inventories are carried for any of the production
processes.
2.6.3 Customer service and Value Addition

A customer actually buys more than just a product. He buys all the benefits that are associated with it and that was involved in getting the product to him. This concept can be seen as added cost to the final product, but a slightly more expensive product in the hands of a customer is worth more to him than the same product, marginally cheaper in a warehouse. The ‘place’- utility created by the distribution function has in this case been the source of added value to the product. This can be shown in Figure 2.3.

The centre element characterizes the core product after production and ready to leave the factory. The outside frame forms the ‘value added’ to the core product by customer service and logistical functions throughout the supply chain. Different marketing elements such as packaging, advertising etc. can also add ‘perceived’ value to a product, but these elements will fall outside the scope of this chapter.
2.6.4 **Customer Service within the logistical supply chain**

While customer service has no single widely used definition, customer service is often viewed in three principle ways. These ways can be seen as the three levels of customer service involvement or awareness (Coyle, Bardi, and Langley 1996:113):

- **Customer service as an activity.** This approach treats customer service as a particular task that a firm must accomplish to satisfy the needs of a customer. Order processing, billing and invoicing, product returns and claims handling are all typical examples of this level of customer service. Customer service departments, which basically handle customer problems and complaints, also represent this level of customer service.

- **Customer service as performance measures.** This level emphasizes customer service in terms of specific performance measures, such as percentage of orders delivered on time and completeness of delivery, and the number of orders processed within acceptable time limits. Although this level enhances the first one, a firm must look beyond the performance measures themselves to ensure that its service efforts achieve actual customer satisfaction.

- **Customer service as philosophy.** This level elevates customer service to a firm-wide commitment to providing customer satisfaction through superior customer service. This view of customer service is entirely consistent with many firms’ contemporary emphasis on quality and quality management. Rather than narrowly viewing customer service as an activity or as a set of performance measures, this interpretation involves a dedication to customer service that pervades the entire firm and all of its activities.

Customer service as a philosophy broadens the role of customer service in the firm. However this still may not be sufficient unless the value-added dimension is included as the goal of the corporate customer service philosophy. The definition of customer service from the viewpoint of a logistical supply chain, can thus be seen as:

'Customer service is a process for providing competitive advantage and adding benefits to the supply chain in order to maximize the total value to the ultimate customer.'
2.6.5 **Improved Customer Service**

The level of customer service can be improved by one of the following actions: (Stock & Lambert 1993:146)

- Thoroughly researching customers’ needs;
- Setting service levels that make realistic trade-offs between revenue and expenses;
- Making use of the latest technology in order processing systems;
- Measuring and evaluating the performance of individual supply chain activities.
- Focusing on specific supply chain activities that form part of the crucial path of customer service regarding a specific product.

The most important element of customer service is that the service strategy must be based on what the customers define as service. This strategy must add the right value to the product without wasting valuable resources and prescribe the optimum level of customer service needed to retain the right customers for the company/supply chain.

2.7 **SUMMARY**

If the consumer forms the activating element in the supply chain, then it is not just company or supply chain actions that will have a direct impact on the consumer, but also that consumer and customer actions will influence the supply chain. The best product from a consumer’s point of view, is a product that has the most value for the least money. Supply chain integration can greatly add to this by shortening the supply chain network and providing a higher level of customer service, which adds to the value of the product. Although product availability can prove to be a problematic issue in a FMCG supply chain, it still forms a crucial element in adding value to the end product. Due to the structure of this industry and the long lead-times involved in the manufacturing process, it forces all the supply chain members to manage market demand in such a way to provide for constant product availability. Consumer demand needs to activate the supply chain in such a way that the right products are available at the right time and place. A forecast of future demand forms the most important link between the consumer, the customer and the manufacturing supply chain. Demand planning as the process to managing demand information, the outputs thereof and
deriving the best forecasts for the business, can greatly assist in increasing customer service and synchronizing the supply chain.

The following important observations can be made about customer service:

- If the basics of customer service are not in place, nothing else matters.
- Customers may define service differently.
- All customer accounts are not the same.
- Relationships are not one-dimensional.
- Partnership and added value can ‘lock in’ customers.

This chapter explored the importance of understanding the customer market as the basis for activating the supply chain through customer demand. It indicated that the internal structure of the customer market consists of two main influencing elements, the consumer and the customer. Each of these elements have unique needs that, together with their demand of products, will influence the way in which a supply chain must deliver to their needs. This level of customer service forms one of the basic fundamentals of supply chain management.

It also indicated that the structure and continuous changes in the FMCG industry have forced supply chains to become more active in the process of customer service to maintain a competitive advantage in the market. The customer needs to be the most important person in the whole supply chain. In fact it can be seen as placing the customer in the center of the supply chain universe. Customer demand needs to form the core of the demand planning process to ensure the best forecasts for the supply chain to deliver the best level of customer service. The next chapter will explore the dynamics of supply chain management.
REFERENCES:

CHAPTER 3: SUPPLY CHAIN MANAGEMENT

3.1 INTRODUCTION

In response to issues affecting competitiveness and customer satisfaction, many firms have begun to explore the concept of supply chain management (SCM). SCM involves the co-ordination of the flow of incoming materials, manufacturing operations, and downstream distribution in a manner that responds to changes in customer demand without creating excess inventory. This includes sourcing and procurement, production scheduling, order processing, inventory management, transportation, warehousing, and customer service. Importantly, it also embodies the information systems used to monitor up and downstream activities.

The scope of supply chain management is not limited to a single enterprise, such as a manufacturer. Instead, SCM helps people to manage the flow of material and all information from the natural resource stage all the way through to the ultimate consumer. A supply chain may thus span several enterprises, such as raw material vendors, finished goods manufacturers, distributors and retailers. SCM focuses on resolving problems that are important to the customer. It looks at the entire value chain from consumption to absorption. The objective is to be flexible, quickly supplying defect-free products up the chain, eliminating all unnecessary cost and time delays.

SCM is also a tool to achieve a sustainable competitive advantage. It supports both differentiation-based and cost-based strategies. The SCM approach contributes to world-class performance by progressing beyond functional excellence and cross-functional integration. It focuses on the practices used by the different businesses that together produce the product and service the customer. It integrates the activities of all the members of the value-added chain to produce higher levels of performance than can be achieved individually. Supply chain management practices can create supply chain integration that yields superior business performance.
This chapter will explore the concept of supply chain management in the fast moving consumer goods (FMCG) industry as a background to the integrated structure of forecasting through the supply chain. Supply chain management on its own is a very complex term due to the many interrelated functions thereof. This chapter will not attempt to analyse and define these functions, but rather to set the scene for the integrated structure of forecasting, and its positive role in the integration of the supply chain.

3.2 THE DEFINITION OF THE SUPPLY CHAIN AND SUPPLY CHAIN MANAGEMENT

3.2.1 The supply chain

A supply chain can be seen as a network of firms interacting to deliver a product or service to the end customer. It operates across functions within organisations, company boundaries, and national borders.

As shown in Figure 3.1, the supply chain generally consists of the following elements:

- Inbound suppliers: These suppliers form an input into the production process and can supply anything from raw and packaging material to certain services.
- Production process: Can be seen as the transformation process where all the inputs from the inbound side are converted into a usable product.
- Outbound Distributors and Retailers: These members are involved in the transfer process between the production unit and the customers. These channel members are normally involved in the physical distribution of finished products to provide time and place utility.
- Customers: They form the ultimate goal of the supply chain – to satisfy consumer demand. They form the activating point of the supply chain.
- Information flow: This includes all types of information flow between channel members.
The APICS dictionary (SAPICS - Ken Titmuss CFPM 1998:35-1) defines the supply chain in two ways:

- The process from the initial raw material to the ultimate consumption of the finished product, linking across supplier-user companies.
- The function within and outside a company that enables the value chain to make products and provide service to the customer.

The FMCG supply chain is characterised by relatively low priced, non-durable, consumable traded products that get consumed at a relatively fast rate. Consumers consume these products in everyday life, and there are a wide variety of these products available in the market. One of the most prominent characteristics is that there exist a number of substitutes for a specific product group under normal pricing conditions. This leads to the fact that consumers are not that loyal to a specific brand.
If their favourite brand is not available, they will buy something different. This characteristic of substitution makes this one of the most volatile and unpredictable markets.

The FMCG supply chain on the other hand is characterised by quite a few complex relationships between channel members. This makes changes in the market hard to follow. The production processes for FMCG are often of a complex nature and the lead-times for raw and packing material orders are often stretched over a few weeks. The high volatility of demand, as well as the longer lead-times throughout the supply chain, lead to large inventories all along the supply chain. These inventories make the supply chain slow to changes in the market and instant reaction is compromised.¹

It seems clear that there is a great contrast between the level of availability demanded by consumers, and the normal structure of a FMCG supply chain. Supply chain management can form a very useful tool in aligning the supply chain with customer needs and ensuring that the gap between customer demand and the channel structure of a FMCG supply chain is bridged.

3.2.1 Supply Chain Management

Supply chain management can be defined in the following way as:

‘a continuously evolving management philosophy that seeks to unify the collective productive competencies and resources of the business functions, found both within the enterprise and outside in the firm’s allied business partners located along intersecting supply channels, into a highly competitive, customer-enriching supply system focussing on the developing innovative solutions and synchronising the flow of the marketplace products, services, and information to create a unique, individualised sources of customer value.’ (SAPICS – JD Reeds CFPIM 1998:24-5)

Other definitions of the SCM process can be seen as the following:

¹ The effect of inventories on demand will be explained in chapter 5.
• ‘An integrating philosophy to manage the total flow of a distribution channel from supplier to ultimate customer’ (Cooper & Ellram, n.d);
• ‘A strategic concept that involves the understanding and managing of the sequence of activities – from supplier to customer – that add value to the product supply pipeline (Battaglia & Tyndall, n.d)
• ‘Integrative management of the sequential flow of logistical, conversion and service activities from vendors to ultimate customers necessary to produce a product efficiently and effectively’ (Stenger & Coyle n.d)

All three definitions indicate the inter-company, boundary-spanning nature of the supply chain for the purpose of managing and / or co-ordinating the flow of material from raw material through to the final product.

Another way of understanding SCM is in the words of Martin Mirsky:

‘SCM is really just changing the viewpoint from which you manage. You look at your current capabilities to deliver goods and services to your customer, while looking also at how you utilise your assets. Those assets now include your equipment, your outside suppliers and partnerships you developed. To meet customer demand, you may decide that you have to reconfigure your supply chain, whereas in the past you did the best with what you had.’

3.3 THE FMCG SUPPLY CHAIN IN GENERAL

As mentioned in chapter 2, the FMCG industry is characterised by continuous, seasonal, erratic and very unpredictable sales. This has caused a great number of inefficiencies in these supply chains and the need exists for an efficient supply chain structure to manage the problematic nature of demand in the FMCG industry.

The following section will briefly discuss general information about FMCG supply chains relevant to the structure of this study, and will build a better background to understanding supply chain synchronisation.
3.3.1 **Supply chain development**

The concept of a supply chain is reasonably new, and the development thereof can be explained with the following figures.

3.3.1.1 **Traditional approach before the concept of supply chain management:**

![Diagram of traditional approach](source)

This approach indicated in Fig. 3.2 can be summarised by the phrase – 'Each man for himself'. Each of the channel members function as a separate entity competing directly with other members in the same chain. Information was treated as confidential and formed barriers between members and the final customer that found himself isolated from the whole process. Different mixes of own and contracted transportation was used, depending on company policy, and even different hauliers were used in the same chain. There was no inventory visibility throughout the whole chain and inventory levels were high for each of the channel members. It can clearly be seen that this approach was highly ineffective and change was imminent.

3.3.1.2 **The developing supply chain:**

Supply chain theory showed that the supply chain is in fact a series of supply and demand interfaces between the different channel members. Each of these members
have different needs and agendas, and more than often, this forms the basis of quite a few supply chain inefficiencies.

Suppliers may have long lead times for some products and this forces the factory to place orders well in advance. Changes can take place, as real market demand becomes more visible over time, for a specific time period. Production plants are normally configured to produce on dedicated lines for long periods of time. This is more beneficial to their utilisation, but customers often demand something different. This can lead to over-stocks on some products and stock-outs for others. Inventory build-up is inevitable. Distribution networks are often decoupled from production plants, and are not aware of the needs and problems that occur on the inbound side of the supply chain. They normally function as a complete separate entity and can obscure demand from flowing through the system, by keeping large inventories. Trade customers often demand small and frequent deliveries from the distribution channel. They do this to keep their own working capital as low as possible, and to ensure flexibility to attend to customers' needs. This however clashes with the approach from distribution. They would prefer larger orders and deliveries due to the cost implication of small deliveries. Consumers as the end users, are not really interested in the problems that the rest of the channel members experience. They are only interested in purchasing the product they want, and will take their business somewhere else if they can not find what they are looking for.
It can clearly be seen that conflicting issues characterised the earlier supply chain structures. This echoes the need for an overall management approach that could manage the costs and get rid of the inefficiencies in the chain, to ensure that all the channel members work together as a single business unit.

3.3.1.3 The supply chain approach:

![Diagram of supply chain approach](image)

The supply chain can be seen as a network of firms interacting to deliver a product or service to the end customer. This includes all the channel members and processes, from the source of the inputs (raw and packing material) into the production process, to the final customer. Supply chain management aims to manage the total flow of products and information, to ensure the most cost effective and competitive supply chain in the market. This will ultimately lead to market leadership. This concept will be discussed further in this chapter.

3.3.1.4 Market adjusted supply chain:

Market adjusted supply chains represent supply chains that are specifically adapted to the needs of the company and the specific markets that they function in. It represents the unique way they see themselves in their part of the industry. Some of the aspects may differ from the normal supply chain theory, but these adaptations will be beneficial to their own situation.
The supply chain processes as indicated in Figure 3.5, can be described as the following: (Unilever Supply Chain Process Model – Europe Version 98.1)

- **Plan** – The process to balance aggregate demand and supply in order to develop a course of action which best meets the established business rules;
- **Source** – The process to produce goods and services to meet planned and actual demand;
- **Make** – The process to transform goods into finished state to meet planned or actual demand;
- **Deliver** – The process to provide finished goods and services to meet planned or actual demand.

This section briefly discussed some elements in the development of supply chains. Most of these changes were a result of changing elements in the supply chain environment that forced a more effective network of activities to provide better cost and service. The latest process models clearly show the importance of information transfer down the chain, as well as the up-flows of products and service.
3.3.2 The Fundamentals of Supply Chain Management

Supply chain management differs significantly from traditional material and manufacturing control in four respects (Coyle, Bardi & Langley 1996):

- It views the supply chain as a single entity rather than a relegating fragmented responsibility for various segments in the supply.
- The second distinctive feature of supply chain management flows directly from the first: It calls for, and in the end depends on, strategic decision making. Supply is a shared objective of practically every function in the chain and of particular strategic significance because of its overall impact on overall costs and market share.
- Supply chain management provides a different perspective on inventories, which are used as a balancing mechanism of last, and not first resort.
- Supply chain management requires a new approach to systems: integration, not simply interface, is the key.

In the past the supply chain was characterised by adversarial relationships with suppliers and downstream customers rather than a co-operative approach. In South Africa it is still the case even today, that companies will seek to achieve cost reductions or profit improvement at the expense of their supply chain partners. Companies with such undertakings do not realise that transferring the cost upstream or downstream does not make them any more competitive. Ultimately all costs will make their way to the final market place to be reflected in the price paid by the end user.

3.3.3 Supply Chain Characteristics

The following important characteristics (Coyle, Bardi & Langley 1996:10-11) of a supply chain can be given:

- One of the major challenges of SCM is to maintain the visibility of inventory in the entire pipeline and to strive to minimise the uncertainty that leads to building
safety-stock inventory or to non-optimal supply chain practices such as forward buying.

- The level of inventory must be co-ordinated all along the supply chain to minimise inventory investment and cost.

- Focusing on the final landed cost of the product optimises the supply chain. Landed cost refers to the final, total actual cost to the customer at the point where they are going to use it, including the initial purchase price and delivery cost, inventory cost, and other costs. Companies are accustomed to focusing upon their own inherent cost and may not be aware of how their approach to doing business with their vendors or customers affects the landed cost of the final product.

- The sharing of information is an important characteristic of any supply chain, but is still a thorny issue particularly in cases where vendors and/or channel customers may also deal with competitors of the company.

- Risk is another characteristic likely to cause concern, since a supply chain perspective requires the sharing of risk.

- Supply chain planning is becoming more popular in a number of industries, particularly in the automotive industry. Both vendors and customers have become more involved in this process.

- Joint planning has created new organisational relationships such as strategic alliances and partnerships.

If the structure of the FMCG market is taken into account, the following observations or characteristics can be mentioned about the FMCG supply chain:

- A relatively complicated chain in terms of the number and type of members. This will include inbound suppliers on a local and foreign level, production facilities all over the country, distribution centres and warehouses in key locations, as well as a wide variety of wholesale and retail stores spread across the country;

- This complicated chain is often the source of conflict between channel partners, which can include anything from communication problems, low level of agility, low level of integration, etc. right to demanding customers;

- Long procurement lead-times vs. immediate need (i.e. no product waiting times are accepted by customers) of customers and consumers;
- The need to carry inventory to bridge the production/consumption gap. This will have a great impact on the visibility and co-ordination of inventory as mentioned in the general supply chain characteristics;
- Good potential to share cost and profits in a synchronised environment;
- The need to develop in a very agile chain to adapt to changes in the market place, with the lowest level of disruption.

The most important characteristic of any supply chain is co-operation between the channel members. This is done with one aim in mind – to satisfy customer demand in the best possible way. Joint planning can have a positive effect on inventory levels that can affect working capital in a positive way throughout the chain. A highly agile supply chain can be formed with the sharing of information and risk. This will allow the supply chain to adapt to nearly any market situation.

This study views demand planning as the most crucial element to satisfy customer demand in the FMCG market. It aims to streamline the demand information flow from the customer to all the channel members in a joint planning structure, to ensure that the supply chain can in fact deliver to customer demand, without the need for large inventories.

3.3.4 Effective Supply Chain Management Requirements

In the business world where cost control and information availability form the most important elements to business efficiency, supply chain management aims to create and manage a supply chain so that it becomes the most efficient chain of activities in an industry. An effective supply chain can be seen as a chain of processes that can provide customers with the most valuable product (in terms of value added), in the quantities they need, where they need it, at the lowest cost, with the highest measure of customer service, and still be able to make the biggest profit on sales.

To be an effective player in the supply chain game, some essential requirements need to be taken into account (SAPICS - Ken Titmuss CFPIM 1998:35-3):

- The ability to maintain real-time, accurate information systems;
The ability to have a fully functional completely implemented material resource planning- (MRP) or enterprise resource planning (ERP) system in place;

The ability to recognise waste and non-value adding processes and eliminate them;

The ability to see the whole picture within one’s own supply chain with the use of distribution resource planning (DRP) and Supply Chain Planning and Optimisation tools;

The ability to partner with suppliers and consumers to achieve efficient material and information flow.

Each of these elements form an important link in the supply chain process. The free flow of information forms one of the corner stones of supply chain synchronisation, and most of these information systems can, if implemented and used correctly, add greatly to eliminate non-value adding activities. This can increase the flow of material through the system to lower overall inventory levels and streamline the management of the overall supply chain.

**3.3.5 Supply Chain Objectives**

Companies have found themselves in an increasingly competitive environment over the past two decades. This forced them to explore better options to gain a competitive advantage and increase their income, over other companies in the same market. They realised that company income can be increased by one of the following ways:

- Increased product prices;
- Increased income by market growth;
- Decreased in underlying product cost.

Increased product prices would yield a higher income if sales stay the same. But this will hardly be the case in a competitive environment. The same is true for market growth strategy. Competition in markets is so fierce that companies experience major difficulties in growing a market without spending a fortune in doing so. Decreasing product cost seemed like the best option to increase income for the company. This
went hand-in-hand with the philosophy of SCM. Integrating supply chain activities can lead to great cost savings along the chain and provide a higher valued product to the customer. This can in turn improve customer service, overall sales, company income and the competitive position of the company in the market.

Successful supply chain integration appears to be based upon achieving the following objectives (Coyle, Bardi & Langley 1996:13):

- Recognising the final customer’s service level requirements;
- Deciding where to position inventories along the supply chain and how much stock at each point;
- Developing appropriate policies and procedures for managing the supply chain as a single entity.
- Developing and streamlining information management systems along the total length of the supply chain.

The first objective is often omitted from business decisions. Final customer demand is the force that pulls inventories through the channel. Successful manufacturing firms need to identify who the customer is and what the customer wants and then co-ordinate inventory flows throughout their own locations as well as through the entire system. Customer satisfaction and service needs should form one of the main focuses during the integration process, and will form part of the ultimate goal to supply chain management – the highest level of customer service at the lowest cost.

The second objective can be seen as a recognised basic operating principle of logistics management: What, where, and how much inventory is needed to satisfy customer and cost requirements? Traditionally management practices would usually involve trying to minimise a company’s own inventories by pushing them either backwards to suppliers or forward to distributors. SCM realises that this concept might optimise a manufacturer’s cost, but definitely sub-optimises the channels cost, which ultimately will affect the manufacturer and the costing of the end product.
The third objective indicates that some type of co-ordinating mechanism should be present in the supply chain in the form of procedures and policies. This can be accomplished through the development of a comprehensive supply chain planning process that aims to set a detailed tactical / operational plan to manage the supply chain as a single entity. This process can be illustrated in Fig. 3.6:

Supply chain planning is the process where supply needs to be synchronised with demand across the supply chain. This forms a process that plans all activities throughout the supply chain, from daily replenishment schedules to long term strategic plans. This concept will not be discussed in further detail because it falls outside the scope of this study, but the concept of demand planning as part of the overall supply chain planning process, will be discussed in chapter 5.

The fourth objective is critical to the above mentioned objectives, in that communication forms the base of all the activities in a supply chain. Good information is the key to good business decisions, and proper information systems are needed to connect suppliers, manufacturers and customers to function as a single entity. Traditionally, information is regarded as confidential in a company. This new approach now requires this information to be shared with supply chain partners to try to gain a competitive advantage for the whole supply chain.

