



# BUSINESS-TO-BUSINESS E-COMMERCE IN THE SOUTH AFRICAN FEED INDUSTRY

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**S. BISSASSER**

Supervisor: Prof. Elza Thomson

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## DECLARATION

This thesis represents the original work of the author and has not been submitted to this or any other University. Wherever use was made of work of others, it has been duly acknowledged in the text.

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## EXECUTIVE SUMMARY

S.A. Bioproducts, a biotechnology company that started in the 1993 manufactures and markets a product called Lysine, which is an animal feed additive. It operates in both the international and local animal feed markets, which are volatile and highly competitive. S.A Bioproducts envisages using e-commerce to streamline business processes and to improve customer service.

This study was designed to assist S.A Bioproducts with the decision making process about the introduction of e-commerce to its customers. It examined the readiness and willingness of Bioproducts customers to purchase Lysine online. The study also explored the behaviour of the industrial buyer with a view to understanding the factors that affect the adoption of e-commerce. Another objective of the research was to understand customers perceived barriers and the benefits of e-commerce.

The study took the form of a research project conducted amongst the current local customers of Bioproducts. Structured questionnaires were used to obtain information about customers' attitudes and perceptions about e-commerce. Due to the small number of customers a census sample was used with one representative from each company filling out a questionnaire. The data was analysed with statistical software called SPSS and mostly descriptive statistics has been used to interpret the results.

Decisions about e-commerce has been gaining importance in organisations and generally forms part of the strategic decision making process either at the functional or the business level. By the end of 2002 it is expected the B2B e-commerce will account for 83% of the total online sales in the world and this is expected to grow to 88% by 2006. Africa's implementation of e-commerce has been lagging behind Europe and U.S due mainly to the lack of infrastructure. By the end of 2002 South Africa is expected to spend R35 billion online, the bulk of which will be B2B e-commerce.

This study shows that the information technology infrastructure amongst Bioproducts customers is very well developed. Although all respondents have access to the Internet only 23.3% of them actually purchased goods online. Currently, the Internet is most commonly used for obtaining quotes and for final electronic payment. The results show that there is high level of interest in e-commerce with only 3.3% respondents not being interested in e-commerce. Approximately sixty percent of respondents have at least an "average" level of awareness for e-commerce indicating that most customers have a reasonable grasp of e-commerce.

The results tend to indicate that larger companies are more likely to adopt innovations sooner than smaller companies, which is in keeping with the finding of Fredrick & Webster (1969). Due to the highly competitive nature of the animal feed industry, the "bandwagon effect" identified by Mansfield (1968) will have significant effect in increasing the rate of diffusion of e-commerce within the animal feed industry in S.A.



The main reason why most local customers are currently not using e-commerce is that suppliers are not ready. In Europe, procurement managers stated that the main reason why managers did not purchase on-line was that their suppliers were not on-line or not ready to implement e-commerce. In Singapore a study found that security, initial set-up costs, and on going operational costs as the main barriers to the adoption of B2B e-commerce.

Customers rated the ability to reach a wider network suppliers and the ability to track orders as the major benefits of e-commerce. This result is similar to the results of the Singaporean survey where 49.1 % of the firms rated global reach of suppliers as being important. Generally the financial benefits of using e-commerce was not rated as highly as the logistical benefits.

This study is only the first step in Bioproducts e-commerce decision making process. Having established there is an interest in e-commerce amongst customers and that customers have the resources to purchase online, Bioproducts can now invest resources in answering the other aspects of the decision making process. The study indicates that most local customers are keen to purchase Lysine online within one year which means that Bioproducts should commence with further investigations as soon as possible. The scope for further research can be increased by including international customers in the survey. Bioproducts needs to perform further research to establish the cost of implementing an e-commerce strategy. The study also needs to evaluate the financial benefits that will accrue to

Bioproducts if it embarks on an e-commerce strategy. Bioproducts also need to establish if its suppliers are in a position to embark on business-to-business e-commerce. If Bioproducts is able to employ e-commerce for procurement and for sale of its products it would increase the financial justification for e-commerce. It is imperative that Bioproducts has a sound business model before implementing e-commerce.

This study shows that people are very concerned about the “lack of human contact” that is normally associated with e-commerce. Bioproducts should ensure that even if e-commerce is introduced it should not be a substitute for human contact. Bioproducts needs to ensure that it employs adequately qualified IT personnel early in the conceptual phases if it wants to successfully implement e-commerce.

While customers welcome e-commerce the traditional methods of marketing still need to be maintained. In essence, e-commerce should complement traditional marketing channels and not substitute them.

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## CHAPTER 1

### INTRODUCTION

#### 1.1 INTRODUCTION

BMI-Tech, a research company predicts that despite the initial sluggish growth, South African business-to-business (B2B) e-commerce would grow from R3.9bn in 2000 to R310bn in 2005, an annual growth rate topping 100% (Augustine, 2001). Douge Franke of Price Waterhouse Coopers believes that the local market is not big enough for all the e-business initiatives (Stones, 2001). This type of conflicting opinions about the South African market highlights the difficulties that business leaders face regarding e-commerce investment decisions.

The study aims to understand the dynamics within a small segment of the South African economy namely the customers of S.A Bioproducts who belong to the animal feed industry. It also aims to establish the size of the potential market and the level of interest in business-to-business e-commerce. S.A Bioproducts would be able to use this information to establish if the market is big enough to sustain an e-commerce initiative.

Although the subject of the study is e-commerce, it does not delve into the technical details of e-commerce however, it uses e-commerce as an example of an innovation when discussing the marketing theory on adoption of innovations.

Industrial buying behaviour is studied by examining different factors that will prompt industrial buyers to use e-commerce. Previous work industrial

buying behaviour concentrated on the decision making process in terms of “what” to purchase, “how much” to purchase, “when” to purchase “whom “ to buy from and “what” is an acceptable price. This study differentiates itself by focussing mainly on “how” to purchase. It examines the scenario after the purchase decision is made and the buyer needs to decide whether to purchase by traditional means or whether to purchase via the Internet. This study also examines Bioproducts customer perceptions of e-commerce while using marketing theory to underpin the research.

This chapter presents the objectives of the study and describes the research design and methodology used to realise the objectives. It chapter also elucidates on the benefits of the study together with the limitations.

## 1.2 BACKGROUND

S.A. Bioproducts (PTY) LTD is a Biotechnology company located 20 km South of Durban. It produces Lysine, which is an amino acid used as an animal feed additive. It currently markets its product to the local and international animal feed industry. Its customer base ranges from large corporate feed animal manufactures to small pig and poultry farmers. Being the only local Lysine producer, Bioproducts has approximately 70 % of the local Lysine market share. The local sale of lysine is executed directly by Bioproducts while overseas sales is undertaken via agents. In the local market traditional sales methods are used where an offer of sale is made after a customer request a price. If the price and terms are acceptable a contract is signed between the two parties and the product is then delivered

as per the terms of the contract. The customer normally pays by an electronic bank transfer or direct deposits into the Bioproducts bank account. Correspondence between the two parties currently takes place either by telephone, fax or e-mail. Although certain aspects of the business are conducted with the aid of the Internet, Bioproducts does not engage in e-commerce to its full extent. Bioproducts currently has a web site, which merely serves serve to create presence on the web. The web site is not interactive and lacks the capability to support e-commerce.

### 1.3 PROBLEM STATEMENT

In an ongoing effort to improve its competitive position and to improve its customer service, S.A Bioproducts needs to establish whether it should invest in e-commerce. This will involve developing a fully interactive website capable of supporting all aspects of e-commerce. This decision largely depends on the whether customers have the need and the means to adopt e-commerce. In order for customers to engage in e-commerce they need to have access to the Internet. It is also important to understand the customer perceptions about e-commerce. Bioproducts also needs to establish an appropriate time to introduce e-commerce to its local customers and identify segments of it market that are amenable to the idea.

### 1.4 OBJECTIVE OF THE STUDY

Bioproducts needs to understand whether it should invest in e-commerce. As an initial step in the investigative process it is important to ascertain whether the current local market is interested in e-commerce. This study

will enlighten Bioproducts whether it should continue with further investigations into the implementation of e-commerce. The other objective of the study is to establish if the local customers of Bioproducts have the means to engage in e-commerce. The secondary objective of the study is to get an indication of how soon customers would like to start procuring Lysine via the Internet. The study is also aimed at identifying the innovators in the animal feed industry. An examination of industrial buying behaviour contributes to the understanding of the factors that affect the adoption of e-commerce. Another objective is to understand the perceptions of customers in terms of the barriers and the benefits of e-commerce. A better understanding of the customer's perceptions, behaviour and attitudes towards e-commerce will serve to facilitate the implementation of e-commerce.

## 1.5 SCOPE OF STUDY

Although Bioproducts trades locally and internationally the study only focuses on the local market. This is due to the fact that Bioproducts is looking at scaling back its international sales of Lysine while focussing more on the local market. Also, due to logistical constraints of obtaining information from overseas clients they were omitted from the study. The other factor is that several empirical studies on the adoption of e-commerce have been conducted around the world, however, South African studies have been limited. Focussing on the South African market will help create a new body of knowledge for the South African feed industry. From a

marketing perspective the study focuses on industrial marketing with very little emphasis on consumer marketing. In terms of e-commerce the study emphasises business-to-business e-commerce rather than business-to-consumer e-commerce.

## 1.6 DEFINITIONS

AIETA - awareness, interest, evaluation, trial and adoption.

B2B - business-to-business

E-business - electronic business

MRO - maintenance, repairs and operations

IT - information technology

E-commerce - electronic commerce

Lysine - an amino acid, which is the building, block for protein.

PC - personal computer

## 1.7 BENEFITS OF THE STUDY

The findings of the study will be used by Bioproducts as one of the elements that will go into the decision making process for e-commerce investments. As the first step into the investigation this study will assist Bioproducts in deciding whether it should invest more resources in investigating the feasibility of e-commerce or whether it should abandon the idea. This study will provide the basis for a larger study which could include international customers and also investigate other aspects of the decision making process like the return on investment. An e-commerce venture calls for a major financial investment and this study contributes to

minimising the risk of failure of such a project. The study also touches on some of the operational issues of the e-commerce project like the timing of project and the target market.

From a research perspective the study contributes to an understanding of the buying behaviour of industrial customers in the animal feed industry. It adds to the body of knowledge on a relatively new subject where limited empirical work has been done in the South African market.

## 1.8 RESEARCH DESIGN AND METHODOLOGY

This section provides the details on collection, measurement and analysis of the data. Apart from presenting the sampling, measurement and analysis techniques the justification for the chosen technique is also presented. The overall study is descriptive in nature, aimed primarily at establishing Bioproducts customer attitudes about e-commerce, but it also attempts to uncover the association between variables. The major challenge of the study was to obtain as much primary information from busy respondents without taking up too much of their time.

### 1.8.1 RESEARCH APPROACH

The study involved both desk research and empirical field research. Desk research took the form of literature searches of journals, newspaper articles, magazines and textbooks to ascertain the current status of e-commerce in industry. Both electronic and hardcopies versions of the aforementioned sources were used. Literature searches also provided a source of theory on industrial buying behavior, adoption of innovations and e-commerce. Field

research involved a survey using a structured questionnaire to gather information on Bioproducts customers' attitudes and perceptions about e-commerce.

#### 1.8.2 SAMPLING

The current local customer base of S.A Bioproducts was used as the sample. Census sampling was used since Bioproducts only has 35 customers that form part of its local customer base. The survey revolved around customers that purchase directly from Bioproducts and excluded those that purchase Bioproducts Lysine via traders. A questionnaire was sent to the industrial buyer in each of the organisations.

#### 1.8.3 MEASUREMENT TECHNIQUES

Data was collected with the aid of a structured questionnaire, which was either e-mailed or faxed to customers. Some forms were also personally handed to customers. Due to busy work schedules of respondents most questionnaires were followed up by telephone calls prompting people to fill out and return the questionnaire. The option to fill out the questionnaire via a telephonic interview was proposed but all respondents declined the offer. A total of 30 questionnaires were returned however, some questionnaires were incomplete.

#### 1.8.4 DATA ANALYSIS

Data was analysed using a statistical software package called SPSS. Exploratory data analysis (EDA) was used as a tool to search for patterns within the data. Cross tabulation resulted in too few data points in order to

perform Chi- squared tests. Due to inadequate data it was not possible to perform any statistical analysis on proving any form of correlation. According to Nel et al. (1992) the frequency in each cell of the table should be at least 5 in order to apply the Chi-square technique. Hence throughout the report the cross tabulations are merely discussed without using any statistical technique to establish a correlation. In some instances correlations are proposed without statistical confirmation. Where applicable the t-test was used as a confirmatory statistic to confirm the difference of means between two samples. The Cronbach reliability analysis was used to test the suitability of multiple questions measuring the same concept. Data is presented in a graphical form of Histograms and Pie Charts to facilitate interpretation.

#### 1.9 STRUCTURE OF REPORT

The report is structured into five chapters beginning with the aims and methodology of the study with the limitations being explained early in the report. The second chapter describes the marketing and e-commerce theory and well as results of past studies. Chapter three paints the background of S.A Bioproducts and the business environment within which it operates. Chapter four presents the results of the research followed by a critical discussion of the results. In order to facilitate the understanding of the results several graphs and table are used to uncover patterns in the data. Much of the results are compared to the findings of other studies as well as the marketing theory. The final chapter presents the recommendations on



how Bioproducts should use the information from this study to progress its investigation into e-commerce.

#### 1.10 LIMITATIONS OF THE STUDY

The study examines customer readiness to adopt e-commerce from a customer's electronic procurement perspective. It does not examine the customer's readiness to effect sales of their products via the Internet. If customers are ready to purchase Lysine via the Internet it does not necessarily mean they are able to conduct business-to-business interactions with their customers.

The scope of the statistical analysis was limited mainly to descriptive statistics with some reliability analysis and t-tests due to the small sample size. The small sample size hampered the establishment of correlations between interest in e-commerce and factors that normally affect industrial buying behaviour.

The study has not focused on any of the financial implications of the project on Bioproducts and is limited to testing the enthusiasm and the ability Bioproducts customers to adopt e-commerce. The findings of this study can only be used as one of the elements that go into the final decision making process on whether Bioproducts should embark on an e-commerce strategy. This study on its own does not provide all the information that Bioproducts will need to make the final decision on its e-commerce strategy.

Surveying only one person per company was a limitation for certain aspects of the study. In some instances the respondents were asked to comment on

their company's attitude to risk. It is recognised that in such instances the respondent's personal bias may have affected their response and thus not portrayed the correct information about the company. A more accurate representation of the company's attitude to risk would have been obtained by surveying a larger sample from each company.

In studying the different factors which affect the buyers interest in e-commerce only a few factors were examined in each of the following categories namely: environmental, individual, group and organisational. Studying only a few factors per category makes it difficult to draw conclusions about the impact of the whole category on the industrial buyer's interest in e-commerce.

The field of e-commerce is continuously evolving and as such the findings of the study may only be relevant at a particular point in time. If Bioproducts does not use the information as soon as possible, then some findings may not be valid at a later date. Some of the empirical studies used for comparative purposes relate to an earlier time and circumstance may have changed. For the purposes of this study past empirical data was used to compare the current scenario in the South African feed industry.

The questionnaire did not evaluate the "trial" phase of the adoption of innovation model when examining the adoption of e-commerce. This aspect of the model was omitted from the study based on the work by Ozanne and Churchill (1971) who found that all five stages of adoption of innovation

model, which was originally used for consumer marketing, was found to be applicable to industrial marketing, except the 'trial' phase.

In establishing the potential innovators in the industry, respondents were asked to indicate when they would adopt e-commerce. Indicated usage time frames of e-commerce may not necessarily reflect actual usage dates, hence it is noted that indicated usage dates may not be as accurate as actual usage dates in classifying innovators.

Lysine consumption was used to gauge the size of a company. Other factors like turnover, sales volumes or net asset values may have been a more accurate indication of company size but due to the sensitivity of financial information this was not explored.

The study focuses only on South African customers. Some of Bioproducts overseas business is conducted directly while the remainder is conducted via overseas agents. This study however, does not cover the full scope of Bioproducts business as it excludes international trade due to the high cost and the complexity of collecting data from overseas clients. It does not explore the full benefit of e-commerce which allows business to be conducted across borders.

The other limitation of the study is that it focuses on the current customers of S.A Bioproducts and does not involve all potential customers in the animal feed industry. It excludes customers that purchase Bioproducts Lysine via traders. Bioproducts customer base is likely to increase if these

customers purchase Lysine directly from S.A Bioproducts thus making these results less applicable.

### 1.11 SUMMARY

The literature search has shown that there are varying opinions about the potential of business-to-business e-commerce in the South African market. S.A Bioproducts needs to establish if there is an interest in e-commerce amongst its customers. This study was designed to assist S.A Bioproducts with the decision making process regarding e-commerce implementation. The study used a structured questionnaire to obtain information about customers' attitudes and perceptions about e-commerce. The study used census sampling and the data was analysed using SPSS. Generally descriptive statistics was used to explain the results, as the sample size did not lend itself to confirmatory statistics in most cases. However, where applicable confirmatory statistics was used to analyse the data.

The study is limited to the South African customers and provides a good basis upon which a broader study can be designed. This study constitutes the first step in Bioproducts e-commerce decision making process. If there is interest in e-commerce amongst local customers it will warrant further financial analyses and a broader investigative study. Bioproducts will be able to use the results of this study to help make the correct business decisions regarding e-commerce and thus prevent the potentially high failure costs.

## CHAPTER 2

### E-COMMERCE IN CONTEXT OF MARKETING THEORY

#### 2.1 INTRODUCTION

The overall objective of the chapter is to place e-commerce in the context of marketing theory. This chapter presents a theoretical framework upon which the dissertation rests. Although e-commerce is a new phenomenon it can still be examined against the backdrop of well established marketing theory like the theory of organisational buying behaviour and the adoption of innovations in an industrial environment.

The general decision-making process forms the foundation of any industrial purchase decision process. The section on general decision making forms an introduction to the more specific section on decision making as it relates to organisational buying. The analysis is further expanded to examine the factors that affect the buying behaviour of organisational buyers. One of the objective of the chapter is to provide a framework for understanding the factors that affect the decision making process of the industrial buyer. This framework is then used to test whether these factors also have a bearing on the industrial buyer's interest in e-commerce.

Empirical findings on the adoption of e-commerce in the animal feed industry in South Africa will be tested on how closely it matches the theory on adoption of innovations. In this instance the Internet is regarded as the innovation.

The theoretical profile of innovators will be tested against empirically established innovators in the animal feed industry in South Africa. Findings from the survey will be used to check if the correlation between different factors affecting the rate of diffusion matches the prediction of theory.

The chapter concludes with the section on e-commerce, which examines past works on e-commerce both internationally and within the South African scenario. The e-commerce section relates mainly to the barriers to adoption as well as the benefits of e-commerce. These barriers and benefits of e-commerce as described by other studies will be compared and contrasted with the animal feed industry in South Africa.

One of the purposes of the chapter is to review previous work that has been done on organisational marketing, adoption of technology in industrial environments and e-commerce. It presents literature searches from different eras and various different sources. Conflicting points of view are presented and based on an evaluation the preferred version of the theory is declared with justification by the author.

The literature search and theory is presented from the point of view of the industrial buyer rather than the industrial marketer. The analysis concentrates on the buying organisation instead of the vendor organisation. Most theory presented relates to business-to-business marketing although in some instance consumer marketing is referred to as a means of contrasting the two forms of marketing.

## 2.2 DECISION MAKING

Managers at all levels of the organisation are involved in decision making. Top management generally formulates the organisation's missions, long term objectives and strategies. Lower level management makes decisions on the monthly weekly and daily activities of their specific sections. Despite the nature of the decisions being different the basic process of decision making remains the same (Smith & Cronje, 1992). Decision-making is defined as "the process of making a choice among alternative courses of action" (Smith & Cronje, 1992, p140).

Decision-making is divided into two types namely programmed and non-programmed. Programmed decision making is generally made on a routine basis and is governed by procedures and policies of the organisation. Non-programmed decision making relates to problems that have not been encountered before. For example the decision whether to adopt e-commerce involves a non-programmed decision-making process.

Smith & Cronje (1992) define three environmental conditions under which decision making takes place namely: certainty, risk and uncertainty.

Certainty - the decision-maker knows exactly what the outcome of each decision would be. This condition for decision making is generally is very rare.

Risk - Decisions are made under a state of risk when the decision-maker does not have all the information.

Uncertainty - In conditions of uncertainty all the alternatives are unknown and risks associated with outcome of each alternative is unknown. Due to the fast pace of change in the industrial environment especially in the arena of information technology, most decisions are associated with an element of uncertainty.

(Smith and Cronje 1992) has identified the following steps in the decision making process:

- Identify and define the problem
- Develop alternative solutions
- Evaluate the alternative solutions
- Select the best alternative
- Implement the chosen alternative
- Evaluate and control

An important aspect in defining the problem is to ensure that the problem definition is clear and concise so that the root causes of the problem are solved and not the symptoms. Several techniques like brainstorming and the Delphi technique could be used to generate possible solutions. Quantitative and qualitative techniques may be used to evaluate the options before the final decision is made.

#### 2.2.1 GROUP VERSUS INDIVIDUAL DECISION MAKING

Individuals or groups of individuals may make decisions however, within the industrial environment most decision-making is done within groups. Major business decisions may be complex and would require the expertise



of several different individuals from different disciplines of work. Since a single individual may not have all the information required to make the decision, a group decision making process may be adopted. Although group decision making is more complicated and takes longer than individual decisions they are likely to result in a superior outcome. Secondly group decisions also aids the acceptance of the final decision due to the participative nature of the process (Smit & Cronje, 1992). Contrary to the aforementioned (Whyte, 1989, p41) states that” the price paid to maintain group cohesiveness, however, is a decline in mental efficiency, reality testing, moral judgement, and ultimately it leads to a decline in the quality of decision making”

In analysing the two types of decision making processes the group buying process is preferred. Consider the scenario where a company needs to make a decision whether to adopt e-commerce or not. Firstly, due to the complex nature of the decision and the impact on several functional departments within the organisation a group decision making process would be imperative. Secondly it is important that the industrial buyer forms an integral part of the decision making process. If the industrial buyer participates in the decision making process he is more likely to support the decision. Hence, he would be more amenable to using the Internet to execute his purchases. Without his support, it is possible that even though a policy to use e-commerce may be decided upon, the policy may fail in its

execution. Based on the above, a group decision making process will provide the best chances of success for complex organisational buying.

## 2.3 ORGANISATIONAL BUYING

“Organizational buying is the decision making process by which formal organizations establish the need for purchased products and services and identify, evaluate and choose among alternatives brands and suppliers” (Webster & Wind, 1972, p2). Organisational buying refers to the both industrial and institutional buying situations. (Haas, 1989) emphasises the fact that organisational buying is not simply the buying action that somebody takes in making a purchase but rather it is the outcome of the interaction between buyers, users, influencers, suppliers and others. The buying transaction is only part of the total decision making process. (Webster & Wind, 1972) make the point that organisational buying behaviour varies from consumer buying behaviour mainly because organisational buying involves many people in the decision making process with complex interactions among people and among individual and organisational goals.

### 2.3.1 E-COMMERCE AND STRATEGY

In the new economy technological decisions are tightly intertwined with strategic decisions as opposed to brick-and- mortar businesses (Rayport & Jaworski, 2001). The decision to embark on an e-commerce is a strategic decision. A strategy consists of a pattern of decisions that set goals and objectives that lead to long-run competitive advantages for a firm (Kleindl,

2001). The Internet can be used by businesses to gain production and logistic efficiencies and better meets the needs of the customers. This in turn would lead to competitive advantages. In the rapidly evolving competitive environment businesses are forced to reassess their current strategies and develop new strategies to ensure long-term survival.

Kleindl (2001) describes strategy is a pattern of decisions that set the goals and objectives that lead to long-run competitive advantages for a firm. Further he presents the following the strategy development steps:

Undertake a SWOT (strengths, weaknesses, opportunities and threats) analysis - this involves investigating the strengths and weaknesses of the business as well as analysing new opportunities and threats from competitors and the environment.

Determine the distinctive competencies - a company needs to establish the advantages it has over its competitors. This is done by analysing the business value chain and using some of the information from the SWOT analysis. A company needs to determine the distinctive competencies that it will be able to maintain over a long period.

Determining the competitive arena - by performing the SWOT analysis and establishing the distinctive competencies. This helps identify the window of opportunity that a firm can pursue and the arena of business it would compete in.

Develop a plan to reach the business goals- the strategic planning process outline the actions and tactics that the firm must adopt to move from where

it currently competes to where it needs to compete. The planning process sets targets, maintains feedback and implements controls in order to achieve the strategic goals.