As indicated in Figure 3.7, the spread of demand information directly from the customer to each of the channel members, can greatly increase the flexibility of the
supply chain. This can be done by creating the electronic data interchange capabilities for the supply chain, and then to ensuring that each of the channel members have the right information available at the right time. This does not mean that each of the supply chain members see the same data derived from the point-of-sale, but rather that this information is used in the latest forecasts and fed through to all the relevant parties. Planning can be done in time, and all the members are aware of real market demand. Information flow between members is just as important, and information systems need to be implemented to ensure free information flow.

The overall set of characteristics and objectives for the effective supply chain management as discussed, are highly interrelated or synergistic. Nevertheless, they represent objectives for achieving the effectiveness that is needed in any supply chain structure.

3.4 SYNCHRONIZING THE SUPPLY CHAIN

The art of supply chain management is to blend appropriate practices in a way that it increases productivity and the value at all stages in the chain of activities, from source to delivery. (SCM - Robert Gumaer APICS 1997/01:47)
Supply chain synchronisation can raise customer satisfaction. It provides increased value to customers by co-ordinating activities throughout the chain reducing cost for all members and creating value by eliminating duplicate or non-value added functions. The supply chain approach recognises that customers evaluate suppliers on more than simply product attributes and availability. Value extends beyond price and includes total cost and service. Innovation can create new markets, quality will permit long-term presence, but differentiation from competition can be achieved only through a capability that increases value to customers and protect margins.

The progress and success of supply chain integration can be evaluated against the objectives of: (SCM - Robert Gumaer APICS 1997/01:47)

- **Service.** Do customers receive what they ordered, when they want it, in the manner they desire?
- **Cost.** Is the net landed cost to the end user optimised with service and time requirements?
- **Assets.** Does inventory exist within the supply chain merely to respect the variability of consumer demand, or to create operational efficiency?
- **Time.** Is the cycle time from source to delivery limited only by the physical constraints (Long distances between suppliers and production plants, type of product to be transported, etc)?

Supply chain integration can be practised in a broad range of industries. The actual techniques and practices may be tailored to specific issues and business characteristics of supplier, manufacturer, channel partner, and customers, who may all reap the benefits of supply chain integration.

Integrating supply chain management requires top management involvement. Supply chain integration may produce fundamental changes in the relationship among channel partners. This can clearly be seen in the discussion on strategic lead-time management in Chapter 6. This strategic drive will need channel members to start working together on an even closer level than before and streamline the processes and distance between channel members. In addition, a supply chain management
approach will call for a cultural change within the organization. Remaining barriers between functions must be eliminated.

Identifying opportunities for supply chain integration requires deep knowledge of customer satisfaction objectives, documentation of the existing supply chain economics, and understanding of practices used in other businesses and industries.

3.4.1 What does a synchronised supply chain look like?

A synchronised supply chain can be seen as an enterprise that derives its plans and schedules by optimising its resources to meet customer needs. These plans and schedules would be driven by business objectives and constrained solely by the capacity of the resources on the critical path, comprised only of value added activities. Synchronised plans would not just drive production, but also the entire organisation. This process extends to all the channel members and their infrastructure, so that everything needed to support a schedule would be available when and where needed, and only in the amounts needed.

Price Waterhouse Coopers (1998) defines the ultimate goal to synchronising the supply chain as:

'To create a supply chain with short cycle, synchronised components that can produce product at the customer's demand rate and replenish each forward component at the rate the customer is pulling from the system'

This statement summarises what supply chain synchronisation is about. The key elements in this definition can be seen as: (Price Waterhouse Coopers 1998)

- Pull system based production – Production is activated by demand.
- Short cycles – Short lead-time enables the supply chain to respond rapidly to changes and creates supply chain flexibility.
- Synchronised components - Lead times of each of the supply chain members are similar and in step with one another.
Reliability – Supply chain members must perform reliably and consistently to stay synchronised and to maintain performance to demand.

Visibility – Visibility of performance is necessary to maintain synchronisation, requiring real-time, accurate and specific information.

The key focus in a synchronised environment is the activity that creates direct value for the customer. Value-added activities produce the products that customers want at a price they are willing to pay. These activities must be performed with the utmost efficiency and timeliness constrained only by the capacity of the assigned resources, and optimised to meet a set of weighted objectives. All other activities should be synchronised to support these value-adding activities, making sure that anything needed to create value is available when and where it is needed. Therefore, real-time monitoring of performance is critical to enable changes in scheduling and production to meet customer demand and accommodate business fluctuations.

This new manufacturing environment provides a great contrast to today's common manufacturing practices. The order-to-delivery cycle involves many steps, no matter what type of product is manufactured. Most traditional manufacturing settings perform these steps sequentially with a great deal of queue time, missed deadlines and loss, or erroneous information along the way. Insufficient attention is paid to value-added activities. In general, most manufacturing management systems have a traditional departmental focus that do not support the notion of real-time process synchronisation, let alone the idea of enterprise or supply chain optimisation. Synchronisation is particularly important if time forms the primary asset or resource to create a competitive advantage. The cornerstone of supply chain synchronisation is a realistic schedule of manufacturing operations, the primary place where customer value is created.

One of the best ways of creating value is by integrated information management. Improved information accessibility can vastly shorten the queue times throughout the manufacturing processes, as well as throughout the entire supply chain. The shortening of order-to-delivery and procurement-to-payment cycles can improve forecasting accuracy and shorten the supply chain to an optimum level. Information
needs to be available to any of the channel members so that decisions can be taken in the shortest time possible. This will greatly improve the reactive ability of the supply chain, and will add to a more agile approach to business situations, where a company can react to a situation even before it occurs. Real-time information forms the key to supply chain integration.

Traditionally manufacturing activities can be separated into four categories:

- **Planning** - represents the periodic activities to approximate the best schedule for materials and machines;
- **Scheduling** - is the generation of an executable plan considering capacity and constraints;
- **Execution** - represents the tracking of the work and other factors of production;
- **Control** - is the application of computer technology to manage the operation of equipment used in the actual manufacturing process.

Supply chain synchronisation blurs the lines of distinction between each phase and allows each phase to occur more concurrently, rather than sequentially. The constant focus is on adding value and reducing cycle time. The planning function can now be broken down into more manageable functions. These can be distributed to the appropriate people for execution, with timely feedback to enable the appropriate degree and frequency of adjustment.

### 3.4.2 The successful implementation of supply chain synchronisation

Supply chain synchronisation closes the loop between supply and demand. It does so dynamically, in real time, and in a way that matches how the business operates. It is based on reality, not on gross, rough cut numbers. At a Gartner Group conference on supply chain management, the industry analyst firm reported that:

‘Average companies work with information averages. Winning companies work with information details, finding business value in the margins’ (SCM - Robert Gumaer APICS 1997/01:47)
According to Robert Gumaer, the key factors that play a major role in successfully synchronising the supply chain are the following (SCM - APICS 1997/01:48):

- The entire virtual supply chain organisation must execute a shared plan, optimised to meet a balanced set of business and customer objectives and considering all resource constraints.
- Plan revisions or problems with execution must immediately be identified, analysed and communicated through the organisation, and beyond, to customers and suppliers.
- Material and other resources must be managed by a real-time 'pull' to actual activities rather than the traditional periodic 'push' of infinite capacity-based schedules.

Dramatic results can be achieved with supply chain synchronisation, as shown in figure 3.8. This capability enables manufacturers to determine the exact status of orders in the system, the operation or activity that is next, whether or not any problems exist and how much time the remaining order fulfilment steps will take. Supply chain optimisation creates a hands-on approach where all activities can be controlled with ease, and the maximum value added to the final product.

Figure 3.8: Results of Supply Chain Synchronisation
Source: Developed by the author.
This figure shows that synchronisation can have two main advantages to the supply chain: Enhanced revenue and less wastage. This can be achieved all along the supply chain and involves increased agility, capacity, speed of information, stock availability and customer service. A decrease will be seen in inventory, wastage, unproductive production practices, failed orders and finally unsatisfied customers.

3.5 THE ROAD TO SUCCESSFUL SUPPLY CHAIN MANAGEMENT.

Mary Lou Fox in her article in the APICS Performance Advantage suggests that there are five stages to reaching the ideal supply chain: (SAPICS - Ken Titmuss CFPIM 1998:35-7)

In Stage 1, the focus is on quality, quality in the production process as well as in the supply chain; getting the product to the customer in good order but not necessarily on-time. The primary business challenge for companies at this level is the cost of providing this quality. The driving goals of the business are to produce dependable, consistent, on-specification products at the lowest possible cost. In this stage, each department focuses on their contribution to quality and product cost. On the information side, a great deal of time is spent on maintaining particularly implemented legacy based transaction and execution material requirements planning (MRP) type systems, in conjunction with spreadsheet planning tools.

The focus in Stage 2 is on serving the customer. Product quality and cost is a given at this stage and the emphasis shifts to ‘shipment order completed’ and ‘on time’ to satisfy customer demand. Customer service becomes the driving goal, almost at any cost. At this stage, companies are still typically organised on a functional basis but some combining could take place such as distribution and transport into logistics, or manufacturing and purchasing into operations. On the system side, a fully integrated MRP system is necessary. At this stage the company may also be using more sophisticated forecasting and distribution requirements planning (DRP) systems to effectively position finished goods in anticipation of customer demand.
Efficiency is the focus in *Stage 3*, the driving goal being high customer response with the ability to quickly deliver high quality goods and services at the lowest total delivery cost. This high responsiveness is achieved by investing in operational flexibility as well as integrating internal supply chains from the acquisition of raw materials to the delivery of the finished product to the customer. To achieve this, cross functional processes and teams commonly replace the traditional functional silo approach. Consensus forecasts intelligently combined with customer orders drive all down-stream operations planning, with the objective of delivering at the lowest total cost. Integrated enterprises at this stage have usually implemented supply chain planning and Enterprise Resource Planning systems which support due date quoting, available/capable-to-promise, and overall customer responsiveness.

The focus in *Stage 4* changes to create market value. The key here is to respond to the tailored products and services offered to the customer. Operations must be able to make-to-order for one customer, whilst finishing and/or assembling-to-order for others. Standard make-to-stock products could also have a place in companies of this type. The information technology focus in this stage is making internal systems capable of interacting with those of customers, suppliers and partners. Internet and message-based communications are utilised to achieve this key planning system implemented at this stage into consumption-driven supply chain planning. These systems integrate actual consumption data at each point in the supply chain with optimised sourcing, constraint-based dynamic supply planning and manufacturing scheduling and enable the supply chain to customise capabilities. Systems of this type enable everyone throughout the supply chain to operate from a single view of the total extended supply chain.

Market leadership is the focus of *Stage 5*. It is the point at which a consolidation of companies into supply chain communities take place. Enterprises that have not mastered supply chain operations are excluded and therefore becoming a preferred supplier is a necessary ingredient to be included in the community. In order to compete and survive in this marketplace, companies form dynamic value networks that demonstrate flexibility, speed innovation and detailed knowledge of the market. Stage 5 companies invent entirely new business processes and methodologies centred on synchronous integration of the community through common goals, objectives and
performance measurements. Real-time information broadcasts are used to link enterprises together into virtual companies. A web of Intranets and Internet is the enabling technology in this stage. In this environment, traditional transactions are replaced with network-centric commerce tools that join organisations and individuals together as networked virtual enterprises, providing the infrastructure for conducting commercial operations in real time. This is the future of business. This is the synchronised supply chain.

Companies need to determine at what stage of SCM they are currently residing. From this point they need to determine a course of action to build the best possible supply chain that suit their needs. The successful completion of this process can lead to a competitive advantage that extends into the feature if maintained.

### 3.6 CONCLUSION

In the 1960's and 1970's generic manufacturing systems development was ahead of emerging technology. Today the software technology has overtaken company technology and is providing tools that are far beyond most companies comprehension. Companies that have realised that the only constant thing in any business environment is change, will forge their way out in front of other companies, with this knowledge, leaving the rest behind.

Supply chain management assists in achieving financial and marketplace success. The integrated movement of materials through the supply chain can build customer satisfaction and improve performance. Supply chain management does not require massive scale of volume. It does require insightful thinking about the processes that are used to manufacture, move, and sell products. Functional excellence is expected of most companies today. Supply chain management moves beyond that to better align the capabilities of suppliers, manufacturers, channel members, and customers to increase customer satisfaction and yield better performance. Competitive advantage will spring largely from service-focussed commitments – the result of intelligent performance with suppliers and customers. Supply chain management provides an approach for making that objective a reality.
It can clearly be seen that the concept of SCM can vastly improve a supply chain’s competitiveness by providing better customer satisfaction. The effective management of the flows of material and information through the chain can create a network that can respond quickly to any situation and be flexible to accept change. This chapter explored the concept of SCM and focussed on the basic structure of a supply chain. This will set the scene wherein the concept of demand planning needs to function, and can, together with SCM, be used to create a competitive advantage. The following chapter will undertake a theoretical study of forecasting, focussing specifically on the different forecasting techniques.

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CHAPTER 4: THE THEORY OF FORECASTING

4.1 INTRODUCTION

Forecasting is one of the most important functions in any company, and forms an input into many critical business actions and decisions. There are many different aspects to be forecasted. For instance resources used, as a factor of production must be forecasted. Sometimes the key resources are human, making it important to forecast the required labour pool. Costs are also an important factor to forecast. If the product is manufactured and follows the experience curve, costs are somewhat more predictable than in other situations. For product managers, accurate forecasts of the rate of change in technology are critical to keep an edge on competitors. General economic conditions have an important effect on many types of businesses. In global business, currency exchange rates have a major impact on profits. Finally, one of the most important forecasts can be seen as the sales or demand forecast, that forms the basis of all operations in the company.

It is important that the fundamental basics of calculating forecasts are understood to ensure that the correct methods be used, applicable to a given situation. In essence there are many different methods of forecasting. Some of these methods are closely related to each other, while others differ considerably from each other. There is not one method that can be established as the best one, rather one that is more or less suitable for a specific company in their own unique environment.

This chapter will take a closer look at the theory of forecasting, and will explore some of the forecasting methods used in business, either individually or as part of a forecasting system. The forecast forms the core of the demand planning process and will influence the whole supply chain in some way or another. This concept will be discussed in chapter 5. In essence the fast moving consumer goods (FMCG) supply chain is driven by forecasts, due to the fact that the FMCG industry is not a ‘make-to-
order' industry, but rather one of 'make-to-stock'. This chapter will attempt only to define some of these forecasting methods used and will not be a detailed study of the statistical background to each of the methods.

4.1.1 The definition of sales forecasting

Sales forecasting concerns:

'the potential and prospective sales volume or market trend of the individual product (company) and sets a sales target in an anticipated market within the overall economy.' (Bolt 1987:81)

Sales forecasting is concerned with the potential sales volume. This implies the possible extent of the market at a particular time. It is important to determine the market share of the company to be able to use it as a measuring device for performance and effectiveness of planning. If company sales are increasing but its market share is decreasing, it could mean that the company is not taking full advantage of the existing market situation and its market opportunity. The definition further refers to the prospective sales volume and this refers to the volume a company could sell by seizing market opportunities. It also distinguishes between sales volume and market trends, the need for which can be seen when considering the different time periods of short, medium, and long term. The last part of the definition suggests that the company sales forecast simply sets a company sales goal in an anticipated market and again emphasizes the underlying interrelationships between the product, the company, the industry, and the economy.

Another approach to defining a sales forecast could be:

'an estimate of future product/service sales in volume/value over a given period of time regarding the current and prospective customers.' (Bolt: 1987:81)

1 The terms 'make-to-stock' and 'make-to-order' refer to the way that the company do business with clients due to the nature of the industry. Industries producing capital intensive products will only make items once they’re ordered, and normally imply a waiting period for the client. On the other hand, consumer goods companies will make product to stock, to bridge the gap between production and consumption in an environment where the consumer is not willing to wait for the product.
It could be argued in management terms that the forecast is merely the first step and that the sales forecast becomes a budget once it has been costed and accepted. When this happens, the budget can be defined as:

'a financial statement of forecasted revenue and expenditure over a given period of time.'

4.1.2 The Definition of demand forecasting

The terms sales forecasting and demand forecasting are seen as two sides of the same coin. Both these terms are concerned with the prediction of potential sales volume over a specific period in the future. Sales normally refer to the actual amount of product that a customer buys, while demand refers to the amount ordered by the customer. In the essence of forecasting they refer to the same thing – the amount of stock that the customer wants. This is the amount of stock that needs to be forecasted by the supply chain. The definition of demand forecasting can thus be seen as exactly the same as for sales forecasting, and this study will refer to the term demand forecasting from this point onwards.

There is however a difference between actual demand and sales, and needs to be mentioned. Actual demand can be seen as the actual order that the customer placed, for a specific amount of product. Actual sales on the other hand will refer to the actual amount of stock invoiced, and may be less than the original order, depending on stock availability. This will influence the post-forecasting evaluation and forms an important part of monitoring standards of forecasting in the supply chain. This concept will not be discussed in this study.

4.2 Types of forecasts

4.2.1 Short term forecasts.

Despite the difference in various industries, it is often possible to link the seasonal pattern of demand in an industry with its short-term period. These forecasts are
usually for periods of up to three months ahead, and as such are really of use for tactical matters such as production planning. ‘Short term’ can be seen as a period, which is long enough to allow the variable factors of production (direct labour, direct materials, existing machinery and buildings, etc.) to be used in different combinations and amounts, to ensure that the maximum profits are obtained.

It’s normally accepted that this period is too short for new capital investment to be planned, purchased and brought into the operation. These are important considerations, as any short-term sales forecast should not exceed the total productive capacity of its present equipment unless it is prepared to sub-contract or purchase outside the company. If an inflated sales forecast figure is achieved in book orders, but the production function is unable to meet these orders, the ensuing customer frustration and ill-will caused by delivery delays will only serve as an obstacle to future sales by the company.

In certain industries during a period of boom, this situation does occur and is characterized by ‘longer order books’. In such circumstances a mistaken picture of true demand, reflected in forecasts, can be built up by buyers placing orders with several suppliers merely to ensure the delivery of part of these orders. Generally, the trend of sales is less important here than short term fluctuations. (Bolt 1987:74-75)

4.2.2 Medium term forecasts.

In most industries there is a recognized business cycle in which, although the actual volume of business is either higher or lower than in the past, the pattern of business is characterized by a fairly even cyclical movement. In various industries these ‘business’ cycles ranges from two to five years and tend to be more difficult to forecast than the seasonal pattern because of the longer time period involved. (Bolt 1987:75)

Also, although on such a cycle it is probable to anticipate an increase or decrease in sales in any one period, the magnitude of fluctuations experienced tends to be much greater. These forecasts have direct implications for planners. They are of
most importance in the area of business budgeting, the starting point of which is the demand forecast. Thus, if the demand forecast is incorrect, then the whole budget is at risk. If the forecast is over-optimistic, then the company will have unsold stocks, which must be financed out of working capital. If the forecast is pessimistic, then the firm will miss out on marketing opportunities, because it is not geared to produce the extra goods required by the market. (Jobber & Lancaster 1997:335)

4.2.3 **Long term forecasts.**

The long-term forecast is usually for periods of three years upwards depending on the type of industry being considered and is the most difficult type of forecast to make with any degree of accuracy. This is mainly due to the time factor involved; obviously the longer the time period the greater the opportunity for new situations to arise and new variable factors to emerge. It is also due to the long-term influences of much wider economic impacts such as world trade, international competition, population trends, consumer behaviour, general trade cycles, technological developments, etc.

Further decisions that fall into this type of forecast is future resource planning, such as finance, buildings, plant and equipment, labour and research and development. Most of these matters are of course the concern of the ‘board of directors’, as they are of a strategic nature. (Bolt 1987:76)

4.3 **FUNCTIONS OF FORECASTS**

In addition to the functions already mentioned under each of the three types of forecasts, other functions can be directly and indirectly affected in their planning considerations as a result of the sales forecast. Such functions include the following: (Jobber & Lancaster 1997:335 and Bolt 1987:76)
4.3.1 **Forecasts answer “what if” questions.**

In considering which strategy and tactics to follow, the key information is an estimate of the outcomes of the various strategies and tactics, typically the sales and profit levels. The simplest “what if” question is *what will happen next year if everything remains as it has been in the past*, which makes the forecast basically an extrapolation.

4.3.2 **Forecasts help set budgets.**

Demand forecasts become the basis of a budget because they specify both sales levels to be attained and, by implication, the recourses needed. All pro-forma income statements are based on a demand forecast.

4.3.3 **Forecasts provide a basis for a monitoring system.**

Deviations from forecasts serve as warnings to the product management to re-examine the market and their strategy in it. Both positive and negative deviations from forecasts can lead to a better understanding of the market place through the examination of the underlying causal factors.

4.3.4 **Forecasts aid in production planning.**

With more companies and their channels moving to just-in-time production and distribution systems with low levels of inventory, accurate forecasting is becoming even more critical. There will also need to be close and speedy liaison between the production and sales department to determine customer priorities in the short term. Production also needs long term forecasts so that capital decisions can be made in order to meet anticipated sales.
4.3.5 Purchasing receives their cue to purchase from the production department.

This is done via purchase requisitions or bills of materials. However, in the case of strategic materials or long-delivery materials it is useful for purchasing to have some advance warning.

4.3.6 Manpower planning.

Personnel are interested in the sales forecast from the manpower-planning viewpoint.

4.3.7 Future research and development.

Research and development will need forecasts, although their needs will be more concerned with technological matters and not with actual projected sales figures.

4.3.8 Sales strategies and promotional plans.

Marketing needs the sales forecast so that sales strategies and promotional plans can be formulated in order to achieve the forecast sales.

4.3.9 Improving customer service.

Even though this is an indirect function of forecasting, it is one of the most important. Forecasting can improve customer service by anticipating the needs of customers and consumers in the market, and then gear the supply chain to provide these products. This links directly to the logistical functions as mentioned in chapter 1.

4.4 Forecasting methods

Forecasting methods can be either qualitative (subjective) or quantitative (objective), or a combination of both. Objective forecasts tend to be of a statistical/mathematical
nature and subjective forecasts tend to be intuitive, based on the application of experience, intelligence and judgement.

The ideal forecast is a combination of both types. It is made up of a number of individual forecasts, some objective and some subjective. The degree of emphasis on either type will depend on a number of factors. These factors will include: The type of industry; the absence of either objective or subjective data that will swing the emphasis to the other; costs in terms of time and money; insufficient experience; and informed intuition.

But even with the individual statistical forecast there is a case for subjecting it to the appraisal, judgement and intuition of practical marketing people. Mechanical forecasting by statistical researchers who are far removed from, or out of touch with, the market place, can often result in naïve projections of future sales.

The following qualitative and quantitative forecasting methods will be discussed briefly, without studying the statistical background to each of the methods. This will fall outside the scope of this study.

4.4.1 Qualitative & subjective methods of forecasting.

Qualitative and subjective methods of forecasting tend to be intuitive and are based on the application of judgement, intelligence and experience to the forecasting situation; in fact they tend to be based on deducted conclusions. This differs from quantitative methods that take only statistical data into account. The following types of subjective sales forecasts can be discussed:

4.4.1.1 Indicator assessment method:

The indicator assessment or 'balance the facts' method makes use of economic indicators. An assessment is made of the general factors, which are likely to be operating, and will affect the company in the next sales period.
The appropriate economic indicators are listed in two columns where particular economic data have been found to reflect the economic climate in a particular industry. One column will show all those indicators that are favorable towards an expansion of trade, and the other column those that indicate a contradiction of trade. The strength and effect of these indicators are assessed and a final conclusion formed and written up.

A variation of this method is to identify various appropriate indicators and send recent past data and current data to three or four interested company executives asking them to 'sort' the material into currently 'favourable' and 'unfavourable' factors in order of their importance to the company or product range.

This method can be used either to indicate some of the anticipated business activity, or to gauge the effects of various economic indicators upon the sales of a product or product range. It is a balancing technique where the statistical data approach is counter balanced by experience and judgement. (Bolt 1987:278-281)

4.4.1.2 Subjective factor assessment:

No matter whether an objective or mechanical method of forecasting was simple or highly sophisticated, its prediction should always be subjected to human judgement, intelligence, reasoning, and logic.

The forecaster being consulted is being asked for an opinion as to the credibility of the forecast and how he would adjust it. The effectiveness of this approach will be dependent on the scope of the expert’s knowledge and experience, his ability to identify relevant factors and their trends and his ability to quantify and measure the factors’ impact on the forecast. (Bolt 1987:281)

4.4.1.3 The Delphi method:

This method of subjective forecasting favours a program of questionnaires designed on a sequential basis to eliminate the traditional committee-activity system. It attempts to make use of the informed intuitive judgement of a selected group of
people, and is based on the personal expectations of each of the individuals. Therefore, it may take into account forecasting and influencing factors not being considered by other people and not included in the calculation of statistical forecasts.

A panel of experts is selected and the first questionnaire, which asks a series of questions on the likelihood of some particular event/situation/phenomenon happening, is put to them. It attempts to establish median values of the particular variable. This is summarized and, together with extreme values, is passed back to the members of the panel. The members are then asked to reconsider their previous answers and modify them if they think appropriate; those who made extreme estimates are asked to explain why such estimates were made. This procedure continues in this manner until consensus is reached. (Bolt 1987:282)

4.4.1.4 Consumer/user survey method:

This method can be referred to as the market research method, and involves asking customers what they are likely to buy for the period to be forecasted. The structure of consumer goods markets make it impossible to interview everyone, due to the sheer numbers involved. An appropriate representative sample of respondents must be approached if the eventual forecast is to be meaningful. It may involve a sample survey at two levels: the consumer's intention to buy a particular product or brand, and the wholesalers/retailer intention to stock and promote it. (Bolt 1987:283)

With industrial products the number of customers and/or potential customers may be relatively few, and sampling may not be necessary. The main problem will be to persuade customers to make such a prediction or to give enough reliable information regarding the future production, plans, future expenditure, manufacturing capacity, new product development policy, etc, so that forecasts can be made.

Survey results should not be used alone for forecasting but in conjunction with other methods.
4.4.1.5 Panels of executive opinion:

This method is sometimes called the jury method, where specialists or experts are counselled who have the knowledge of the industry being examined. These experts can also come from within the company's own structure. (Jobber & Lancaster 1997:338) Executive forecasts are evaluated, combined and averaged, and through discussion a single forecast emerges. Executives should appreciate the need for forward planning and will realize that this is based ultimately on the number of items that can be sold. If executives can be encouraged to obtain forecasting data and opinions from within their own functional areas and make a considered forecast of these, this method is in effect the distilled forecasting thinking of the company. Company policy will be known and the panel fed with basic economic and market information. (Bolt 1987:284)

One use of a panel of executive opinion is that of assessing and adjusting other forecasts based on mathematical and mechanical projections. Specialized human judgement and intelligence are used to check the credibility of objective techniques. Where forecasts have been obtained from various sources, panels of executive opinion can also be used in the final compiling stages of the forecast. Each source needs to be analysed and evaluated before opting for a final forecast.

4.4.1.6 Sales force composite:

This method involves each sales person making a product-by-product forecast of his/her particular sales territory. Individual forecasts are built up in this way to produce a company forecast. This is why this approach is sometimes called a 'grass root' approach. Each salesperson's forecast must be agreed upon with his/her area manager and the divisional manager where appropriate. Eventually the sales manager agrees to the final forecast. (Jobber & Lancaster 1997:337)

The main justification for this type of forecasting is that it is presumed that sales people have detailed knowledge of their own market. The immediate problem with the sales force composite method of sales forecasting is that when the forecast is used
for future remuneration (through the establishment of sales quotas or targets) there will be a natural tendency for salespeople to produce a pessimistic forecast. This can be alleviated to a certain extent by linking the sales expenses to the forecast as well as future remuneration. On the other hand, when remuneration is not linked to the sales forecast there is perhaps a temptation to produce an optimistic forecast in the view of what was said earlier about customers and sales people over-estimating. (Bolt 1987:285)

Other disadvantages claimed are that forecasts by salesmen are influenced by recent successes or failures, rather than by future sales opportunities.

4.4.1.7 Surveys of expert opinion:

This approach can range from buying in forecasts from consultants to running a panel made up of experts from within the company and specialists from outside, i.e. economists, marketing experts, specialist psychologists, typical customers etc. Further, the method can be of the kind where each panel member makes a forecast and never meets the other members, or where they meet as a committee and, through discussion, arrive at a composite forecast. (Bolt 1987:286)

This compiled forecast may however contain judgmental errors due to the arbitrary structure from which the final forecast is compiled. The validity of it may be questioned. In spite of these difficulties the survey of expert opinion is a useful forecasting tool, because of the individual component from which it is compiled. The range of possibilities can prove to be quite useful.

4.4.1.8 Product testing and test marketing:

Forecasts for new or modified products for which no previous sales figures exist and for which it is difficult to estimate likely demand, can prove quite a problem. This technique involves estimating likely demand for the product by testing it on a sample of the market beforehand.
Product testing involves placing the pre-production model(s) with a sample of potential users beforehand and noting their reactions to the product over a period of time by asking them to fill in a diary noting product deficiencies, how it was working, etc. (Jobber & Lancaster 1997:340)

Test marketing is perhaps of more value for forecasting purposes, and simply involves the limited launch of a product in a specific defined test area. A national launch is thus simulated in a small area obviously at less expense. However, the estimate can only cover the launch and, over time, the novelty factor of a new product might wear off.

4.4.2 Quantitative or Objective Methods of Forecasting

Quantitative forecasting techniques are sometimes termed objective or mathematical techniques in that they rely more upon mathematics and less upon judgement in their computation. These procedures are mainly based on the manipulations of historical data.

While using quantitative procedures may at times seem tedious, two major reasons encourage their use: (1) they simplify routine, repetitive situations, and (2) they force explicit statements of assumptions. When using quantitative methods, it is best to take the following supplementary steps:

- Do a sensitivity analysis;
- Examine large residuals;
- Avoid pessimistic predictions;
- Be tolerant of errors;
- Remember that you will generally miss the turning points.

The following types of quantitative forecasting techniques can be described:
4.4.2.1 Naïve Approach:

All time series forecasts rely on past data to provide a base for making projections about the future. The naïve forecast is the simplest forecast technique and is often used as a standard comparison with other procedures. It assumes that nothing is going to change and that the estimate for the future is the current level of sales. Sales can be seasonally adjusted, but this method is rather simple and does not hold much use in practical situations. (Dalrymple & Cron 1995:335)

4.4.2.2 Tied indicators and derived demand:

Published statistics can be quite scarce for some products. In such a case there may be other products, which sell in an identifiable relationship with others, and which are better documented, with readily available data.

Sales of one product may be related to the sales of other products. The latter would be termed a tied indicator and demand is derived. This relationship can be seen where products are incorporated into others. (Bolt 1987:157)

4.4.2.3 Lead and lag techniques:

One of the most popular approaches for the use of independent variables such as economic indicators is the lead/lag method. This method involves finding one or more economic indicators that tend to assume a similar pattern to the data being forecast, but which increase or decrease ahead of it. By observing movements in the leading indicator, forecasts can be made, as these movements will repeat themselves later in the lagging data. This is done ideally by the use of graphs or tables of figures.

There are many types of independent variables, such as economic indicators, that have a lead/lag effect on sales. The main advantage of this method of forecasting is in determining potential directional increases or decreases in market situations or sales. (Bolt 1987:157-158)
4.4.2.4 Moving averages:

This method averages out and smooth data in a time series. The longer the time series, the greater the smoothing will be. The principle is that one subtracts the earliest sales figure and adds the latest sales figure. The moving average method assumes that the future will be an average of past achievements.

When there is a strong trend in a time series, a moving average always lags behind; that is dampening the effect of a strong trend. However, this lag can be an advantage when sales change direction.

A crucial issue in using moving averages is in determining the ideal number of periods to include in the average. With a large number of periods, forecasts tend to react slowly, whereas a low value leads to predictions that respond more quickly to sales in a time series. A characteristic of moving averages that detracts from their ability to follow trends is that the time periods are weighed equally. This means that information from the oldest and newest periods is treated the same way in making up the forecast. (Dalrymple & Cron 1995:338)

4.4.2.5 Exponential smoothing:

This is a technique that apportions varying weights to different parts of the data from which the forecast is to be calculated. An important feature of exponential smoothing is its ability to emphasize recent information and systematically discount old information. The problem with moving averages and straightforward trend projection is that it is unable to predict a downturn and upturn in the market (unless the forecaster deliberately places a downturn or upturn in the data). In this technique, the forecaster apportions appropriate degrees of 'typicality' to different parts of a time series, and the response to up- or downturns can be immediate. (Jobber & Lancaster 1997:343)

The formula combines a portion of current sales with a discounted value of the smoothed average calculated for the previous period to give a forecast for the next
period. The major decision with exponential forecasting is selecting an appropriate value for the smoothing constant.

This method is a simple, adaptable forecasting technique that gives good tracking of historical data. Despite these merits, managers sometimes want to include variables in addition to past sales in their forecasting. In practice the technique is simple to operate, but it is essentially a computer technique.

4.4.2.6 **Time series analysis:**

This technique is useful when seasonality occurs in a data pattern. It is of particular use for fashion products and for products that respond to seasonal changes throughout the year. It can be used for cyclical changes in the longer term (like patterns of trade) but there are better techniques available for dealing with such longer-term trends. Thus its best application is where the pattern is repeated on a fairly regular annual basis. These seasonal movements are measured in terms of their deviation from the aggregate trend. (Jobber & Lancaster 1997:344)

4.4.2.7 **Z (or Zee) charts:**

This technique is merely a furtherance of the moving average technique. In addition to providing the annual total, it also shows the monthly sales and the cumulative sales. Each Z chart represents one year’s data and it is best applied using monthly sales data. As a vehicle for forecasting it provides a useful medium where sales for one year can be compared with previous years using three criteria: monthly, cumulative and annual movements. (Jobber & Lancaster 1997:346)

Moving annual sales are obtained by adding on the new month’s figure and taking off the old month’s figure, twelve months previously. The cumulative sales are obtained by adding each month to the next month, and the bottom line of the Z is the monthly sales.
This method is a comparison by sight method and in this case would be used for the medium-term (one year) sales forecast. However, as a serious method for prediction its uses are limited; its use is for comparison.

4.4.2.8 Trend projections:

The use of trends to project sales is a popular technique among business firms. With this method, the analyst estimates trends from past data and adds this figure to current sales to obtain a forecast. Trends can also be expressed as a percentage of change. The percentage of change method will however give a different sales forecast than the unit rate of change method. When sales are increasing, forecasts prepared with the percentage of sales method will normally be higher than those obtained by other projective techniques.

Where there is a strong trend in sales, a trend forecast will give lower forecasting errors than the simple naïve estimates.

4.4.2.9 Linear regression:

The simple linear regression, the relationship between sales and some independent variable, can be represented by a straight line. The key step in deriving linear regression equations is finding values for the coefficients that give the line that best fits the data. One way to determine these coefficients is to plot the data on a graph and make a freehand estimate of the line that represents the relationship between two variables. (Dalrymple & Cron 1995:340)

The simple regression forecast assumes that sales will follow a linear pattern. Although this may hold for some series, others have cyclical patterns that are hard to track. This forms the main limitation of this forecasting method. In this case, the analyst can base the equation on the logarithms of the time series data. Log transformations of nonlinear data often produce improved forecasting equations. Another problem is to know how much past data to include in the calculation of the forecast. An argument to include more past data in regression is that it will provide
greater stability to the equation. On the other hand, a short regression will do a better job of tracking changes.

4.4.2.10 Multiple regression:

With multiple regression, a computer is used to build forecasting models based on historical relationships between sales and several independent variables. Sales managers first have to find an appropriate set of independent factors that are related to the series being predicted. Some of the best variables for multiple regression equations are leading indicators, such as housing, new orders for durable goods, and contracts for plant and capital equipment. These variables have the advantage that current values can be plugged into multiple regression equations to predict the future.

If coincident factors such as income or interest rates are used, the sales manager has to prepare estimates for these variables for the time periods, which are being forecasted. Usually this means that independent variables have to be forecasted before using it in a sales prediction. Another problem with multiple regression is that a huge amount of historical data is needed, to ensure that model forecasting is correct. (Dalrymple & Cron 1995:343-344)

4.4.2.11 Turning points:

Numerical forecasting methods make projections from historical data. Almost all of these methods do a poor job of predicting turning points in a time series. Methods like the percentage rate change, unit rate change, and two-variable regression are all poor predictors of a series that changes direction. Naïve, moving average and exponential smoothing are somewhat better, but tend to lag behind, and then adapt to new information. Subjective procedures are often a better approach for the identification of turning points. These methods can pick up environmental cues that signal turning points frequently missed by numerical methods. Sometimes leading indicators can be included in multiple regression equations to predict turning points accurately. (Dalrymple & Cron 1995:344)
4.5 SELECTING FORECASTING METHODS

Factors such as cost, accuracy, need for a computer, pattern of the data, time available and company experience should be considered when selecting forecasting techniques. The time horizon of the forecast is an important selection criterion because accuracy tends to vary according to the length of the forecast. While simple and multiple regression methods work well for longer forecasts, moving average and exponential smoothing are more desirable for short-range forecasts. Dalrymple and Cron (1995:344-345) views the following factors as being very important to consider when considering forecasting techniques:

The cost of preparing sales forecasts varies from almost nothing for simple exponential smoothing to very substantial expenditures for regression techniques. The undertaking has the job of balancing low costs and simplicity of methods such as the moving average against the more expensive complex models. Forecast accuracy not only refers to the skill of a method in following data, but also to the ability to predict turning points. Many of the simpler methods do a poor job of predicting turning points, and the recognition of changes in the direction can be important in certain forecasting situations.

Accuracy is one of the most important criteria in the selection of forecasting procedures. Management expects to find the methods that work well for the type of products under its control. Research has shown that simple techniques such as naïve, moving average and exponential smoothing often have lower forecasting errors than other, more complex methods. This suggests that one should start with the basic procedures and move to more sophisticated models only when they are needed.

The existence of trend, horizontal, seasonal, or cyclical patterns in a time series also influences the choice of forecasting methods. Thus, if a series is basically horizontal, a moving average method could be used, and if it showed a trend, the regression technique might be employed. On the other hand, if seasonal or cyclical patterns were evident, regression models would be more appropriate. Historical data for business and economic series are often limited, which can restrict the choice of techniques that can be used.
Since no single forecasting technique is best for all situations, some analysts now employ several methods and take the average of these projections as their final forecast. Research shows that forecasts based on averages of several procedures have lower errors than any single-technique forecast. However, this approach forces one to balance possible improvements in accuracy against the greater cost and complexity associated with multiple forecasts.

This discussion suggests that sales forecasting techniques should be selected to fit the needs of the data, time available, the size of the budget, the length of the forecasting horizon, and the accuracy constraints. Techniques must be selected that can be sold to management. If managers cannot understand how forecasts are prepared, they are apt to reject the techniques in favor of their own judgmental forecasting methods.

4.6 GUIDING PRINCIPLES FOR FORECASTING

Figure 4.1 displays the number of principles on which market-demand forecasting can be based. Each of these guidelines can be discussed in the following section. (Stanton, Buskirk & Spiro 1991:450-453):

4.6.1 Minimize the number of market factors

In market analysis, simplicity has great value. The more factors on which an analysis is based, the more difficult it becomes to determine exactly what affects the demand for a product. Often, the inclusion of many factors in a market index only results in the duplication of a few basic forces.

4.6.2 Use sound logic

Sound logic is the basis of all good market analysis. In determining and using market factors, essentially all that is required of a market analyst is a keen logical mind. To be logical, the analyst must have a fundamentally sound background in economics and marketing theory. The art is being able to discern what statistics to collect and use, and this requires marketing acumen.
4.6.3 **Use more than one method**

The experienced market analyst uses as many of the analysis techniques as possible in order to check one against the other. The forecaster usually begins with the market-factor derivation method, using several different factors as checks against one another. Then if a correlation analysis is possible, its results are compared with the answers obtained previously. Available consumer surveys are used to check previous results. The market analyst can have more confidence in the results if all the estimates of the market potential reasonably agree with one another, than if they vary widely.
4.6.4 Recognize the limitations of the situation

Each situation is different. Some firms compete in well-established, stable industries for which excellent historical and current data are already available. Other firms try to sell in markets about which little is known and for which scant data is available. Moreover, small businesses seldom have the research capabilities and the people that large concerns have at their disposal.

4.6.5 Use the minimum-maximum technique

Sound research strategy dictates the use of both minimum and maximum estimates in all computations in order to obtain a range of variations. Analysts should work up one set of estimates that assumes the worst possible developments in each of the calculations. In doing this they compute the lowest probable potential market for the product. At the same time, they should estimate what the market potential would be should all things be favorable. They also may prepare other estimates, each based on varying assumptions between two extremes.

4.6.6 Understand Mathematics and Statistics

The determination of market and sales potentials is not for the statistically and mathematically uninformed. A logistics manager should be sufficiently acquainted with statistical techniques to recognize any serious errors in the material presented. The executive with little knowledge of statistics is at the mercy of a statistician and often cannot perceive discrepancies or errors.

4.7 CONCLUSION

Forecasting is one of the most important functions in any company, and a critical input into the production planning process. It is also an input to aspects of the marketing strategy such as the objectives and strategies. Forecasts form the core of the demand planning process and activate the supply chain to act on perceived customer demand, to provide products to consumers when they need it. When forecasts are
substantially off on the high side, objectives are over ambitious, inventories are too large, and senior managers, production personnel, and channel members become upset. When the forecast is much lower than actual, the losses are opportunity costs: lost sales. The company’s demand forecast is closely related to the market potential of the products or services it perceives the market will demand on a specific future date. It is thus of vital importance that the forecasting process starts with understanding the firm’s market and sales potential.

Most forecasting techniques rely on historical data that is processed in some way in order to anticipate the future. The real basis of forecasting rests on a careful analysis of the internal and external environment in which the company operates. The analysis of market factors is extremely important, and connects directly with consumer needs. The determination of market factors depends on a perceptive analysis of the consumer or user of the product.

The best forecasts will require the best forecasting techniques to be used. The methods described in this chapter represent the basic methods used in the forecasting process. The description of each of the methods indicated the different ways of calculating forecasts, as well as the information that each method needs. Most of these methods are not used in isolation in the FMCG industry, but are compiled into electronic forecasting packages that use the methods in combination to suit the supply chain’s situation and needs. These packages take into account the unstable nature of this industry and may provide a solution to the forecasting problem. However, it needs to be kept in mind that forecasts are never accurate, and that the structure and level of integration of the supply chain will influence the usefulness of forecasts.

This chapter served as a general background to the theory of forecasting methods used in the forecasting process. In essence, all forecasts have the same historical building blocks and one needs to understand how different forecasting methods use this data to derive a forecast. The next chapter will focus on the forecasting process called ‘Demand Planning’, and will study the management of information that is used in a forecasting techniques or packages, as well as managing the outputs.
References:

CHAPTER 5: DEMAND PLANNING AS AN INTEGRATED ELEMENT OF SUPPLY CHAIN MANAGEMENT

5.1 INTRODUCTION

To succeed, every company must plan, execute, and control its operations. Planning helps one make decisions about implementing programs to achieve the company's sales and profit objectives. Planning mostly relies on forecasts. With regard to inventory, planning decisions are orientated toward deciding what is needed, where it is needed, how much is needed, and when it is needed. Based on this information the decision must be made whether to buy or manufacture more products.

Company actions are assumed to be predictable or at least under the control of the product manager, although decisions such as pricing and advertising may be taken in other parts of the company. In contrast, customer and competitors' actions are part of the background assessment. The general environment consists of such elements as the state of the economy, key industries in it, demographic changes in the population and costs of basic resources.

As mentioned before, there are many things to be forecasted in and outside of a company and the supply chain environment. This includes elements such as company resources, costs, technology, general economic conditions, exchange rates, and most importantly, sales or demand. Forecasts are important to all business decisions. The short, medium, and long-term periods all have some relevance to some business functions. In the absence of reasonably accurate forecasting, where such plans are not based on a solid foundation, business decisions will have to be modified later as sales turn out to be wide of those predicted in the sales forecast.