Businesses do not operate in a vacuum but are subjected to the forces from the external environment. Environmental turbulence, forces change in business strategies and in distinctive competencies needed to compete. These environmental factors are analysed by performing a PEST (Political, Economic, Social and Technological) analysis. Kleindl (2001) identifies the following drivers of environmental turbulence that affect e-businesses.

Moore's Law states that the density of the micro-processors double every two years while cost decrease. This has allowed the use of technology to be used across a broader spectrum of products and uses. Customers around the world are coming under increased time pressures and are using the Internet to enable them to achieve more within a limited time frame. Product lifecycles are becoming shorter and customers are willing to try new products. The distance between competitors is vanishing with the Internet allowing competition across borders. This has resulted in the increase in the number of competitors and the intensity of competition. In the business- to-business applications, time is of the essence and instant connectivity is the norm.

In single business enterprises there are three levels of strategies namely: business strategies, functional strategies and operating strategies. Business strategies relate to ways in which the organisation can build a long term

competitive position. Functional strategies define a game plan on how each functional department e.g. purchasing would be run. Operating strategies relate to key operating units like plants and sales districts and details how daily operating tasks with strategic significance should be handled (Thompson and Strickland, 1999).

It is important to note that the decision to adopt e-commerce is a major strategic decision and will involve several members of the organisation. The decision would generally be made at a functional or a business level of strategic decision making. It involves a comprehensive decision-making process with several roles players participating in the decision making process. On the other hand individual buyers at the different plants are responsible for the operational decisions. In this lower level decision making process the industrial buyer may choose to use e-commerce as one of the decision making criteria when choosing a supplier.

According to Thompson and Strickland (1999) companies can adopt the following strategies to gain competitive advantage:

- Low cost leadership strategy - Appealing to a broad spectrum of customers based on being a low cost provider of goods or services
- Broad differentiation - Differentiating the company's product offering from its competitors in a way that makes it appealing to a broad spectrum of customers.

- Best cost provider strategy - The objective is to have the lowest cost and prices relative to producers of product of comparable quality and features.
- Focus strategy based on lower cost - Concentrating on a narrow segment and serving them at lower cost than competitors.
- Focus strategy based on differentiation – Concentrating on a narrow segment of the market but focussing on customised products and service that serves the needs of the consumers better than the rival.

Information technology has allowed business to become more efficient by reducing cost of sales and marketing (Kleindl, 2001). Further increase in internal and external speeds of communication is speeding up manufacturing, R&D (research and development) and purchasing, resulting in cost savings (Moozakis, 1998). Hence e-commerce can be used to follow a low cost strategy.

E-commerce can also be used to pursue a differentiation strategy for example it can be used to gain first mover advantages and improve customer services by staying closer to customers (Kleindl, 2001).

The danger of e-commerce is that managers could get bogged down with the technology and lose sight of its role in the mission of the company. E-commerce like any other business element must be focussed and directed at specific target segments. E-commerce does not replace existing distribution channels but rather it supports and supplements them (Hutt and Speh, 2001). Barnes (1999, p11) states that e-commerce should fit “into the fabric

of their traditional business operations, leveraging it as a new communications tool that can increase sales, satisfaction and service levels”. The adoption of e-commerce does not necessarily simply mean selling something over the internet, but in-cooperating the Internet into the day to day operation for business-to-business transactions in order to build customer relations (Internet 20).

### 2.3.2 THE BUYING CENTRE

The decision-making unit within an organisation is generally referred to as a “Buying Centre”. It comprises of several different members of the organisation who play some role in the purchase decision process. The following members make up the buying centre:

Initiators	Those employees who would request the purchase of an item or service.
Users	Those people who actually use the product or service purchased.
Influencers	People who influence the purchase decision. Generally they are technical people who provide information and assist in the evaluation of alternatives.
Deciders	People who decide on product requirements.
Buyers	People who have the formal authority to execute the purchase. They play an important role in selecting and negotiating with vendors.
Approvers	They authorise the proposed actions of deciders and buyers.

Gatekeepers They control the flow of information between the members of the buying centre.

Members of the buying centre are motivated by a complex interaction of individual and organisational goals. Their interactions with one another involve all the complexities normally associated with interpersonal interactions (Webster & Wind, 1972).

### 2.3.3 BUYING DECISION MAKING PROCESS

The buying decision making process which varies from company to company, represents a set of complex activities undertaken by several different members of the organisation and results in the commitment to purchase goods or services from a vendor (Baker, 1995). According to (Robinson, Faris & Wind, 1967) the major phases in the industrial buying decision making process are:

- Problem recognition
- General need description
- Product specification
- Supplier search
- Proposal solicitation
- Selection of suppliers
- Order routine specification
- Performance review

In actual purchase situations, the aforementioned steps may not be as clear cut. The industrial marketer who wishes to influence the buyer may



experience difficulty in establishing exactly which phase the buying company is at in the buying process. For the buying company however the activities form distinct phases in the buying process (Baker, 1995). A further explanation of the different buy phases follows.

#### 2.3.3.1 PROBLEM RECOGNITION

The recognition of the problem is the initial step in the industrial buying process. The problem may either be triggered internally with the organisation or may emanate externally.

#### 2.3.3.2 GENERAL NEED DESCRIPTION

The industrial buyer will obtain the quantity and the general characteristics of the item or items to be purchased. The buyer works with other role players with the organisation like engineers and users to derive the general characteristics of items to be purchased.

#### 2.3.3.3 PRODUCT SPECIFICATION

A detailed product technical specification is drawn. This is especially applicable when the item being purchased is complex and expensive. A detailed technical specification assists the buyer in acquiring the correct item. It also assists suppliers who would be able to supply the correct item to meet the needs of the customer. It is important that technical specifications are accurate as they sometimes are used as basis to resolve disputes between buyers and sellers, which could amount to millions of Rands.

#### 2.3.3.4 SUPPLIER SEARCH

The buyer uses the technical specification to search for potential suppliers. Previously this was mainly done via hardcopy trade directories and advertisements. Recently the Internet has been gaining popularity in performing supplier searches. Many company have a list of preferred suppliers from who may be able to supply the new item required.

#### 2.3.3.5 PROPOSAL SOLICITATION

After the buyer has identified potential suppliers he will request written proposals from suppliers. The degree of detail of the proposal will be aligned with the complexity and the expense of the item in question. After evaluating the proposals the buyer will develop a shortlist of the most suitable suppliers. In some instances suppliers are asked to make verbal presentations and are evaluated either by a team of experts or by the buyer.

#### 2.3.3.6 SUPPLIER SELECTION

Generally the buying centre performs the selection of the supplier. It is important that the selection process is transparent and objective. One of the first steps in evaluating suppliers is to generate a list of criteria, which are then rated in terms of their importance. Each supplier is then objectively rated against the criteria. Finally an overall score is obtained for each supplier and generally the supplier with the highest score is selected.

#### 2.3.3.7 ORDER ROUTINE SPECIFICATION

After the supplier is selected, the final order is negotiated where the buyer confirms prices, quantities and delivery time. Other issues maintenance and warranties are also confirmed. In the event of long term contract the buyer negotiates a blanket contract where the supplier agrees to supply goods or services at agreed prices over a long term. Although there is an element of certainty in such a contract it also comes with associated risk for both parties. For example exchange rates may vary during the term of the blanket contract which may disadvantage either party.

#### 2.3.3.8 PERFORMANCE REVIEW

The buyer would periodically review the performance of suppliers. Kotler (2000) refer to three common methods of performance review namely:

- Checking with end users.
- Rating suppliers against weighed criteria.
- Aggregating the cost of poor supply performance and then adjusting the purchase price accordingly.

The results of the performance review assist the buyer in deciding whether to modify, continue or terminate the relationship with the supplier.

#### 2.3.4 BUY CLASSES

Baker (1995) categorises purchases into three main classes according to the newness of the buying situation: straight re-buy, modified re-buy and new task. The risk, familiarity with the product and frequency of purchase determines the amount of information sought and the number of people that

form part of the buying decision process. The various buy classes are discussed in the following section.

**STRAIGHT REBUY:** In this instance the purchase situation is familiar and the re-order levels may be triggered by drop in inventory levels or it may be time-based repurchase. The risk associated with this type of purchase is low and can be handled in a completely routine fashion.

**MODIFIED REBUY:** Generally the buyer has purchased the product before but the buying situation may have some degree of uniqueness. The specifications may have changed slightly compared to the prior purchase. The buyer may need to gather information on a new supplier and may have to vary the terms of the contract.

**NEW TASK:** This involves the purchase of a product that has never been purchased by the organisation before. The decision making process is more complex and a great deal of emphasis is placed on the early stages of the decision making process outlined above. It also carries with it the highest degree of risk compared to the straight re-buy and the modified re-buy.

Table 2.1 shows a simplified version of the Robinson, Faris and Wind Buygrid model. It uses the afore mentioned concepts of buy phases and buy classes to explain the different decision making process steps that are adopted in different buying situations. The model shows that the most complex buying situations occur under the “new task” purchase situation. This buying situation involves the largest number of decision-makers and

represents the greatest difficulty for management. A new task may entail policy questions and special studies.

Table 2.1 Buygrid Framework: Major stages (Buy Phases) of the Industrial Buying Process in relation to Major Buying Situations (Buy Classes)

	<b>Buy Class</b>		
<b>Buy Phases</b>	<b>New task</b>	<b>Modified Rebuy</b>	<b>Straight Rebuy</b>
Problem recognition	Yes	Maybe	No
General need description	Yes	Maybe	No
Product specification	Yes	Yes	Yes
Supplier search	Yes	Maybe	No
Proposal solicitation	Yes	Maybe	No
Selection of suppliers	Yes	Maybe	No
Order routine specification	Yes	Maybe	No
Performance review	Yes	Yes	Yes

*Source: Adapted from P.J Robinson, C.W Faris and F. Wind, 1967, Industrial Buying and Creative Marketing, Boston: Allyn & Bacon Inc and Marketing Science Institute Series, P13-18*

#### 2.3.4.1 CRITIQUE OF BUY CLASS FRAMEWORK

Although the Buygrid model is widely used it has also come under criticism which revolve mainly around its simplicity which is also the primary reason for its popularity (Moriarty, 1980). The first time purchase of a minor supply item like light bulbs (a new task) will require a more elaborate decision making effort than replacement of a firms automobile fleet (modified re-buy) under the Buygrid framework. The model overstates the role of newness as a summary descriptor of purchase tasks. And does not consider the importance of the purchase or the complexity of the evaluation task (Johnston, 1981).

Puto et al (1985) found that for some new task situations industrial buyers would avoid (rather than consider) alternatives as a way of reducing risk. This is done by using existing suppliers when purchase risk are high for new task situations. This finding is contrary to the Buygrid model, which states that more alternatives are sought for new task buying situations. This theory was further supported by McMillian (1972) who found that there was a common perception that current suppliers are less risky than prospective new suppliers.

Despite the criticisms the Buygrid framework is the most widely used theory in organisational buyer behaviour (Anderson et al. 1987). Anderson et al. (1987) conducted an empirical study of the Buygrid framework and found good correlation between the newness of the task and the amount of information sought. The framework is useful for understanding the

organisational buying process and recognising where marketing emphasis should be placed within that process (Haas, 1989).

### 2.3.5 FACTORS INFLUENCING ORGANISATIONAL BUYING BEHAVIOUR

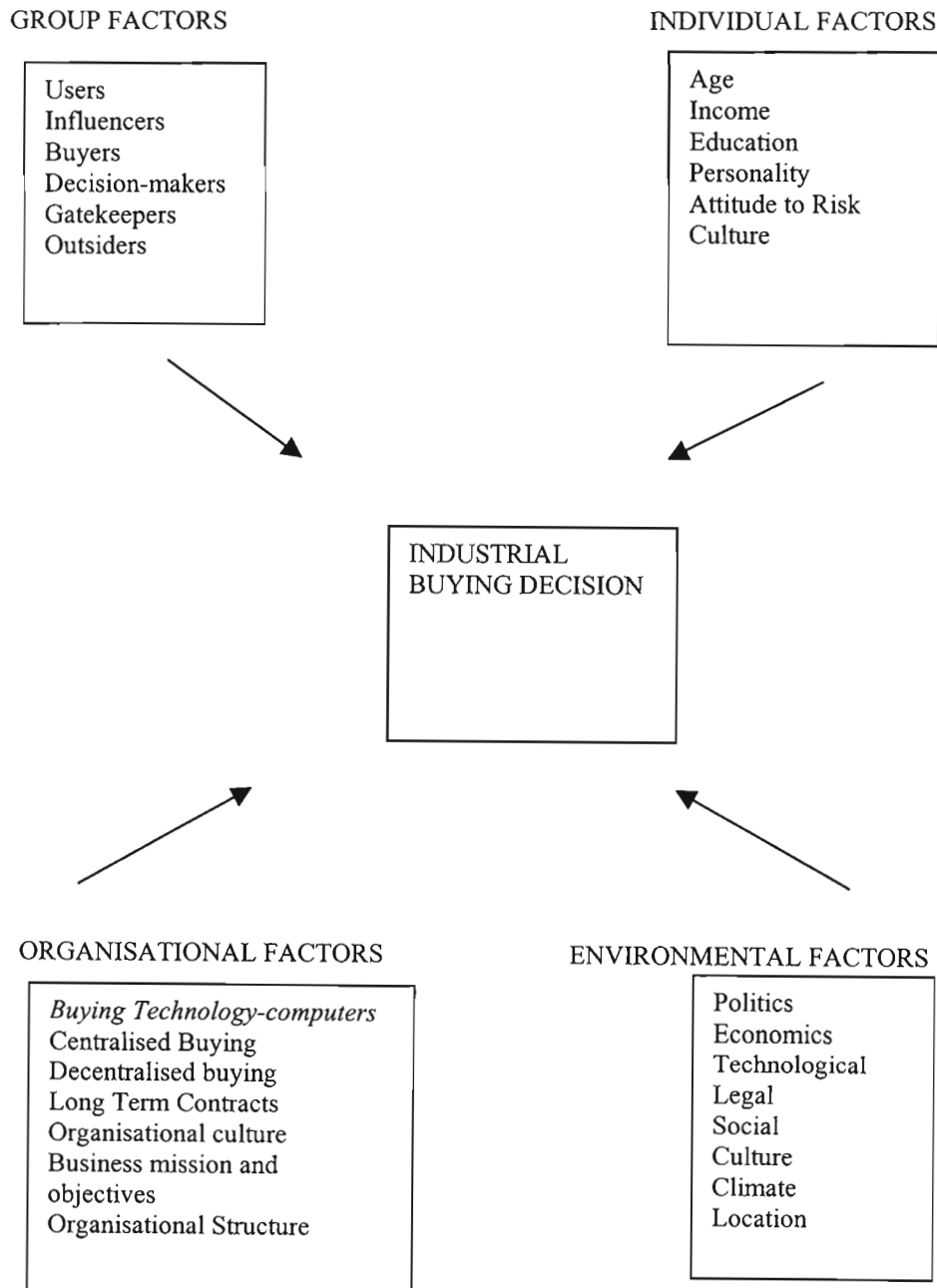
Webster and Wind (1972) found that traditional views on organisational buying behaviour lacked comprehensiveness. These views either emphasised rational economic factors which focussed on the end objective of obtaining the minimum price or lowest cost-in-use. Other views erred on the opposite side where they emphasised non- task factors like emotion, personal goals and internal politics that focussed on the decision making process rather than the outcome.

When supplier offerings are similar, industrial buyers place more emphasis on the personal treatment they receive from vendors. In contrast when supplier offerings vary substantially, business buyers are more accountable for their actions and pay more attention to economic factors (Kotler, 2000)

There are several forces that impact on the buying decision within the organisation, some of which emanate externally while others emanate internally. Webster and Wind (1972) have classified these factors into four levels: environmental, organisational, group and individual factors. This model which is depicted in Fig 2.1 is more comprehensive than previous models and covers the different factors that affect the organisational buying decision making process carried out by individuals in interaction with other people.

Figure 2.1

TITLE: FRAMEWORK OF FACTORS AFFECTING INDUSTRIAL  
BUYING DECISIONS





*Adapted from Webster F.E & Wind Y,1972, 'A general Model for Understanding Organisational Behaviour', Journal of Marketing , Vol 36(April 1972),pp12-19*

#### 2.3.5.1 ENVIRONMENTAL FACTORS

The buying behaviour of industrial buyers is influenced by several factors in the external environment. These factors may be classified as economic, political legal, cultural, physical and technological. Together these factors provide the boundaries within which buyers and sellers interact.

Economic conditions may determine whether a buyer enters into short or long term contracts. If for example in a weakening economy a buyer may not commit to long term raw material contracts as demand for finished goods may decline thus affecting the raw material requirement.

Political and Legal implications have a direct bearing on the buying influence within an organisation. This is especially prevalent in the animal feed industry with South Africa where importers of Lysine are faced with import tariffs and anti dumping duties. These restrictions generally force buyers to source raw materials locally.

The purchasing decisions of the industrial buyer are affected by the culture of the environment within which he operates. Culture reflects the norms, values, habits and customs of people. The culture that is prevalent outside the organisation will tend to influence the culture within the organisation.

Physical factors like location of the organisation and the climate also plays a role in buying behaviour. Suppliers located close to the organisation are more likely to be chosen than suppliers that located further away. Poor climatic conditions may have a negative effect on crop yields and thus cause prices to rise. In the animal feed industry buyers may be faced with a shortage of raw materials and higher prices due to poor climatic weather conditions. This may result in the search for alternate sources of raw materials.

The changing technological environment could alter the buying plans of an organisation and could also influence the structure of the buying unit. Technical and engineering personnel tend to play a larger role in the buying decision and marketers also get more involved so as to adapt their marketing strategy to the new technological environment (Bright 1970).

#### 2.3.5.2 ORGANISATIONAL FACTORS

Organisational factors refers to those forces within the organisation and to relate to organisational structure, its buying technology, its missions and goals and it's culture and philosophy (Baker, 1995).

Organisations may choose to procure its raw materials either on a centralised or a decentralised basis. Centralised buying tends to lead to specialisation where buyers acquire a sound understanding of the supply and demand forces. The buyer uses this knowledge to negotiate better prices for his organisation. Generally the big-ticket items are purchased centrally

to obtain purchasing clout while the small ticket items are done on a decentralised basis (Kotler 2000).

Technology influences both what is bought and the nature of the organisational buying process itself (Fredrick, Webster and Wind, 1972).

With the advent of the Internet, computers are forming an integral part of the decision making process. Computers have proved very useful in straight re-buy situations. Routine purchases are handled faster by computers than purchasing staff. With computer assisted vendor searches the buyer performs more intensive searches and places orders with fewer vendors. This has resulted in a reduction in the number of vendors dealing with the buying organisation (Baker 1995).

The mission and goals of the organisation define buying behaviour within many organisations. There is a trend of organisations entering into longer-term contracts with fewer suppliers who manufacture high quality products (Kotler 2000). In the new economy technological decisions for example purchasing via the internet have become tightly intertwined with strategic decisions as opposed to brick-and-mortar businesses (Rayport & Jaworski, 2001).

Corporate culture is defined as “ the value shared by people within an organisation” (Smit and Cronje, 1992). Corporate culture develops over time but is greatly influenced by actions of its current leaders. The buying behaviour of a company will vary depending whether a company is concerned with long term development or short-term growth (Baker 2000).

#### 2.3.5.3 GROUP FACTORS

The buying centre which consist of users, influencers, buyers, decision makers and gate keepers have different interests, authorities, status and persuasiveness which impacts on the group dynamics during the buying decision making process (Kotler, 2000).

Webster and Wind (1972) provides a broader framework for understanding the group factors with the organisation namely:

- Interactions between the members of the buying centre
- Interaction between members of the buying centre and “outsiders” such as vendors’ salesmen.

While Kotler (2000) focuses on the interactions within the buying centre, Webster and Wind (1972) also consider the interactions outside the buying centre.

Purchasing agents within the buying centre use several tactics to increase their power base. They use rule–orientated tactics to ensure that all personnel, even their superiors abide by the rules. Some buyers engage in early bargaining tactics in order to extend their scope of influence (Webster and Wind, 1972). The degree of involvement of group members varies in the procurement process from routine re-buys, where purchasing agent takes into account the preferences of others, to complex new task buying situations, where the group plays an active role throughout the decision process (Baker, 1995).

#### 2.3.5.4 INDIVIDUAL FACTORS

Since individuals within organisation ultimately make the business purchase, it is important to understand the individual motives. Motives can generally be broken down into two categories namely economic or non-economic (non-task). Economic motives relate to cost saving and productivity improvements. Non-economic motives are difficult to measure and include status and prestige and career motives of the buyer. (Webster and Wind, 1972) define two categories of non-task motives namely; achievement motives and risk reduction motives. Buyers will tend to remain with the status quo in order to reduce the possibility of negative outcomes. It is rare for an industrial buyer to adopt non-task motives in a purchase decision. However, if “all things are equal” it is possible that personal preference will come into play (Webster & Wind, 1972). Buyer’s personal motivations, perceptions and preferences are influenced by individual factors like age, income, education, attitude to risk, job position and culture. According to Kotler (2000) buyers adopt different buying styles and he describes them as follows: “keep-it-simple” buyers, “own-expert” buyers, “want-the best” buyers and “want-everything-done buyers”. Some younger highly educated buyers use computers to perform rigorous analyses on competitive bids before choosing a supplier while other buyers are “toughies” from the old school would pit suppliers against each other (Kotler, 2000).

Figure 2.1 provides a logical grouping of the different factors that affect the industrial buying decision-making process. The framework was used as one of the bases for the development of the survey questionnaire and the interpretation of the results. It was also used to study adoption of e-commerce, which is regarded as a technological innovation in the industrial market.

## 2.4 ADOPTION OF TECHNOLOGY IN THE INDUSTRIAL ENVIRONMENT

Kotler (2000) defines innovation as “any good, service or idea that is perceived by someone as new”. Crawford and Benedetto (2000) make an important distinction between invention and innovation. They say invention refers to dimensions of uniqueness and is usually patentable, whereas innovations refer to the commercialisation of the invention. Innovation can also be regarded as doing something that someone else has not done before. The process involves having creative new ideas and implementing for survival and competitive advantage (Cook, 1998). Based on these definitions the introduction of the Internet and e-commerce can be classified as a technological innovation.

### 2.4.1 DEFINITION OF ADOPTION AND DIFFUSION OF INNOVATION

Hoyer and MacInnis (2000) define adoption as the purchase of an innovation by an individual consumer or a household. Although this definition is limited to consumer buying behaviour it may also be extended

to adoption buy industries. The mere purchase of an item may not necessarily constitute adoption of the item. As explained by (Baker, 2000), the adoption of an innovation is best defined as the continued use of a product. In the case of a durable good the first time purchase would be regarded as adoption of the good but the first time use of a consumable item would be regarded as a mere trial of the item.

As an increasing number of consumers adopt an innovation, the innovation spreads or diffuses through the market. Hence the spreading of the use of an innovation is regarded as the diffusion of innovation (Crawford and Benedetto, 2000). While adoption refers to the behaviour of an individual person or company, diffusion refers to the behaviour of groups of individuals or companies.

The following section examines the different stages in the adoption process of innovations in the industrial environment. It also details the characteristics of industrial innovators. Finally it elucidates on the factors that affect the diffusion of innovations within an industrial environment.

#### 2.4.2 STAGES IN THE ADOPTION PROCESS

The underlying assumption of the innovation adoption process is that the acceptance of an innovation is not an instantaneous or a random event but rather it is a distinct mental and behavioral sequence that the consumer undertakes. Roger (1962) defines the following five stages that consumer move through after first hearing about a product to final adoption:

Awareness - the consumer becomes aware of the innovation but lacks information about it.

Interest - the consumer is stimulated to seek information about the innovation.

Evaluation - based on the information that has been gathered, the consumer decides whether to try the innovation.

Trial - the consumer tries the innovation to improve his or her estimate of its value.

Adoption - the consumer decides to make full and regular use of the innovation.

Ozanne and Churchill (1971) applied the above adoption process to industrial buying, and their study focussed on the adoption of a new automatic machine tool. Apart from the trial stage the five-stage adoption process fitted the study quite well. An important note about the above framework is that the different stages are not necessarily equidistant. The importance of each phase will vary according to product and consumer characteristics. Further, some stages may actually be omitted in real life (Baker, 1995). Hoyer and MacInnis (2000) make a distinction between “high-effort hierarchy of effects” and “low-effort hierarchy of effects”. In the high-effort purchase situations e.g. adoption of e-commerce by an organisation, a great deal of effort goes into the gathering of information and the evaluation of the innovation. Also several people may be involved in the decision making process and the process itself could extend over a



long period. In contrast, a low- effort purchase situation fewer people are involved and the risks are also lower. Far less effort goes into the decision making process and the consumer may move into the trial phase soon after becoming aware of the innovation.