This chapter will focus on the concept of 'Demand Planning', and how this process manages all demand information as being the activating factor of the supply chain and its members to strive towards optimal customer service. The discussion will focus on
the forecasting process and the importance of ensuring that consumer demand gets communicated throughout the supply chain.

### 5.2 DEMAND PLANNING

Consumers and customers have grown accustomed not to have to wait. If the goods they require are not in stock or unavailable at short notice, they will go elsewhere. Consequently, their requirements have to be anticipated and most of all manufacturing and distribution operations have to be complete before their orders are received. It follows that the driving force behind a company’s operations is a demand forecast. Without a forecast there is no basis on which to determine what to stock, what to ship, or what to manufacture.

It is becoming a crucial necessity to create a demand driven supply chain through an integrated demand planning process, to enable compliance with consumer and customer demand in a highly competitive environment. The nature of competition, the low level of supply chain integration and the lack of an efficient demand planning process in fast moving consumer goods (FMCG) supply chains can create high cost gaps in supply chain capacity. These elements are displayed in figure 5.1. These costs are normally associated with lost sales, higher inventories throughout the supply chain, and being unable to use idle supply chain capacity, and are all caused by a combination of the lack of supply chain synchronization and poor demand forecasting. These elements create complications for efficient communication and longer lead-times for stock, information and supply chain agility.

These inefficiencies can cause a company not to be competitive enough in a demanding market. To be effective, all of the supply chain members need a process that can: (Coopers & Lybrand 1998)

- Accurately communicate volatile demand;
- Send timely signals to the supply chain;
- Communicate supply chain constraints;
- Support cost-effective service;
5.2.1 The definition of demand planning

Demand planning from a marketing-demand perspective can be seen as:

'getting closer to the market to understand the needs of the customer base, both existing and potential customers. This whole process will clearly facilitate an improved knowledge of, and ability to forecast, demand.' (SAPICS – GL Schlegel CPIM 1998:9-1)

If this definition is re-worked to reflect the viewpoint from the supply chain, demand planning can be defined as:

- 'the process of managing all sources of demand information,
- that is needed to power the forecasting system, the forecasting process, and the outputs of this process,
- to derive an accurate forecast,
- for all business processes,
- to enable the supply chain to get as close to the customer as possible,
Demand planning can be divided into two sub processes, namely 'Demand Management' and 'Demand Communication', that focuses on forecasting and the interpretation of the results thereof. These two processes will be discussed throughout the course of this chapter.

5.3 COMPONENTS OF A FORECASTING PROCESS

The following components form a part of a forecasting process (AJ Martin 1993:171):

- Statistical component
- Management interaction component
- Feedback component
- Information organization component.
5.3.1 Statistical Component

This component makes use of mathematics and statistics to derive a forecast for the future, from historical data. This can be done by using quantitative or objective methods to manipulate historical data, as discussed in chapter 4. This approach assumes that what has happened in the past will help forecast what will happen in the future, but this may not be the case. Quite often situations arise that can not be forecasted out of historical data, and this type of approach can prove to be of limited value.

One way of determining the best database structure or forecasting model compiled out of historical data, is to use the concept of 'Focus Forecasting'. (AJ Martin 1993:171) Focus forecasting is a simulation approach to forecasting. It takes advantage of computing capabilities that did not exist until very recently. The system tries many different models, and then selects the best one - the one that would do the best job of predicting what has already occurred. Examples of focus forecasting can be the following:

- Whatever we sold during the last quarter is what we will sell during the next quarter.
- Whatever we sold last year during the next quarter will be what we will sell this year during the coming quarter.
- Whatever the average was during the last two quarters is what we will sell during the coming quarter.

Focus forecasting uses each strategy to simulate what it would have predicted to occur. In other words, if this model has been used, how well would it have performed? It keeps track of the model that comes the closest to what actually occurred. It then recommends that a specific model should be used as the basis for forecasting. This type of approach can be followed by most forecasting software packages.
5.3.2 Management interaction component

The real business world almost always changes too quickly to be able to rely solely on statistical forecasts. In this case, the statistical forecast needs to be combined with consensus input from numerous business people. This forms one of the best and most sensible approaches to deriving a forecast.

Marketing often implements new programs to gain more market share for average performing products. A statistical forecasting module will not be able to predict future sales, because the historical database used will not have the influence of such a program built into it. It will continue to forecast at the usual level of business as indicated by history. Marketing management must therefore notify the rest of the organization about the anticipated impact of their program on their activities. Without their interaction there will probably not be enough product stock for the program to succeed.

An important element in this management interaction component is market intelligence. Marketing intelligence can be seen as the information provided by category management about promotions and other programs designed to influence the prevailing level of business, or simply as anything that can improve the forecast. (AJ Martin 1993:176 and Coopers & Lybrand 1998) This normally involves the gathering and evaluation of market information, interpreting it to ensure the correct action, and then updating the forecast with this information. Practical examples of market intelligence can be the following (Coopers & Lybrand 1998):

- General elements:
  - Competitors
  - Economic conditions
  - Legislation

- Pipeline stock:
  - Once-off demand to fill pipeline
  - Demand from intermediate stock policies
- Lumpy demand from intermediate batching

- Introduction of new products:
  - New products
  - Impact on existing products

The forecasting system must be provided with the impact of the planned promotions and programs. Listed below are factors to consider when predicting the impacts of promotions (AJ Martin 1993:177):

- Expected magnitude of increase in demand for products being promoted;
- Length of the promotional period;
- Impact on the items being promoted before the promotion begins. In other words, if customers know in advance about the promotion, how will this impact demand before the promotion period begins;
- Impact on the items promoted after the promotion ends. In other words, have customers bought before they really needed the product because of the promotion? If so, how long will it be before they buy again;
- Impact on complementary products;
- Impact on competitive products. If only one specific product is being promoted, it is likely that the sales of competing products may decline during the promotion.

Forecasting volumes for a new product may seem problematic in the beginning. Fortunately, in almost all cases, a forecast for an existing but similar product can be modified to suit the new product's characteristics. The forecast can then be adjusted according to actual sales and the patterns emerging from it.

5.3.3 Feedback Component

This is probably the most important part of the forecasting process. A forecast needs to be controlled and measured to set standards to ensure that the forecasting process is under control. Feedback helps to determine when the forecasting process is out of control, and signals when appropriate action should be taken to regain the control of
the system. It is extremely useful to build a history of forecasting accuracy and the reasons why errors actually occurred. Statistical forecast can then be manipulated by management interaction if a trend in forecast errors occur. This can improve forecast accuracy in turn.

The feedback component needs to ensure that a detailed history of the original forecast and the market intelligence that affected the forecast is kept. Any changes need to be monitored and explained in detail, so that referrals can be made back to the situation if needed. The accuracy of the market intelligence needs to be monitored and compared to the historical forecast and the average rate of sale. Demand variability needs to be monitored so that a bias information is available to establish over or under forecasts. It is also important to record exceptional situations where a high level of success or failure was achieved. This can help to recreate a procedure or prevent the occurrence of a bad forecast. All this information becomes a necessity in the evaluation and improvement of the forecasting procedure.

5.3.4 Information organization component

After all the forecasting information has been gathered and a forecast compiled, it needs to be organized into a usable format for each of the channel members. This process is normally handled by a computerized forecasting- or ‘Enterprise Resource Planning’ system that reworks the original forecast from consumer demand, to a production plan, and then into a raw- and packaging material plan for the different suppliers. This component also includes the communication of any changes in demand during a forecasting cycle. Real-time information is extremely important to ensure that the supply chain stays as agile as possible, and business decisions can be based on the latest information.

Each of these elements form a critical part of the forecasting process and must be included to ensure that the best forecast is derived. Demand planning aims to extend these components into a process that can cover the issue of compiling and communicating demand throughout the supply chain.
5.4 DEMAND COMMUNICATION

Much of the success of enterprise planning and decision-making processes depends on the formulation of accurate forecasts. Forecasting permits firms to establish performance measurements for customer service, plan the level of total inventory investment, choose between alternative operating strategies, and develop assumptions about the ability of the business to respond to the future needs of the market place. Effective forecasts can dramatically improve the supply chain's profitability, productivity, and customer service, and ensure a firm's competitive advantage. Finally, good forecasting assists distribution enterprise functions by eliminating waste in the form of excess inventory, reducing lost sales and expensive expediting, and controlling costs involved in maintaining plant size, labour, equipment, and transportation. (D.F. Ross 1996:118)

In the past, many enterprises could be characterized as having not one but several forecasts, each reflecting the narrow operational objectives of each functional business area. Sometimes forecasts can be out of alignment with each other, projecting different sets of data and performance measurement criteria, depending on departmental goals. Today, 'world-class' distributors conceive of forecasting as an integrative and interactive process whereby the strategic goals of the enterprise are formulated and then desegregated down through the organization. As the forecast unfolds through time, data concerning actual activity is then passed back up the organization for forecast revision and further desegregation. The objective of the whole process is to ensure that each business function is planning the resources and capacities necessary to realize the overall business strategy. (SAPICS - Derek Roux 1998)

5.4.1 Definition of Demand Communication

Demand Communication involves the initial stages of identifying, collecting, understanding and communication of demand information. (Figure 5.3) This all forms part of the forecasting process where information is collected from various sources, a forecast made from historical information and information added about planned promotional activity. The goal to demand communication is to understand
and communicate demand throughout the supply chain to enable the effective and
efficient meeting of consumer and customer requirements. This involves
communication in both the business directions, consumer to suppliers, and vice versa,
to include demand components, the character thereof and the understanding of the
supply chain's capabilities in terms of this demand.

One of the reasons for forecasting can be to enhance both the demand and supply side
of the business ledger (SAPICS – GL Schlegel CPIM 1998:9-1). On the demand side,
the forecasting approach will be:

- One forecast of demand that will drive the supply side;
- A 'what-if' tool for sales and marketing to assess outcomes due to price changes,
  promotional events and new product introductions, before the organisation
  commits resources;

On the supply side, the forecasting approach can attempt to:
• Increase inventory turnover;
• Standardise the inventory/planning process;

5.4.2 Forecasting – an overview

Forecasting is a necessity because of uncertainty about the future. Mathematical models can be developed that calculate the outcome of any occurrence in a theoretical world where patterns are perfect and relationships are exact. In the business world, however, a similar degree of predictability cannot be achieved. To begin with, instead of mathematically calculable factors, randomness and endless variations mark the world of human affairs. Patterns and relationships change, often dramatically. (D.F. Ross 1996:120) Therefore, instead of a process that will produce exact calculations that will be readily applied in management decision making, it will be better to begin with an understanding of the limitations and uncertainties that reside at the core of forecasting.

Plossl (1985:62) feels that managers must realize that forecasts will always be subject to error and that, although there are techniques available to improve forecasting accuracy, the amount of effort expected soon reaches a point of diminishing returns. Beyond this point, it is better to concentrate more on coping with forecast error than on developing additional forecasting models. He goes on to state the general characteristics of forecasting as:

• Forecasts will be wrong.
• Forecasts are most useful with an estimate of error.
• Forecasts are more accurate the larger the statistical population.
• Forecasts are more accurate for shorter periods of time.

5.4.3 Common Complaints about Forecasting

There are many companies and supply chains that do not use forecasting in the proper manner. Most of these companies and supply chains have a bad record of forecasting,
and these are some of the common complaints/problems that can be listed about forecasting (AJ Martin 1993:161):

- There is a total lack of integration. Everybody uses a different forecast. The results are not even close to being consistent;
- Nobody is held accountable for forecast accuracy;
- Everybody is focussing on the statistical techniques instead of the forecast process;
- Forecast accuracy varies from 'just poor' to simply 'terrible'. Since no feedback loop exists, however, no one really has an idea of how good or bad the forecasts are;
- Systems do not provide easy ways for a person to provide intelligence to the forecast at meaningful levels;
- Nobody understands the underlying statistical methodology;
- Business in general is promotion-orientated. No system can help for this approach;
- Demand cannot even be captured – so there is no way a forecast can be made;
- There are a number of phase-ins and phase-outs. Therefore, enough history cannot be collected to have a reasonable forecast.

The nature of the problems above can be summarized as:

- There are too many forecasts, and none of them are any good.
- Feedback and accountability are lacking.
- Proper inputs are lacking.

5.4.4 Developing the Forecast

In developing forecasts managers must perform the following steps (AJ Martin 1993):

- Define the purpose of the forecast;
- Select the appropriate forecasting models;
- Prepare the statistical components;
- Ensure the interaction of the firm's functional managers;
• Execute the forecast;
• Track and maintain the forecast through timely and accurate feedback.

Makridakis and Wheelright have defined six characteristics or dimensions that play a critical role in determining the requirements necessary to establish effective forecasting (Makridakis & Wheelright 1989:26-28). A short description of each follows:

• **Time Horizon.** In formulating business plans, managers must forecast the probable course of events that might occur over varying lengths of time. In formulating forecasts to effectively guide the planning process, forecasters must consider planning horizons and the appropriate forecasting technique to be applied at each level.

• **Level of Aggregate Detail.** Forecasts are used in the development of business, marketing, sales, logistics, and detailed inventory plans. Each forecastable area differs in two regards: the methods employed and the level of detail required. As forecasters move from the general to the specific, the level of forecast detail correspondingly moves from a concern with aggregate data to gross detail. In selecting the appropriate forecast for a specific plan, managers must be aware of the level of detail required for that forecast.

• **Size of the Forecastable Database.** The number of elements in a forecastable population will have a direct impact on the forecasting methods employed. In general, as the number of occurrences increases, the more valid the statistical mean. Conversely, the smaller the size of the data to be used in a forecast, the more complex must be the forecasting technique if variation is to be smoother and accounted for.

• **Forecasting Control.** When forecasting some occurrences, managers may wish to utilize a method that renders accurate and timely feedback to permit management control. The method must indicate when the actual events have moved beyond a predetermined boundary and allow the alteration to adjust to the basic patterns or relationships. The objective is to provide forecasters with management controls to ensure that business forecast decisions are being made that are in alignment with actual events.
• **Constancy.** Forecasting events or relationships of events that exhibit great stability over time is quite different from calculating the future of occurrences that demonstrate a wide range of variation. The principle underlying this dimension is simply that the more random variation that occurs in the forecast, the more the weight recent events and patterns must have in forecast adjustment.

• **Existing Planning Procedures.** Instituting a forecasting method is a critical management decision that must reflect the objectives of the enterprise. Forecasting methods should be chosen that support the firm’s planning and decision-makings processes, as well as enhance and improve upon existing operational norms.

### 5.4.5 Selecting Forecasting Techniques

Choosing the proper technique(s) is perhaps the most critical stage in the forecasting process. Most of the conventional forecasting techniques have been discussed in the previous chapter, and the best technique or forecasting package will depend on the company using it. According to D.F. Ross (1996) and A.H. Lines (1996), the chosen technique needs to consist of the following elements:

• **System Dynamics.** The first stage in forecasting technique selection is to determine the dynamics and components of the business system elements to be forecasted. This can be attained by clarifying the relationships of the different elements of the enterprise, such as the marketing and sales system, the procurement system, the distribution system, and so on. The enterprise forecasting system that is constructed should indicate where input is controlled by the company and where the input is in the control of external forces.

• **Time Horizon.** Selection of the proper time horizon is critical in the determination of the length of time to be considered by the forecast. Generally, qualitative methods are employed to calculate long-range forecasts, and quantitative methods are employed to calculate medium- to short-range forecasts. In addition, the data of the proposed forecast is also affected by the time horizon to be used. The timespan of a forecast is determined by two separate component times, namely the lead time and the decision review interval. The lead time in this case can be seen
as the time it takes from making the decision to realizing it, and the decision review interval as the time that must elapse between successive opportunities to review and alter the decision. In the case of an inventory system it is the time between the successive opportunities to place purchase or production orders. It is necessary to keep these two times in mind when deciding on the timespan of a forecast.

- **Data.** In selecting forecasting techniques, forecasters must understand the nature of the data required and the availability and accuracy of that data in the organization. Fundamental to the appropriateness of the data is understanding the kinds of patterns found in the existing data. Some data, for example, may exhibit an average value with a fairly random variation; on the other hand, other data may contain a historical trend or seasonal demand. Other data may consist of a combination of these patterns.

- **Level of detail.** The level of detail can be closely related to the timespan and the nature of the data required. The level of detail indicated is quite important, especially in a product range with different sizes, flavors etc. under one brand name.

- **Cost.** The utility of the forecast is reflected in the quality of the decisions based on a simple correlation of forecast cost and the value of the forecasted decision. In general, the shorter the range of the forecast, the more low-cost forecast techniques should be used, with the more costly methods reserved for long-range forecasts.

- **Accuracy.** Besides appropriateness, the data used must be accurate if forecast output is to be meaningful. Before a particular technique can be selected, forecasters must understand how the data has been obtained, verified and recorded. To ensure accuracy, forecasters must employ tools that control errors and provide for appropriate adjustment of nonrecurring events.

- **Ease of use and simplicity.** As a forecast is a science, many practitioners make the mistake of overcomplicating their forecasts by trying to use complex mathematical formulas to solve relative simple business problems

After choosing a forecasting technique that suits the company’s conditions the best, a forecast needs to be derived. There are however a few very important elements that
need to reviewed or kept in mind when a forecast is prepared. Some of these issues will be discussed in the following section.

5.5 **HOW MANY FORECASTS ARE NEEDED?**

Typically, an organization has multiple forecasts due to different company needs, but it needs to be stressed that only one forecast is needed. It is difficult enough to get a single all-embracing forecast. Existing forecasts are most of the time not at the right level and this results in irreconcilable differences such as not believing another’s forecast. Each group derives their own forecast because they can not use another group’s forecast.

Each group should be able to look at forecast information with a unique eye. Even so, there must only be one forecast. It can be derived from the top down, from the bottom up, or from a combination of the two, extend it and display it any way that is necessary. But only one forecast must be derived. If not, the accountability for the forecast will be a charade. In addition, it will be practically impossible to arrive at the same destination at the same time, as different functions will be aiming at different objectives. (AJ Martin 1993:161)

5.5.1 **Forecasting inputs**

Lack of proper inputs is a major reason why many forecasting systems fail to achieve potential. This section explains the proper inputs and contrasts them with the traditional ones.

5.5.1.1 **Importance**

Good statistical forecasts can minimize the demand planners’ efforts in reviewing forecasts. This is especially true for low, medium, and high-volume products sold to a broad customer base. The best results will be achieved if the history on which the statistical forecasts are based, reflects reality. If not, the demand planners will spend a disproportionate amount of time reviewing and fixing forecasts. (AJ Martin 1993:166)
5.5.1.2 Problems with historical data

Major forecasting problems are often caused by the fact that the quality of historical data is suspect. Historical data is commonly used as the source for statistical forecasting and is the basis for interaction. The reason for this is that an organization seldom achieves a 100 percent level of service. This causes past sales not to reflect the true demand for a product. It is not difficult to imagine that very different forecasts would be derived depending upon which set of numbers formed the basis – actual sales or orders received.

The capturing of actual demand is a problem for many businesses. Quite a few problems can occur. For example, during extended periods when products are out of stock, some customers may re-order the same product several times until they have received it. Even cancellations can cause quite a few problems. Did a customer really intend to buy from your company, or was he simply shopping for prices? If he was, then it would make sense not to include his order into demand. If he cancelled because you could not serve him, it probably should be included.

Another factor that can distort the input data is the length of the month. For example, demand history is typically collected in monthly increments. Likewise, forecasts are usually derived for monthly increments. Not considering differences in the number of sales days in each month can be quite misleading to the statistical model. And the resulting forecasts may be seriously distorted. (AJ Martin 1993:168)

It can clearly be seen that building a history database to derive future forecasts from, can pose quite a few problems during the collection of historical data. It is of vital importance that the correct data is captured to ensure that future forecasts are error free and more useful to the company. It will prevent the continuous adjustment of the final forecast. A decision needs to be taken by management about the handling of these issues, and will relate to the structure of the supply chain.
5.5.1.3 Impact of promotions on demand history

Promotions are another factor that can distort demand history. Under most circumstances, a statistical forecast should only be used to forecast regular business. Management interaction, rather than statistics, should be used to communicate the impact of promotions. The basis of statistical forecasts should reflect only regular business. That is the reason that the forecasting system should store at least two separate kinds of demand history — one that contains regular demand and one that allows you to specify what you want to contain. (AJ Martin 1993:161) A baseline forecast should be derived from the average running rate, taking into account the specific trends in the data. Thereafter, the influence of the promotions, either via market intelligence or trends according to the unfiltered history data bank, should be taken into account and added or modified to be included in the base forecast.

When the formal forecasting process starts, the quality of the demand information might be suspect: Shipments can be collected instead of history, history may be effected by promotions, etc. Unfortunately there is not much that can be done about this. With time most of these problems can be sorted out.

5.5.2 General Guidelines

The following recommended guidelines can be followed for the building of a history database for forecasting, as mentioned by Andre J. Martin (1993:170):

- Keep as much history about demand for a product as feasible. Two years should be the minimum.
- To save space, store information about detailed demand (product/distribution centre/customer) somewhere other than the forecasting system itself. This information will allow reconfiguring of the demand-history database when necessary.
- Store at least two different forecasts for each month: the one resulting from the statistical model or focus forecast, and the other resulting from any management interaction. Meaningful comparisons can be made if necessary.
• Forecasts should be calculated over at least an 18-month horizon. This will cover most long lead-time products and it is also a long enough period to assist the budgeting process. Budgeting should not be overlooked because it is an important part of closing the operations/finance loop.

• Finally the forecast should correspond to a monthly increment. It should be updated using statistics or focus forecasting only once per month unless it is a high-fashion item. Intelligence should be added to the forecasts as needed.

5.6  HANDLING PRODUCT COMPLEXITY

One of the main characteristics to the FMCG market is that delivery times to the trade are short and product ranges are wide. Wider product ranges are used as a strategy to increase demand. Demand however rarely increases in the same proportion to increased product variety. Few producers are able to produce directly to consumer demand and a high level of customer service can only be maintained if product is supplied out of stock. To improve supply chain efficiency, producers need to forecast future demand to enable them to lower inventory levels and maintain the same level of service. This can only be done by involving suppliers and the trade under one roof to improve supply chain performance. (Holmström 1998) This can be seen as part of the Efficient Consumer Response (ECR) strategy, and will be discussed in Chapter 6.

5.6.1  Analysing the demand forecasting unit

An important issue in the demand planning process is the determination of the right level at which the forecast should be created. This is normally done in a top-down or a bottom-up level of creation. In the top-down approach, forecasts are created at a high level in the forecast information matrix and allocated down to lower levels (e.g. forecast done at a brand level and allocated down to a stock-keeping-unit (SKU) level). Conversely, a bottom-up process creates forecasts at a lower level and adds it up to produce a higher level forecast. It is important that the general business needs are taken into account when the right level of forecasting is considered. Short term forecasts are generally best produced at lower levels in the forecasting matrix, but
long-term strategic forecasts would be better at a higher level. Another important element that will also determine the level of forecasting, will be the availability of information at the different levels of forecasting.

As mentioned, wider product ranges make it hard to forecast on a SKU level and can create certain problems in the approach to forecasting. The conventional approach to forecasting product demand is based on defining a demand forecasting unit (DFU). Historical demand needs to be analysed for this grouping, to determine averages, trends and seasonal demand components. The DFU is defined by the:

- Demand unit – the level of aggregation for the product, usually a stock keeping unit, product dimensions, ingredients or brand name;
- Demand group – Level of aggregation for the consumer and can be total market, wholesale groupings, retail chains or geographical groupings.

The main problem in this case is to find the right level of aggregation of demand for the product, customer and time dimensions of the forecasting process, and it is important for the following two reasons (Holmström 1998):

- The forecast does not automatically get more accurate by increasing the level of detail for product and customer dimensions. Total demand is normally more reliable as a forecast than demand for a specific product or group of customers. The reason is that the optimism or pessimism of the forecaster is easily built into each product forecast and can create a very significant error on the aggregate level. (Shearer 1994)
- The second problem can be seen as the forecasting demand period. This implies that, in a competitive market, frequent forecasts are a necessity, and it becomes more tempting to forecast for shorter periods of time. With a high resolution of individual items it can lead to anticipating individual transactions.

One of the disadvantages of the DFU approach is that that forecasting operation must be repeated for each DFU. There are no attempts to take advantage of the relationships between individual demand units within the product range. Results also
have to be reviewed individually for each DFU. Forecasting on a unit level is very
time-consuming in a complex market, regardless of the level of aggregation that is
used. This shows that conventional approaches to demand forecasting are not that
practical anymore in a situation where increasing co-operation in the supply chain
gives producers access to end consumer demand data. There is a strong need to link
category management with supply chain management, and without this it will be
difficult to learn and improve the forecasting process and its inputs.

5.6.2 Account based forecasting at Nabisco Biscuit Company

This case study will attempt to indicate how the Nabisco biscuit company coped with
the problem of using a certain level of aggregation for forecasting in the FMCG
industry. It needs to be kept in mind that the approach will differ from supply chain
to supply chain depending on the specific market situation that it operates in. This
article was published in the Journal of Business Forecasting by M. Barash & D.H.
Mitchell (1999), and will be represented from their viewpoint.

Nabisco recognized that due to the advent of flexible trade programs, their traditional
approach to forecasting had limited value. The new focus was on creating a new
forecasting approach that build upon key account promotional plans to create the
distribution center forecast.

5.6.2.1 The forecasting process before account based forecasting

Nabisco employs a top-down methodology to develop the distribution forecast, and
starts with a national production forecast by product over a week sales period. The
national forecast incorporates information from marketing and finance areas and from
the national schedule of trade promotions. This forecast is then allocated to a
distribution center (DC) level by week to create the initialized distribution product
forecast. This allocation process uses a statistical model based on DC level sales
history and the standard trade promotion calendar. The management of each DC will
then review the forecast and has the option to override the initial forecast based on
their knowledge of market activities.
5.6.2.2 Reasons for a new forecasting approach

One of the major reasons for the new forecasting process was that the standard trade promotional calendar that the forecasting process used to determine the timing of promotions had become of limited use. This was due to two fundamental changes in the business environment:

- The first change was the advent of flexible trade programs. Nabisco, in response to the growing power of the retailers, began providing greater flexibility in its promotional offerings. Any Nabisco account can customize the standard promotional calendar in both the timing and the terms of the promotional event. The result is that the demand volatility in the market is no longer driven by the trade promotional calendar, but rather by the major accounts of that market.
- The second change was the emergence of everyday low pricing strategies through the mass merchandisers and the warehouse club trade channels.

Together these business changes limited the usefulness of the forecast initialization process that could not incorporate any local market conditions and account specific promotions.

5.6.2.3 Opportunity for a new process

A big advantage for the new approach was that Nabisco built a formal promotional planning process to manage the account-specific flexible trade programs. Account managers used this process to create promotional events tailored to the account-specific goals and programs. Central to this new planning process was a computer based trade planning tool that incorporated account-specific sales information, and suggested sales levels based on the merchandising conditions of the event. This system could provide the critical element of promotional timing to the account-specific needs of forecasting.
5.6.2.4 The account based forecasting process (ABF)

The ABF process can be divided into the following steps:

- Creating the weekly account forecast: The process begins with creating an account baseline forecast that represents non-promotional sales, and a six-month moving average of weekly non-promotional shipments is created for all account authorized products. For promotional sales volume, it was agreed that the Account Planning System should have only non-event volume and does not include the baseline volume. The promotional forecast for the accounts is created separately. The ABF promotional model first determines the duration of the event in the weeks from the start to end dates and the total promotional volume is then allocated evenly to the weeks, creating an initial event week promotional forecast. After each of these forecasts has been completed, they are combined. For each week of the baseline forecast, if a promotional forecast exists for that week, it overlays the baseline volume.

- Creating the partial weekly DC forecast: For the partial DC forecast, it was agreed that the planned promotional volume and timing are by event and not by week; and the promotional volume projection is what is to be sold to the end consumer and not what is to be shipped to the customer. Once the weekly account forecast has been completed, it is converted to create a partial weekly DC forecast. The conversion process uses the assignment of each customer to a servicing DC and to its account. The weekly account forecast is disaggregated by SKU to customer level using the last 12 months of customer SKU sales as an allocation basis. Once at the customer level, the forecast is aggregated to the DC level, creating the partly DC forecast. This is a partial forecast since the weekly account forecast represents approximately 70%-80% of the DC overall sales volume.

- Creating the full weekly DC forecast: The next forecast process completes the final 20%-30% of the DC forecast. It is assumed that the promotional events are at an account level, but the distribution forecast is at a DC level. To do this, an account is created for each DC, named the ‘Rest of DC’ account, comprising of all the customers that are not part of the forecasted accounts. A 12-month moving average of the ‘Rest of DC’ customers promotional and non-promotional
shipments is created by using the normal promotional calendar to project the future promotional weeks. Once the ‘Rest of DC’ forecast is created, it is added to the partial DC forecast, to create the weekly full DC forecast.

ABF provides an initial forecast which should largely reflect key account activities, but provides only a statistical forecast for the ‘Rest of DC’ customers. The local DC management is responsible for maintaining this forecast, as was true with the previous process, but now just monitors the key account forecasts. Forecast review and modifications are done on an online system, which allows changes by account, including the ‘Rest of DC’ account.

5.7 WHY FORECASTS FAIL

The following points made by D.F. Ross (1996:151-154) attempt to examine the critical reasons why forecasts fail:

- **Management involvement.** Effective forecasting is needed at the top management, operations management, and operations execution levels of the firm. What is more, these forecasts must be in line with one another. Perhaps the foremost reason why forecasts fail is because of the lack of participation by functional management both in the development and in the execution of the forecast systems. To be effective, forecasting should be viewed as a team effort.

- **Oversophistication and cost.** Forecasting systems that are too difficult to understand are doomed to failure. Most organizations rely on simplistic ‘rule of thumb’ in developing a forecast for the future. Imposing complex statistical techniques that require sophisticated calculations turn forecasting into a ‘black box’ activity that divorces users from the process. The more complex the system, the more costly it is to run and maintain.

- **Compatibility.** Forecasts fail when there is a lack of compatibility between the forecasting system and the capabilities of the using organization. When managers do not understand the techniques employed, nor trust the results produced, there is a strong likelihood that they will not follow the forecast. The result is that
managers will bypass the formal system in favor of their own informal techniques.

The unnecessary proliferation of separate functional forecasts produces a dysfunctional approach where values promoting alignment and team work are replaced by departmentalization and the uncoupling of the business planning process.

- **Data accuracy.** Although it is obvious that the data used by a forecasting technique must be accurate, errors do arise in the data collection process. Data collection errors can arise in the following areas:
  - **Sampling methods.** Although an important tool in qualitative forecasting, sampling can contain errors in data due to the size of the sample and being incorrectly applied in statistical calculations. In addition, the patterns and relationships of the data components on which the sample is based can change over time, also creating error.
  - **Measurement errors.** These errors occur in the actual collection, data entry, and forecast processing. The more these activities are automated, the less the chance for errors.
  - **Hidden information.** Sometimes information may be unintentionally left out or deliberately falsified or withheld.
  - **Poorly designed questionnaires.** Questionnaires can suffer from a number of errors ranging from respondent misunderstanding to lack of questionnaire comprehensiveness.
  - **Data aggregates.** Errors in aggregate data collection occur as a result of omitting or double-counting data elements.
  - **Classification and definition.** Data elements need to be as sharply defined as possible. Lack of definition causes data either to be left out or double counted.
  - **Time factors.** It is critical that the time periods and the data collected are in alignment. An example would be inventory transaction data that is not reported in the same time period as accounting information.
  - **Unnecessary items.** Often forecasts are developed for items that should not be forecast. One example is 'dependent demand' item usage. These items are found as components within a Bill of Material. Also forecasts should not be established for final assembly products that are the result of futures and options. An example
is pack sizes of the same product that can be produced from a combination of modular Bills of Material. Forecasting such products should be done at the feature and option and not at the end product level.

- **Lack of Management Control.** Review and maintenance of the forecast are critical to forecast effectiveness. By its very nature, every forecast developed is likely to be wrong. Forecasters must be diligent in monitoring the forecast to ascertain the degree of error, when the forecast should be altered, and what parameters should be used to guide forecast adjustment.

Ensuring forecast effectiveness is an ongoing process that requires the participation of the entire supply chain. To guard against incorrect and misleading forecasts, managers must be careful to select the proper forecasting techniques that fit the needs of the organization, audit and maintain data accuracy, track closely actual activities against forecasted results, and promptly update forecasts that have exceeded acceptable boundaries.

### 5.8 DEMAND MANAGEMENT

#### 5.8.1 Defining the concept of demand management

Demand management involves managing the inputs, outputs and controllable drivers of demand in the forecasting process. This is done to ensure a value-adding product or service to the consumer and customer, and to provide maximum customer service. Demand management aims to influence the business ledger in the following ways:

**Demand side:**

- This is a process that assists sales and marketing in channel management. This will allow marketing to profile different channels of distribution, their wants, needs and financial impacts on the top and bottom line sales number;
- Sales, marketing and finance as a vehicle form differentiating profitable versus unprofitable channels of distributions and customer partnerships.
Supply side:
- Synchronise demand and supply planning to produce the right product at the right place at the right time.
- Leverage the forecasts for production/inventory planning;
- Leverage the calculated forecast errors to drive down inventory planning;

Demand communication can be illustrated in Figure 5.4:

Demand management focuses on the ability to interpret and understand the forecast as derived. This involves understanding the inputs to the process, the volatile nature of demand, how external economic influences are going to impact on demand, using this understanding to effectively create a demand plan for the supply chain, and ensuring that it is passed on to every single member of the chain.

5.8.2 Internal objectives of demand management

In any form of planned activity it is necessary initially to lay down the objectives, the purpose and the desired achievement of the planning entity. Market and sales
forecasting are no exception, and it is essential to lay down individual company objectives because each organization represents a different combination of policies, resources, products and market aims. Demand planning aims to align these individual company objectives to strive towards the supply chain goal. Each of the channel members needs to set themselves internal objectives in line with the overall supply chain objective, to ensure that the chain functions as a single business unit. The most important element in demand management is the objective to leverage the demand plan derived, to provide the consumer with a value added product and to ensure customer service. This will add to the overall supply chain objectives of providing a better value adding service to their customers.

Other internal objectives can relate to the degree of accuracy, time etcetera, and will reflect the relative importance of various aspects of company activity. The following general objectives for the total company-forecasting environment can be mentioned. (Bolt 1987:83-85)

5.8.2.1 Forecasting objectives and research and development

Forecasting objectives in the research and development field are mainly concerned with obtaining longer design and development lead times, assessing how functional features will affect sales, providing forecasts in segments rather than total markets and forecasts for product sizes, colours, models, etc.

Such forecasts can center around the following questions:

- Is there a market for the product?
- How big is it?
- Is it intensive or extensive?
- How many products can be sold at what prices?
- Where is the market located?
- What are the short, medium, and long-term prospects, etc.?
In this area potential profit levels can be anticipated, for there is an obvious link between the range of unit volumes that can be sold at a range of prices, which in turn is linked to costs.

5.8.2.2 Purchasing

The objective of a forecast relating to the purchasing function is concerned with future material requirements in types, materials, sizes, colors, quantities, qualities and the timing of their purchase. Effective forecasting enables the purchasing function to:

- Deal in standard parts or materials, bulk quantities or grouping of orders related to special discounts
- Purchase at times geared to seasonal price change
- Reduce the number of buying occasions
- Lower raw material stock levels

It also permits the planning of financial requirements for purchasing and the procurement of special non-standard material. Depending on individual company needs, objectives should be set giving due consideration to the needs of the purchasing function.

5.8.2.3 Production

The main objectives of forecasting as an aid to the production function, concern the scope of operation and the degree of using the existing and future production resources. In industries where economies of scale are possible, volume predictions as the life cycle progresses, are of extreme importance in planning for future production resources. But with any scale of operation, forecasts indicate the degree of potential use of existing plant and equipment. This gives management the opportunity to consider new product development projects and to ensure more economical working of production resources in the future. Effective production and production line scheduling, long order lead times, long runs of one product, size or colour, are factors that affect production economy and the forecasting objectives should reflect them.
Demand forecasts in this area are likely to take the form of an analysis by brand or product groups, sizes, models, and etcetera.

Inventories have to be financed and in the most cases inventory costs are high. The aim of the forecast could be to enable a company to carry economic levels of finished and partly finished stock.

5.8.2.4 Personnel

Manpower budgets as well as material budgets must be planned, and demand forecasts form the basis of planning for future increases, decreases or static personnel requirements. The objective of forecasts in this company activity area is to give the personnel department the greatest possible lead time, not only to obtain suitable personnel, but also ideally, to permit proper training to take place.

Efficient market and demand forecasting can also foster good employer/employee/trade union relationships as it gives advanced warning of future changes in the numbers and types of staff the company will require.

5.8.2.5 Finance

The objective of the demand forecast with regard to the financial function of the company, will be to provide appropriate data upon which the forecasted stock turn, cash flow, return on capital invested, desired profit margins, profits, and dividends are based. In many companies the balance between the inflow of cash and the outflow of expenditure is very fine and month by month predictions of volume by product type, and market segment will assist in financial management. In different markets, and sometimes in different market segments of the same markets, accepted credit limits will be different and the identification of these different credit areas can be carried out by analysis of a forecast by consumer group, type of outlet, or industrial classification.

Further, as the demand forecast should form the basis of all budgets in the company, it therefore assists financial management to determine the company’s master budget,
and also to plan the amount of money that will be available at the correct times during
the short, medium, and long term for working and fixed capital and capital projects.

5.8.2.6 Marketing

Although it forms one of the sub-functional activities of marketing, market and
demand forecasting will have a number of uses for other parts of marketing.

The forecast will be either the input or the output of various marketing activities. In
advertising and sales promotion the prediction objective might be to determine the
appropriate levels of advertising expenditure. Forecasts of the size, location, type of
market and consumer, with forecasts of product models, help to determine which
media and advertising theme is appropriate to reach such a consumer market.

5.8.2.7 Physical Distribution / Logistics

Demand forecasting objectives in the area of physical distribution relate to the
information of transport, warehousing, location of strategic stocks, and channels of
distribution (wholesalers, retailers, etc). In the case of transport, the number of items
that will be sold, size of the order, and the geographic spread in the various areas will
help to determine such factors as whether to use the company's own or external
transport services, size of fleet and size of individual vehicles, frequency of delivery
etc.

Volume, seasonal factors and a breakdown of size and type of product are important
factors when considering warehousing and the placing of strategic stocks. Forecasts
will also help to determine the channels of distribution to be used by the company.

Setting the objectives is in effect giving the answers to a series of questions
commencing with the words Why, What, How, Where, and When:

• Why do we need a forecast? The most important primary and secondary reasons
  should be determined and the forecast built around them.
• *What* are we trying to achieve, in terms of accuracy, scope, and effectiveness; do we need a trend or a detailed forecast?

• *How* is the forecast to be compiled in terms of information needed and how many techniques are to be used?

• *Who* is going to do the forecast? Is it to be at executive level, or by specialist forecasters?

• *Where* is the forecast to be done?

• *When* will the forecast be done?

• *How* will the forecast impact on the supply chain and each of the different members?

• *Where* are the critical or constraining areas in the chain?

• *How* will these problems be solved?

• *How* will the highest levels of customer service be provided?

• *How* will the process be evaluated after a forecasting cycle etc?

It is important that the demand management process ensure that the information gained out of the forecasting process be used to align the company into a strategic position to supply market demand. This can only be done if this information is studied and interpreted in the correct way, communicated throughout the supply chain, and used to align the chain with consumer needs.

**5.9  CASE STUDY – UNILEVER’S APPROACH TO DEMAND PLANNING**

This section aims to investigate the approach of Unilever in restructuring some of their FMCG supply chains in the USA and Europe, and how this approach correlates with the theory provided in this chapter in the overall structure of a demand planning process. Each of the supply chains have approached this critical element slightly differently, but this is mainly due to different business conditions. The information supplier in this section is based on the work done by the Unilever MAST Group’s Supply Chain Knowledge Center, that aims to provide cross-category expertise in Manufacturing, Supply Chain and Engineering.
5.9.1 **Demand Planning**

The MAST group sees demand planning as the process of using drivers to predict the future demand for products. It consists of the following processes:

- **Baseline forecasting** – used to determine long-term underlying demand, without the influence of instantaneous or transitory events.
- **New product demand forecasting** – estimates the demand for a new product before launch and during its early life.
- **Event forecasting** – estimates the impact on demand from advertising, special promotions or from other short-term influences such as holidays, industrial disputes and trades policy changes.

These processes are combined under the term 'Operational forecasting', and are used to aggregate the output of the three sub-processes and give a volume number to drive the supply chain and financial management. This approach can be indicated by figure 5.5:

![Figure 5.5: Elements of Operational Forecasting](Figure 5.5: Elements of Operational Forecasting
Source: Unilever MAST Supply Chain Knowledge Center)

A summarized discussion of these elements will be done in the following section.
5.9.1.1 **Baseline Forecast:**

Baseline forecasting can be defined as:

‘the derivation of the starting point upon which to add the impact of incremental demand drivers. It typically incorporates the level, seasonal, trend and cyclical elements.’

This simply means to forecast the level of underlying customer demand. The baseline forecast can be distinguished by the detail of inputs over time. The long-term baseline is developed at an aggregate level, such as brand family, for the extended horizon typically beyond six months out to 18-24 months. In the short term, the baseline forecast can be developed bottom-up from history usually at an SKU level or SKU/customer level. These short-term forecasts must be aggregated and reconciled with the appropriate aggregate long-term forecast. Variances must be analyzed and adjustments made accordingly between the aggregate short- and long-term forecasts.

After this reconciliation, the forecast can be disaggregated to the required level. Various statistical methods are available for generating the baseline forecast, including several forecasting software packages for accurate baseline modeling. These will not be discussed because it falls outside the scope of this section.

5.9.1.2 **New product demand forecasting:**

New product demand forecasting can be seen as:

‘the volume forecasting of new products into the market, taking account of shipment dates, pipeline stocks, distribution targets and build in order to meet the timing and requires level of customer service.’

Forecast for any outgoing products should be phased out to avoid obsolescence and where applicable cannibalisation of existing products should be accounted for. On the extended forecasting horizon, the new product demand forecast is driven primarily by the inputs provided from marketing and the innovation centers.
A long-term new product forecast is prepared using a new product information plan to review external and internal information. This forecast is usually prepared at an aggregate level. In the short-term, the detailed forecast is primarily driven by input from Sales, detailing the phase out of old SKU’s, the projected impact of the new product demand and the timing and shipment of the product by customer. The cannibalisation of other SKU’s must also be determined. The forecasting process also provides a post-launch evaluation stage, where the accuracy of this part of the forecast is evaluated and stored for future reference.

5.9.1.3 Event forecasting:

Events such as promotions, media, price changes, may target the customer, the consumer or both. Additionally there may be customer demand based information such as changes in inventory policy which affect the level of demand. Events forecasting accounts for the volume effect on customer and/or consumer demand.

A long-term event forecast will be created and will provide a basis for the short-term forecast. The long-term event forecast is typically developed by marketing or category management and is usually at an aggregate level such as per brand family or brand family by customer. The short-term forecast will focus on specific account factors as well as the validation of information to ensure that the most up-to-date information is included in the forecast. Detailed sales intelligence will be needed, as well as the effect of it on other SKU’s in the same group. The promotions and the effect thereof will once again be evaluated after the event, and fed back into the forecasting process.

5.9.1.4 Operational Forecast:

Operational forecasting is:

'the process of aggregating the outputs of the sub processes listed (baseline forecasting, new product forecasting, event forecasting) to create volume numbers that are used to drive the supply chain and are an input into resource planning.'
This definition completely explains the nature on the operational forecast as a dynamic activity in the demand planning process. It will focus on the consolidation of volumes and reconciling the aggregate level to SKU/customer forecasts. The short-term forecast will be allocated into days and updated on a daily basis.