#### 2.4.3 CATEGORIES OF ADOPTERS

The following discussion will examine the adoption life cycle and will also classify industrial users into classes of adopters. The adopters of innovations are categorised according to how soon after the introduction of the innovation they actually adopt the innovation. From a marketing perspective it is important to identify those that would be the first to adopt since they generally influence the other adopters to follow suit. The initial marketing programs can be targeted at the early adopters for maximum effect. Rogers (1962) assumed that the rate of adoption of a new product followed a normal distribution curve over time. The first 2.5 % of the of the adopters are called “innovators”, the next 13.5% are called “early adopters”, the next 34% are called “early majority”, and the next 34% the “late majority” and the final 16% are “laggards”.

Hutt & Speh (2000) identify the following classes of industrial customers in terms adoption of industrial technology innovations:

Technology enthusiasts:	They are keen to explore new technologies and have a large influence in how people within the organisation perceive new products but they have little control over the financial
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resources. They generally serve as the gatekeeper to the rest of the technology life cycle. Their endorsement of new product is vital if the product is to be considered by the rest of the organisation.

**Visionaries:** These are true revolutionaries who are keen to exploit the innovations for competitive advantage. They have access to the resources of the organisation.

**Pragmatists:** They make the largest number of technology purchases within the organisation. They support evolution rather than revolution. They would generally purchase products from market leaders who have a good track record.

**Conservatives:** They would reluctantly purchase hi-tech products to avoid being left behind. They are price sensitive and are pessimistic about the value they will get from technology investments.

**Skeptics:** They are very critical about the hype surrounding high technology products and generally do not represent potential customers.

#### 2.4.4 CHARACTERISTICS OF INNOVATORS

Fredrick & Webster (1969) argued that firms that are first to adopt innovations are those:

- To whom the innovation offers largest relative advantage, in terms of profit or cost reduction.
- That can best tolerate the risk, measured by the size of the investment, size of the firm, liquidity management and self-confidence.
- That have the highest level of aspiration as indicated by recent trends in profitability, market share, and gross sales.
- For whom information relating to the innovation provided by the supplier has the greatest value in terms of reducing risk and improving the adopter's relative advantage.

The aforementioned theory will be used to test whether South African firms in the animal feed industry who are most likely to adopt e-commerce match any of the criteria set out above. The above criteria provide a sound basis against which empirical information can be tested. The shortcoming of the above criteria is that it was developed in 1969 and may not be applicable in current times.

#### 2.4.5 FACTORS AFFECTING DIFFUSION IN INDUSTRIAL MARKETS

There are several factors that affect the diffusion of innovations in industrial markets namely: nature of the product, competitive pressures, size of firm, profitability of investment, uncertainty in the future. (Webster, 1971)

classified these factors either into those that focus on “results” of diffusion (cost, revenues and profits) and those that concentrate on the “process” of diffusion (e.g. size, management and organisation)

#### 2.4.5.1 PRODUCT CHARACTERISTICS

Rogers (1962) identified the following characteristics of a new product that affects how soon it will receive trial.

Relative advantage - This refers to innovation superiority over other products or problem solving methods it was designed to compete against.

Compatibility - The diffusion of an innovation is facilitated if the innovation is compatible with existing products and processes.

Complexity - The more complex the nature of the product the more it inhibits the diffusion process.

Divisibility (triability) - The easier it is to test a product the faster the rate of diffusion.

Communicability (Observability) - The more likely a product is to appear in public places where it can be studied by potential users, the faster it is likely to diffuse through the market.

#### 2.4.5.2 COMPETITIVE PRESSURES

Mansfield (1968) studied technological innovations in 14 US firms since 1900. He found support for what he called “the band wagon effect”. He found that as information increased and the associated risks decreased then the competitive pressures started to tell on non-adopters. Non-adopters felt disadvantaged by not adopting the new innovations that their competitors

had adopted. In order to match their competitors non-adopters were forced to adopt the new innovations.

#### 2.4.5.3 SIZE OF THE FIRM

Mansfield (1968) found that the speed of adoption of innovations was directly related to the size of the firm. If the profitability of two firms is the same and the one firm was four times larger than the other, the probability that the larger firm will adopt first is 0.8. This study will attempt to test the above correlation in the animal feed market in South Africa

#### 2.4.5.4 PROFITABILITY OF THE INNOVATION

Mansfield (1968) also found that if the size of the company remained constant and then those innovations that offered a higher return on investment were more likely to be adopted. This study will examine the financial benefit that lysine customers will derive from e-commerce. This benefit will then be used to predict how soon a customer would be likely to adopt e-commerce for the purchasing Lysine.

#### 2.4.5.5 UNCERTAINTY IN THE FUTURE

Sutherland (1969) conducted a study in the UK cotton textile industries. In the study he addressed the long-term economic situation. He found that if there was uncertainty in the future then it was all the more difficult to introduce an innovation to a company even though it was well proven innovation. E-commerce, which has been declared as an innovation will now be examined more closely.

## 2.5 E-COMMERCE

The rapid change of pace of technology within the last decade has forced industrial organisations to change the way they do business. This has resulted in the evolution of a new business model based on electronic business practices. This section begins with some basic definitions that contribute to the understanding of e-commerce. It also explores business-to-business e-commerce from a world perspective and finally honing in on the South African scenario. The main thrust of this section relates to the barriers and the benefits of business-to-business e-commerce.

### 2.5.1 DEFINITIONS

Electronic business refers to conducting business using new technologies to enhance buying and selling online, improve customer service and forge closer links with business partners. In order to fully understand the subject of e-commerce and to place it into context it is important to firstly define the commonly used terms. Kleindl (2001) proposes the following definitions:

Internet - This is a global network of computer networks that use a common interface for communication.

Extranet - Internet based connection between a business and its suppliers, distributors and partners, which is not open to the general public.

Intranet - This is an internal private network that uses the same types of hardware software and connections as the as the Internet. It can link

divisions of business around the world into a unified communications network.

E-Business - This is the process of using information Technology (IT) to support the fuller operation of a business. This could include generating leads, providing sales support, integrating partners, and linking aspects of the business operation to suppliers and distributors through Extranets.

E-Commerce – Consists of using electronic information based systems to engage in transactions or commerce online and includes automating web site purchases.

There is an important distinction made between e-commerce and e-business where e-business is a broader concept, which includes the use of Intranets and Extranets. Further while e-commerce is linked to the online transaction the scope of e-business is broader and includes other aspects of business where information technology is used (Kleindl, 2001). Contradictory to Kleindl (2001), Hutt & Speh (2001) believes that e-commerce is a broader term than e-business as it deals with all transactions that are internet based, whereas e-business refers to transactions between organisations only.

Rayport (2001, p3) provides a contemporary definition of e-commerce as “technology-mediated exchanges between parties (individuals, organizations, or both) as well as electronically based intra-or–interorganizational activities that facilitate such exchanges”

The afore two definitions of business-to-business e-commerce vary in some respects. Rayport (2001) does not make a distinction between e-business and e-commerce. In fact he uses e-commerce as a synonym for e-business. Fuller (2000, p157) subscribes to this definition when he describes “electronic commerce, also referred to as electronic business or e-business, involves the use of computer and communications technology that allow businesses or an organization to improve its performance levels”. Most literature studied tends to use the Rayport (2001) definition of e-commerce, which is a more generic definition than Kliendll (2001). For the purpose of this study and the development of the questionnaire the Rayport (2001) definition was adopted.

Hutt & Speh (2001) describe the multifaceted nature of e-commerce by viewing it from various different perspectives. From a communications standpoint e-commerce is the delivery of information, product or service via telephone lines computer networks. If viewed from a business perspective the e-commerce is the application of technology towards the automation of business processes. From a service perspective e-commerce is a tool to meet the needs of customers while cutting costs, improving quality of goods and increasing the speed of service. From an online perspective e-commerce provides the capability of selling products and information on the Internet and other online services.

Rayport (2001) describes four categories of e-commerce namely: business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer



(C2C) and consumer-to-business (C2B). B2B refers to the full spectrum of e-commerce that occurs between two organizations. It includes activities like purchasing and procurement, supplier management, inventory management, channel management, sales activities, payment management and service and support. B2C refers to exchanges between business and consumers. C2C refers to transactions between consumers which may not include 3<sup>rd</sup> part involvement. An example of this would be auction sites and sites that carry classified advertisements. C2B refers to transactions where consumers band together to form and present themselves as buying unit to business. These groups are formed either by profit motive or may be unite due to a common social cause. Fig 2.2 shows a simplified representation of the different categories of e-commerce based the where the business originates from and the type of consumer.

Fig 2.2- Four Categories of e-commerce

		Business originating from....	
		Business	Consumers
And Selling to..	Business	B2B	C2B
	Consumers	B2C	C2C

Source; Rayport & Jaworski (2001) p 4

### 2.5.2 HOW DOES THE INTERNET WORK?

Network infrastructure is the underlying group of electronic devices and connecting circuitry designed as a system to share information (Rayport, 2001). Most Internet users around the world connect to the World Wide Web at home through a telephone line, connecting via an analog modem to their personal computer. Once a user accesses the Web through the ISP (Internet Service Provider) typing in the sites URL (Uniform Resource Locator) accesses a particular website. The URL then locates the web sites IP (Internet Protocol) address. Every computer connected to the Internet has its unique IP address. Communication between the user and the site is broken into packets and is sent through the Internet by specialised computers called routers and switchers. Routers direct the packets through various paths across the Internet. Switches do the actual moving of the packets through the Internet. Once data communication from the user is received by the Web site, it enters the server which then “serves” the site information back to the user.

### 2.5.3 ONLINE SHOPPING-B2C E-COMMERCE

By the end 2002, 660 million people worldwide will have access to the World Wide Web. People in the United States do more online shopping than any other country and account for 40% of the money spent online. This is however likely to drop to about 38% by 2006 as Asia and Western Europe increase their online spending. In Asia online shopping is growing by 89% per year. However, only a small percentage of the total population

is buying online. E-commerce in Western Europe is expected to grow by 68% per year primarily due to new common currency, which brings about improved deals for online buyers. Generally the annual growth in other regions in the world is about 40%. Online shopping is the slowest in Japan, Latin America and Eastern Europe (Internet 5).

#### 2.5.4 E-COMMERCE – WORLD PERSPECTIVE

Business-to Business (B2B) makes up the largest share of the Web sales. In 2002 B2B will account for 83% of the online sales and is projected to be 88% in 2006 (Internet 5).

In Europe the IDC, a research company found that half of the purchasing managers buy operational supplies via the Net while one quarter buy materials used to manufacture products (Internet 15). Of the 500 procurement managers interviewed only 9% have ruled out the option of using the Internet as a purchasing channel. This is a clear indication that B2B e-commerce is growing in Europe and will continue to grow. The adoption of Internet in Europe has followed the general pattern of maturity of e-business in the continent. For example more than half the companies in Sweden are purchasing online compared to 21 % of French companies.

A study conducted by Forrester Research showed that nearly half of all US corporations are now using the Internet to cut down on their supply cost. The report showed that 45% of companies in the US that spend more than US\$ 100 million or more per year on supplies, used the internet to save money in the 4<sup>th</sup> quarter 2001. This represents an increase of 160% based on

the 3<sup>rd</sup> quarter 2001. The pace of Internet adoption in the US was hampered by the economic down turn. However, more than half of company executives surveyed said that they were beyond the earliest stages of Internet development. Just over 21% said that Internet adoption was more than 20% complete (Internet 4). All but a few corporate executives see the Internet growing in importance (Internet 4). Between 2002 and 2003 the projected sales that would be conducted using business-to business e-commerce in the US is \$1.3 trillion which represents 9% of the total US sales (Kleindl, 2001).

According to the research firm IDC, the attitude to B2B E-Commerce in the Asia Pacific has generally been negative. However, by the end of 2002 the value of the B2B e-commerce will amount to US\$61 billion compared to US\$12.8 billion spent in 2000. Currently e-distribution and e-procurement account for majority of the B2B e-commerce transactions in the Asia-Pacific region (Internet 2). Further (Internet 2) states that adoption of B2B in the Asia Pacific will take place in two phases. The large multinationals with operations in Asia will be the early adopters. The second evolution will consist of small and medium sized firms jumping into the B2B market. The primary driver for B2B adoption is the lowering of the administrative cost for buying and selling activities. Security issues are the biggest barriers to Asian businesses entering into the world of B2B e-commerce. Other barriers revolve around antitrust issues, shortage of IT skills and the lack of e-commerce standards. China and South Korea are expected to bypass

Australia as the biggest B2B leaders, accounting for just under half of the total B2B in the region by 2005, excluding Japan (Internet 2).

A survey conducted by Ernest and Young in 2000 amongst 180 emerging growth companies in Australia showed that more than three-quarters had some level of e-commerce involvement. IDC a research organisation found that of those involved in e-commerce, 88 % were engaged in business-to-business e-commerce. They also predict that the B2B e-commerce will grow to \$21.3 billion by the end of 2004 (The Australian, 2000). While Australian e-commerce is showing signs of growth there is room for improvement. In order to assist the implementation of B2B e-commerce, the Australian Government handed out US\$ 6.64 million over a five-year period. A report released by IDC in May 2001, showed that most small businesses in Australia and ‘barely active” in e-commerce. 56% of small businesses surveyed had no Internet related revenue (Internet 6). It is evident from the above that the original enthusiasm for e-commerce has dwindled away. Some of this erosion of participation could be attributed to the failure of several e-commerce business models, which has forced business to rethink their on-line strategies.

#### 2.5.5 E-COMMERCE – AFRICAN PERSPECTIVE

(Internet 8) states that of the 1.3 million Internet subscribers in Africa, approximately 750 000 of them reside in South Africa. North Africa has approximately 250 000 Internet users. Europe and the US were introduced to the Internet in mid nineties when most companies merely made their

presence felt on the Internet. While these continents are embarking on the second phase of full electronic commercial transactions, Africa still has a long way to go. The basic problem in Africa is the lack of infrastructure for power supply as well as telephone lines. The other vital factor in successfully exploiting e-commerce is a robust and sophisticated financial system. In many African countries this is sorely lacking. 18 African countries including SA, have adopted a strategy of making Internet dial-up costs cheaper than voice calls. Nigeria has recently issued 38 licenses for Internet service providers of which 12 are already active. At a corporate level, better-developed countries like, SA, Egypt, Morocco and Tunisia have been able to exploit Internet technology commercially. The Internet has become a necessity for Western economies but is still a luxury in Africa where basic human needs have not been met.

#### 2.5.6 E-COMMERCE - SOUTH AFRICAN PERSPECTIVE

By the end of 2002 South Africa will spend about R35 billion online, the bulk of this online expenditure will be in the form of B2B e-commerce (Internet 9). Many South African companies are starting to experiment with the potential of B2B e-commerce. Most of the high profile B2B ventures announced in South Africa is aimed at maintenance, repairs and operations (MRO) procurement, which is one of the most basic applications of B2B e-commerce. The common mechanism for embarking on e-commerce has been the joint ventures between old economy companies and technology

companies e.g. Miraculum is a joint venture formed between Dimension Data, Old Mutual, Nedcor and J&J. (Internet 7)

BMI-Tech a research company predicts that despite the sluggish growth S.A B2B e-commerce would grow from R3.9bn in 2000 to R310bn in 2005, an annual growth rate topping 100% (Augustine C, 2001). According to Price Waterhouse Coopers (PWC) business to business e-commerce is more likely to succeed in South Africa than business-to-consumer e-commerce. Electronic procurement can be used as a successful tool to bridge the gap between businesses and suppliers (Taylor, 2001). According to a BMI-T survey about 8% of SA companies had already installed some form of e-procurement system in 2001 and this figure is expected to grow to 54% by the end of 2002 (Internet 7). In 2001 B2B commerce accounted for less than 5% of the traffic for the service provider however this is projected to increase to more than 50% within two to four years (Internet 7).

The growth in the B2B e-commerce will have a positive effect in a variety of IT services and products like application service provision and disaster recovery planning. Also manufactures of high-powered servers which forms the backbone of B2B marketplaces would experience higher demand for their products. Business intelligence vendors also expect to capitalise on the situation when B2B e-commerce matures. As end users start to adopt supply chain management systems and e-procurement solutions they would need software to help them understand their buying patterns as well as the relationships with their customers, suppliers and intermediaries (Internet 7).

Some commentators are quite critical of the funds being invested in e-commerce. Douge Franke of PWC believes that the local market is not big enough for all the e-business initiatives (Stones, 2001). Riaan de Jager of Aqua Online stated that most e-business initiatives failed as companies invested large sums of money into their ventures without a justifiable model for getting a return (Stones, 2001).

#### 2.5.7 BARRIERS TO THE ADOPTION OF E-COMMERCE

This section describes the barriers to adoption of e-commerce. It initially focuses on different industries and then examines barriers in different countries. Finally it expands on attempts that have been made to reduce the barriers to e-commerce.

The adoption of e-commerce depends on business cycles and the prevailing economic conditions. The economic down turn in the economy had greatly hampered the adoption of e-commerce in several countries. Many companies had to re-think their online strategies or at least cut back on their online investments. In March 2000 the research firm Gartner, predicted that online e-commerce would reach \$7.3 trillion by 2004. However in March 2001 this prediction was scaled back to \$6 trillion (Internet 10). A combined report by Forrester Research and the Institute for Supply Management (ISM) in the United States cited economic downturn as one of the main reasons hampering the pace of Internet adoption (Internet 4). The same report found that the earlier barriers like integration and other



technical difficulties have been overshadowed by overall spending slowdown.

#### 2.5.7.1 BARRIERS VARING ACCORDING TO INDUSTRY AND SIZE OF COMPANIES

The barriers preventing the adoption of e-commerce varies from industry to industry. The ensuing discussion will examine different barriers as they relate to various industries. The adoption of e-commerce in the chemical industry is slower than expected but is still leading to changes to the way chemical companies do business (Internet 11). Spending on the Internet investments have been competing with other investments that have a clearer return on investment. Bayer, a large chemical corporation quoted security especially protection from competitors and hackers as the main barrier to adoption of the online initiatives (Internet 11). In the agricultural sector companies have been slow to trade on B2B exchanges, either because of infrastructure problems or worries about transaction security (Internet 12).

The National Association of Insurance Commission (NAIC) in the USA conducted a survey to identify regulatory barriers that prevent insurers from efficiently transacting business electronically. There was also a concern about online payment and digital signatures. The main issue revolved around the validation and the verification of signatures between customers and insurers (Roland 1999).

A major survey conducted in the IT arena showed that the lack of trust was the leading barrier, which prevented the growth of E-Commerce (Internet

13). Approximately 60 of the respondents were concerned that their privacy would not be maintained. 56% of the respondents were concerned that the true identities of the transacting parties could not be verified, and an equal percentage were concerned that their technology infrastructure was not robust enough to withstand unauthorised attacks. The study also found that technology was immature to handle support the high volume of transactions. 57% of the respondents quoted the lack of skilled manpower as a major problem. There is the tendency for high turnover among IT staff. Companies have been finding it difficult to retain staff despite the good remuneration package (Internet 13). 51% of respondents were nervous about opening up corporate systems to suppliers and customers.

A survey conducted by Commerce Net 2000 using over 1000 respondents from six countries was aimed at establishing the barriers to e-commerce. Apart from the type of industry' barriers also vary according to the size of the company. The main barrier to large global companies was culture and organisation while small and medium enterprises listed "lack of qualified personnel" and "lack of business models" as critical barriers (Internet 14). This is not surprising as large companies are more likely to possess more inertia and hierarchical structures which are generally difficult to transform. Change in smaller companies on the other hand, would affect fewer personnel and would thus make the transformation process easier. Smaller companies would generally have fewer resources than larger companies and the lack of these resources may impede the implementation of e-commerce.

Generally small firms do not have dedicated IT personnel whereas large companies have in-house IT departments who would be able to handle the implementation of e-commerce.

This study will use these findings of this International survey to test whether the same applies to the local scenario in South Africa. It will be able to establish whether the lack of IT personnel applies mainly to the small Lysine customers or whether the larger Lysine customers also experience the same problem.

#### 2.5.7.2 BARRIERS VARYING ACCORDING TO COUNTRIES

Barriers in e-commerce tend to vary from between countries due to the difference in the stages of the adoption life cycle. The varying resource levels and economic conditions amongst countries will also have a bearing on the nature of the barrier to e-commerce.

The critical shortage of IT professional skills is the biggest barrier to e-commerce in Australia (The Australian, 2000). This is due mainly to qualified IT personnel being poached by overseas companies. Most of these employees are being enticed by higher salaries. A survey conducted amongst 180 emerging growth companies showed that security was not seen as significant barrier (The Australian 2000). This is contrary to findings in most other countries where security is listed as a significant barrier.

In Europe, a recent IDC survey amongst 500 procurement managers showed that the main reason why managers did not purchase on-line was that their

suppliers were not on-line or not ready to implement e-commerce. Other non-users of the Internet quoted long term running contracts with existing suppliers as a deterrent to the adoption of the Internet (Internet 15). Almost 27% of the respondents stated that internal resistance to change hindered the implementation plans of the e-commerce. Other barriers identified in the survey include: difficulty in using or understanding the e-procurement system, insufficient employee training and the challenge of integrating the new system with the existing information technology networks (Internet 15).

An empirical study conducted in Singapore in 1999 amongst several different economic sectors examined the pattern of adoption of business-to-business e-commerce. The study carried out in 1999 covered. The study found that security, initial set-up costs, and on going operational costs as the main barriers to the adoption of B2B commerce or the extension of its usage (Jochen & Poh, 2001). Current users of e-commerce and those interested in e-commerce reported very different barriers compared to those people that were not interested in e-commerce. Firms that were not interested normally cited 'no need' as a barrier to entry. Over 75% of the companies that were not interested were small firms who felt that their size did not warrant the adoption of e-commerce. Only 2.7% of large firms were not interested in e-commerce. Firms that were interested did not have clear ideas of the barrier of adoption. However, most saw 'security', 'initial set up costs' and 'on going operational costs' as the main barriers. The initial set-up cost for

adopting e-commerce is high and depends on the industry, company size and type of software and hardware used. Privately owned firms may see this as a greater barrier due to the immediate need for return on investment. Government firms may not suffer the same economic pressure as private firms. The study also showed that the smaller the firm the greater was the concern over security issues.

CommerceNet conducted a survey by involving 1000 companies from 6 countries to identify the barriers and inhibitors to e-commerce. The study also contrasted the barriers between countries. According to (Internet 14) the following table reflects the business to business barriers in the US as compared to the rest of the world

Table 2.2 Top 10 business to business barriers in the U.S and beyond

Top 10 U.S	Rank	Top 10 Non- U.S
Interoperability with complementary companies	1	Organisation
Interoperability between e-commerce applications and with Legacy systems	2	Culture
Culture	3	International trade barriers
Organisation	4	User authentication of and lack public key infrastructure
User authentication of and lack public key infrastructure	5	Legal issues
Lack of standards	6	Lack of qualified personnel
Partner e-commerce readiness	7	Lack of standards
Lack of qualified personnel	8	Inconsistent tax laws
International trade barriers	9	Executive awareness
Robust infrastructure	10	Legal environment

Table 2.2 shows that in the U.S the major areas of concern revolve around the interface of new e-commerce based systems and organisations legacy computer systems. It is also evident that there is a marked difference between barriers facing U.S companies and non-U. S companies. The difference between the nature of the barriers between U.S and other countries is due partly to the fact that the U.S has advanced much further in the adoption life cycle of e-commerce. Hence they are now grappling with more substantive issues. By contrast, the other countries are grappling with barriers relating to organisational and cultural issues. Since most of respondents from the other countries were from Asia it is not surprising that trade barriers feature high on the list in table 2.2 (Internet 14).

As is evident from table 2.2 the nature of the barriers and the level of impact of the barriers differ between countries. These differences may be partly due to the resources of a country as well as the stage of e-commerce adoption.

(Internet 14) also showed that the barriers globally tend to change over time and the level of importance of the barrier also varies with time. In 1999 “executive awareness” was rated as one of the top 4 barriers globally but, by 2000 this factor was relegated to 10th position. This is due to the fact that, over time executives gained more knowledge about e-commerce. The survey also showed that international trade barriers had increased in level of importance between 1999 and 2000. This can be explained by the fact that

companies were expanding the business boundaries as they as they adopted e-commerce.

E-commerce barriers also vary with the size of the organisations. (Internet 14) showed that in large businesses “organisation” and “culture” were the main barriers while in small and medium enterprises “lack of qualified personnel” and “lack of business models” were the major concerns.