5.9.2 Conclusion:

This case study clearly indicates that the practical approach to a demand planning process in the FMCG industry are in line with the elements presented in this chapter. In many cases, these elements have been combined into the same step to ensure that the approach is in line with business needs. This will depend on the nature of the business and the structure of the supply chain.

This forecasting process aligns with the statistical, management interaction, feedback and information organisation components of a typical forecasting process and focus on critical elements unique to the business. The process steps are also aligned with the elements of demand communication and demand management.

5.10 SUMMARY

There is no perfect forecasting technique. The only thing that can be certain about a forecast is that it is going to be wrong. Nevertheless, techniques must be used, and can be successful if tempered with good judgement. The four most important elements in forecasting are:

- Assigning the responsibility for developing forecasts.
- Maintaining accurate data on all forecasting inputs and outputs, including both shipments and actual sales demand.
- Maintaining good communications, and implementing a communications policy as a normal part of running the business, reaching to all the supply chain members.
- Measuring and evaluating the forecast.
Forecasting elements and actions of the external company environment forms the main reason for forecasts. Consumer and customer actions need to be monitored and forecast on a continuous basis to ensure product for market demand. The ultimate is to strive for every opportunity available for customer connectivity marketing. The need for forecasting can partly be eliminated by offering consumers a value-added service and keeping track of their direct requirements. This type of approach can open a significant opportunity that can change the way business is done. The company that gets to customer connectivity marketing first, will ultimately shift the balance of power in its marketing channel. Few firms will be able to compare in terms of increasing profitability and market share.

Forecasting is a necessary part of the FMCG business planning process. Perhaps no other activity has such an immediate and long-range effect on a supply chain's operations as forecasting. An effective forecast can dramatically improve supply chain profitability, productivity, and customer service and ensure a competitive advantage. Effective forecasting is also fundamental to the well-being of the supply chain. Good forecasting assists companies by eliminating waste in the form of excess inventory, by reducing shortages, missed due dates, lost sales, lost customers, and expensive expediting, and by providing visibility to control capacity requirements such as plant size, labor, equipment, and transportation. The process of demand planning forms a key element in creating a demand driven supply chain in the FMCG industry where a highly agile approach to business is needed. The accurate communication of demand, timely signals to the supply chain, communication of supply chain constrains, and a cost effective service, can all add to providing the best service to the customer in a changing environment.

This chapter defined the term and process of demand planning in an FMCG supply chain. It showed that it is of vital importance that the forecasting process must be under firm control to provide useful forecasts to satisfy the needs of the different functionaries in a company and supply chain. Care needs to be taken of how a forecast is derived as well as the important components of the forecasting process. All these issues can successfully be addressed by implementing the demand planning approach to forecasting. The next chapter will explore the extension of this concept,
as well as a future perspective of how the synchronization of the supply chain can add to the management of demand information.

References:

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CHAPTER 6: INTEGRATING SUPPLY CHAIN MANAGEMENT, DEMAND PLANNING AND CUSTOMER SERVICE

6.1 INTRODUCTION

The main aim of demand planning is to provide a forecasting process that enables the company and supply chain to respond quickly to consumer demand and to position the supply chain as close to the consumer as possible. This process can however reach a point where it is not worth spending more time and money improving forecast accuracy and the forecasting process as part of synchronising the supply chain. It is then better to improve the connecting activities and processes to accomplish the overall supply chain goals of adding value to the end product, minimum inventories, improved customer service and product availability. This will in turn have a positive effect on the demand planning process and improve the usability of forecasts.

This chapter will focus on specific issues that can influence the processes of demand planning, supply chain management and customer service by extending the supply chain theory. The following concepts will be discussed in this chapter:

- **Lead-time management** - how this can influence supply chain management and demand planning.
- **Efficient Consumer Response (ECR)** - an extension of supply chain management and demand planning to provide an indication of how specific industry characteristics can create a new approach to satisfying consumer demand.
- **The Industrial Internet** - a futuristic approach about how to get closer to the customer.
6.2 STRATEGIC LEAD-TIME MANAGEMENT

'Time is money' is perhaps an overworked cliché in common parlance, but in logistics and supply chain management it goes to the heart of the matter. Not only does time represent cost to the logistics function and the supply chain, but extended lead times also imply a customer service penalty. As far as cost is concerned there is a direct relationship between the length of the logistics and supply chain pipeline and the inventory that is locked up in it. Every day that product is locked up in the chain, it incurs an inventory holding cost. Secondly, longer lead times mean lower response to customer requirements, and, given the increased importance of delivery speed in today's internationally competitive environment, this combination of high cost and lack of responsiveness provides a recipe for decline and decay. (M. Christopher 1992:125)

One of the elements of supply chain management can be seen as the controlling of lead-time throughout the supply chain. Shorter lead-times have a positive effect on adding value to products produced by individual companies as well as the entire supply chain. In this process, many unnecessary steps can be cut out of logistics and the supply chain and both these parties as well as the customer will benefit from it.

This section will look at how lead-time management can have a positive effect on demand management and how these two processes together, are directly linked to synchronising the supply chain to add more value to the products for the end customer. This section is based on the theory and view of Martin Christopher in his book, *Logistics and Supply Chain Management*. (1992:125-151) Presenting it in this format will ensure that the objective of this chapter is met.

6.2.1 Time-Based Competition

As mentioned in Chapter 2, customers in all markets are becoming more and more time-sensitive. They place high emphasis on the value of time and this is reflected in their purchasing decisions. In consumer markets, customers make their choice from the brands available at the time and if the preferred brand is out of stock, it is quite likely that a substitution brand will be purchased instead.
In the past it was often the case that price was the most important influencing element in the purchasing decision. Now, whilst price is still important, a major determinant of choice of supplier or brand is the 'cost of time'. The cost of time is simply:

'the additional cost that a customer must bear whilst waiting for delivery or whilst seeking out alternatives.'

The pressures that lead to the growth of time sensitive markets can be seen as the following:

- Shortening life-cycles;
- Customers' drive for reduced inventories;
- Volatile markets make reliance on forecasts dangerous.

6.2.1.1 Shortening life cycles

The concept of the product life-cycle is well established, and suggests that there is a recognisable pattern of sales from launch to the final decline for many products. A feature of the last few decades has been the shortening of these life-cycles. Take as an example the case of a typewriter, where the first mechanical typewriters had a life-cycle of about 30 years. These mechanical typewriters were replaced by the electro-mechanical typewriters which had a life-cycle of approximately 10 years. The electro-mechanical typewriter gave way to the electronic typewriter with a four year life-cycle. Now word processors have taken over with a life-cycle of less than one year. (M. Christopher 1992:126-128)

In situations like this the time available to develop new products, to launch them and to meet the market-place demand is clearly greatly reduced. Hence the ability to 'fast track' product development, manufacturing and logistics becomes a key element of competitive strategy. It is clear that the time-to-market is a major determinant of total profit over the life-cycle of a product. Once a product is on the market the ability to respond quickly to demand is equally important. Here the lead-time to resupply the
market determines the organisation's ability to exploit demand during the product life-cycle.

### 6.2.1.2 Customers' drive for reduced inventories

One of the most pronounced phenomena of the recent years has been the universal move by companies to reduce their inventories. Whether the inventory is in the form of raw materials, components, work-in-progress or finished products, the pressure has been to release the capital locked up in stock and hence simultaneously to reduce the holding cost of stock. The same companies that have reduced their inventories in this way have also recognised the advantage that they gain in terms of improved flexibility and responsiveness to their customers.

The knock-on effect of this development up-stream to suppliers has been considerable. It is now imperative that suppliers can provide a just-in-time service. Timeliness of delivery — meaning the delivery of the complete order at the time required by the customer — becomes the number one order-winning criterion.

Whilst the requirements of such customers could always be met by the supplier carrying inventory close to the consumer(s), this is simply shifting the burden from one part of the supply chain to another — indeed the cost may even be higher. Instead what is needed is for the supplier to substitute responsiveness for inventory whenever possible.

The trade-off facing every organisation in an increasingly competitive climate, is that customer service is of vital importance to balance the cost of inventory against the cost of investing in time compression. Nine times out of ten, time compression produces a better ratio of benefit to costs than the alternative inventory-based solution. (M. Christopher 1992:128)

### 6.2.1.3 Volatile markets make reliance on forecasts dangerous

A continuing problem for most organisations is the inaccuracy of forecasts. It seems that no matter how sophisticated the forecast techniques employed, the volatility of
markets ensures that the forecast will be wrong. Whilst many forecasting errors are the result of inappropriate forecasting methodology, the root cause of these problems is that the forecast error increases as lead-time increases. This can be seen in Figure 6.1.

The evidence from most markets is that demand volatility is tending to increase, often due to the competitive activity, sometimes due to unexpected responses to promotions or price changes and as a result of intermediaries’ re-ordering policies. In situations such as these there, are very few forecasting methods that will be able to predict short-term changes in demand with accuracy.

The conventional response to such a problem has been to increase the safety stock to provide protection against such forecasting errors. However it is preferable to determine lead-times in order to reduce the need for inventory. This can be explained in more detail by the following concept called ‘Breaking the planning loop’ (M. Christopher 1992:129-130)

6.2.1.4 Breaking the planning loop:

‘Traditionally manufacturing requires long lead-times to resolve conflicts between various jobs or activities that require the same resources. The long lead-times, in turn, require sales forecasting to guide planning. But sales forecasts are inevitably wrong;
by definition they are guesses, however informed. Naturally, as lead-time lengthens, the accuracy of the sales forecast decreases. With more forecasting errors the inventories balloon and the need for safety stocks at all levels increases. Errors in forecasting also mean more unscheduled jobs that have to be expedited, thereby crowding out scheduled jobs. The need for longer lead-time grows even greater and the planning loop expands even more, driving up costs, increasing delays, and creating system inefficiencies.'

'Mangers finding themselves trapped in the planning loop often respond by asking for better forecasts and longer lead-times. In other words they treat the symptoms and worsen the problem. The only way to break the planning loop is to reduce the consumption of time throughout the system; that in turn will cut the need for lead-time, for estimates, for safety stock, and for all the rest. After all, if a company could ever drive its lead-time all the way to zero, it would have to forecast only the next day's sales.' (Stalk, G., 'Time — The Next Source of Competitive Advantage' Harvard Business Review July-August 1988)

6.2.2 The Concept of Lead-Time

From the customer's viewpoint there is only one lead-time: the elapsed time from order to delivery. Clearly this is a crucial competitive variable as more and more markets become increasingly time competitive. Nevertheless it represents only a partial view of lead-time. Just as important from the supplier's perspective, is the time it takes to convert an order into cash and, indeed, the total time that working capital is committed from when materials are first produced through to when the customer's payment is received.

6.2.2.1 The order-to-delivery cycle

From a marketing point of view the time taken from receipt of a customer's order through to delivery is crucial. In today's JIT (just-in-time) environment short lead-times are a major source of a competitive advantage. Equally important however is the reliability or consistency of that lead-time. It can actually be argued that
reliability of delivery is more important than the length of the order cycle - at least up to a point – because the impact of a failure to deliver on time is more severe than the need to order further in advance.

6.2.2.2 The Procurement-to-payment cycle

The basic concern of any organisation is how long it takes to convert an order into cash. In reality the issue is not just how long it takes to process orders, raise invoices and receive payment, but also the length of the pipeline from the sourcing of raw material through to the finished product. Throughout the pipeline, resources are being consumed and working capital needs to be financed.

From the moment when decisions are taken on the sourcing and procurement of materials and components, through the manufacturing and assembly process to final distribution and after-market support, time is being consumed. That time is represented by the number of working days of inventory in the pipeline, whether as raw materials, work-in-progress, goods in transit, or time taken to process orders, issue replenishment orders, as well as time spent in manufacturing, time in queues or bottlenecks and so on. The control of this total pipeline is the true scope of logistics and supply chain lead-time. (M. Christopher 1992:134-135)

The longer the pipeline from source of materials to the final user, the less responsive to changes in demand the system will be. It is also the case that the longer the pipeline the more obscure the ‘visibility’ of end demand so that it is difficult to link manufacturing and procurement decisions to market place requirements. Thus, an inevitable build-up of inventory can be found as a buffer at each step along the supply chain.

To ensure timely response to volatile demand requires a new fundamentally different approach to the management of lead-times.
6.2.3 **Logistics pipeline management**

The key to successful control of logistics and supply chain lead-times is pipeline management. Pipeline management is the process whereby manufacturing and procurement lead-times are linked to the needs of the market place. At the same time, pipeline management seeks to meet the competitive challenge of increasing the speed of response to those market needs. The goals of logistics pipeline management are:

- Lower costs;
- Higher quality;
- Greater variety;
- More flexibility;
- Faster response times.

The achievement of these goals is dependent upon managing the supply chain as an entity and seeking to reduce the pipeline length and/or to speed up the flow through the pipeline. In examining the efficiency of supply chains it is often found that many of the activities that take place add more cost than value. Whilst it is inevitable that all activities add cost, it is also the case that only a minority of activities in the logistics pipeline add value. Conversely, a non-value-adding activity is one that can be eliminated with no deterioration of utility to the customer.

The challenge to pipeline management is to find ways in which the ratio of value-added to cost-added time in the pipeline can be improved. Pipeline management is concerned to remove the blockages and the fractures that occur in the pipeline and which lead to inventory build-ups and lengthened response times. The sources of these blockages and fractures are such things as extended set-up and changeover times, bottlenecks, excessive inventory, sequential order processing and inadequate pipeline visibility. Figure 6.2 indicates the influence of a bottleneck in the goods pipeline. This causes inefficient high inventories in the production plant and the warehouse, wasting valuable resources such as time, space and capital.
The greatest opportunity for improvement will generally come from better use of information regarding demand. Too often data on demand is obscured from view because the order penetration point is too far down the chain. In other words when an order reaches the system it is passed sequentially from one node in the chain to another, its very existence being hidden by the presence of intermediary stockholdings. Thus in a traditional system, inventory held by the distributor will hide demand until that distributor’s re-order point is reached. (M. Christopher 1992:135-138)

6.2.4 Logistics Value Engineering

Many businesses have invested heavily in factory automation with the aim of achieving more efficient throughput times. However, many of these businesses that have spent huge amounts shaving a day off manufacturing inventories through the application of sophisticated computer systems, still rely upon inaccurate forecasts and lead-times of two weeks to process an order. The requirement is to look across the different stages of the supply chain to see how time as a whole can be reduced through re-engineering the way the chain is structured.

The target for any organisation should be to reduce lead-times at every stage in the logistics pipeline and as close to zero as possible. In so many cases it is possible to
find considerable opportunity for total lead-time reduction, often through very simple changes in procedure.

The question that arises is what the minimum lead-time should be. To answer this, definitions have to be given to the terms of 'throughput efficiency' and 'process efficiency'.

6.2.4.1 Throughput efficiency

Throughput efficiency can be seen as:

'a measure of the validity of the actual cumulative lead-time compared with the cover level calculated by modelling to accommodate the variations in business activity and the processing and handling times at each stage.' (M. Christopher 1992:143)

It is important that any measure of throughput efficiency recognises the external and internal constraints and with those measures the degree to which the supply chain activities add more value than cost. By employing time-based simulation techniques it is possible to establish the extent to which 'buffers' are needed to cope with variations in demand, forecast inaccuracy and economic production and purchasing cycles at each stage in the supply chain. These 'buffers' will normally take the form of inventory and capacity.

This approach calculates the theoretical throughput cover, expressed in time, across the whole business necessary to service projected customer demand. It also enables the components which make up the total time efficiency of the business to be tested individually and their effect on the total cover to be calculated.

The total actual throughput time for business can be measured using simple techniques based on conventional methods of study. (The discussion of these methods will fall outside the purpose of this study and will not be discussed.) One feature of strategic lead-time that is quickly recognised is that the time it takes to move a product from procurement to payment is determined by the speed of the slowest
moving item or element in that product. This proves that the same material from another source can be used to reduce the end-to-end pipeline time.

6.2.4.2 Process efficiency

Unlike the measure of throughput cover, which reflects a limit to the opportunity to create a stockless environment with zero processing lead-time, the process efficiency of the business should be viewed as an absolute measure. As previously shown, the requirement for 'visibility' all the way from the customer demand to the start of the supply chain is crucial to achieving a strategic dimension for lead-time management. Since modern information systems are capable of providing near-instantaneous visibility of all players in the chain, the assumption can be made that perfect information can exist and any process cycle time represents inefficiency. (M. Christopher 1992:138-144)

6.2.5 The Lead-Time Gap

The fundamental problem that most organisations face is that the time it takes to procure, make and deliver the finished product to a customer is longer than the time the customer is prepared to wait for it.
Figure 6.3 reflects the basis of the lead-time gap. The customer's order cycle refers to the length of time that the customer is prepared to wait, from when the order is placed through to when the goods are received. This is the maximum period available for order fulfilment. In some cases this may be measured in months but in others it is measured in hours.

In the conventional organisation the only way the gap between the logistics lead-time (i.e. the time taken to complete the process from goods inwards to delivered product) and the customer's order cycle (i.e. the period they are prepared to wait for delivery) can be bridged, is by carrying inventory. This normally implies a forecast. Hence the way most companies address this problem is by seeking to forecast the market's requirements and then to build an inventory ahead of demand. Unfortunately, experience suggests that no matter how sophisticated the forecast, its accuracy is always less than perfect. It has been suggested that all mistakes in forecasting end up as an inventory problem — whether too much or too little!

Whilst improving forecast accuracy will always be a desirable goal it may be that the answer to the problem lies not in investing even greater sums of money and energy in improving forecasting techniques, but rather in reducing the lead-time gap.

The company that achieves a perfect match between the logistics lead-time and the customer's required order cycle has no need for forecasts and no need for inventory. The challenge for logistics and supply chain management is to search for the means whereby the gap between the two lead-times can be reduced, if not closed. Looked at in the abstract, it will appear that if the logistics lead-time can be shortened and the customer's order cycle lengthened, then the problem can be solved.

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1 Clearly the competitive conditions of the market as well as the nature of the product will influence the customer's willingness to wait.

2 The logistics lead-time and the customer's order cycle.
6.2.5.1 Reducing logistics lead-time

Companies have not managed the total flow of material and information that link the source of supply with the ultimate customer. This creates an incredibly rich opportunity for improving the efficiency of the process.

In those companies that do not recognise the importance of managing the supply chain as an integrated system, it is usually the case that considerable periods of time are consumed at the interfaces between adjacent stages in the total process and in inefficiently performed procedures.

Because no departmental or individual manager has complete visibility of the total logistics process, it is often the case that major opportunities for time reduction across the pipeline as a whole are not recognised.

Goldratt (1990), who has developed the theory of constraints, has made a significant contribution to the way that logistics process is viewed. This theory of constraints is known as 'optimised production technology' (OPT).

The essence of OPT is that all activities in a logistics chain can be categorised as either 'bottlenecks' or 'non-bottlenecks'. A bottleneck is the slowest activity in a chain. Whilst it may often be a machine, it could also be part of the information flow such as order processing. The throughput time of the entire system is determined by bottleneck activities. It follows therefore that to speed up the total system throughput time, it is important to focus on the bottlenecks, to add capacity where possible and to reduce set-ups and set-up times if applicable.

Equally important however is the realisation that non-bottlenecks should not be treated in the same way. It is unnecessary to improve the throughput at non-bottlenecks as this will lead to the build-up of unwanted inventory at the bottleneck. Thus the output of non-bottlenecks that feed bottlenecks must be governed by the requirements of the bottlenecks they serve.

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3 As indicated in Figure 6.2
These ideas have profound implications for the re-engineering of logistics systems if the objective is to improve throughput time overall, whilst simultaneously reducing total inventory in the system. The aim is to manage the bottlenecks for throughput efficiency that implies greater batch quantities and fewer set-ups at those crucial points, whereas non-bottlenecks should minimise batch quantities even though more batch quantities will be involved. This has the effect of speeding up the flow of work-in-progress and these ‘transfer batches’ merge into larger ‘process batches’ at the bottlenecks, enabling a faster flow through the bottleneck.

6.2.5.2 Extending the customer’s order cycle

The idea that it could be possible to ‘extend’ the customer’s order cycle may at first seem implausible. Certainly it is unrealistic to expect that customers could be persuaded to wait longer for delivery of their order. If anything – the pressure is on to reduce order cycle times.

Extending the customer’s order cycle means that a significantly earlier warning of the order should be obtained. What is found is that the first order penetration point is too far down the pipeline and that secondly, real demand is hidden from view and that only the orders can be seen. Both these points need further explanation.

The simplest definition of an order penetration point is that it occurs at that point in the logistics chain where ‘the order meets the plan’. Upstream from this point, everything is driven by the forecast and/or a plan. Downstream the company can respond to customer orders. Clearly in an ideal world, it would be preferable for everything to be order-driven so that nothing is purchased, manufactured or shipped unless there is a firm order for it.

A key concern for logistics management should be to seek to identify ways in which the order penetration point can be pushed as far as possible upstream. This might be achieved by the use of information so that manufacturing and purchasing get to hear of what is happening in the market place faster that they currently do. The other route to achieving an upstream shift of the order penetration point is by postponing the final commitment of the product to its final form. For example, paint manufacturers can
now offer customers an infinite variety of colours of paint by combining a limited number of base colours at the point of sale.

The scope of moving the order penetration point will be constrained by technological and market factors, but if it can be achieved, then the greater the ability it provides for responding in shorter time frames.

Perhaps the greatest opportunity for extending the customer's order cycle is by gaining earlier notice of their requirements. In so many cases the supplying company receives no indication of the customer's actual usage until the order arrives. If the supplier could receive 'feed-forward' on what was being consumed he would anticipate the customer's requirement and better schedule his own logistics activities. (M. Christopher 1992:145-151)

6.2.6 Conclusion

Time is one of the most valuable resources, whether it is to a company, supply chain or customer. Shortening the time a product spends in a supply chain will benefit all of the parties in the process by adding value to the end product, lowering channel cost and ensuring product availability. This can only be done by shortening the lead-times between processes and functions in the supply chain.

Shortening lead-times can have a positive effect on demand management in the sense that information reaches the forecasting function in the shortest space of time. This ensures forecasts based on the latest information that will be more accurate and usable in volatile markets, such as the fast moving consumer goods (FMCG) industry.

As a strategy to shorten the supply chain, the approach of pipeline management can yield great benefits for the company or supply chain, such as lowering working capital, lower inventories, greater flexibility in production, a more agile supply chain, better product availability etcetera. Each of these benefits will become more important in a competitive environment. A competitive advantage can only be gained by providing a differentiated product of the highest value to the end customer. This only emphasises the importance of supply chain management.
This section indicated that the process of demand planning and strategic lead-time management go hand-in-hand with synchronising the supply chain. This inter-related structure must be kept in mind at all times in the process of supply chain management.

6.3 **EFFICIENT CONSUMER RESPONSE (ECR)**

In a competitive and fast moving world, customer and consumer requirements are increasingly complex and dynamic. Customer relationships are more and more characterised by a network of cross-company, multi-functional teams. Specialist talks directly to specialist, bringing a full range of skills and expertise to the total business development process. In this arena, the need for jointly agreed and clearly communicated objectives is vital, as these provide the framework and direction for all activity. This challenge demands the review of fixed paradigms, skills and technologies to enable change in a competitive environment.

The process of supply chain management has been around for more than a decade and has proved to be a very useful tool to achieve a sustainable competitive advantage over other companies and supply chains. This process aligns the capabilities of suppliers, manufacturers, other channel members, customers, and consumers to increase customer satisfaction and yield better performance. The effective management of the flows of material and information through the supply chain can create a network that can respond quickly to any situation and be flexible to accept change.

ECR can be seen as an extension of the supply chain management theory which attempts to address the inefficiencies that lead to excessive inventory and unnecessary costs at all levels in the supply chain, to provide an even closer link with the consumer. It can be seen as an attempt to increase the velocity of inventory in the FMCG industry throughout the supply chain of wholesalers, distributors and ultimately the consumers. To be successful, the ECR approach will have to eliminate most of the forward buying practices of large retailers and wholesalers, which have led to large inventory accumulations in the industry of the supply chain, from manufacturing to retailers. SCM focus on the entire supply chain, from source to
consumption, wherein ECR can form a key initiative to synchronise specifically the outbound supply chain. (Coyle, Bardi, Langley 1996)

ECR originated in the USA in 1992 as a direct result of alternative store formats or types, and their supply chains (McKinsey & Co 1992) which highlighted major inefficiencies within the supermarket and the supply chain (Kurt Salmon Associates, 1993). In order to survive, the US grocery industry leaders took an initiative to study how to improve the performance of the supermarket supply chains in 1992. As a result of their study, the ECR initiative was established, and the term ‘efficient consumer response’ was first introduced at the US Food Marketing Institute Conference in January 1993 (Robins, 1994). This ECR initiative was concerned with transforming the grocery supply chain from a ‘push’ system to a ‘pull’ system – where trading partners form new alliance relationships and the replenishment of store products is initiated by the point of sale (PoS) data (Harris, Swatman, & Kurnia 1999).

6.3.1 The Definition of Efficient Consumer Response

The definition of ECR can best be explained by the ECR Europe Executive Board Vision Statement (1995), as:

‘Working together to fulfil consumer wishes better, faster, and at less cost’

This implies that ECR looks at a category from the total supply or value chain perspective, considering packaging and ingredient suppliers, manufacturers, wholesalers, retailers and consumers. Only through looking at the value chain in its entirety can optimisation decisions be made or consumer value maximised. The drive towards ECR will focus on the following elements (PriceWaterhouseCoopers 1998):

- Reduction in cost in the supply chain;
- Reduction in inventory in the supply chain;
- Improved customer service.
ECR calls for the creation of a timely and accurate flow of information through electronic data interchange (EDI), and strategic alliances between supply chain members. (Fiorito, 1995; Sansolo, 1993) This will lead to a continual product flow matched to consumer consumption.

One of the most important pre-conditions in order to make this work is removing the barriers that exist between functions in a company and between trading partners in order to facilitate better decision making. There proved to be quite a few high and persistent barriers even within some of the leading companies where decision making is still based on a narrow understanding of the value chain.

Figure 6.4 indicates that there are quite a few barriers between different trading partners and internal functions. This will limit the efficient transfer of information that can create even bigger gaps between partners. Trading partners in the same supply chain were often competing with one another, whereas the ECR focus will be on the creation of partnerships with channel members to ensure that supply chains can compete with one another. Technology will form the key element to ensure effective partnerships and the communication of supply chain information.
6.3.2 ECR Initiatives

To accomplish the ECR drivers of cost and inventory reductions and improved customer service, the following key initiatives were identified:

6.3.2.1 Efficient store assortment

The objective of this initiative is to optimise the productivity of inventory and shelf management at the consumer interface. Optimal allocation of goods on supermarket shelves maximises consumer satisfaction by providing the best products and service while, at the same time, ensuring the most efficient use of space to increase manufacturer, distributor and retailer profitability (Harris, Swatman, & Kurnia 1999). The relationship between manufacturers, distributors and retailers is crucial in achieving efficient store assortment (Kurt Salmon Associates, 1993; Wood, 1996). To streamline business practices in the area of store assortment, manufacturers, distributors, and retailers need to adopt a ‘category management’ strategy (Kurnia, 1998; Pramataris, 1997).

6.3.2.2 Efficient promotion

The efficient promotion initiative aims at maximising the total system efficiency of trade and consumer promotions. Efficient promotions attempt to eliminate inefficient trade promotions like diverting and forward buying, by introducing better trade promotions such as ‘pay for performance’ and ‘forward commit’:

- **Pay for performance** is concerned with rewarding retailers on the basis of how many products they sell to consumers, rather than how many products they buy from manufacturers (Washburn, 1995).

- **Forward commit** relates to spreading the actual shipment of one order over several physical deliveries. This allows retailers to take pricing benefits offered by manufacturers at a particular period in time (just in the case of forward buying), without having to carry the inventory. In essence, this technique operates on
'virtual inventory' which will be transformed into real inventory when required (Martin, 1994).

The use of paper-based coupons as a consumer promotion technique can be replaced with electronic coupons, frequent shopper systems, every day low price policies and other efficient incentive programmes. The efficient promotion initiative thus endeavours to remove excessive cost by re-engineering promotional practices, and is also supported by the 'category management' strategy (Kurnia, 1998; Pramataris, 1997).

6.3.2.3 Efficient product introduction

The objective of the new product introduction initiative is to maximise the effectiveness of new product development and introduction activities in order to reduce costs and failure rates in introducing new products (Kurt Solomon Associates, 1993). This is achieved by the involvement of wholesalers, distributors, retailers and consumers at an early stage of the new product development process. Manufacturers, distributors and retailers must work together as allies to reduce the cost of product development and to produce only the products anticipated and demanded by the consumer marketplace. Once again the 'category management' strategy plays a crucial role in achieving this initiative, because of its contribution to an understanding of successful existing products (Kurnia, 1998; Pramataris, 1997).

6.3.2.4 Efficient product replenishment

The effective product replenishment initiative is the fundamental platform which supports the overall ECR strategy and it represents more than half the total projected savings from the ECR implementation in the US grocery industry (Kurt Solomon Associates, 1993). The objective of this initiative is to optimise cost and time in the replenishment system by the provision of the right product to the right place at the right time in the right quantity and in the most efficient manner possible. In order to remove inefficiencies in product replenishment (e.g. high inventory levels and carrying cost and sporadic manufacturing schedules), a continuous replenishment schedule approach is required (Kurnia, 1998; Pramataris 1997).
6.3.3 **ECR business activities**

To achieve these four efficiencies, ECR requires the following major business activities or initiatives (De Roulet, 1993):

- Category management,
- Continuous replenishment program,
- Computer assisted ordering,
- Flow-through distribution (or cross-docking),
- Integrated electronic data interchange,
- Activity-based costing.

Each of these activities will be discussed in the following sections:

6.3.3.1 **Category management**

The term 'category management' first appeared in 1987 (Smith, 1993), when certain organisations such as Procter & Gamble (Mathews, 1995), began moving from brand management to management by category. Category management has evolved to mean a process that involves managing product categories as business units and customising them on a store-by-store basis to satisfy consumer demands (Gnau 1992). A category is a group of products having a common consumer end use (Hofler, 1996) and includes such things as household cleaners, dairy and frozen foods, paper products, health and beauty care products, soft drinks etcetera. Category management allows the category manager to operate a category like a business so as to identify optimal product mix and to stock each store with specific products that demographic and point-of-sale (PoS) information indicates customer preference. Category management is supported by EDI and barcode applications (Kurnia, 1998).

6.3.3.2 **Continuous replenishment program (CRP)**

Continuous replenishment, usually managed by the manufacturer, is a programme used to control and monitor the movement of goods from the manufacturer to the
warehouse or distributor. CRP involves the manufacturer (rather than the retailer's warehouse) taking responsibility for replenishing the warehouse inventory, with the buyer supplying actual warehouse inventory withdrawal data and data on 'stock-keeping-units' (SKU) to the manufacturer (Cross, 1993). CRP programmes reduce costs in distributors' inventory, but can increase some costs, such as transportation costs, if the manufacturer ships in smaller truck loads more frequently (Garry, 1994a). Successful CRP implementation is dependent on effective trade relations, requiring shared business practices and information systems which will rely heavily on EDI.

6.3.3.3 Computer-assisted ordering (CAO)

Computer-assisted ordering covers the second half of the overall inventory supply chain – the movement of goods from the warehouse or distribution centre to the retail store. The aim of CAO is to generate store replenishment orders automatically, with minimal management intervention, based on such things as current historical PoS scan data, delivery data and sales forecasts. The benefits of CAO have been identified as labour saving and dependability, warehousing and shipping improvements, and inventory reduction (Gary, 1994b). Traditionally stores have based their orders on the re-order clerk manually inspecting the store shelves and scanning the shelf-tag barcodes for those items with limited stock on the shelf (Anderson, 1996). The re-order amount entered by the clerk is based on the actual shelf amount and the ideal shelf quantity. The clerk is not in the position to take into account PoS data, inventory which have already been scheduled for delivery, or likely future trends based on forecasting. Integrated CAO systems are designed to minimise and even eliminate these problems. (Harris, Swatman & Kuria, 1999)

6.3.3.4 Flow-through distribution (cross-docking)

According to Garry (1994c) the purpose of flow-through distribution is to hasten the flow of products from the supplier to the retail store by reducing storage and handling of products at the distribution centre or warehouse. It involves the breaking down of pallets at the distribution centre, reassembling them for store delivery and then shipping them to the retail store without ever storing the product in the warehouse. This requires significant investment in technologies such as EDI, bar-coding and
scanning of pallets and cases, and warehouse design changes such as lower ceilings and less racking. The key EDI transaction required for cross-docking is the Advance Shipping Notice (ASN), to inform the distributor of the merchandise that is about to arrive. The automation of the warehouse inventory management system using barcodes means that inaccuracies can be eliminated (Harris, Swatman & Kuria, 1999).

6.3.3.5 Integrated electronic data interchange (EDI)

EDI is the computer-application to computer-application communication of structured, formatted messages based on international standards, using electronic transmission media with no manual intervention (Brawn, 1989; Swatman, 1993). EDI is a technology which allows structured information to be shared among organisations in the supply chain resulting in significant reductions in transaction cost and enabling the organisation to adopt new and more effective business strategies (Spence, 1994), such as ECR. EDI is viewed as the essential effective enabler of the ECR management strategy because it focuses on achieving integration across organisational functions and between organisations (Swatman, 1993), in the grocery supply chain.

6.3.3.6 Activity-based costing (ABC)

Activity based costing provides the cost and operating information necessary to support the innovative management improvement initiatives such as ECR. The focus of ABC is on accurate information about the true cost of products, services, processes, activities, distribution channels, customer segments, contracts and projects (Miller, 1996). ABC supplies information about profits (where money is being made) rather than about costs. Traditional accounting systems use gross margin calculations that spread the operating costs across all products based on unit purchase prices regardless of the actual value chain (Porter, 1985) through which the products passes. ABC focuses the management's attention on controlling the source of costs, decisions that create activities, rather than squeezing budgets. Therefore ABC as part of ECR can increase the profitability of the supply chain by removing or reducing those cost activities that do not add value. This cannot be done with traditional systems because they do not reflect cost accurately (Weinstein, 1993)
6.3.4 Conclusion

ECR as part of supply chain management shows the potential to create a great competitive advantage for supply chains that choose to go this route. Its focus is to ensure better value for the consumer, lower supply chain cost, more trading relationships, more accurate and timely information, ensuring the right product at the right place and time, and using a standard measurement and reward system that can add to the focus of:

‘Working together to fulfil consumer wishes better, faster, and at less cost’ (ECR Europe Executive Board Vision Statement (1995))

These improvements will be focussed on both the supply and demand side of the supply chain, where these two terms refer to:

Supply side:
- The flow of products through the entire supply chain, from ingredients and packaging, through production, distribution to wholesalers and retailers, and finally into stores and shopping carts of consumers. Supply side improvement will be focussed on integrated suppliers, reliable operations, synchronised production, cross-docking, continuous replenishment and automated store ordering.

Demand side:
- The assortment of products offered to consumers, the effectiveness of product promotions and new product introductions, and the efficiency of related demand planning activities.

ECR as a strategy places the consumer in the centre of all supply chain efforts to create superior consumer value as the decisive factor for long-term growth of the supply chain. Lead-time management forms a great part of this strategy to bring the supply chain as close to the consumer as possible. This will ensure more accurate information throughout the supply chain, and most importantly, from the customer as
the activating element of the supply chain. This will also ensure better information for the demand planning process, that will eliminate the risk of change involved with long lead-times. Ultimately, the more the accuracy of demand information, the less will the need be for forecasting consumer demand due to the real-time information provided.

6.4 **COLLABORATIVE ENTERPRISE NETWORK – THE INDUSTRIAL INTERNET**

The way that companies conduct business with one another has not really changed over the past few decades. The buyer places an order with the manufacturing company, which then delivers the goods to the customer. The customer then pays the company the amount due as per invoice. Each company operates in its own private little universe, selling goods and services from other companies trying to maximise their own profits.

This process served the industrial community for two centuries, but is now being questioned due to the large number of inefficiencies that have been identified. Getting rid of these inefficiencies will mean an opportunity for more profits and a competitive advantage over other companies. The need for a new process has been strengthened by the move to synchronise and shorten supply chains. Most of these opportunities were identified at an earlier stage, but information technology and information infrastructure was lacking. This is however still a problem today, but huge improvements indicate that a process change is closer than anticipated. (Numetrix, 1998)

This section will focus on the concept of the industrial internet and how it can help to improve true collaboration between channel partners in a supply chain, and getting even closer to the consumer. This section goes hand-in-hand with the concept of ECR and the elimination of lead-times throughout the supply chain. All the information in this section was derived from Numetrix, that published a report late in 1998 as part of their future view of supply chain collaboration.
6.4.1 The Industrial Internet

The industrial internet will connect a company with its suppliers, customers and business partners throughout the supply chain. This structure will then form a network of collaborating companies. Many different channels of collaboration may exist between two parties in a supply chain. All these channels combined will then form a global industrial internet. These channels of collaboration are much more than just an electronic message medium, but a framework of rules and objectives that defines how the two parties wish to conduct their business. This channel will consist of information and events as they occur as well as information agents that strive to optimise the business process. These agents can be seen as objects that live on the network and are capable of interpreting, acting upon and propagating messages on the network.

The industrial internet will form the basis for conducting business in the 21st century. It can be seen as an information and decision support network that links decision-makers and transaction processors across all companies that are part of a specific supply chain. The industrial internet can facilitate the synchronisation of material, information and cash flow along the supply chain. In this way it attempts to optimise value gain along each of the value chains/networks.

The focus of each company in today's business world is to manage its own business process, to maximise profits and to maximise company value. Each of these companies that form part of a supply chain/collaborative network will focus on maximising its contribution to the value gain along the entire network and deriving its profits and ultimate company value in proportion to this value addition to the supply chain.

This new approach of doing business can improve the supply/value chain in the following ways:

- Total cycle time can be reduced;
- Increased productivity right across the supply chain;
• Capital tied up in inventory can be freed for more productive purposes;
• Reductions in warehouse space;
• Reductions in associated material handling cost;
• But the most important gain will be that companies collaborating in this network would become much more responsive to end customer demand at significantly reduced costs.

These improvements will give each of the companies and the supply chain a devastating competitive advantage over the companies still practising the traditional approach.

6.4.2 Examples

While there are no full scale industrial internets in operation at this time, there are numerous early examples of network supported collaboration between companies. Some of these networks shared demand forecasts for a selected number of items between the manufacturer and retailer, and savings of between US$150 billion to US$250 billion in annual inventory costs were made. This project has now been expanded and renamed to Collaborative Planning Forecasting and Replenishment (CPFR).

An example common to the retail sector is known as ‘Vendor-managed inventory’, where the stocks held in the retail establishment are controlled by the manufacturer and part of the total supply chain inventory system. (Clemmet 1995) In the USA, Wal-Mart broke down the barriers to information by sharing and opening their consumer information to Procter & Gamble for their usage. This was a revolutionary step resulting from the belief that it did not matter what competitors might learn about the business, as long as the relationship with their own supplier grew stronger, thus resulting in better service for their customers (Johansson et al.1993). Procter & Gamble presently take the consumer information from Wall-Mart at point of sale and decide how frequently and how much stock to deliver to the stores to meet contracted consumer service levels. It is Procter & Gamble’s responsibility to keep shelves full and thus maximises Wall-Mart sales. How this is achieved is entirely up to Procter &
Gamble. This approach benefits both companies individually and hence their supply chain is far more flexible. Wall-Mart not only gets far superior service from their supplier but also has eliminated buffer stock holding in individual stores. Procter & Gamble now has better control of its factories because it can see the whole picture and knows exactly what is going on in the market place. This is a far cry from the usual supplier-retailer relationship where the retailer determines how much stock it will order from the supplier with both parties double-guessing the true state of the system. (Towill 1994; Towill & Mason-Jones 1997)

CPFR has a very limited scope that only encompasses a single level or one link in the supply/value chain. This collaboration is limited to sharing forecasts between the customer and the supplier and it by no means provides to optimise production and distribution dynamically, across the supply/value chain. The main focus of the current project is to establish standards for data interchange. The big advantage of this is that leading companies are taking it seriously to learn how to become a collaborative company and how to build a network to enable the process.

6.4.3 Conclusion

By 2002 most companies will be conducting the bulk of their business over the industrial internet (Numetrix 1998). A company’s share of the business will depend directly on whether it has learned how to be an effective collaborator within a network. This network will only be able to survive if the right value is added to the end product.

The information revolution will always be changing the rules of business. This approach focuses on shortening information lead-times through the integration of the transfer of information throughout a supply chain. Ultimately this means getting closer to the customer by enabling the company or supply chain to react quicker on changes in customer demand. This will save the supply chain money and will add more value to the end product. Any company or supply chain that can recognise this change in formal business procedures, can mobilise themselves to take advantage of the Industrial Internet.
6.5 SUMMARY

Managing the supply chain to ensure the co-ordination of the flow of incoming materials, manufacturing operations, and downstream distribution in a manner that responds to changes in customer demand without creating excess inventory, still forms the basis of the supply chain theory. The integrated movement of materials and demand information through the supply chain can build customer satisfaction, improve performance, and ensure a competitive advantage. All these elements are supported by the concepts of strategic lead-time management, efficient consumer response and the industrial internet.

Strategic lead-time management focuses on the control and shortening of supply chain lead-times to lower inventory levels and the associated costs of keeping inventory, and increasing the value of products to consumers. Lower inventories and better communication will assist in creating demand visibility throughout the supply chain and also speed up the rate at which information is received by the forecasting and production departments. This will improve the accuracy of the information received as well as forecasting accuracy. The demand planning process can then function with greater success and create a highly agile supply chain that can supply a value added product to comply with consumer needs.

ECR as an extension of the theory of SCM, aims to fulfil consumer needs faster, better and at a lower cost. This concept goes hand-in-hand with strategic lead-time management and focuses on the same goals of reducing supply chain cost and inventory levels, and to improve customer service. This is done through the creation of timely and accurate information flow and creating strategic alliances between supply chain members. This will lead to a continuous product flow that can be matched to consumer consumption. This concept also echoes the importance of having the consumer in the centre of all supply chain efforts. Collaboration between all parties constitute the most important element and will ensure that all supply chain members strive towards the same goal.
The 'industrial internet' concept was created with a network of collaborating companies in mind. Companies that form part of this network can become more responsive to end-consumer demand at significantly reduced costs. This places great emphasis on investments in improving communication in the supply chain to become an effective collaborator in a more competitive world. The ability to gather, interpret and use consumer information will in future distinguish the best companies and supply chains from the rest.

The concepts of sharing information, strategic alliances and shorter lead-times were echoed through every part of this chapter. It boils down to providing the demand planning process with the best information to provide the ultimate customer service. All of these processes are very closely linked and address more or less the same issues in a slightly different way. It proves that the demand planning and SCM processes are very closely linked and issues in both need to be addressed at the same time to get the best results.
References:


CHAPTER 7: OVERALL SUMMARY

7.1 INTRODUCTION

As the new millennium dawns upon business, macro-economic conditions are becoming more and more complex. Consumer expectations are rising, the variety of goods on offer is increasing and competitive pressures are growing. As mentioned in Chapter 1, the change in customer expectations and of the nature of competition, have forced manufacturers to look at their business and industry with different eyes. Organisations are no longer just competing with others in the same town, same region or even the same country; their competitors can reach their markets from anywhere in the world. This means that they always have to compete with the best. The model of a world-class firm is thus always changing and improved upon, and companies refusing to participate in the power struggle, will become extinct.

The basic theory of supply chain management was introduced in the late 1950's. This theory only started to become more popular in the late 1970's as pressure increased from competitors and customers. This management of information and materials, from the original natural resource to the ultimate consumer, was a perfect response to the issues of increased market competition and ever increasing customer expectations. Supply chain management as an enterprise-wide approach, became the perfect tool to provide a sustainable competitive advantage.