In the South African scenario malicious e-mail code in the form of viruses, has negatively affected the adoption of business-to-business e-commerce (Gordon, 2000). These viruses strip the e-mail servers of small and large organisations resulting in the breakdown of electronic communication. With the dramatic increase of the use of e-mail in business-to-business transactions, S.A companies are increasingly reliant on networks for the running of their organisations. The “I love You” virus which affected the worlds teledata networks in June 2000 cost companies more than \$10 billion in network down time and lost information. The proliferation of viruses through networks has dampened the enthusiasm for business to business e-commerce. Businesses are concerned about the cost of contamination and are re-evaluating their situation regarding e-commerce (Gordon, 2000).

According to the director of e-commerce at Pricewaterhouse Coopers, the South African market is not big enough to sustain many of the e-commerce ventures in South Africa (Stones, 2001). He advised companies to establish whether the market for e-commerce was big enough before embarking on a

major e-commerce project. The lack of adequate bandwidth and lack of trust of customers are the other major hurdles that need to be conquered in the field of electronic trading. Multi-disciplinary teams consisting of business and technical leaders implement most e-commerce projects. The culture of and adaptability of these teams could prove to be a major hurdle in the adoption of e-commerce (Stones, 2001)

The lack of certain infrastructure in S.A also creates a barrier to e-commerce adoption. Digital Subscriber Line (DSL) allows for high-speed data transmission over existing copper telephone lines. It provides a cheaper alternative to more pricey digital technologies like ISDN (Internet Subscriber Digital Network). Although South African businesses are keen to implement DSL they are unlikely to be introduced soon due to the problems experienced with this technology worldwide. Dawson. B of Internet Solutions says that the “ the lack of cheap bandwidth, or capacity, is putting the brakes of e-commerce”(Gordon, 2001, p1).

The other impediment is governments backtracking on issuing broad band licenses. Broad band means high-speed connections that enable users to receive voice, video and data messages simultaneously. There however are conflicting views as to whether broad banding will assist S.A in the implementation of e-commerce. Ernest and Young are optimistic about broad banding; they believe it will result in new applications and business models. On the other hand, Internet Solutions believes that broad band business models are dependent on high volume business and South African



market is too small for broad banding to have any positive effect on the economy (Planting & Bidoli, 2001).

#### 2.5.8 BENEFITS OF E-COMMERCE

Electronic technologies are being exploited by thousands of businesses and organisations to increase revenue, create new information based products, establish new service delivery channels and to better serve and interact with customers. The transaction management aspect of e-commerce also helps firms to reduce operating cost by enabling better coordination between sales personnel, production and distribution processes (Kalakota & Whinston, 1997). Implementing an e-commerce model does not mean selling something over the Internet, rather it involves the in-corporation of the Internet into the day to day running of the company in particular business-to-business transactions for building customer relationships (Internet 16). Analysts believe that online value creation resides more with multi-partner collaboration rather than in transaction processing (Vigoroso, 2001).

##### 2.5.8.1 ENHANCED CUSTOMER FOCUS, RESPONSIVENESS AND RELATIONSHIPS:

E-Commerce provides a direct link between business marketers and corporate buyers making it is possible to tailor products to meet the exact requirements of the customers (Hutt & Speh, 2001). Customer Relationship Management (CRM) enables a company to focus on developing a relationship with each customer through the effective use of individual account information (Rayport and Jaworski, 2001). By better understanding

the buying behaviour of the customer, companies will be able to build long term relationships with customers and thus improve long term profitability. A CRM program can only be effective if there is an integrated effort by all functions within the company to satisfying the needs of the customer. The use of electronic technology aids the CRM process which ultimately aims to increase customer retention and loyalty as well as increase customer profitability (Rayport & Jaworski, 2001).

#### 2.5.8.2 REDUCED TRANSACTION COST:

Suppliers are able to provide a low-cost access to both order entry and to order tracking via the Internet. The customer also enjoys the advantage of being to place orders or access information at any time (Hutt & Speh, 2001). Companies are able to exchange purchase orders and invoices through the Internet which is a cheaper option than using EDI (Electronic Data Exchange) - this is especially beneficial to smaller companies who cannot afford the infrastructure for EDI (Internet 19). Financial Value Chain Management (FVCM) technology providers are using e-commerce to reduce hard-copy documentation with electronic documents. This results in improved cash flow, reduction of outstanding debts and reduced administration cost (Internet 19). Routine purchases made via the Internet are more cost effective than traditional purchasing method due to the lower cost of order generation (Jackson, 2001). In Asia Pacific the biggest driver of B2B adoption is the lowering of administrative cost of buying and selling activities (Internet 2).

#### 2.5.8.3 INTERGRATION OF SUPPLY CHAIN:

The Internet allows electronic connection between suppliers, customers, intermediaries, and alliance partners despite them being geographically separated. This allows all parties to be connected to a common database which make the whole value adding process more seamless and efficient (Hutt & Speh, 2001). Efficient businesses can meet customers delivery dates 96% of the time versus 83% for inefficient businesses (Stein, 1997).

Supply chain management is a complex discipline involving processes such as inventory and warehouse management, procurement, order processing, deliver fulfillment, logistics, supplier management and demand planning. Previously the supply chain was a sequential series of inflexible events that started with the sourcing of raw materials to the final product delivery to the customer. Now the Internet has transformed the supply chain into a web of relationships. It has become easy for organisations to share real time information cheaply over the Internet. Shared supply chain management allows companies across the supply chain to automate the management of inventory. The Internet allows the monitoring of customer stock levels and the replenishment of stock with the minimum of human intervention. This streamlines the previously paper-based systems by maintaining a balance between holding too much or too little stock (Internet 17).

Customers are able to track the shipment of an order and they are also able to establish if the manufacturer has stock before placing an order. As companies become more competitive and products become commoditised,

companies will need to compete on value-added services and price. Management of the supply chain via the Internet creates this opportunity for companies to add value to the product offering (Internet 17).

Frank (1995) describes the new trends in procurement companies that are forging close relationships with fewer suppliers. The Internet is also allowing closer relationships between the buying and selling sides of organisations. There is closer relationship with suppliers allowing for just-in time deliveries targeted at improving product and service quality.

A study by Giga Information Group projected that worldwide savings could reach \$1.25 trillion from using e-commerce to streamline business processes (Internet 18). Jackson (2001) describes how multinational companies have used the afore-mentioned principles to streamline purchasing and procurement processes to reduce internal costs. Forrester Research in U.S have found that large-volume buying organisations have made dramatic increases in the cost savings and rated the importance of the Internet as very high (Internet 4).

#### 2.5.8.4 FOCUS ON CORE BUSINESS:

The Internet makes it easier for companies to outsource its non-core activities allowing it to focus on its core functions thus improving its competitive advantage. For example Boeing has sub contracted several services from warehousing to manufacturing services so that it could focus on the its core strategic strength i.e. product design. All this is possible due

to close links with the sub-contractors as a result of the Internet (Hutt & Speh, 2001).

#### 2.5.8.5 EFFECTIVE INFORMATION AVAILABILITY FOR CUSTOMERS:

Customers are able to easily find the products that match their need using an electronic product catalog. A web site may be configured such that the customer is able to fill out his requirements on the web page and the computer performs a database search and retrieves the product that matches the customers need (Hutt & Speh, 2001). Further customers are able to find information on their individual accounts and prices of individual products to be ordered. Customers are able to use the electronic link to their suppliers to ascertain whether a product is in stock prior to placing an order (Rayport & Jaworski, 2001).

#### 2.5.8.6 BENEFITS OF DISINTERMEDIATION

Disintermediation is defined as the reduction or the elimination of the role of retailers, distributors, brokers, and other middlemen in transactions between the producer and the customer. The current wave of disintermediation resulting from e-commerce is giving buyers direct access to information and services without the help of middlemen. E-commerce disintermediation will play a key role in boosting economic growth (Atkinson, 2001). Customers benefit by receiving products and services at a lower price due to the fewer intermediaries who generally add to the cost of the final product. Suppliers also benefit as disintermediation puts them in

closer contact with customers, thus being able to better understand the customer needs. This improved understanding places suppliers in a better position to meet the needs of customers.

## 2.6 SUMMARY

In its narrowest sense decision making can be seen as a process of making a choice among alternative courses of action. Decision-making can be classified by its relative uniqueness. Programmed decisions can be made by habit or policy and involve, simple, common and frequently occurring problems. Non programmed decisions on the other hand are more complex and occur less frequently. They generally require the formal decision making process for its resolution. The decision making process generally starts with the problem identification and definition of the problem. The other steps in the process involve development of alternative solutions, evaluations of these solutions, selection and implementation of the best solution. The final step involves the evaluation and control of the chosen alternative once it is implemented. Individuals or groups, depending on the complexity of the problem may make decisions in organisations. Despite the slower process involved in group decision-making, it is the preferred option for complex decision making. Decisions about e-commerce has been gaining importance in organisations and generally forms part of the strategic decision making process either at the functional or the business level.

The purchasing decision making unit within an organisation, normally referred to as the buying centre comprises of, initiators, influencers, gatekeepers, approvers, users and deciders. This group of individuals would generally use group decision-making techniques for complex decision making.

The industrial buying process is broken up into the following buying phases: problem recognition, general need description, product specification, supplier search, proposal solicitation, selection of suppliers, order routine specification and performance review. This process is based on the generic decision making process. Robinson, Faris and Wind (1967) proposed the Buygrid model (Table 2.1) which describes the buying behaviour of industrial buyers, which varies according to the type of purchase situation. For a new task purchase situation the information search is intensive and a larger number of people are involved in the decision making process compared to a straight re-buy situation. Despite criticism for its simplicity the Buygrid model provides a useful framework for understanding industrial buying behaviour. There are several forces that impact on the buying decision within the organisation, some of which emanate externally while others emanate internally. Webster and Wind (1972) have classified these factors into four levels: environmental, organisational, group and individual factors.

Ozanne and Churchill (1971) used the classical AIETA (Awareness, Interest, Evaluation, Trial and Adoption) consumer adoption of innovation

model and showed that it worked equally well in an industrial situation. Hutt & Speh (2000) identify the following classes of industrial customers in terms of adoption of industrial innovations: technology enthusiasts, visionaries, pragmatists, conservatives and skeptics. The technology enthusiasts are the first to adopt and the skeptics who are analogous to “laggards” in consumer markets would be the last to adopt an industrial innovation like e-commerce. Fredrick & Webster (1969) argued that firms would be the first to adopt an innovation if it offered the largest relative advantage, in terms of profit or cost reduction and if they are able to tolerate the risk of adoption. The rate at which an innovation diffuses through an industrial market depends on, nature of the product, competitive pressures, size of firm, profitability of investment, uncertainty in the future (Webster, 1971).

Mansfield (1968) found support for the “the band wagon effect” showing that as competitive pressure from rivals increased the rate of diffusion of innovations increased. Mansfield (1968) found that the speed of adoption of innovations was directly related to the size of the firm and the return on investment. Sutherland (1969) found rate of diffusion of innovations is limited by uncertainty in the future.

Rayport (2001, p4) defines e-commerce as “technology-mediated exchanges between parties (individuals, organizations, or both) as well as electronically based intra-or-interorganizational activities that facilitate such exchanges” This definition of e-commerce which includes e-business



is the preferred definition. There are four categories of e-commerce namely: business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer (C2C) and consumer-to-business (C2B).

By the end of 2002 it is expected the B2B e-commerce will account for 83% of the total online sales in the world and this is expected to grow to 88% by 2006. In the U.S the Internet is being widely used to reduce supply costs and most corporate executives see the Internet growing in importance. Although the attitude to e-commerce in Asia Pacific has been negative, e-commerce sales has increased 5 fold since 2000. China and South Korea are expected to account for just under half of the total B2B in the region by 2005. Australia's implementation of e-commerce has been slow and has been assisted by injection of funds by government.

Africa's implementation of e-commerce has been lagging behind Europe and U.S due mainly to the lack of infrastructure. By the end of 2002 South Africa is expected to spend R35 billion online, the bulk of which will be B2B e-commerce. B2B e-commerce is expected to grow to approximately R310 billion by 2005. Some critics however believe that the South African market is too small for e-business initiatives.

The barriers to the adoption of e-commerce tend to vary according to the type industry and size of the company. A major survey conducted in the IT arena showed that the lack of trust was the leading barrier, which prevented the growth of E-Commerce. The insurance industry in USA quoted concern about online payment and digital signatures as the main barrier to e-

commerce. Apart from the type of industry' barriers also vary according to the size of the company. The main barrier to large global companies was culture and organisation while small and medium enterprises listed "lack of qualified personnel" and "lack of business models" as critical barriers. Barriers in e-commerce are bound to vary from country to country depending on the adoption life cycle that a country finds itself in. The critical shortage of IT professional skills is the biggest barrier to e-commerce in Australia. In Europe, procurement managers stated that the main reason why some managers did not purchase on-line was that their suppliers were not on-line or not ready to implement e-commerce. In Singapore a study found that security, initial set-up costs, and on going operational costs as the main barriers to the adoption of B2B commerce. In the U.S the major areas of concern revolve around the interface of new e-commerce based systems and organisations legacy computer systems. U.S has advanced much further in the adoption life cycle of e-commerce than most other countries and are now grappling with more substantive issues. By contrast, the other countries are grappling with barriers relating to organisational and cultural issues. In the South African scenario the lack of adequate bandwidth and lack of trust of customers are the other major hurdles that need to be conquered in the field of electronic trading The lack of certain infrastructure in S.A also creates a barrier to e-commerce adoption.

The benefits of e-commerce are being exploited by many businesses to increase revenue, create new information based products, establish new service delivery channels and to better serve and interact with customers. The transaction management aspect of e-commerce also helps firms to reduce operating cost by enabling better coordination between sales personnel, production and distribution processes. The Internet makes it easier for companies to outsource its non-core activities allowing it to focus on its core functions thus improving its competitive advantage. Customers are able to easily find the products that match their need using an electronic product catalog. Disintermediation, which is possible due to e-commerce, has resulted in the elimination of middlemen in transactions between the producer and the customer. This in turn has helped improve service levels and customer satisfaction.

## CHAPTER 3

### S.A. BIOPRODUCTS COMPETENCIES AND BUSINESS ENVIRONMENT

#### 3.1 INTRODUCTION

The purpose of the chapter is to provide background information necessary for the understanding of the subsequent chapters. It examines the relevant internal aspects of S.A Bioproducts and also describes the external environment within which the company operates.

This chapter describes the history of the company, which covers the inception of the company as well as the transitions that have taken place to date. The term Lysine is frequently used in the report and this chapter helps create an understanding of the product. Lysine is a chemical compound used in animal feeds. Its chemical nature as well as its benefits as it pertains to animals, is explained. For the ease of understanding the technical concepts are described in simplistic terms.

The animal feed market in South Africa is complex and dynamic. An understanding of the market forces that currently prevail in the South African feed industry helps in the understanding of the circumstances under which industrial buyers make their purchasing decisions. The pricing mechanism for Lysine is explained in detail. A description of the customer base as well as the distribution channel contributes to the understanding of the market. A discussion of the S.A Bioproducts Web page rounds off the

promotional element of marketing. This chapter touches on all 4p's of marketing as well as the competitive forces in the Lysine market.

S.A Bioproducts is an innovative company constantly looking to break new barriers. The company culture is progressive with a positive attitude to innovation, which is a prerequisite for embarking on an e-commerce strategy.

### 3.2 S.A. BIOPRODUCTS - COMPANY HISTORY

AECI Bioproducts Pty Ltd was formed in 1993. The company was formed after AECI Limited, a large chemical company, and the IDC, the state owned Industrial Development Corporation of South Africa, entered into a joint venture. The objective of the new company was to develop a skills base in the emerging field of industrial biotechnology. This new capability was to be used to produce high value chemicals for the animal feed market. To this end the construction of the Lysine Plant commenced in 1993 at Umbogintwini. The world class lysine fermentation plant costing \$65M was successfully commissioned in 1995. In December 2001 the company changed ownership and was renamed S.A. Bioproducts (PTY) LTD. The company is currently jointly owned by Zarara Energy Limited, the IDC and management.

When Bioproducts was launched, an agent involved in the animal feed industry distributed all local lysine. During 1999 S.A Bioproducts took over the local distribution of lysine to large customers. As time progressed Bioproducts found that it would be able to provide better service to its

customers by removal of the agent from the supply chain. To this end Bioproducts embarked on direct distribution of all local lysine as from 1 April 2002.

### 3.3 WHAT IS LYSINE?

Living beings require protein for growth and health. Proteins are made up of amino acids, which are sometimes referred to as the building blocks of protein. Animals digest their food into amino acids before these are built up into the proteins. 10 of the 20 amino acids are referred to as essential amino acids as the diets of monogastrics (single stomach animals such as pigs and poultry) must contain these amino acids. Monogastric animals cannot produce these 10 essential amino acids. Non-essential amino acids on the other hand can be produced by the animal. Lysine is an essential amino acid utilised in the manufacture of animal feed. It is a vital growth ingredient in pig and poultry diets.

The ratio of the essential amino acids in the feed must closely approximate to the optimum ratio required by the animal. Any amino acids in the feed that are in excess of those required by the animal must be metabolised and excreted. This implies added cost and, because the breakdown products of amino acids are nitrogenous, these excretions have a significant adverse environmental impact. Addition of pure amino acids gives the feed formulator the opportunity to match the amino acid profile of the feed to the optimum required by the animal more cost effectively than by the use only of whole protein.

### 3.4 ANIMAL FEED MARKET IN SOUTH AFRICA

In the 10 years leading up to 1991, world-wide pork and poultry consumption had increased by 40% and 81% respectively (SAPA Conference 2001). For health reasons there has been a global trend of increasing white meat consumption as opposed to red meat. Further the recent prevalence of “ Mad Cow” disease has further supported the above trend. South Africa currently produces about 190729 tons of pig and 2745067 tons of poultry feed per annum (Internet 1). Over the past 10 years the animal feed production has grown at a rate of 10.65% per year (Internet 1). Approximately 7800 tons of lysine is currently consumed in the manufacture of pig and poultry feed in S.A.

Pig and poultry feed industry is dominated by a few large feed milling companies. Feed mills manufacture animal feed and feed-ingredients in large quantities. In this way they are able to secure lower prices and are also able to hedge their prices. Some of the ingredients that go into the making of animal feed are maize, soya, sunflower seed, vitamins, amino acids (one of which is Lysine). Qualified nutritionists who ensure that the feed is balanced for optimum growth of the animals formulate the feed. Some of the ingredients like maize are crushed and the optimum quantities of each ingredient are blended in a ribbon mixer to produce the final feed. The feed is then either bagged or sold to users in bulk. The bulk feed is transported to the point of use by large road tankers.

Animal feed can also be manufactured at the point of use i.e. a chicken farm or a pig farm. This establishment is regarded as a feedlot. Generally the pig or poultry farmer owns the feed mill. The farmer buys in his own feed ingredients from various suppliers and manufactures the feed on his farm. The feedlots consume a smaller volume of Lysine compared to the larger feed mills.

Premix companies are also consumers of lysine. A premix company prepares a blend of the high value ingredients that go into the animal feed- these include vitamins, some amino acids, minerals and enzymes. Due to the small volume of the premix that goes into a batch of feed these blends are normally not prepared at feed mills. The full blending operation of the premix is done at premix companies. The premix companies sell their premix to feedlots and feed mills.

The recent hike in the price of feed ingredients has seen a rationalisation of the local feed industries with a few months. In 2001 the millers cost of maize was R685/ton while in February 2002 the millers cost of maize was R2100/ton (Nofal, 2002). The drastic rise in the price of maize was due to shortages within the country. According to Willemse. J an agricultural economist the production of maize within the country has decreased since the deregulation of maize production (Nofal, 2002). Further the local price of maize is based on import parity and the weakness of the Rand has resulted in a higher local maize price. Allied with the increased maize price,



the price of other ingredients like, soya, fishmeal and lysine have also increased.

Due to the higher cost of the raw materials the smaller feed mixers have found it difficult to secure raw materials due to cash flow problems. Also the shortage of maize has meant that they are unable to produce their own feed resulting in some small feed mills shutting down. This however may be a temporary measure until feed ingredient prices fall again. Other small feed mixers are now forced to purchase ready-made feed from the larger feed mills. The smaller feed mixers benefit by receiving favorable terms of payment from the large mills thus assisting their cash flow problems. Secondly, since larger mills are able to secure raw materials at a lower price due to volume discounts and hedging, the small feed users benefit from lower cost of feed.

Thus the higher feed ingredient prices have forced a rationalisation within the feed industry. There is a shift away from the small-scale manufacture of feed to larger scale manufacture. The shutting down of smaller feed mills means that there will be less competition amongst the smaller feed mills. There will also be a negative impact on S.A Bioproducts revenue derived from Lysine. The demise of the smaller users of Lysine, who generally represent higher margins, means that there will be a reduction in revenue for Bioproducts. The total volume of Lysine sales will however remain unaffected, as the volume that is lost due to the demise of smaller feed mills will be compensated for by the increase in demand by the larger feed mills.

### 3.5     MARKETING OF LYSINE

S.A Bioproducts is currently the sole manufacturer of Lysine in South Africa. It produces 11000 tons of Lysine per year of which about 6000 tons is sold locally while the remainder is exported. In 2001 Bioproducts captured about 70% of the local lysine market. It faces strong competition from importers who import Lysine mainly from United States of America and Indonesia. Both these countries have been “dumping” Lysine into South Africa. Towards the latter part of 2001 anti-dumping duties have been implemented to protect the local manufacturer. Further an import tariff of 10% instituted in 2001 is expected to span 5 years diminishing by 2 % per year. Some overseas Lysine manufacturing companies have local agents within S.A, while others supply traders who compete with the local manufacturer. To a small extent some the larger feed mills import lysine directly from overseas manufacturers.

S. A Bioproducts sells its lysine directly to the larger customers like the large feed companies. The remainder is sold to local traders or end users like pig and poultry farmers. Most large customers buy forward over a three-month period. This sale takes the form of a short-term contractual basis. Smaller customers and Traders generally place their orders on a monthly basis, which then gets delivered in truckloads to them.

The lysine price on the international market is very volatile. The pricing mechanism is very complex and apart from depending on the supply and demand dynamics it is also linked to other feed ingredients like soya, maize

and fishmeal. Both soya and maize contain natural lysine, with soya having a higher concentration of lysine. When the price of soya increases it also causes the demand for lysine to increase and hence the Lysine price would also increase. More precisely, the price of lysine is generally proportional to the difference in the price between maize and soya commonly referred to the “spread”. If the corn /soya spread increases then the price of lysine will generally increase. The local lysine price is based on the import parity price and generally lags the international prices by 3 weeks due to the transit time from Europe or USA to South Africa.

### 3.6 COMPANY CULTURE AND COMMITMENT TO TECHNOLOGY

S.A Bioproducts possesses superior technological skills, which has been proved by successfully building and commissioning the first Lysine Plant in South Africa. The company received the South African Institute of Chemical Engineers Innovation award in 1997. Employees strive for technical excellence and benchmark themselves against world’s best practices.

The companies mission statement declares that “ opportunities to reduce cost and add value using information Technology will be continuously sought” In order to honour this commitment the company developed its own in house information technology department. Several in-house software packages have been written to streamline several business and administrative processes. All marketing data is captured in a database and

extracted in the form of customised reports that were developed by the information technology department.

S.A Bioproducts has a Web page that was developed in-house in 1996 and is currently also maintained by in-house personnel. The current web page serves to create a presence on the Internet and employees are also able to enter the company electronic mail system from remote locations via the current web site.

S.A Bioproducts also has an Intranet, which is used to disseminate useful information to employees. It also gives employees access to company information that they may require to perform their jobs.

### 3.7 INTERACTIVE WEB PAGE

In keeping with its culture of being technologically advanced the company hopes to embrace Internet technology and use it to improve its business performance. The company is contemplating a fully interactive web page, which will be used as a platform for e-commerce. In the long term it hopes to improve customer service by giving customers the option of purchasing online. Customers will be able to place their orders faster and have them processed faster. Customers will also have easier access to more information.

### 3.8 SUMMARY

S.A. Bioproducts, a biotechnology company that started in the 1993 has met its objectives of creating a skills-base in biotechnology and thereby building the first Lysine plant in South Africa. It operates in a market that is very volatile and highly competitive. Due to unfair competition from U.S.A and Indonesia it was forced to apply for government protection in the forms of anti-dumping and import tariffs. The company has slowly increased its local market share. It is involved in the animals feed industry, which is also growing at a steady pace. The company's customer base is currently diminishing as smaller feed mills shutting down due to high input costs. This has resulted in increase of production by the larger feed mills. The rationalisation of the industry will have a negative impact on the margins obtained from the sale of lysine. However, this will be compensated for by lower distribution cost as feed mills consolidate their production.

S.A Bioproducts is technologically advanced both in information technology as well as biotechnology. They have successfully exploited their competencies to survive in a very competitive industry. They further envisage the use of e-commerce to streamline business processes and to improve customer service.

## CHAPTER 4

### RESULTS AND DISCUSSION

#### 4.1 INTRODUCTION

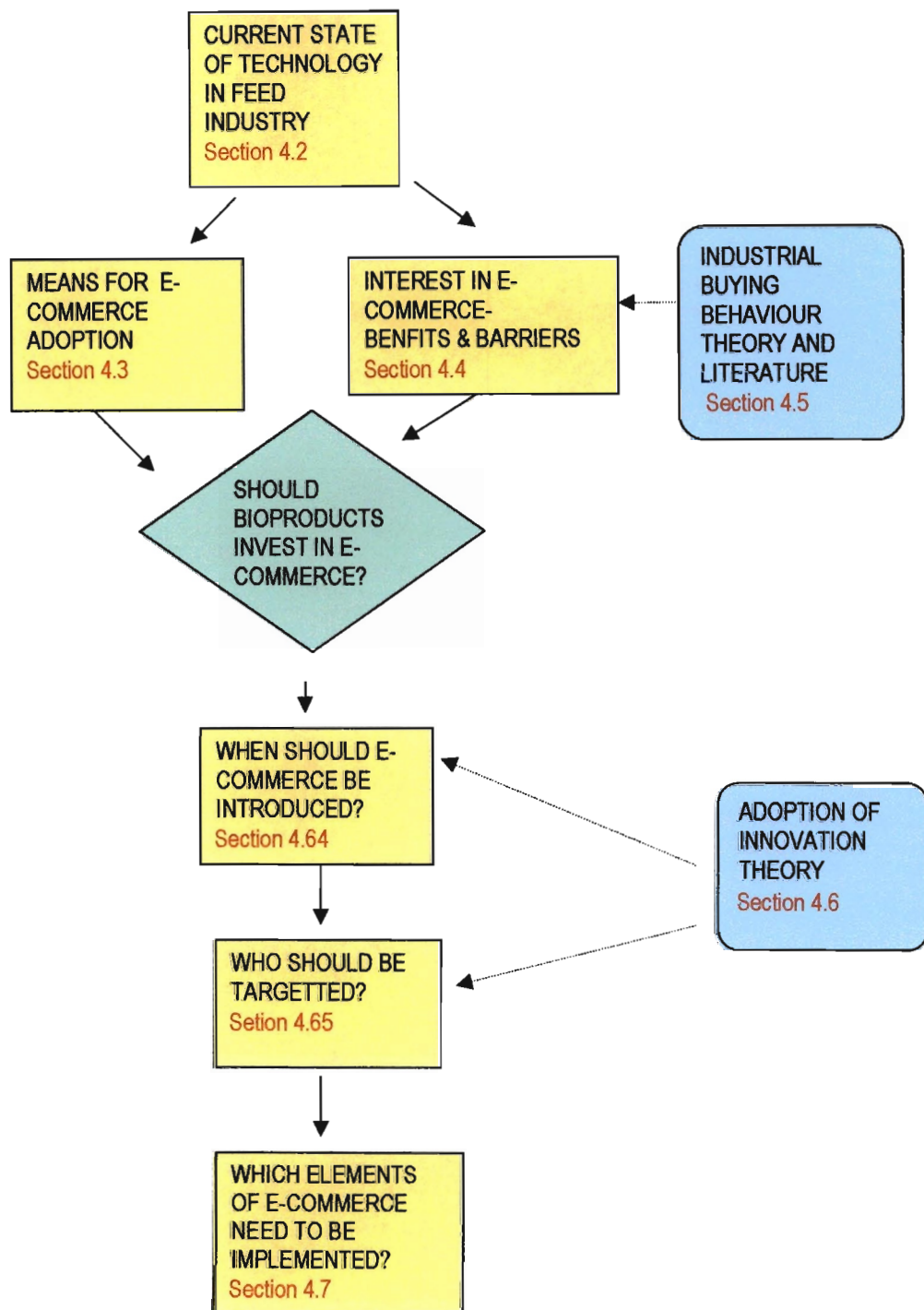
This chapter presents the results of the survey that was conducted amongst the current industrial customers of S.A Bioproducts. The chapter is structured such that it logically answers the management question whether S.A Bioproducts should implement e-commerce. One of the major deciding factors would be whether customers have the means and the interest in adopting e-commerce. If customers have the means and the interest in e-commerce then it is likely that they will adopt e-commerce when it is implemented.

The other question that needs to be answered relates to the timing of implementation of e-commerce. Bioproducts needs to understand when customers would be ready to adopt e-commerce. Bioproducts also need to establish who would be the first to adopt e-commerce. This is important as the initial marketing effort could be tailored towards to “innovators”. The last section of this chapter explains the aspects of e-commerce customers are most keen to use.

The results of each of the aforementioned aspects are discussed against the backdrop of the relevant theory. Secondly prior research results are compared and contrasted with the results of the survey. The innovation adoption theory and prior empirical work is used as a basis to identify innovators in the animal feed industry. These concepts are also used to gain

an insight into the timing of e-commerce implementation. Industrial buying behaviour theory is used to analyse those factors, which affect buying via the Internet. The framework presented in Fig 2.1 is used as the basis for the aforementioned analysis. Empirical results from different parts of the world are used as a point of departure to examine the benefits and barriers to the adoption of e-commerce. Fig 4.1 is a graphical representation of the layout of chapter 4. Apart from showing the flow of the chapter it also reflects where relevant theory and literature is used to reinforce the study.

Fig 4.1 – Structure of Chapter 4

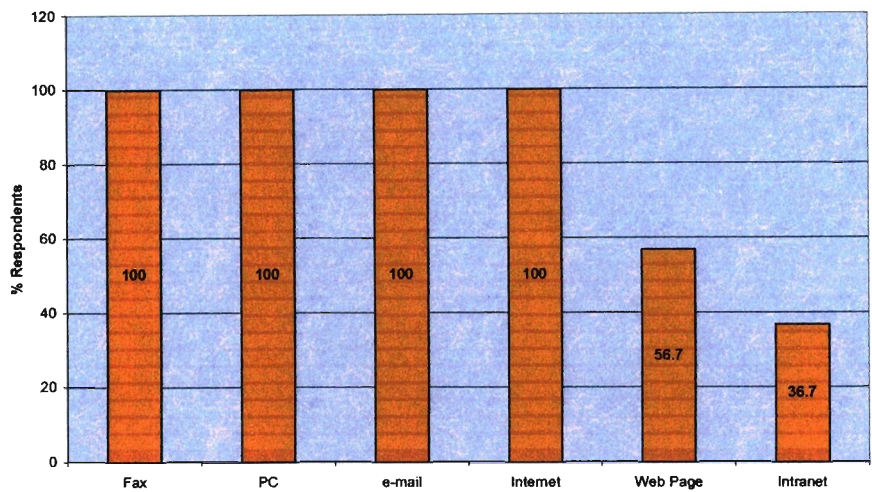




4.2 CURRENT STATE OF TECHNOLOGY IN THE FEED INDUSTRY

One of the objectives of the questionnaire was to establish the type of information technology infrastructure that current Lysine customers possess. Customers were asked to fill out a multi response question relating to the state of their information systems and office automation. The results of the finding are summarised in Fig 4.2

Fig 4.2 – Information technology infrastructure in the animal feed industry



All subjects have access to a fax, personal computer, e-mail and the Internet. 56.7% of subjects have a web page while only 36.7% have an Intranet. Ironically (Internet 8) states that the lack of infrastructure in Africa is a major problem to the implementation of e-commerce. In the feed industry in South Africa there does not appear to be this problem. On the contrary all respondents have access to the Internet. This illustrates the

point that South African feed industry has advanced beyond most African countries with respect to e-commerce. This supports the view reflected in (Internet 8) that better-developed countries like SA, Egypt, Morocco and Tunisia have been able to exploit Internet technology commercially, unlike the poorer countries in Africa. Since all companies have access to the Internet it will make the implementation of e-commerce easier. S.A Bioproducts will need a fully interactive web site, which will enable customers to gain access and to engage in e-commerce.

The Intranet is web based and is normally used to link people or business units within the same organisation. The different parties are able to share certain common information, which facilitates the business interaction. The functionality of the Intranet best suits larger organisations. Based on Table 4.1 only 16.6% (13%+3.3%) of the respondents could be classified as large organisations i.e. consuming more than 30 tons of Lysine per month. Hence it is not surprising that less than 40% of respondents have an access to an Intranet.

Contrary to the findings in (Internet 14) which states that companies within the agricultural sector have been slow to trade on B2B exchanges because of infrastructure problems, this study shows that customers within the feed industry have the infrastructure to purchase on-line.

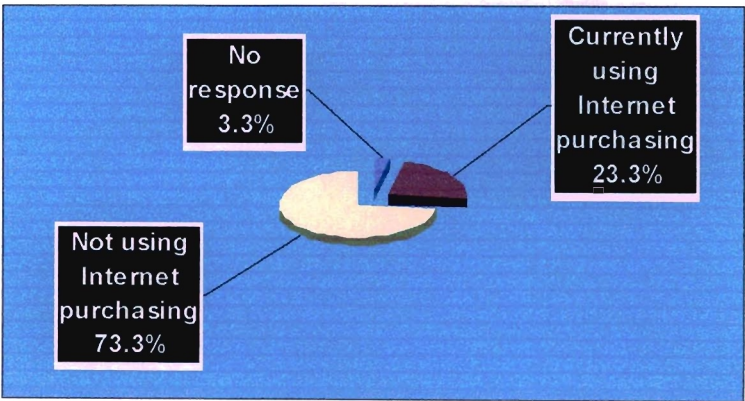
Table 4.1 Frequency table of company size classified according to Lysine consumption

	Frequency	Percent
No response	2	6.7
< 5 tons Lysine	9	30
6-10 tons Lysine	7	23.3
11-20 tons Lysine	2	6.7
21-30 tons Lysine	5	16.7
31-40 tons Lysine	1	3.3
41and more tons Lysine	4	13.3
Total	30	100

4.2.1 CURRENT E-COMMERCE USERS

Despite having access to the Internet not all respondents actually use the Internet to purchase online. Only 23,3 % of respondents actually use the Internet for purchasing on-line. A later discussion will follow to establish the reason why companies do not purchase online.

Fig 4.3 – Percentage of customers currently using e-commerce



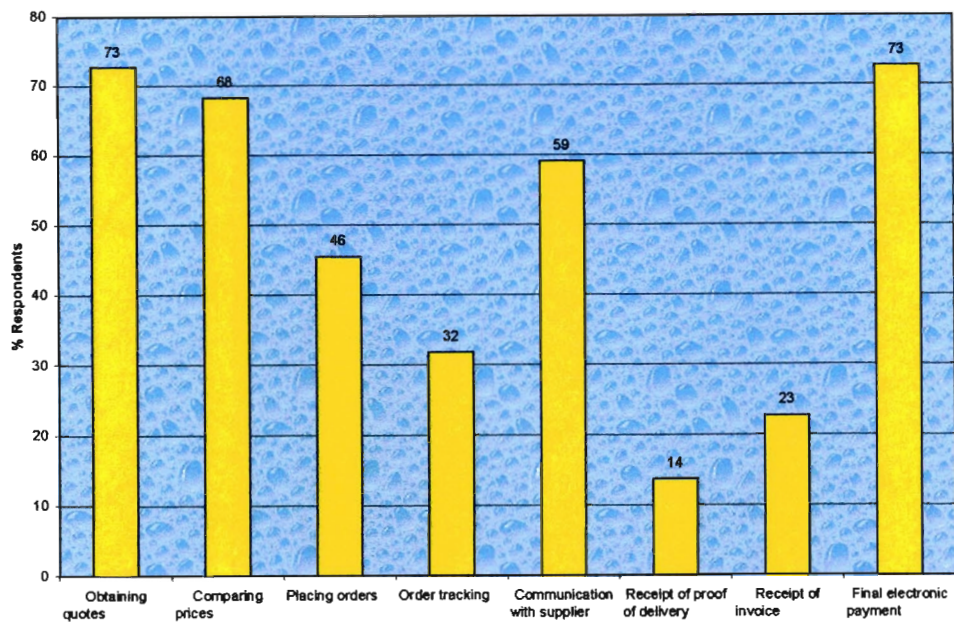
Comparing these statistics to the other parts of the world, South African feed industry Internet purchasing resembles the French companies where

21% of French companies are using online purchasing. Sweden on the other hand has more than half the companies in Sweden are purchasing online. According to (Internet 15) there is a relationship between the maturity cycle of the Internet and the percentage usage by industries. Considering that South African-an emerging country- has comparable Internet purchase percentage to France is quite commendable. A study conducted in Singapore by Jochen and Poh (2001) found that 8,5% of all firms surveyed were employing some form of e-commerce.

#### 4.2.2 CURRENT USES OF INTERNET

Respondents were asked to fill out a multi response question detailing the different uses for the Internet. The Internet is most commonly used for obtaining quotes and for final electronic payment. Customers normally log into a bank website and the transfer funds electronically into the supplier's account. Fig 4.4 shows the elements of e-commerce that are currently being used by customers.

Fig 4.4 – Current uses of the Internet by Lysine customers



Sixty eight percent of the respondents who have access to the Internet use it to compare prices. This would however only apply to products, which tend to have a fixed listed price. In industrial buying process prices are sometimes negotiated between supplier and customer. In this case the use of the Internet will have limited application. Fig 4.4 shows that only 14% of respondents were keen to use the Internet to transmit proof of delivery documents. In normal business practice the recipient generally signs proof of delivery documents when he receives the goods. If a customer receives goods he would prefer to sign the original delivery documents. The results also indicate that only a small percentage of people received electronic invoices. It would appear that most companies are still operating with hard copy invoices rather than electronic invoices. In order to meet “Generally

Accepted Accounting Practice” (GAAP) some companies will only effect payment on the original hard copy invoice.

#### 4.3 MEANS FOR ADOPTING E-COMMERCE

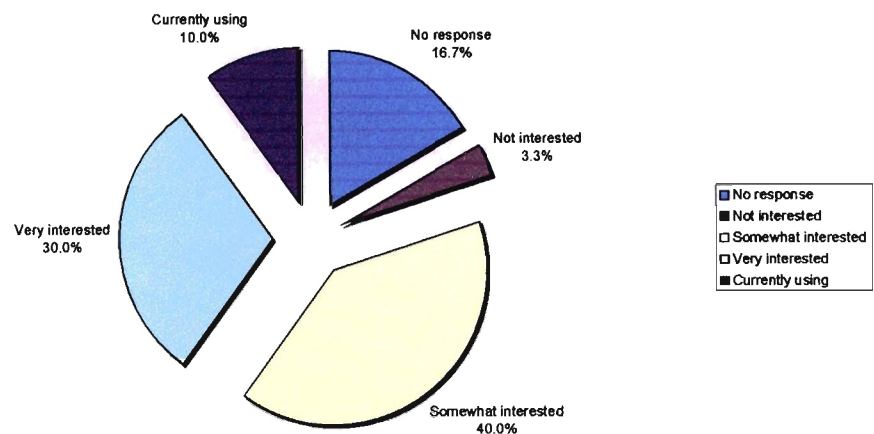
The preceding discussion shows that most customers within the feed industry in South Africa have the means to purchase via the Internet. As a bare minimum online purchasing requires that customers have access to the Internet. Having a link to the Internet will enable customers to access the Bioproducts web site and to engage in e-commerce. An Internet link gives the customer the opportunity to buy-in supplies if the supplier has an interactive web site. The customer will however not be able to sell products via the Internet unless he has configured his website for e-commerce.

#### 4.4 LEVEL OF INTEREST IN E-COMMERCE IN THE ANIMAL FEED INDUSTRY

Having established that Lysine customers have the means for purchasing online, the next requirement for Bioproducts decision-making process is that customers need to also have an interest in adopting e-commerce. This interest will be based on the benefits that customers can derive out of using e-commerce. The level of interest will also be negatively affected by the disadvantages of e-commerce. This section examines the levels of interest in e-commerce as well as the advantages and the barriers to e-commerce as perceived by customers in the feed industry. Fig 4.5 indicates that only 3.3 % of the respondents were not interested in e-commerce.



Fig 4.5 - Levels of interest in e-commerce



An empirical study conducted in Singapore found that only 63.5% of firms were not interested in business to business e-commerce or unsure of their future plans (Jochen & Poh, 2001). The animal feed industry in South Africa seems a lot more enthusiastic about e-commerce than Singaporean firms. However it should be noted that the Singaporean study was conducted in 1999 and levels of interest would have changed with time. The high level of interest level of e-commerce bodes well for the adoption of business-to-business e-commerce in South Africa. A total of 80% of respondents have some form of interest or are actually using e-commerce. Having established that there is a high level of interest in e-commerce within the feed industry will help sway Bioproducts decision towards selling Lysine via the Internet.

#### 4.4.1 HOW DOES THE INTEREST LEVEL VARY WITH THE DIFFERENT TYPES OF CUSTOMERS

The attitude to e-commerce was cross-tabulated against the different types of businesses within the feed industry in order to establish the levels of interest for the different business categories. The cross tabulation results are shown in Table 4.2

Table 4.2- Variance of e-commerce attitude with company size

	E-Commerce Attitude					Total
	No Response	Not interested	Somewhat interested	Very interested	Currently using	
Type of Business						
Feed Mill	5 (16.7)	1 (3.3)	10 (33.3)	4 (13.3)	1 (3.3)	21 (70)
Premix					2 (6.7)	2 (6.7)
Trader			2 (6.7)	2 (6.7)		4 (13.3)
Farmer				3 (10)		3 (10)
Total	5 (16.7)	1 (3.3)	12 (40)	9 (30)	3 (10)	30 (100)

*% shown in brackets*

Within the feed mill category there appears to be a spread of attitudes with most people being “somewhat interested”. The premix category appears to be advanced and are currently using e-commerce in their normal course of business. It is surprising that farmers have a high level of interest in e-commerce. According to the definitions provided in section 2.4.3 the farmer would generally have been considered a “skeptic”, someone who would be critical about the hype surrounding new technology. Previous studies in the agricultural sector showed that companies have been slow to trade on B2B exchanges, either because of infrastructure problems or worries about transaction security (Internet 12). On the contrary, this study tends to indicate that the farmers are actually “technology enthusiasts”. This could



be in indication that farmers are now becoming more sophisticated and are being forced to adopt new technologies in order to remain competitive.

#### 4.4.2 PERCEIVED BENEFITS OF E-COMMERCE

Having established that there is an interest in e-commerce, this section explores some of the reasons why customers are interested in e-commerce. Customers were asked to rate the perceived benefits if they procured Lysine via the Internet. Customers rated a list of benefits according to a five point semantic differential scale ranging from “no benefit” to “very large benefit”.

The Alpha Cronbach reliability analysis was used to test the extent to which the list of benefits related to each other. The result for the Cronbach analysis was:

N of Cases = 30.0

N of Items = 7

Alpha = 0.9504

This is a model of internal consistency, based on the average inter-item correlation. The high Alpha value it implies that the list of benefits has good repeatability and the scale as a whole is internally consistent.

The list of benefits which revolved around economic savings and logistics, focussed on Lysine price, product delivery, order generation, order tracking, supplier reach and inventory. The benefits were limited to the procurement aspects of the customer’s business and the scope did not include customers operations or marketing.

Table 4.3 shows that there was a mixed response on the price benefit of e-commerce. 20% of respondents saw it as having a large benefit on lysine prices while another 20% thought e-commerce will have no benefit on Lysine price.

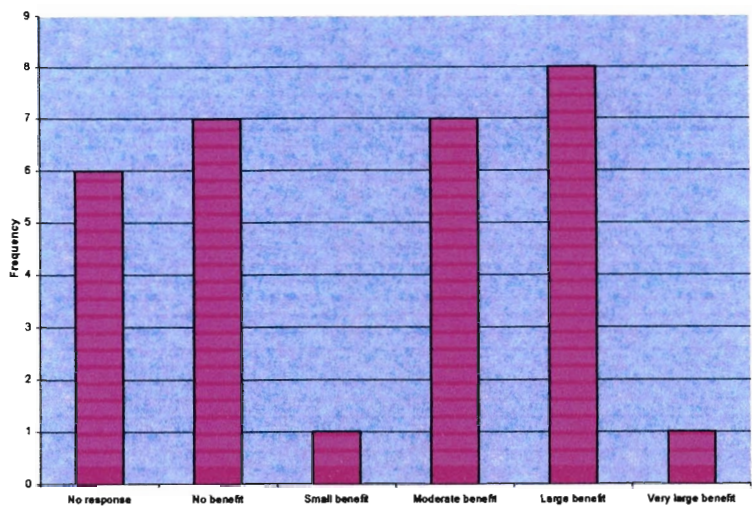
Table 4.3 - Frequency table of respondent ratings of “price benefit” of e-commerce

	Frequency	Percent
No response	6	20
No benefit	6	20
Small benefit	4	13.3
Moderate benefit	3	10
Large benefit	6	20
Very large benefit	5	16.7
Total	30	100

These varying opinions could be based on the fact peoples understanding of e-commerce varies. Customers may also be of the impression that any savings attributable to the new way of doing business will be offset by the investments required to implement e-commerce. Other customers may feel that any savings achieved by Bioproducts would not necessarily be passed on to them.

Fig 4.6 shows that most people believed that purchasing Lysine via the Internet would have a “large benefit” to the speed at which their orders can be generated. Once again people’s opinions were divided on whether e-commerce would increase the speed of processing orders.

Fig 4.6 – Speed of order generation



This seems to be in keeping with the view of some analysts who believe that online value creation resides more with multi-partner collaboration rather than in transaction processing (Vigoroso, 2001).

People were one again divided on the benefit of e-commerce regarding the cost of generating an order as shown in Table 4.4. An equal number of people believed that cost of their orders would benefit either “moderately” or “largely” from e-commerce.

Table 4.4 – Frequency table of respondent ratings of “lower cost of order generation” due to e-commerce

	Frequency	Percent
No response	6	20
No benefit	5	16.7
Small benefit	2	6.7
Moderate benefit	7	23.3
Large benefit	7	23.3
Very large benefit	3	10
Total	30	100

Routine purchases made via the Internet are more cost effective than traditional purchasing method due to the lower cost of order generation (Jackson, 2001). Literature supports the notion that routine operations would benefit from e-commerce by speeding up the operation and reducing the cost of the operation. In Asia Pacific the biggest driver of B2B adoption is the lowering of administrative cost of buying and selling activities (Internet 2).

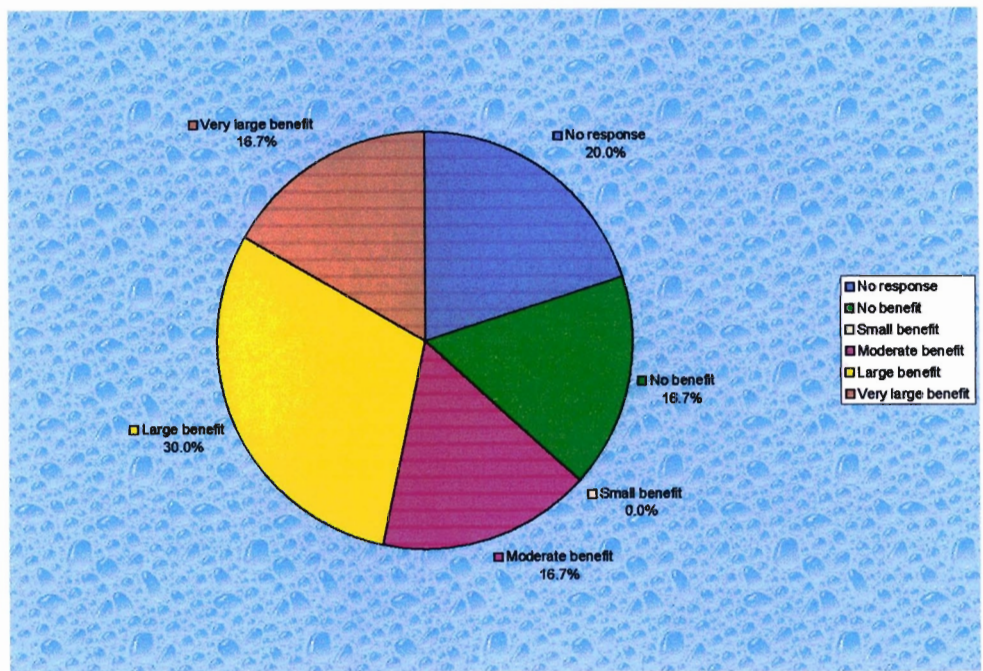
Table 4.5 shows that most people believed that they would benefit “largely” by being able to better track of their orders using e-commerce. A relatively small percentage of respondents believed that e-commerce would have no role to play in tracking their orders. Order tracking give the customer insight when the stock is available. He is also kept informed about dispatch dates and estimated time of arrival of his goods.