One of the industries that was affected the most by these changes, was the fast moving consumer goods (FMCG) industry. Traditional marketing- and production driven companies were starting to become very sluggish, when it came to sudden changes in consumer needs and expectations. These companies often had the view that they were directing market trends when it came to FMCG. But the continuous increases in customer expectations, the rapid rate of consumption of consumer goods and world-wide competition created supply chains that were focussed directly on the consumer. For these traditional firms, the classic phrase ‘Adapt or Die’, became a frightening reality of modern business life.
The quote of Regis McKenna as mentioned in Chapter 2 summarises customer expectations as:

'Right here. Right now. Tailored to me. Dished up the way I like it'

This new voice of the consumer was one of the elements involved in creating the term 'supply chain agility', that became the new phrase in the business world. It was no longer just enough to get product to the market, but an in-depth knowledge was needed of what the customer is waiting for. A supply chain must be able to react in the shortest possible time to consumer needs and give consumers exactly what they want. Failure to comply with these demands will unquestionably cause the consumer to take his business somewhere else.

Acquiring in-depth consumer knowledge implies the creation of formal structures to collect, interpret and manage information about various macro and micro economic elements that can have an influence on the company. This is especially true for the modern supply chain, where information about the consumer forms the basis of all decisions. Within the structure of this study, consumer demand information forms the single most important element to activate and drive a supply chain. The structure of the FMCG industry placed even more emphasis on customer demand due to the fast moving nature of product in this industry. Current and historical information about consumer needs forms an important role in determining consumer demand, but ultimately it will be the supply chain's perception of future demand, that drives the activities in the supply chain. The quality and accuracy of forecasting this demand will undoubtedly influence the supply chain’s ability to meet consumer demand and will also play a role in the level of agility, and thus the success of the supply chain in a highly competitive environment. As more companies and supply chains are starting to explore and invest in generating demand information, the further the meaning of a competitive supply chain will be moving in the future.

This study was about the following two areas of research:
An exploration of the subject of Demand Planning in the synchronisation of a FMCG supply chain. It aimed to show how an effective demand planning process could positively influence the supply chain management process and form an active element in supply chain synchronisation.

An investigation of the influence of certain supply chain strategies was also undertaken on demand planning to indicate the level of integration between these two processes. In order to do this a theoretical study needed to be done on Demand Planning and into the elements thereof.

The process called demand planning influences virtually every part of the supply chain and its members. Forecasting as part of the demand planning process forms a crucial part of business and strategic planning. An accurate forecasting process can create a solid foundation to drive down general problems in the supply chain structure, like high inventories, long lead-times, slow reactive ability, lost sales, bad customer service, high supply chain cost etc. But it cannot function in isolation. Supply chain management and demand planning forms an integrated structure wherein great advantages and savings can be made and to create a more agile and cost effective supply chain, that can add value to the end product and consumer. And in essence that is what supply chain management is all about - creating value for the end consumer and in turn for the supply chain.

This chapter will summarise the most important elements discussed in this study and will draw conclusions about the integrated structure between supply chain management and the process of demand planning. It is not just the process of demand management that will influence supply chain synchronisation, but also certain elements of supply chain synchronisation that can have a positive effect on demand planning. All these processes form the basis to adding more value to the product for the end user. This chapter will start with one of the main goals to supply chain management, customer service. From there on it will link with the subjects of supply chain management and demand management and how these two processes add to a more synchronised, cost effective and service orientated supply chain.
7.2 THE CUSTOMER SERVICE GOAL TO SUPPLY CHAIN MANAGEMENT

Chapter 2 explored the importance of the consumer and the customer in the supply chain process, and how changes in the consumer market placed more pressure on the traditional manufacturing firms in FMCG. One of the important elements to supply chain management (SCM) is to provide the highest level of customer service at the most optimum cost. This will include all normal customer service elements like sales service, order convenience, reliability etc. The main focus in this study was however, to indicate how product availability, as one of the customer service elements, forms one of the most crucial success elements to any FMCG supply chain, and how the process of demand planning combined with the process of SCM, can deliver this level of service.

The consumer market has undergone a massive development since the 1970's and 1980's. This development from a stagnant non-participative element to the dynamic core of the supply chain process can be summarised with the following points:

- Consumers want conveniently placed products. This point to the concept of availability, to have the right product, at the right place, at the right time, within easy reach of the consumer.
- The right price forms the next important concept. Not the lowest price, but rather the price that allows the consumer to get the best value for his money.
- The role of information is getting more and more important. Product information and an effective grievance procedure form the most important elements for the consumer.

These elements form part of the perceptive value of a product for the customer. Value-addition is in fact one of the ways in which the product-service package can be seen in terms of customer service. This will have a definite impact on the way the supply chain strategy is structured, and specifically in the following ways:
Customer service is a process involving all channel members;
This relationship may span over a few companies in a supply chain;
Value added forms the key concept in determining customer service;
Value added to customers must result in cost effective benefits for the entire supply chain.

These elements indicate that customer service is a strategic or survival factor that must be managed in such a way that it can be seen as a distinguishing factor that separates one supply chain’s product from its competitors.

If the main goal of the supply chain is to satisfy customers by providing a profitable, value-adding product, then the customer must form the main focus of the supply chain. This is true especially in view of the highly dynamic nature of the FMCG industry, and rapid changes that take place in the consumer market. It is here that SCM can help a business to manage the flow of material and all information from resource to final consumption, and focus on resolving problems that are important to the customer. Supply is a shared objective of every function in the chain, and of a strategic significance due to the impact on overall cost and market share. The challenges of maintaining inventory visibility to prevent non-optimal stock building, co-ordination of inventory along the supply chain focus on the final landed product cost, sharing of information, the sharing of risk and most importantly, joint planning, can create a highly adaptive chain by synchronising the activities of the channel members. This synchronised environment is a necessity in the highly volatile and demanding FMCG market.

The management of information forms another key concept to SCM. The importance of it can be seen in the nearly every definition of SCM. To ensure an agile supply chain that can adapt to any change in the market place, it is necessary to keep track of the various sources of micro and macro environmental information. Information flow throughout the supply chain ensures that the integrated structure is kept in tact and that joint supply chain planning can be done off the same information base. Information is also a key concept when it comes to availability. Customer demand information is extremely important within the structure of a FMCG supply chain, and
thus also to customer service. The consumer needs to be the activating element in the supply chain. His needs need to activate all the processes from the raw material stage right to the consumer interface to ensure the right product at the right place at the right time. Final customer demand needs to be the force that pulls inventories through the channel.

This can only be done successfully in a synchronised supply chain environment. Chapter 3 defines the goal for supply chain synchronisation in the following way:

‘To create a supply chain with short cycle, synchronised components that can produce product at the customer’s demand rate and replenish each forward component at the rate the customer is pulling from the system’

This summarises what supply chain synchronisation and management is really about — the ability to create direct value for the end customer, to the advantage of the entire supply chain. This successfully sets the scene in chapter 3, wherein the concept of demand planning was demonstrated. As part of supply chain management, demand planning can contribute to the creation of a competitive advantage for the supply chain by managing demand information.

7.3 MANAGING DEMAND INFORMATION

Demand planning can be seen as the process of getting closer to the consumer market, to enable the supply chain to manage all sources of demand information. This will include the actual management of consumer and customer information, deriving an accurate forecast for the entire supply chain, and ensuring that customer demand is the force that pulls inventories through the supply chain. This implies the supply chain ‘marching to the beat’ of the customer. Chapter 5 as the core of this study, focussed on this relationship between the customer and the manufacturing supply chain.

All supply chain actions are considered to be predictable to some degree, or at least under the control of someone. Much of the success of supply chain planning and
decision making-processes depends on the formulation of accurate forecasts. Chapter 4 as a background study to chapter 5, investigated the theory of forecasting and explored most of the methods used in business, either individually or as part of a forecasting system. The FMCG supply chain depends heavily on the forecasting of consumer demand to activate the chain and ensure the right level of product availability for the customer. One of the most important necessities for a demand driven supply chain is an integrated demand planning process.

Demand planning consists of the following two key processes:

- Demand communication;
- Demand management

The most important elements to these two processes can be summarised in the following section.

7.3.1 **Demand communication**

Demand communication involves the stages of identifying, collecting, understanding and the communication of demand information. The core of this process can be seen as deriving a demand forecast that consists of the following components:

- Statistical component;
- Management interaction component;
- Feedback component.

The statistical forecasting process makes use of quantitative forecasting techniques to derive a mathematical forecast based on sales or demand history.\(^1\) The statistical approach assumes that what has happened in the past will help forecast what will happen in the future. This may not always be correct due to the dynamic nature of the FMCG market, as well as internal drivers of changes such as specific marketing plans

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\(^1\) Described in Chapter 4 point 4.2.
and promotions. To overcome this problem, the forecasting process also consists of a management interaction component.

The management interaction component can be seen as qualitative forecasting that is based on intuition, the application of judgement, intelligence and experience to the forecasting situation. The statistical forecast needs to be reviewed with this aim in mind to ensure that the changes in the market are catered for. Market intelligence information needs to be added to the statistical forecast to take the influence of promotions, market situations and other marketing programs into account. This double-sided approach will ensure that the final forecast takes the normal average demand rate into account, as well as changes in demand due to environmental influences, whether internal or external.

The feedback component of the forecasting process involves the collection and studying of the effects of a specific forecast. This will include measuring forecast accuracy, as well as the reasons for the performance of the forecast against actual demand. Standards need to be set to ensure that the forecast is under control and this feedback will signal if action needs to be taken to regain control of the forecasting system. Building a forecast-accuracy history databank can be extremely useful to explain why certain errors occur and can be used in future forecasts to eliminate the influence of these errors. All changes to the forecast need to be documented and explained in detail. Other elements that need to be monitored are the accuracy of market intelligence, the level of demand variability, the influence of a specific forecast on the rest of the supply chain, etcetera.

These elements need to form the core of the demand communication process and will directly influence the effective use of demand information throughout the supply chain. Determining the requirements necessary to develop an effective forecast and the selection of specific forecasting techniques will also form part of this process.

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2 Techniques described in Chapter 4 point 4.1.
3 Based on statistical forecasting
4 Based on qualitative forecasting
7.3.2 Specific forecasting elements

Chapter 5 also aimed at identifying specific forecasting elements that are extremely important to the efficiency of a demand planning process. The most important of these elements is that only one forecast is needed for the entire supply chain. The focus of the supply chain's demand planning process will be to match supply and demand of products. This can be done by letting customer demand pull inventories through the supply chain, and allow the channel members to act on direct customer demand. The requirements of the customer will create certain individual requirements for each of the channel members that will be transferred down the supply chain in order to meet the original demand. The important element in this is that it is still activated by the same demand information from the customer. Each of the channel members will need to supply another member in the chain according to its requirements. It will be impossible to supply the customer if channel members work off different forecasts.

The quality of statistical forecasts as the core to the forecasting process needs to reflect the true reality of demand. Many forecasting problems are caused by incorrect historical data used as the source for a statistical forecast. Specific problems that can distort the demand history can be seen as:

- The difference in basing a forecast on actual sales or orders received;
- Capturing re-ordered demand as normal demand for products that are experiencing out-of-stocks;
- The length of the time period involved that the forecast is based on;
- The effect of promotions and sales drives on demand.

Under normal conditions, a forecast needs to be based on regular business, or the average rate of sale. Distortions to demand history can compromise the accuracy of the base forecast, and overall forecasting accuracy will be lower. A management decision needs to be taken about the handling of this issue and how it will relate to the rest of the supply chain. One of the options available will be to store two separate
history banks – one based on regular demand, and another based on total demand including all promotions and management interaction.

Another important element that needs to be kept in mind when storing demand information, is that information that relates to a specific event in time, needs to be stored with the rest of the data. Useful comparisons can be made in future and relationships can be drawn between certain scenarios. This in turn can improve forecasting accuracy.

### 7.3.3 Demand Management

The second key process of demand planning is demand management and involves the management of the inputs, outputs and controllable drivers of demand in the forecasting process. It focuses on assessing and understanding the incoming demand data to the forecasting process, the volatile nature of this demand, and how other factors – internal or external - will have an impact on forecasting demand. This element also focuses on the internal supply chain constraints and need to formulate an action plan for production to customer demand. The understanding of the inherent nature of demand can be used to leverage the demand plan for the supply chain, tailor made for the needs and constraints of every channel member.

The internal focus of demand management also focuses on the individual functions performed in the supply chain. It aims to align individual, and often-conflicting functionary and company objectives, with the overall supply chain objective. Leveraging the demand plan to provide the customer with a value-added product and providing the highest level of customer service still forms the main goal of the demand planning process.

To conclude the issue of demand planning, it can be mentioned that there is no perfect forecasting technique and that forecast will always be wrong. This process can however deliver great advantages and customer service returns for the supply chain, if it is managed in a responsible effective way. The maintenance of accurate data on all forecasting inputs and outputs, good communication, measuring and evaluating the
forecast and understanding the market and supply chain dynamics that will have an
effect on delivering the demand plan, will form a critical factor in determining the
strategic alignment of the supply chain in the FMCG market.

7.4 INTEGRATING DEMAND PLANNING, SUPPLY CHAIN
MANAGEMENT AND CUSTOMER SERVICE

Chapter 6 focused on specific issues or 'drivers' that influence the process of demand
planning, supply chain management and customer service by extending the supply
chain. The following summary can be made of these concepts in the context of the
study:

7.4.1 Strategic lead-time management

The fundamental problem that most FMCG supply chains face is that the time it takes
to procure, make and deliver the finished product to a customer is longer than the time
the customer is prepared to wait for it. These lead-times represents extra cost to the
supply chain and will also mean a penalty to customer service. There is a direct
relationship between the length of the supply chain and the inventory that's carried in
it and will imply increased inventory cost. Long lead-times also have a very negative
effect on response times to customer requirements. One of the elements of supply
chain management is managing the lead-times throughout the supply chain. Shortening
lead-times can have a positive effect on adding value to products, and can
increase the agility of a supply chain to be more responsive to the customer.

Customers are becoming more time-sensitive, and this is reflected in the way they
make their purchasing decisions. Product availability once again forms one of the key
needs for most customers. Most companies and supply chains have started reducing
inventory levels to align themselves with more demanding customers. In this way a
great advantage could be gained in terms of improved flexibility, responsiveness to
customers and a release of capital employed in material stocks.
The volatile nature of the FMCG market ensures that forecasts will be wrong. Long lead-times will only add to this problem due to the fact that forecast error increases as lead-time increases. This can form a vicious circle that just keeps on adding to the problem: Inaccurate forecasts will increase the need for higher safety stocks; Forecasting errors will cause more unscheduled production jobs as well as having to contend with even more volatile demand. Demand information travels through the supply chain at the speed of inventory. This will cause the demand to reach the supply chain members at a very late stage, and add to more inaccurate forecasts. Which in turn will lead to the need for higher safety stocks. If lead-times are out of control the supply chain will not achieve its goals.

The key to control supply chain lead-times is pipeline management. Pipeline management is the process whereby manufacturing procurement lead-times are linked to the needs of the market place, and seeks to meet the competitive challenge of increasing the speed of response to the market. It aims towards the following goals:

- Lower costs;
- Higher quality;
- Greater variety;
- More flexibility;
- Faster response times.

The achievement of these goals will depend on the level of supply chain integration and the level of integrated management of the channel members. Supply chain activities either add cost or value to the system. Pipeline management aims to find ways to increase the ratio of value-adding time to cost adding time.

Another great opportunity for improvement, especially in the context of the study, is to come from the better use of demand information. Demand data is hidden by the order penetration point being too far down the pipeline and the fact that large amounts of inventory hide its presence. Normally, orders will only be placed when a channel member’s re-order point is reached. This makes demand data less accurate because there is more time for the market to change. Pipeline management aims to shorten
lead-time and inventory in the system, thus greatly improving the usability and accuracy of demand information. This can be done by reducing the logistics or supply chain lead-time, and by extending the customer’s order cycle.

Reducing the supply chain lead-time involves the recognition of the importance of integrating the supply chain system by focusing on the interfaces between adjacent stages where most time is normally wasted. This can be done through the approach of ‘optimised production technology’\(^5\). Extending the customer’s order cycle means that an earlier warning of customer orders should be obtained. This can be done by pushing the order point higher upstream or using information technology to bring the manufacturer faster in contact with what is happening in the market.

Strategic lead-time management can be a great benefit to the supply chain by adding value to the end product, lowering channel cost and ensuring product availability. This strategy of shortening lead-time can have a positive effect on demand management in the sense that information reaches the forecasting function in the shortest space of time, and that forecasts are based on the latest information. By shortening the supply chain, it can yield great benefits by lowering working capital, lowering inventories, giving greater flexibility in production, creating a more agile supply chain, better product availability, and most importantly, increased customer service.

7.4.2 Efficient consumer response (ECR)

ECR can be seen as an extension of the supply chain theory and aims to address inefficiencies in terms of high inventory levels and costs in the supply chain, with high focus on the outbound supply chain side. The main aim of this theory is to move the supply chain closer to the consumer to provide the ultimate level of customer service. This can be seen in the definition of ECR\(^6\):

‘Working together to fulfil consumer wishes better, faster, and at less cost’

\(^5\) As explained in chapter 6, section 2.5.1  
\(^6\) As defined in chapter 6 section 3.1
The main focus elements of this strategy can be seen as:

- Reduction in cost in the supply chain;
- Reduction in inventory in the supply chain;
- Improved customer service.

These elements are directly in line with the goals of supply chain management and indicate that ECR looks at the supply chain from a value chain perspective considering the actions of all the channel members. ECR aims to create a continuous flow of products matched to consumer consumption by creating timely and accurate information flow between partners, as well as creating strategic alliances between channel members. In order to make this succeed it is necessary to remove all the barriers between channel partners in order to facilitate better decision making. Technology will form the key element to ensure effective partnerships and communication.

To achieve all this ECR requires the following major business activities:

- Category management – developing a process that involves managing product categories as business units and customising them on a store-by-store basis to satisfy consumer demand;
- Continuous replenishment program – a program managed by the manufacturer to control and monitor the movement of goods from the manufacturer to the warehouse of the distributor;
- Computer assisted ordering – covers the movement of goods from the warehouse or distribution centre to the retail store and aims to generate store replenishment orders automatically based on historical point-of-sale scan data, delivery data and demand forecasts;
- Flow-through distribution – to hasten the flow of products from the supplier to the retail store by reducing storage and handling of products at distribution centres or warehouses;

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7 The detail of these business activities has been discussed in chapter 6 section 3.3.
• Integrated electronic data interchange – allows the sharing of structured information amongst channel partners and will result in reductions in transaction costs enabling the adoption of more effective business strategies;
• Activity-based costing – provides accurate information about the true cost of products, services, processes, activities, distribution channels, customer segments, contracts and projects.

These elements show that ECR as part of the supply chain management process, can create a great competitive advantage for the supply chain by ensuring a higher value, lower cost product and better customer service. It places the customer in the centre of the supply chain by managing the flow of products through the supply chain and ensuring control over the assortment and availability of products offered to the consumer. ECR focuses specifically on shortening the lead-times between channel partners and improving information flow throughout the supply chain. These elements form a critical part of the demand management process in managing the supply chain.

7.4.3 Collaborative enterprise networking – The industrial internet

The process of synchronising the supply chain has indicated that a huge amount of inefficiencies exists in modern day business. The industrial internet as part of the ECR and supply chain management drives, aims to connect a company with its suppliers, customers and business partners in a supply chain. These combined channels of collaboration between channel partners will then form a global industrial internet to form a framework of rules and objectives that defines the way partners do business with one another.

The industrial internet can further be seen as an information and decision support network that links decision makers and transaction processors across channel members. By linking these channel members, each of them will focus on maximising its contribution to the value gained along the entire network. This will improve productivity, reduce cycle time, reduce inventory tied up in the chain, and reduce warehouse space etcetera.
As a future perspective, the industrial internet may change the way business is done and a company or supply chain's share of the business will depend directly on its ability to learn how to be an effective collaborator within a network. This will add greatly to customer service and ensure a supply chain that stays one step ahead of change.

Each of these concepts indicate that the processes of demand planning and supply chain management form an integrated matrix of events that can have a great impact upon each other. Everything in the supply chain is about dependant events and the supply chain theory aims to co-ordinate the flow of incoming materials, manufacturing operations, and downstream distribution in a manner that responds to changes in customer demand without creating excess inventory. The initiatives of strategic lead-time management, ECR and the industrial internet aims in a dynamic way to shorten the supply chain and bring all the channel members closer to the one element that really matters...the consumer.

7.5 **CONCLUSION**

The aim of this study was to explore the importance of handling demand information in a structured process called demand planning, as one of the most important parts of supply chain management. It proved that the forecasting process forms the core of the supply chain and will directly influence the effectiveness of the chain in regards to its main objectives of maximising customer service at the lowest cost. It also indicates that the demand planning process can not be seen in isolation, but as an integrated part of the supply chain management and synchronisation processes. These processes will influence one another in a direct way, and cannot be approached from the viewpoint of only one of these processes.

Implementing an integrated demand planning process can form a once off exercise on its own or as part of a supply chain restructuring process. It will however demand continuous management and changes to ensure that the process stays in line with current practices or with changes in the environment. The basics of this approach will
not change and a demand forecast will still form one of the most important parts to a FMCG supply chain, but changes must be made to ensure improvements. This process can also be a collaborative project including the inputs of many channel partners. This can greatly increase the forecasting process effectivity and add to the buy-in of having just one forecast for the entire supply chain.

This chapter concluded the study of the importance of demand planning in the synchronisation of a FMCG supply chain. It showed in a dynamic way that the processes of demand planning and supply chain management are linked, and how these processes can positively influence one another with unquestionable importance. The value of the future knowledge of customer and consumer demand cannot be overstated in this study. In the end, all company actions are still about pleasing the customer by providing a good quality product, available at the right place in the right format. By ensuring that the demand planning side of the supply chain is at its most effective, the customer can in fact become king, by forming a dynamic part of an agile chain of events, to ensure the meeting of the everyday needs of people in an ever-changing environment.
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