Table 4.5 – Frequency table of respondent ratings of “ better order tracking “ benefit of e-commerce

	Frequency	Percent
No response	6	20
No benefit	4	13.3
Small benefit	2	6.7
Moderate benefit	4	13.3
Large benefit	8	26.7
Very large benefit	6	20
Total	30	100

Fig 4.7 shows 30% of respondents believe they will benefit largely from having a wider reach to suppliers.

Fig 4.7 - Ratings of “ wider supplier reach ”



In the instance they will have easier access to foreign suppliers of Lysine which could be to the detriment of S.A Bioproducts, as this would increase the competition in the local market. Bioproducts needs to take cognisance of the above results as it may indicate that customers are keen to evaluate other suppliers of Lysine. If customers access new suppliers Bioproducts would lose local market share.

Referring to frequency Table 4.6 there appears to be an even spread of opinion on the benefits of e-commerce creating opportunities to hold lower inventories.

Table 4.6 – Frequency table of respondent ratings of “lower inventory” benefit of e-commerce

	Frequency	Percent
No response	6	20
No benefit	5	16.7
Small benefit	5	16.7
Moderate benefit	4	13.3
Large benefit	6	20
Very large benefit	4	13.3
Total	30	100

This may possibly be related to the size of the organisations. Larger firms hold more working capital thus creating a greater opportunity for cost savings. Larger organisations will tend to place more emphasis on inventory levels and hence derive more benefit from proper inventory management than smaller companies. Since the sample contained both small medium and large organisations the responses regarding the benefits of e-commerce relating to inventory levels will also vary.

Table 4.7 indicates that most people rated “faster delivery” as having the “no benefit”. Most respondents (30%) thought that e-commerce will not contribute to faster delivery.

Table 4.7 – Frequency table of respondent ratings of “faster delivery”  
benefit of e-commerce

	Frequency	Percent
No response	6	20
No benefit	9	30
Small benefit	2	6.7
Moderate benefit	7	23.3
Large benefit	5	16.7
Very large benefit	1	3.3
Total	30	100

This may be a valid perception since customers regard delivery as the physical movement of the product from Bioproducts to themselves. They see little correlation between e-commerce and the speed at which the product is transported to them. However if they viewed “ delivery” in a broader context they may have realised that with the aid of e-commerce Bioproducts would be able to run a more streamlined supply chain thus resulting in quicker dispatching of product. The other possible reason is that customers are currently satisfied with the timeous delivery of Lysine and do not see e-commerce adding more value to the operation. The previous tables and figures relating to the benefits of e-commerce have been summarised and presented in Table 4.8.

Table 4.8 Summarised version of the frequency tables for benefits of e-commerce

	1 No benefit	2 Small benefit	3 Moderate benefit	4 Large benefit	5 Very Large benefit
Lower Lysine price	6	4	3	6	5
Faster delivery of product	9	2	7	5	1
Quicker generation of order	7	1	7	8	1
Lower cost of order generation	5	2	7	7	3
Better order tracking	4	2	4	8	6
Wider reach of suppliers	5	0	5	9	5
Ability to hold smaller inventories	5	5	4	6	4

Based on the modes reflected in Table 4.8 most respondents generally see a “large” benefit in procuring Lysine via the Internet. This is in keeping with the findings of BMI-T survey showing about 8% of SA companies had already installed some form of e-procurement system in 2001 and this figure is expected to grow to 54% by the end of 2002 (Internet 7). If industries in South Africa see “large” benefits in e-procurement systems then it is possible that the prediction by BMI-T would come to fruition.

In order to rank the different benefits the percentage responses of the “large” and “very large” benefits were summed to obtain an overall score for each benefit. This derived score was then used to rank each benefit and the results are shown in Table 4.9



Table 4.9 Ranking table for benefits of e-commerce

<b>Benefit</b>	<b>Summed % response of “large” and “very large” benefit</b>	<b>Ranking</b>
Order tracking	46.7	1
Wider reach of suppliers	46.7	1
Ability to hold lower Inventories	43.3	2
Cost of order	33.3	3
Quicker order generation	30	4
Lower Lysine price	26.7	5
Faster Delivery	20	6

There is an indication that people rate the ability to track an order and the ability to reach a wider supplier base, as the two main perceived benefits of e-commerce. Although customers have indicated that they highly value the ability to reach more suppliers, Frank (1995) describes the new trends in procurement companies that are forging close relationships with fewer suppliers. This contradiction may be explained by South African companies in the feed industry wanting the ability to interact with other suppliers for the purposes of price comparisons. Due to South Africa’s past isolation from the global markets, there is a need within the feed industry to evaluate alternate overseas suppliers. Bioproducts needs to take note that current customers are keen to evaluate alternate suppliers, which will increase competition in the local feed industry. Bioproducts will need to ensure that

it consistently meets the needs of its customers in terms of quality, price and service or it may lose market share to other suppliers.

It is possible to give customers access to the Bioproducts logistics system so that customers are able to track the status of their orders. The customers will be able to ascertain whether their order is in the planned, manufactured or dispatched stage. E-commerce will make it possible for customers to obtain an accurate time of delivery. Hutt and Speh (2001) states that the low cost of access via the Internet has promoted the use of order tracking. Bioproducts need to take cognisance of customers' requirement to have their orders tracked. This needs to be considered when and if the interactive web site is developed.

If customers are better able to track the supply of their order they will ultimately be able to hold lower inventories. It is not surprising that "lower inventory" is ranked just below "order tracking". The Internet has streamlined the previously paper-based systems by maintaining a balance between holding too much or too little stock (Internet 17). Lower inventory means lower working capital and hence lower interest payments and better profitability.

The results show that cost savings and efficiency gains was not rated the main benefits of e-commerce. The need for better information and better access to suppliers seem to have greater importance. Although this seems to be in variance with business literature the two need not be in conflict: having better information and reach to more suppliers will eventually result

in cost savings and efficiency gains. This result is similar to the results of the Singaporean survey conducted by Jochen and Poh (2001) who found that 49.1 % of the firms rated 'global reach of suppliers' as being important. Also 40.6% of the respondents rated tracking of orders as important. The fact that most customers do not expect a lower Lysine price when e-commerce is introduced is encouraging for Bioproducts, as they will not need to reduce prices when e-commerce is introduced. The added benefits of e-commerce will prompt customers to adopt it.

The overall benefit of implementing e-commerce would be cost savings and smoother logistical operations. A study by Giga Information Group projected that worldwide savings could reach \$1.25 trillion from using e-commerce to streamline business processes (Internet 18).

#### 4.4.3 PERCEIVED BARRIERS TO E-COMMERCE

Having established that there is an interest in e-commerce there are also several factors that would prevent customers from using e-commerce. Customers were asked to rate a predetermined list of factors that prevented them from using e-commerce. The factors were derived from similar studies conducted in Singapore (Jochen & Poh, 2001). Some factors were modified to suit the South African situation, while new factors were added as required to meet the objective of the study. A summarised version of the ratings is shown in table 4.10. The Alpha Cronbach reliability analysis was used to test the extent to which the list of barriers related to each other. The result for the Cronbach analysis was:

N of Cases = 30.0

N of Items = 7

Alpha = 0.8998

This is a model of internal consistency, based on the average inter-item correlation. The high Alpha value it implies that the list of barriers has good repeatability and the scale as a whole is internally consistent.

Table 4.10 illustrates how respondents rated each barrier on 1 to 4 semantic differential scale. A rating of "1" means that the barrier in question does not prevent the respondent from adopting e-commerce. A barrier rating of 4 means that the barrier prevents respondents from adopting e-commerce. Table 4.10 shows that the mode for seven of the ten barriers has a rating of 1 "does not hold me back". This implies that most respondents did not perceive 7 of the 10 listed barriers as major obstacles. The remaining three barriers "suppliers not ready", "security" and "lack of human contact" - which have modes greater than one - are more highly rated barriers.

Table 4.10 – Rating of e-commerce barriers

	1 - Does not hold me back	2 - Slightly holds me back	3 - Strongly hold me back	4 - Prevents me
Reliability of Internet	<b>12</b>	7	2	3
Set-up and maintenance costs	<b>15</b>	4	3	1
Lack of in-house competence	<b>11</b>	7	1	4
Company not ready for e-commerce	<b>9</b>	7	5	2
Security	8	<b>9</b>	4	2
Don't know enough about e-commerce	<b>9</b>	7	4	3
No perceived benefit	<b>10</b>	8	3	1
Lack of human contact	9	<b>11</b>	2	1
Suppliers not ready	4	4	<b>10</b>	5
Potential loss of jobs	<b>20</b>	1	1	0

The mode of each factor was used to rank each barrier in order of importance. The ranking is not based on any statistical analysis but tries to portray the opinions of the bulk of the respondents. Table 4.11 shows the ranking in descending order of importance.

Table 4.11- Ranking of e-commerce barriers

BARRIER TO E-COMMERCE	RANKING
Suppliers not ready	1
Lack of human contact	2
Security	3
Don't know enough about e-commerce	4
Company not ready for e-commerce	5
No perceived benefit	6
Lack of in-house competence	7
Reliability of Internet	8
Set-up and maintenance costs	9
Potential loss of jobs	10

The most significant barrier that prevented respondents from adopting e-commerce was that “suppliers were not ready”. Table 4.11 also shows that “company readiness” is not a highly ranked barrier, which support the earlier finding that customers are ready to adopt e-commerce for the purchase of Lysine and other products. Customers have the inclination and

the capability to purchase raw materials online however the major factor holding them back is that suppliers are not e-commerce ready. From Bioproducts perspective this is encouraging as the results show that e-commerce will readily be adopted if offered to customers. The results also show that the largest barrier is within the control of the suppliers.

It is interesting to note that the most highly rated benefit discussed in section 4.4.2 and the most highly rated barrier both relate to the supplier. Customers perceived the largest benefit of e-commerce as the ability to reach more suppliers and the greatest barrier is that suppliers are not e-commerce ready. A possible reason why S.A suppliers have not implemented e-commerce is that the local market is not big enough to support e-commerce ventures (Stones, 2001). Also many suppliers are weary of the numerous failures of e-commerce ventures in South Africa. According to Stones (2001) most of these were due to fact that e-commerce ventures did not have a sound business model to generate revenues. Despite the initial sluggish growth rate of South African B2B e-commerce, it is expected to grow from R3.9bn in 2000 to R310bn in 2005, an annual growth rate topping 100% (Augustine C, 2001).

In Europe, a recent IDC survey amongst 500 procurement managers revealed that the main reason why some managers did not purchase on-line was that their suppliers were not on-line or not ready to implement e-commerce (Internet 15). This shows that the main barrier highlighted in the

animal feed industry in S.A is exactly the same as the barrier determined empirically in a study in Europe.

The Australian (2000) states that the main barrier in Australia is the lack qualified IT personnel, which is quite different to South African case where lack of supplier readiness is the main barrier. The aforementioned discussion shows that while countries may have some e-commerce barriers that are similar other barriers may vary markedly from country to country.

The other highly rated barrier is the “lack of human contact”. This shows that despite the interest in business- to- business e-commerce customers are concerned with the lack of human contact normally associated with e-business. In business to business marketing human contact plays an important role especially in marketing of technical products. Human contact is vital in complicated price negotiations as well as technical back-up service that go with industrial marketing.

The “lack of human contact” as well as the “loss of jobs” both have social connotations however the former is ranked very highly while the latter is ranked the lowest. In order to understand this dichotomy one can assume the factors were not rated because of their social relevance rather they were rated on their business implications. Customers are concerned about the lack of human contact since it may have a negative effect on business performance. Also the “loss of jobs” is possibly seen as savings in cost, which would explain why it a ranked very low as a barrier. In fact customers may actually deem the “loss of jobs” to be a benefit. This

discussion tends to indicate that the decision to adopt e-commerce is made on the basis of business criteria rather than social criteria.

It is surprising that “security” is rated number 3 as one would have expected it to feature higher in the barrier ranking especially since the “I love You” virus which affected the worlds teledata networks in June 2000. In the South African scenario malicious e-mail code in the form of viruses, has negatively affected the adoption of business-to-business e-commerce (Gordon, 2000). Also since S.A is in its infancy stages of business -to-business e-commerce security would be a major barrier. However, in the B2B environment one would expect security to be less of an issue than in B2C e-commerce as the former has a smaller number of transactions that are easier to manage.

An empirical study was conducted in Singapore found that security was one of the main barriers to the adoption of B2B e-commerce (Jochen & Poh, 2001). The Singaporean study also found that “initial set-up cost”, and “on going operational costs” were also major barriers to e-commerce adoption and extension of usage. This contrary to the South African study where set-up and maintenance cost featured very low in the ranking of the barriers. The Singaporean study revolved around the setting up of a fully operational e-commerce site. The cost of setting up a fully interactive web site to support e-commerce together with the supporting infrastructure is very expensive. In the South African study respondents merely had to have access to the Internet in order to use e-commerce for procurement. The



South African respondents considered only the procurement aspects of B2B e-commerce whereas the Singaporean study considered all aspects of B2B e-commerce. This explains why the South Africans did not consider set-up and maintenance costs as a major barrier to e-commerce.

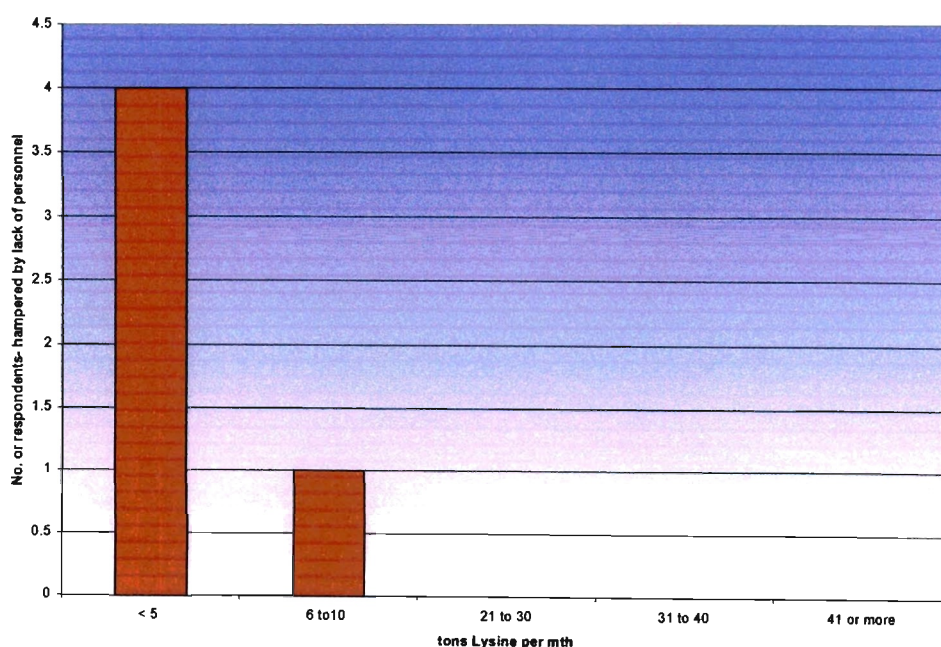
Respondents “not knowing enough” about e-commerce is also a fairly important barrier to e-commerce adoption. This lack of information about e-commerce is due to the lack of exposure to e-commerce as it is still in its infancy stages in South Africa. Internet adoption barriers tend to change over time for example in 1999 “executive awareness” was rated as one of the top 4 barriers in USA but by 2000, this factor was relegated to 10th position (Internet14). This is due to the fact that, over time executives gained more knowledge about e-commerce. The same phenomenon will also take place in South Africa, as people gain more knowledge about e-commerce it will become less of barrier to e-commerce.

It is surprising that people “not knowing enough about e commerce” was ranked 4th as a barrier. In a separate question when people were asked about their level of e-commerce awareness, 60% of the respondents indicated that had at least an “average” level of awareness of e-commerce. It is possible that people overstated their level of awareness when asked directly about their knowledge status. However, when the question was posed relating to barrier to e-commerce respondents provided a more realistic answer, as the question was less judgmental about their personal competence.

Comparing Table 4.11 with Table 2.2 it is evident that USA’s barriers relate more systems integration while the South African feed industry is still grappling with suppliers not being e-commerce ready. The USA has matured in the field of B2B e-commerce and has far less infrastructure problems than South Africa. In table 2.2 “infrastructure” has been ranked as the lowest e-commerce barrier in USA.

Surprisingly both South African feed industry and the USA do not seem to have a problem regarding availability of qualified personnel. Fig 4.8 attempts to reflect a relationship between ‘lack of qualified personnel’ and the “size of the companies”. It shows the size of firms that regarded “lack of personnel” as barriers to adoption of e-commerce.

Fig 4.8 – Lack of personnel versus company size



The respondents indicated either the lack of personnel “prevented” or “strongly” held them back from adopting e-commerce. The size of the firms

are deduced from the amount of Lysine they consume per month. Fig 4.8 clearly shows that only the small firms regarded the “lack of personnel” as substantial barrier while none of the larger firms listed this a barrier. These results are similar to a survey conducted by Commerce Net 2000 using over 1000 respondents from six countries which found that the “lack of qualified personnel” main barrier in small organisations (Internet 14).

#### 4.5 UNDERSTANDING E-COMMERCE IN TERMS OF INDUSTRIAL BUYING THEORY

The factors which affect the buying behaviour of industrial buyers can be categorised into four levels namely environmental, organisational, group and individual factors (See fig 2.1). Most of this section is discussed on the premise that the organisation has already taken the major decision to adopt e-commerce. The buyer then needs to make a lower level decision whether he would like to use e-commerce or traditional buying methods. The other lower level decision he needs to make is whether he uses e-commerce as a decision making criteria in the whole decision making process. For example, an industrial buyer who is very keen on e-commerce may insist that his suppliers have the capability to conduct business via the Internet. Those suppliers who do not possess the e-commerce capability will be ruled out in the selection process.

Previous work used the framework presented in Fig 2.1 to understand the industrial buying decision making process in terms of “what” to purchase, “how much” to purchase, “when” to purchase “whom “ to buy from and

“what” is an acceptable price. This study uses the framework in Fig 2.1 to examine “how” to purchase. It examines the scenario after the purchase decision is made when the buyer needs to decide whether to purchase by traditional means or whether to purchase via the Internet. Some of these factors that affect the industrial buying decision-making process are examined with a view to establishing if there is a relationship between these factors and the buyer’s interest in e-commerce. The assumption made here is that if the buyer is interested in e-commerce then he would be more likely to purchase via the Internet. This in effect means that buying behaviour is tested indirectly as it is assumed that if a buyer is interested in e-commerce then he would be likely to purchase via the Internet. The analysis also looks at how soon customers are ready to adopt e-commerce and also examines their interest in e-commerce.

The study examines only a few of the important factors from the different categories in Fig 2.1. It was not possible to examine all factors empirically, as it would have made the study very extensive.

#### 4.5.1 INDIVIDUAL FACTORS

Webster and Wind (1972) define two types of individual motives namely economic or non-economic (non-task) that have an impact on industrial buying behaviour. An industrial buyer’s personal motivations, perceptions and preferences are influenced by individual factors like age, income, education, attitude to risk, job position and culture. This section examines

the effect of the buyer’s “age” and “attitude to risk” on ones interest in e-commerce.

#### 4.5.1.1 AGE

Age which is regarded as an individual factor was checked to see if it affects the industrial buyer’s attitude to e-commerce. The age of the respondents was cross-tabulated against their interest in e-commerce.

Table 4.12- Cross tabulation of age and attitude to e-commerce

	E-Commerce Attitude					Total
	No Response	Not interested	Somewhat interested	Very interested	Currently using	
Age (yrs) 21-30			3			3
31-35			2	2	1	5
36-40	1		2	3		6
41-45	3		1	1	1	6
>46	1	1	4	3	1	10
Total	5	1	12	9	3	30

*Data represents frequencies*

The hypothesis being tested is that younger respondents who received more formal education in computers and who were generally more exposed to computers would have a greater interest in e-commerce than older respondents. Kotler (2000) differentiates between younger highly educated buyers who use computers to perform rigorous analyses on competitive bids before choosing a supplier while other buyers are “toughies” from the old school would pit suppliers against each other. Based on the Table 4.12 there seems to be little link between age and the level of interest in e-commerce. People who are “very interested” and “somewhat interested” in e-commerce belong to different age groups. There is inadequate data to use the Chi-

Squared test to prove or disprove any correlation between “age” and “interest in e-commerce”.

#### 4.5.1.2 PERSONAL ATTITUDE TO RISK

The industrial buyer’s personal attitude to risk is another individual factor that may have a bearing when he would like to adopt e-commerce. Respondents were asked to rate their personal attitude to risk on a 5 point semantic scale ranging from “avoiding risks at all cost” to “taking very high risks”. Respondents were also asked when they would like to adopt e-commerce for Lysine purchase. Those that stated that they would like to purchase Lysine online with 6 months as regarded as “innovators” the risk profile of the innovators were then compared to the risk profile of the total sample. The hypothesis being tested is that high-risk takers would adopt e-commerce sooner than people who are more conservative. Hoyer and Mac Innes (2001) subscribe to this hypothesis.

Fig 4.9- Risk profile of innovators and total sample

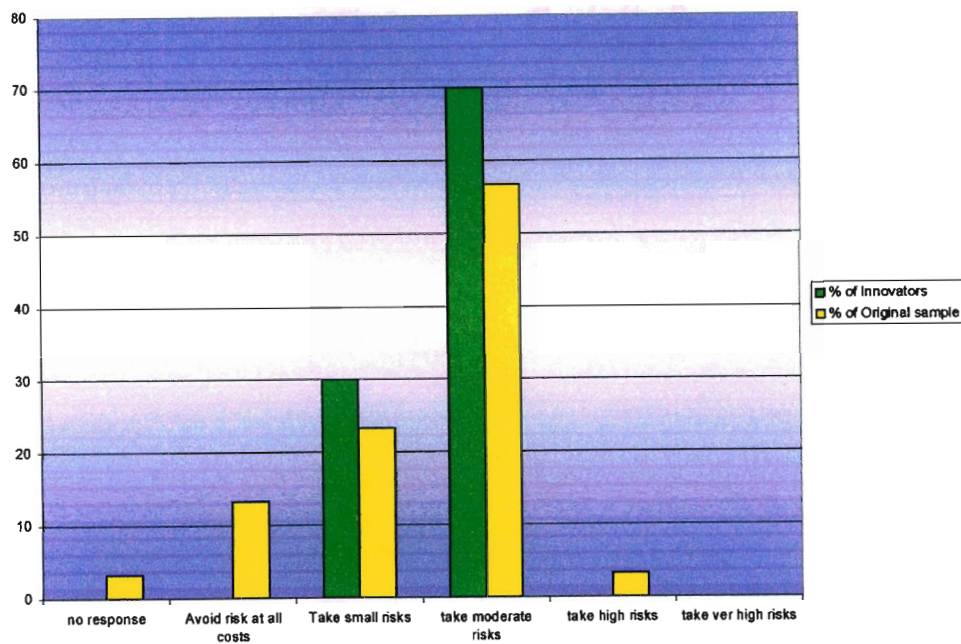


Fig 4.9 shows that most “innovators” take moderate risks. They tend to take higher risk than the rest of the market. Hence the results tend to show that if an industrial buyer has higher risk profile then he will tend to adopt innovations sooner. The graph also shows that innovators do not avoid risk whereas the general sample has just over 10% of people who “avoid risk at all costs”.

It is not surprising that the two aforementioned non-task motives do not show a strong effect on the buying decision making process. It ties in with Webster and Wind (1972) contention that it is rare for an industrial buyer to adopt non-task motives in a purchase is decision. However, if “all things are equal” it is possible that personal preference will come into play. The results tend to indicate that individual factors may have a small effect on

whether an industrial buyer purchases online however, this effect is not overwhelming

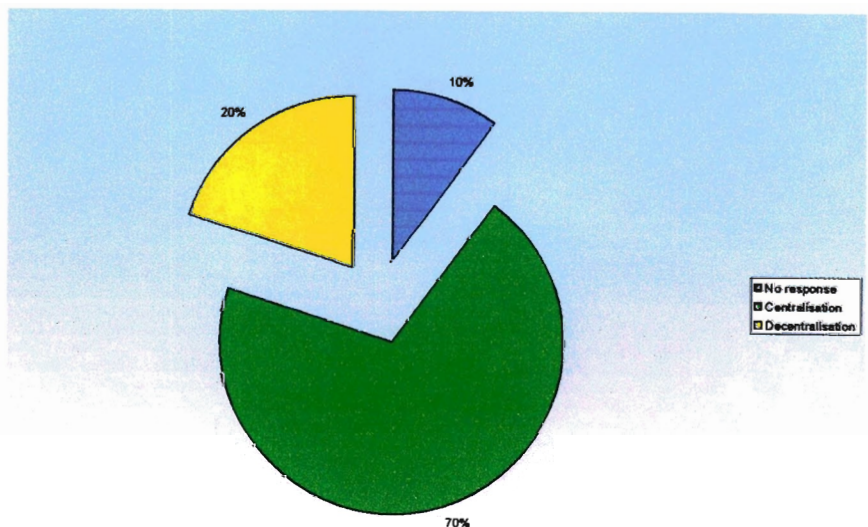
#### 4.5.2 ORGANISATIONAL FACTORS

The study examined two organisational factors namely organisation structure and buying technology. More specifically, organisational structure was explored from the perspective of centralised or decentralised buying. The study also looked at companies' current information technology infrastructure and how it affected their attitudes to e-commerce.

##### 4.5.2.1 CENTRALISATION

Fig 4.10 shows that most lysine is purchased on centralised basis. This conforms to the notion proposed by Kotler (2000) that “big ticket” items are purchased on centralised basis. Lysine is high value product that forms a significant part of the input cost of the industrial customers. On this basis it is regarded as big-ticket item and would be purchased on centralised basis.

Figure-4.10 Breakdown of respondents based on centralisation





In order to test whether the buying behaviour would vary according to the organisational factor of “centralisation” or “decentralisation”, the aforementioned factors were cross-tabulated against the level of interest in e-commerce.

Table 4.13 – Cross tabulation of e-commerce attitude and centralisation

	E-Commerce Attitude					
	No Response	Not interested	Somewhat interested	Very interested	Currently using	Total
<b>Centralisation</b>						
No response	1 (33.3)		2 (66.7)			3 (100)
Centralised	3 (14.3)		8 (38.1)	7 (33.3)	3 (14.3)	21 (100)
Decentralised	1 (16.7)	1 (16.7)	2 (33.3)	2 (33.3)		6 (100)
Total	5 (16.7)	1 (3.3)	12 (40)	9 (30)	3 (10)	30 (100)

*% shown in brackets*

As Table 4.13 shows that all of the centralised buying centres showed some level of interest in e-commerce and they are also the only companies using e-commerce. In the South African scenario most of the larger feed mills purchase Lysine on a centralised basis. The results also show that only decentralised companies stated that they were “not interested in e-commerce”. Based on the above cross tabulation there does not appear to be any trend regarding the levels of interest in e-commerce and centralisation. Due to inadequate data it is not possible to perform any statistical analysis on proving any form of correlation. According to Nel et.al. (1992) the frequency in each cell of the table should be at least 5 in order to apply the Chi-square technique.

#### 4.5.2.2 TECHNOLOGY

The company's computer systems and policies will also dictate the buying behaviour of industrial buyers. Some companies have highly automated purchasing procedures where orders are generated and purchase requisitions are authorised very efficiently. Other companies have laborious paper based systems where hardcopies of forms are routed between various department before approval and final placement of order. The more sophisticated systems require some form of information technology and a streamlined purchasing process. Fig 4.1 shows that all respondents have the necessary computer infrastructure to conduct e-commerce. This gives the industrial buyer the option to either choose to purchase via the Internet or to use traditional purchasing methods. However, the policies within the company will also govern whether e-commerce should be used and whether it should be applied to certain commodities only.

According to Baker (1995) computers have proved very useful in straight re-buy situations where routine purchases are handled faster by computers than by purchasing staff. The high level of interest in purchasing Lysine via the Internet is surprising since, Lysine purchasing is regarded as a modified re-buy situation. In this instance the buyer and seller may need to negotiate prices and volumes. Although negotiations may be conducted via the Internet it is not as effective as one to one personal negotiations.

### 4.5.3 GROUP FACTORS

The operation of the buying centre which consist of users, influencers, buyers, decision makers and gate keepers is affected by the group dynamics during the buying decision making process. It would have been very complex to study the dynamics of the groups within each organisation. In order to test the effect of group factors an attempt was made to test if interest in e-commerce varied with either individual or group buying.

#### 4.5.3.1 INDIVIDUAL VERSUS GROUP BUYING

The different respondents were classified into either individual or group buyers.

Table 4.14 – Frequency table of individual and group buyers

	Frequency	Percent
No response	2	6.7
Individual Buying	23	76.7
Group Buying	5	16.7
Total	30	100

The frequency Table 4.14 shows that most buying is done by individuals rather than groups. This is contrary to most of the theory discussed earlier in this report. Organisational buying generally differs from consumer buying behaviour mainly because organisational buying involves many people in the decision making process with complex interactions among people and among individual and organisational goals (Kotler 2000). Most Lysine

purchases are done on an individual basis because generally the purchases are modified rebuy situations. In this scenario the industrial buyer has identified the preferred supplier and generally renegotiates the volumes and prices. The product specification for Lysine and other terms and conditions remains constant in this business to business interaction. The individual and group interactions were cross tabulated and the results are shown in Table 4.15.

Table 4.15 - Cross tabulation of individual/group buying and e-commerce attitude

	E-Commerce Attitude					
	No Response	Not interested	Somewhat interested	Very interested	Currently using	Total
<b>Buying Type</b>						
No response	1 (50)		1 (50)			2 (100)
Individual Buying	4 (17)	1 (4.3)	9 (39.1)	8 (34.8)	1 (4.3)	23 (100)
Group Buying			2 (40)	1 (20)	2 (40)	5 (100)
Total	5 (16.7)	1 (3.3)	12 (40)	9 (30)	3 (10)	30 (100)

*% shown in brackets*

Based on table 4.15 there does not appear to be a correlation between individual or group buying and interest in e-commerce. The different attitudes towards e-commerce seem to be evenly spread across group and individual buying scenarios. However, it is noteworthy that only individual buyers indicated they were “not interested”.

#### 4.5.4 ENVIRONMENTAL FACTORS

Economic, political legal, social, cultural, physical and technological factors generally referred to as environmental factors provide the boundaries within which buyers and sellers interact. The survey concentrated on the social

factors “loss of jobs” and “lack of human contact”. The study also examined how the current economic situation affects buying decisions in the feed industry.

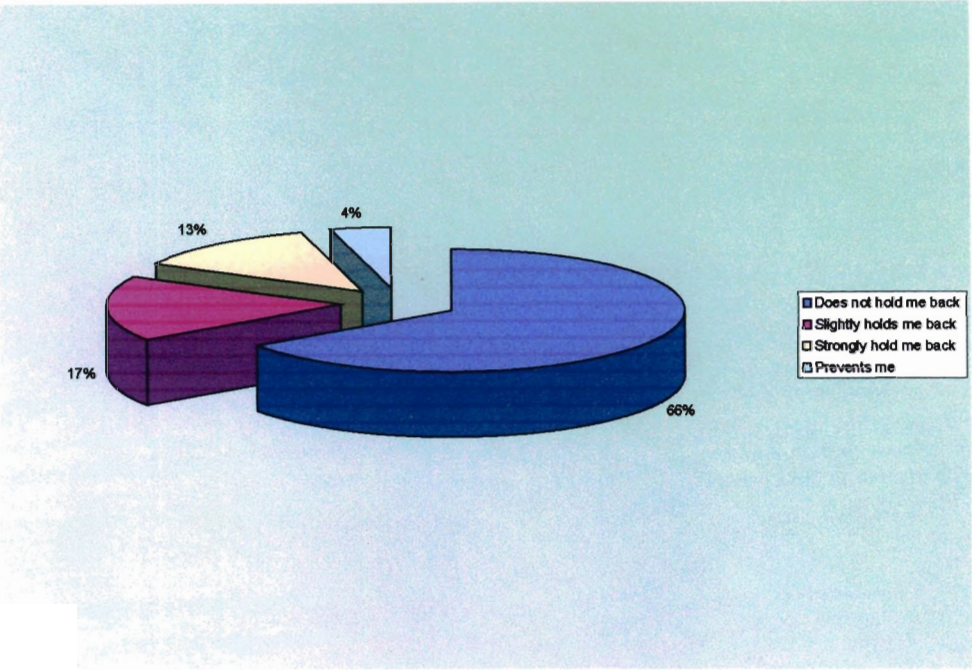
#### 4.5.4.1 ECONOMIC FACTORS

A combined report by Forrester Research and the Institute for Supply Management (ISM) in the United States cited economic downturn as one of the main reasons hampering the pace of Internet adoption (Internet 4). In the South African feed industry the economic situation has a major influence on the buying behaviour of industrial buyers. Due to the weakness of the Rand against other major currencies importers of raw materials are finding the landed cost of raw materials very high. In order to combat the depreciation of the Rand many buyers have been engaging long term contracts with foreign suppliers. The difficult economic conditions will put a strain on capital investment within the feed industry. In those cases where capital is required to implement e-commerce there may be resistance to do so in the current economic situation.

Sutherland (1969) conducted a study in the UK cotton textile industries and found that if there was uncertainty in the future then it was all the more difficult to introduce an innovation to a company. The cost of setting up and maintaining an e-commerce system is an economic factor that was correlated with the attitudes to e-commerce. The results show that set-up and maintenance cost of e-commerce was not really considered a barrier to e-commerce despite the uncertain economic conditions. Fig 4.11 shows

66% of the customers that responded to the question indicated that set-up and maintenance cost was not a barrier to e-commerce.

Fig 4.11 – Set-up and maintenance cost as barriers to e-commerce



The findings of this study tend to contradict the findings of Sutherland (1969). This anomaly where set up costs does not pose a problem in difficult economic conditions may be explained by the fact that most companies already have the infrastructure to conduct e-commerce (see Fig 4.1). Secondly, the set-up cost to purchase online is much lower than developing an on-line web site used for selling via the Internet.

4.5.4.2 SOCIAL FACTORS

Respondents were questioned on two social factors namely “the loss of jobs” and “lack of human contact”. They were asked whether these factors would prevent them from adopting e-commerce. The objective was to

establish whether these social factors would affect their decision to purchase online. Due to the rationalisation of business with e-commerce there could potentially be a loss of jobs. Atkinson (2001) showed that disintermediation results in the elimination of middlemen in the supply chain.

The introduction of e-commerce could also result in less human interaction between the industrial buyer and the industrial marketer. Instead of dealing with the industrial marketer the buyer would be able to conduct most of his/her business by linking up with the suppliers computer systems. A frequency distribution of the two social factors is presented in a graphical form in Fig 4.12

Fig 4.12 - Effect of Social factors on adoption of e-commerce

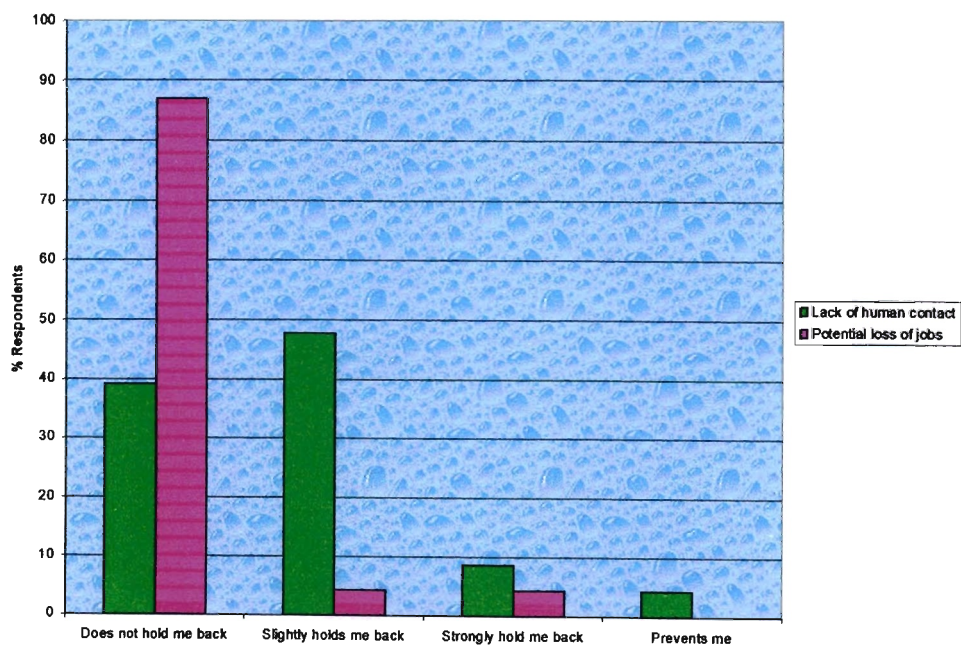




Fig 4.12 shows that customers were not concerned about the potential lack of jobs. Over 80% of respondents to the question stated that the potential loss of jobs did not prevent them from adopting e-commerce. Respondents may not necessarily see the link between the introduction of e-commerce and loss of jobs. Secondly acknowledging the fact that jobs may be lost, respondents may genuinely not be concerned about the loss of jobs. It is more likely that the former factor is the reason why respondents were not concerned about the loss of jobs. In South Africa industrialists have been conscientised about their social responsibility. Several companies have taken positive steps to promote the development of previously disadvantaged employees. Retrenchments and downsizing has been handled very sensitively where retrenchment is only considered as the last resort after other options like redeployment have been considered. The questionnaire was not designed to test the aforementioned subtleties within the “loss of job” factor. The results tend to show that there is a very weak link between the loss of jobs and the business decisions of industrial buyers. However, industrial customers were a bit more concerned about the “lack of human contact”. Most respondents to the question indicated that they were “slightly” concerned about the lack of human contact. This is understandable, as most industrial purchases would rely on some form of negotiation, which is best done on a face-to-face personal basis. It is important for Bioproducts to ensure that if e-commerce is implemented that the interaction between the industrial marketer and the industrial buyer does



not diminish. The preceding discussion shows that although some social factors like the “loss of job” may not have a significant effect on whether an industrial buyer would purchase on- line, other factors like “loss of human contact” play a more important role in the buying process.

#### 4.6 UNDERSTANDING THE RESULTS ON THE BASIS OF ADOPTION OF INNOVATION THEORY

Roger (1962) defines the following five stages that consumer moves through after first hearing about a product to final adoption: awareness, interest, evaluation, trial and adoption. These stages depicted in Fig 4.3 will be used to evaluate the animal feed industry with respect to adoption of e-commerce. Since the interest in e-commerce was discussed in detail in section 4.4 it is not emphasised in this section. As shown earlier in this report e-commerce can justifiably be regarded as an innovation. The remainder of this section examines adoption of e-commerce by the feed industry in S.A using empirical data as well as the marketing theory of adoption of innovations.

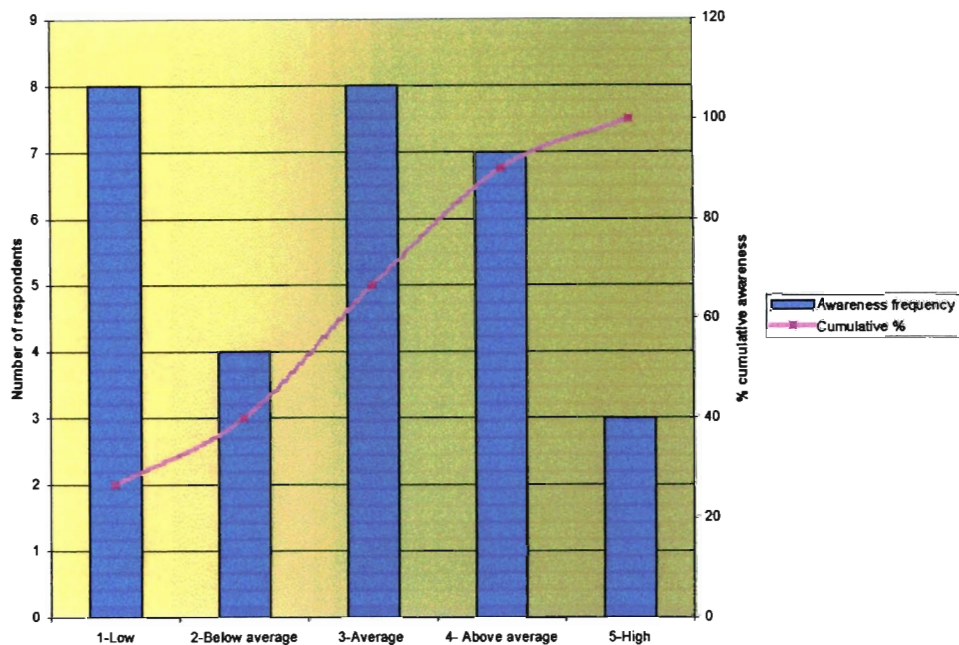
Fig 4.13 – Adoption of innovation model



#### 4.6.1 AWARENESS OF E-COMMERCE IN THE FEED INDUSTRY

Respondents rated their personal level of awareness of e-commerce on a semantic scale from 1 to 5 with 1 being “low” awareness and 5 being “high” awareness. Fig 4.14 shows the response of customers in the form of a histogram.

Fig 4.14- Respondents awareness of e-commerce



Baker (1967) describes awareness as the first step in the adoption of innovation process. Fig4.14 shows that 60 % of the respondents have at least an “average” level of awareness for e-commerce indicating that most people have a reasonable grasp of e-commerce. The substantial level of awareness of e-commerce amongst the respondents is encouraging since it will facilitate the rest of the adoption process. In other words it will be easier to introduce e-commerce to respondents who already have an awareness of the new technology.

#### 4.6.2 EVALUATION OF E-COMMERCE

The next step after awareness in the adoption process is the interest in the innovation. This has been discussed extensively in Section 4.4 and has been

omitted from this section of the report. The evaluation step follows after the subject is interested in the innovation. Subjects were asked whether their companies had evaluated e-commerce. A semantic scale was used ranging from “nil” to “extensive” ranging from a score of 1 to 5.

Table 4.16 - Extent of e-commerce evaluation by respondents

	Frequency	Percent
No response	5	16.7
1-Nil	7	23.3
2	6	20
3	4	13.3
4	5	16.7
5-Extensive	3	10
Total	30	100

Table 4.16 shows that 23.3 % of the respondents did not do any evaluation of e-commerce. 60% of the respondents have investigated e-commerce to varying degrees. This is encouraging as it shows that most customers have progressed beyond the awareness and the interest phase through to the evaluation phase. This leaves only the trial phase before customer adopts e-commerce.

#### 4.6.3 TRIAL PHASE OF E-COMMERCE

The questionnaire was not designed to test whether respondents had tried using e-commerce. But since 23.3% of the respondents were already using the Internet for online purchases one can safely assume that they had they also tried the product as well. Since e commerce has several different facets respondents would have tried different elements of e-commerce.

Ozanne and Churchill (1971) applied the consumer adoption process model shown in Fig 4.13 to industrial buying, and their study focussed on the adoption of a new automatic machine tool. They found that the “trial” stage did not fit the five-stage adoption process quite as well as the other stages. Due the Ozanne and Churchill study, this survey has placed little emphasis on the “trial” phase of the industrial adoption process.

#### 4.6.4 ADOPTION OF E-COMMERCE

Having established that customers have evaluated e-commerce, they were asked when they would like to purchase Lysine online. A frequency table of the responses is shown in table 4.17.

Table 4.17 - Respondents preferred adoption date of e-commerce

	Frequency	Percent
No response	7	23.3
6 months	10	33.3
1 year	9	30
2 years	2	6.7
3 years	1	3.3
4 years and longer	1	3.3
Total	30	100

Table 4.17 shows that 33.3 % of customers would like adopt e-commerce within 6 months while a further 30 % indicated that they would like to purchase lysine via the Internet within 1 year. This indicates that customers are keen to start using e-commerce within a very short space of time. This can be explained by the theory on adoption of innovations. Since most customers have already gone through the awareness, interest, evaluation and trial phases, the transition to the adoption stage should take a short time.

This readiness to adopt within a short space of time is borne out by the results of the survey.

Hoyer and MacInnis (2000) make a distinction made between “ high-effort hierarchy of effects” and “low-effort hierarchy of effects”. In the high-effort purchase situations a great deal of effort goes into the gathering of information. The adoption of the e-commerce would be regarded as a “high-effort” purchase situation as it is a complex decision requiring a high degree of information search and the process is extended over a long period of time. Based on the results of the survey it appears that most Lysine customers have been engaged in the decision making process which was spread over a long period. Despite being a “high-effort” purchase situation, customers are able to make a decision with a short space of time since many of them have already performed extensive information search and have evaluated their options.

It is important to note that the first time adoption of e-commerce by an organisation is regarded as a “high-effort” decision making situation. This decision will involves several members in the decision making process and would extend over a long period. Once the company has decided that they will use the Internet to purchase on-line the subsequent decision making processes become a “low-effort” purchase situation. In this instance the buyer will decide whether he would like to exercise his option to purchase online or whether he would like to use traditional trading methods.

4.6.5 WHO ARE THE INNOVATORS?

In order to maintain the confidentiality of customers the actual names of innovators cannot be listed. Instead, the innovators have been grouped according to the types of businesses. In Table 4.18 innovators are classified as those people that would adopt e-commerce within the next six months.

Table 4.18 - Breakdown of innovators according to industry type

	Frequency	Percent
Feed Mill	7	70
Premix companies	2	20
Farmers	1	10
Total	10	100

Table 4.18 indicates that innovators are spread across three different categories namely, feed mills, premix companies and farmers. Traders do not feature in the innovator category. It appears that traders would be happy to follow the rest of the players in the feed industry.

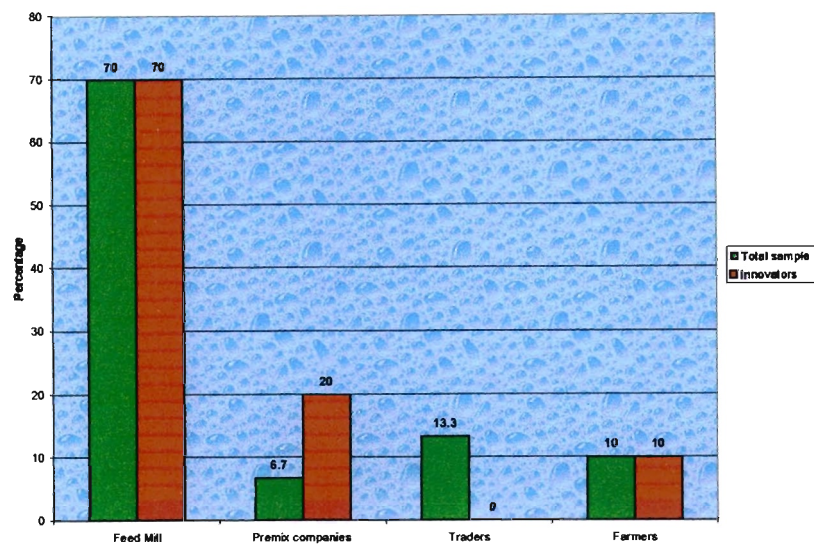
Table 4.19 - Categorisation of all respondents into business categories

	Frequency	Percent
Feed Mill	21	70
Premix companies	2	6.7
Traders	4	13.3
Farmers	3	10
Total	30	100

Table 4.19 reflects the breakdown of the total sample into the different categories. Tables 4.18 and 4.19 are combined and depicted graphically in

Fig 4.15 which shows the ratio of “feed mill” and “farmer” innovators reflect the same ratio as in the original sample that was interviewed.

Fig 4.15 - Categorisation of innovators and total sample in to different business categories



The “premix” innovators reflect a slightly higher ratio within the total innovator group than the original sample. Overall this means that the cross section of innovators roughly reflects the cross section of the original sample interviewed and no industry stands out as an innovator.

From a marketing perspective this makes the introduction of an innovation a little more challenging for an industrial marketer. If the innovators are limited to a particular industry type then the same industrial marketing strategy could be used for customers within that segment. In this case since the innovators are spread across three segments the marketing strategy will need to be modified to suit each segment.



#### 4.6.5.1 ARE INNOVATORS DETERMINED BY THE COMPANY SIZE?

As shown in the preceding section that is little link between the type of industry and innovators. This section explores whether the size of a company would determine whether a company would be an innovator or not. The size of the company has been inferred by the amount of Lysine they purchase on a monthly basis. Since most companies surveyed are in the business of feed manufacture and lysine forms a fixed ratio of the feed composition, using lysine consumption to determine the size of the company is justified. Larger companies would either consume or sell more animal feed than smaller companies. The amount of lysine used is directly proportional to the amount of feed used or sold. Hence there is strong direct correlation between lysine purchases and size customers businesses. It is also easier to obtain information about customers Lysine purchases rather than obtaining financial figures, which in some cases are confidential.

Table 4.20 shows a breakdown of Innovators in terms of the company size as inferred from Lysine purchases per month.

Table 4.20 - Categorisation of innovators according to size of business

	Frequency	Percent
< 5 tons Lysine	3	30
6-10 tons Lysine	2	20
21-30 tons Lysine	1	10
31-40 tons Lysine	1	10
41 or more tons Lysine	3	30
Total	10	100

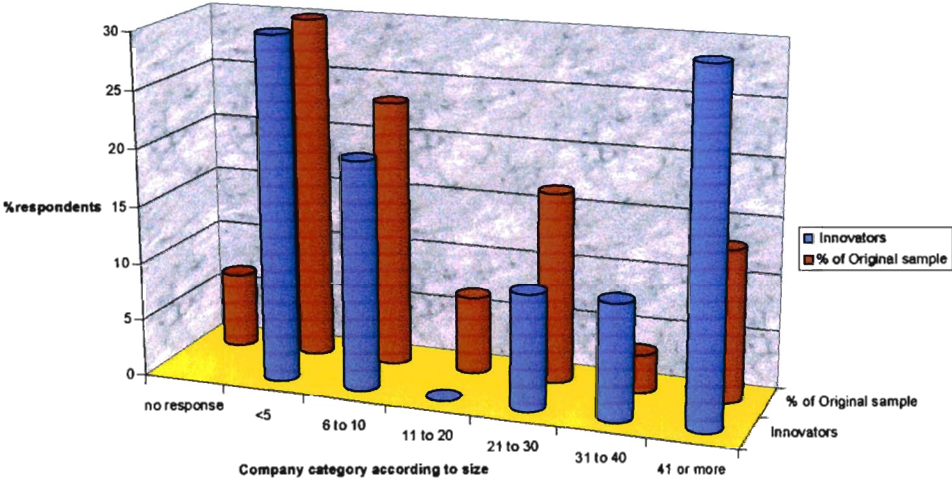
Table 4.21 shows a breakdown of total sample in terms of the size of firm as inferred from Lysine purchases per month

Table 4.21- Categorisation of total sample according to business size

	Frequency	Percent
No response	2	6.7
< 5 tons Lysine	9	30
6-10 tons Lysine	7	23.3
11-20 tons Lysine	2	6.7
21-30 tons Lysine	5	16.7
31-40 tons Lysine	1	3.3
41 or more tons Lysine	4	13.3
Total	30	100

Fig 4.16 indicates that majority of the respondents were small companies purchasing less than 5 tons of Lysine per month. In fact, over half of the respondents purchase less than 10 tons of Lysine per month. Table 4.20 and 4.21 are combined and depicted graphically in Fig 4.16, which shows that the large companies consuming more than 31 tons of Lysine is in a higher percentage in the innovator group than the general population.

Fig 4.16 - Business size of innovators and total sample



In order to reflect the aforementioned concept more clearly those companies that purchased more than 31 tons of Lysine per month were classified as “large” companies. The rest of the companies were classified as “small” companies. The ratio of “large” companies to “small companies in both the innovator group and the general sample is clearly shown in Fig 4.17.

Fig 4.17 – Size of company versus adoption rate

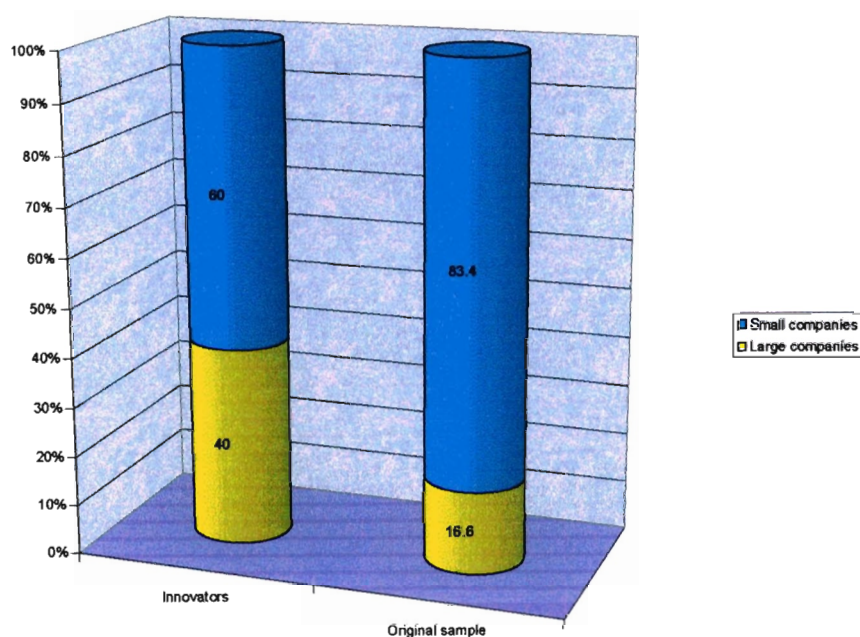


Fig 4.17 indicates that the ratio of large companies is higher in the innovator group than the total sample of respondents. This tends to indicate that larger companies are more likely to adopt an innovation sooner than smaller companies. This finding ties in with the finding of Fredrick & Webster (1969) who argued that firms that are first to adopt are those who can best tolerate the risk. Generally larger firms would be better able to tolerate risks than smaller firms would. Mansfield (1968) also found that if the profitability of two firms is the same and the one firm was four times larger than the other, the probability that the larger firm will adopt first is 0.8. This research seems to support the empirical findings of other research.

4.6.5.2 RISK PROFILE OF INNOVATORS

The risk profile of companies was checked by using a five point semantic scale ranging from “avoid risk at all cost” to “taking very high risks”. The risk profile of the company was obtained by surveying only one person from each company. It is possible that the person surveyed may have a different perception of the company’s risk profile compared to other personnel within the company. A more reliable way to ascertain the company’s risk profile would have been to interview a lot more people within the organisation or to use some other objective quantitative measure to gauge the company’s risk profile. Noting the shortcoming of the method of establishing the company’s risk profile the data was processed to classify different companies according to the risk profiles for the innovators and the total sample.

Fig 4.18 Risk profile of company for Innovators and total sample

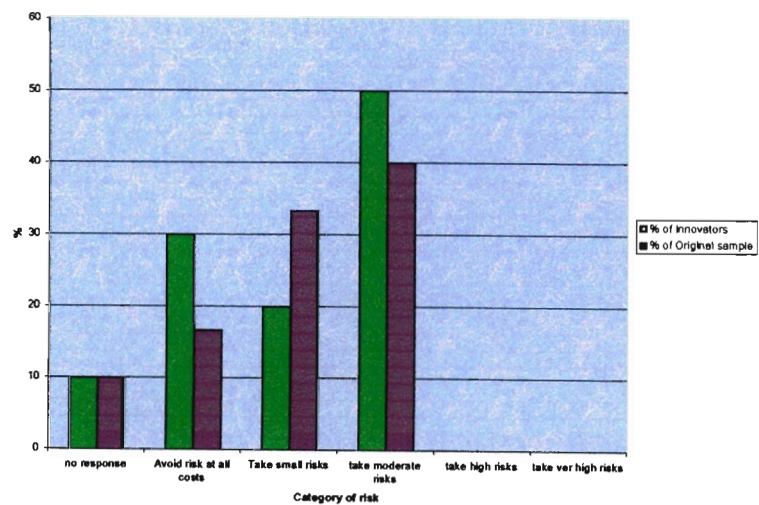


Fig 4.18 shows that most companies fell into the category of “moderate” risk erring more on the side of conservatism. No company declared that

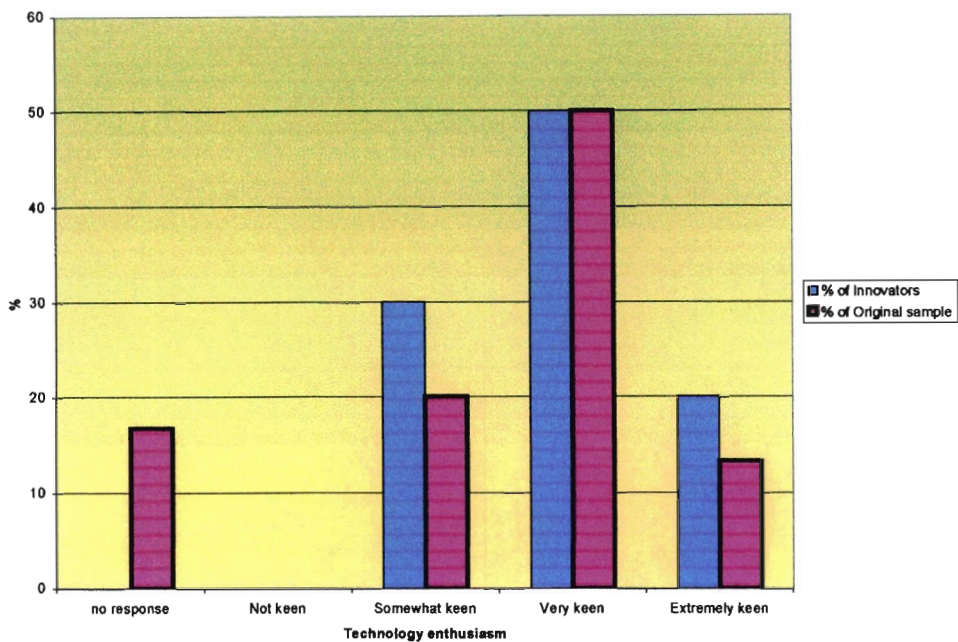
they took “high” or “very high” risks. This is not surprising as most of the companies are linked to farming industry, which has typically had a conservative outlook to business.

Fig 4.18 also shows that the highest risk classification for all firms was “moderate” risk. It also shows that the proportion of “moderate risk” businesses is higher in the innovator group than the general sample that was surveyed. This tends to indicate that innovators take higher risks than the general population which is consistent with the findings of Fredrick & Webster (1969) who found that firms which can best tolerate risk would be the first to adopt new innovations. However, there is also some inconsistency with the above results. Approximately 30% of the innovators declared that they “avoided risks at all cost” which are inconsistent with innovator profiles as described by Hoyer and MacInnis (2001). Embarking on e-commerce naturally has some risk associated with such a venture. If companies really avoided risks at all costs they would not want to be the first to adopt e-commerce. The inconsistency can be explained by respondents misrepresenting their company risk profile since only one person within each company was surveyed.

4.6.5.3 INNOVATORS AND ENTHUSIASM FOR NEW TECHNOLOGY

Fig... compares the enthusiasm for technology of the innovators with the technology enthusiasm of all respondents. There seems to be little difference between the two groups that are compared in Fig 4.19.

Fig 4.19 - Enthusiasm for technology



The t-test procedure was used assuming a normal distribution to compare the means of the two groups i.e. the original sample and the innovator group. Respondents that did not respond to the question were left out of the analysis. Table 4.22 shows the results of the t-test that was performed using SPSS.

Table 4.22 – Results of t-test

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Technology Enthusiasm	Equal variances assumed	.328	.570	.080	33	.937	2.000E-02	.2501	-.4888	.5288
	Equal variances not assumed			.075	14.737	.941	2.000E-02	.2662	-.5482	.5882

Since the significance value for the Levine test is high equal variances can be assumed. Since for value for the t-test is (0.93) means that there is no significant difference between the two group means. One would have expected that innovators would be much keener to adopt technology than the general population. Hutt & Speh (2000) describe innovators as “technology enthusiasts” who are keen to explore new technologies and have a large influence in how people within the organisation perceive new products.

4.6.6 THEORETICAL PREDICTION OF THE RATE OF DIFFUSION WITH THE ANIMAL FEED INDUSTRY

Rogers (1962) identified the following characteristics of a new product that affects how soon it will receive trial and the rate of diffusion through the market. According to Roger (1962) the complexity of the product reduces the rate of diffusion through the market. E-commerce is a complex subject to the uninitiated and the boundaries of e-commerce keep expanding with the advent of new technology. As the scope of e-commerce increases its complexity also increases. Based on the complexity of e-commerce one would expect it to diffuse slowly through the market. This slow pace of



diffusion is evidenced by the fact that despite being introduced several years ago only, only 23.3% of those surveyed are currently using e-commerce.

The “band wagon effect” as described by Mansfield (1968) is pertinent to the animal feed industry in South Africa. The animal feed industry is very competitive and with the number of competitors shrinking the intensity of competition amongst the larger players is also increasing. The animal feed industry is mature and there is little latitude for differentiation. Since the profit margins are small animal feed producers need to capitalise on every bit of competitive edge in order to survive. Those competitors that do not adopt e-commerce will find themselves disadvantaged when compared to the adopters. “The band wagon “ effect will result in non-adopters being forced to adopt despite their resistance to innovation.

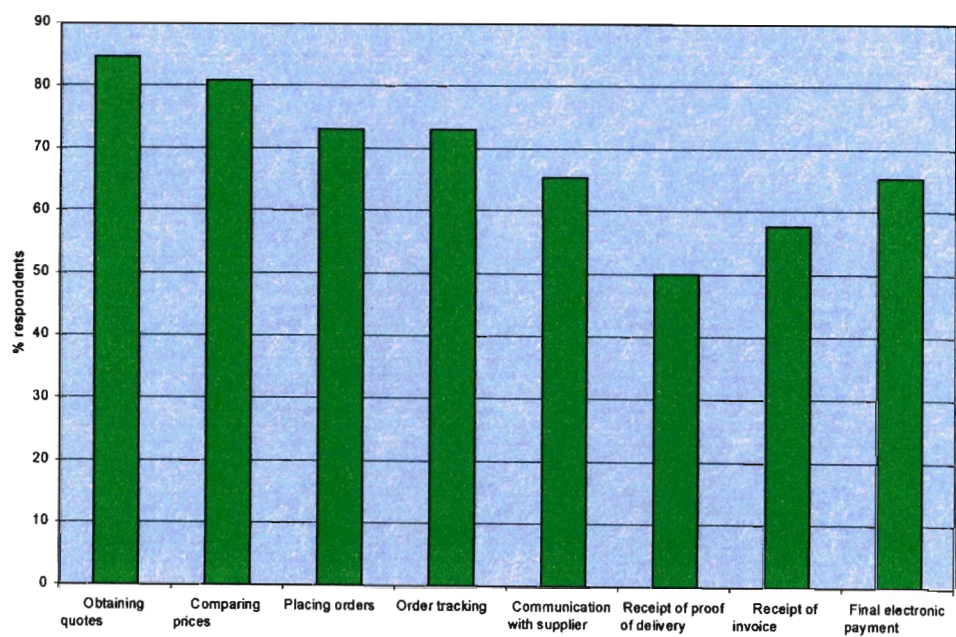
Sutherland (1969) found that it is more difficult to introduce an innovation when the economic outlook is bleak. The competitive trading conditions within the animal feed industry in South Africa makes for an uncertain economic future for the industry. Despite the industry growing, the rising cost of feed ingredients has reduced the profit margins of feed manufacturers. Also with globalisation local industries have to face competition from well-established business from abroad. The rising inflation rate in South Africa will have a negative impact on the consumption of animal products. This in turn will have a negative impact on the demand for products from the animal feed industry. This uncertainty

will make the introduction of e-commerce a little more challenging than if the economic outlook was more positive.

4.7 CUSTOMERS PREFERRED ASPECTS OF E-COMMERCE

Having established that Lysine customers are keen to adopt e-commerce this section describes which aspects of e-commerce customers would like to use. This information will provide a steer to S.A Bioproducts on the different modules of e-commerce that need to be implemented. The different aspects of e-commerce are depicted in Fig 4.20.

Fig 4.20 – Preferred aspects of e-commerce



It is apparent from Fig 4.20 that customers of Bioproducts would like to adopt all aspect of e-commerce. The Fig 4.20 also shows that most people would like to use the Internet to obtain quotations and comparing prices. In the case of Lysine customers these quotations may be obtained directly

from the Bioproducts website. Placing this in the context of the decision making process it appears that the most common use for the Internet would be in the “information-search” stage of the buying decision making process. The least popular function of the e-business would be the transmission of the proof of delivery. When Lysine is delivered to a customer the associated documentation is also sent with the transportation company to the customer. One of these documents is referred to as the “proof of delivery” (POD) document. This document is normally signed by the customer to acknowledge receipt of the goods. The customer also confirms that the goods were received in good order. Bioproducts will pay the transportation company on the basis of the POD. The ‘proof of delivery’ is a legal document that may be used in the settlement of disputes regarding the delivery of goods. Due to its legal implications it is not surprising that customers would prefer to receive a hard copy of the document rather than a scanned version that is e-mailed to them. The same principle seems to apply to the transmission of invoices where customers seem to prefer to obtain a hard copy of the invoice. Many customers’ transactional procedures stipulate that payments for goods will only be made on the basis of the original invoice, and they would not pay on faxed copies of invoices.

#### 4.8 SUMMARY

The results show that the information technology infrastructure amongst Bioproducts customers is very well developed. All customers that responded have the basic office automation like faxes and telephones but more importantly all respondents have access to the Internet. The majority of the respondents also have their own web pages on the Internet. Compared to the rest of Africa the respondents are have better information technology infrastructure.

Although all respondents have access to the Internet only 23.3% of them actually purchased goods online. These figures are very similar to the percentage of French companies who purchase on-line. A country like Sweden who is further in the e-commerce maturity cycle have more than 50% of the companies engaging in B2B e-commerce. Currently the Internet is used most commonly for obtaining quotes and for final electronic payment. One of the research questions was to establish if respondents have the means to engage in e-commerce. The results show that all most Bioproducts customers have access to the Internet, which will enable them to engage in business- to business e commerce. The other major research objective was to establish if Bioproducts customers have an interest in e-commerce. The results show that there is high level of interest in e-commerce with only 3.3% of respondents not being interested in e-commerce.

According to customers they rated the ability to reach wider network suppliers as one of the major benefits of e-commerce. This result is similar to the results of the Singaporean survey conducted by Jochen and Poh (2001) who found that 49.1 % of the firms rated global reach of suppliers as being important. The other benefit that was rated equally high was the ability to track orders with 40.6% of the respondents rating the tracking of orders as important. Generally the financial benefits of using e-commerce was not rated as highly as the logistical benefits.

The main reason why most customers are currently not using e-commerce is that suppliers are not ready. This barrier highlighted in the animal feed industry in S.A is exactly the same as the barrier determined empirically in a study in Europe (Internet 15). The other highly rated barrier to the adoption of e-commerce is the lack of human contact. Security concerns and the lack of knowledge of e-commerce were also highly rated as barriers to e-commerce. The social impact of people losing their jobs as a result of e-commerce did not bother the customers of Bioproducts. . Customers have the inclination and the capability to purchase raw materials online however the major factor holding them back is that suppliers are not e-commerce ready.

According to The Australian (2000) the “lack of qualified personnel” is the main barrier to B2B e-commerce in Australia, however in S.A and U.S.A this is not really a problem. The “lack of qualified personnel” was a barrier that is more pronounced amongst the smaller Bioproducts customers. This

finding mirrors the findings of a survey conducted by Commerce Net 2000 using over 1000 respondents from six countries which found that the main barrier in small organisations was the “lack of qualified personnel” (Internet 14).

The other objective of the study was to ascertain if the interest in e-commerce could be correlated with the factors that affect industrial buying behaviour namely: environmental, individual, group and organisational. The two individual factors studied were buyers “age” and the buyer's “attitude to risk” showed there was no indication that the age of the buyer affected his interest to e-commerce. The results tend to show that the innovators of e-commerce have a slightly higher risk profile than the general population. The results tend to indicate that individual factors may have a small effect on whether an industrial buyer purchases online however, this effect is not overwhelming.

The study examined two organisational factors namely ‘organisation structure’ and ‘buying technology’. There was no evidence to indicate that a buyer operating in a centralised buying structure had a different attitude to e-commerce than a buyer operating in a decentralised buying structure. The results tend to indicate that there was no relationship between the level of interest in e-commerce and the group or individual buying.

The environmental factors studied were ‘economy’ and ‘social factors’. The findings of this study tend to contradict the findings of Sutherland (1969), where economic pressures in the feed industry in S.A. has not dampened the

customers enthusiasm for e-commerce. This study shows that there is a very weak link between the 'loss of jobs' and the business decisions of industrial buyers. However, industrial customers were a bit more concerned about the 'lack of human contact'. Most respondents to the question indicated that they were "slightly" concerned about the lack of human contact. Despite being supportive of e-commerce Bioproducts customers also wanted to maintain human contact with suppliers.

The framework for industrial buying behaviour described in Fig 2.1 is generally useful in studying the different factors that affect industrial buying behaviour however, based on the limited factors studied in this survey it does not show any strong relationships between the factors and interest in e-commerce.

60 % of the respondents have at least an "average" level of awareness for e-commerce indicating that most people have a reasonable grasp of e-commerce. The result show that only 3.3% of the respondents are not interested thus indicating that there is high level of interest in e-commerce. 60% of the respondents have investigated the use of e-commerce to varying degrees. This is encouraging as it shows that most customers have progressed beyond the awareness and the interest phase through to the evaluation phase.

Currently 23.3% of respondents have already adopted e-commerce for purchasing of goods online. 33.3 % of the respondents indicated that they would like to used e-commerce within 6 months to purchase Lysine, while a

further 30 % indicated that they would like to purchase lysine via the Internet within 1 year.

One third of the respondents can be classified as innovators as they would like to adopt e-commerce as soon as possible. Overall, the cross section of innovators roughly reflects the cross section of the original sample interviewed. There is not any particular type of industry that could be classified as innovators. However, there were no traders in the innovator group.

The results tend to indicate that larger companies are more likely to adopt an innovation sooner than smaller companies, which is in keeping with the finding of Fredrick & Webster (1969). There is an indication that the risk profile of the firm is related to the time of adoption. Innovators tend to take higher risks than the general population, which is consistent with literature.

Due to the complexity of e-commerce it has diffused slowly through the market which is consistent with the findings of Roger (1962). Due to the highly competitive nature of the animal feed industry, the “bandwagon effect” identified by Mansfield (1968) will have significant effect in increasing the rate of diffusion of e-commerce with the animal feed industry in S.A.

The study showed that although customers wanted to use the full scope of e-commerce, most respondents wanted to use the Internet to obtain quotations and to compare prices.



It is clear from the study that Bioproducts customers are interested in e-commerce and they have the necessary infrastructure to engage in e-commerce. There is a strong indication that if Bioproducts introduces e-commerce most customers would like to purchase Lysine via the Internet within a year. However despite being keen on the e-commerce customers would still like to maintain the human contact.

## CHAPTER 5

### RECOMMENDATIONS AND CONCLUSIONS

#### 5.1 INTRODUCTION

This chapter uses the findings of the study and Bioproducts e-commerce aspirations to highlight gaps that need to be bridged. This culminates in the generation of recommendations that will help Bioproducts in implementing an e-commerce strategy. The recommendations revolve around prescribing additional investigations required to make the final decision whether to adopt e-commerce or not. It also helps define the scope for of e-commerce that needs to be implemented as well as timing of implementation.

Based on the limitations of this study, further ideas for further research are also proposed. Other research ideas were borne out of interesting concepts that arose out of the study. Finally this chapter concludes with a section that captures the essence of the whole study.

#### 5.2 RECOMMENDATIONS

The ensuing recommendations are aimed at helping Bioproducts with the e-commerce decision making process. It goes further than the e-commerce adoption decision and specifies a design for an e-commerce system, should such a system be implemented. The findings of the study have been translated into recommendations that will enhance Bioproducts marketing program if e-commerce is launched. This section also presents a guide on the timing of the e-commerce project as well as ways to overcome the barriers to e-commerce.

### 5.2.1 SHOULD BIOPRODUCTS INTRODUCE E-COMMERCE?

S.A Bioproducts currently uses certain aspects of e-commerce when marketing Lysine. Currently some customers request prices via e-mail and quotations are e-mailed back to clients. Bioproducts currently has a web site, which only provides information to customers and other interested parties. Bioproducts hopes to fully exploit the benefits of e-commerce by having a fully interactive web site, which will be used to transact with customers as well as provide additional information to clients. In order to make a decision on the e-commerce strategy Bioproducts will need to examine the following factors; customers interest in using e-commerce, customers mean for adopting e-commerce, cost implications of implementing e-commerce, financial benefits and service benefits that e-commerce will provide.

The study has shown that Bioproducts customers have a keen interest in e-commerce and they also have the means to engage in on line purchasing. This tends to indicate that if Bioproducts introduces e-commerce there is a strong likelihood that customers would adopt it.

This study answers only certain facets of the total decision making process. Further studies are also required to establish any financial savings that emanate from business-to-business e-commerce. This study reviewed savings from the customers' perspective. A detailed analysis needs to be performed to ascertain if Bioproducts will make any financial savings due to e-commerce. The overall savings and improvement of service must

outweigh the cost of implementation and the operating cost of the e-commerce system. It is important to note even though there is an interest in e-commerce amongst customers Bioproducts need to have an economically viable business model before embarking on an e-commerce strategy. If Bioproducts engages in an e-commerce model that is not economically viable it could drain company resources and lead to the demise of the company.

Many businesses have failed, as they did not have sound business models (Internet14). Most case studies have shown that virtual trading environment cannot totally replace the brick and mortar version of business (Porter, 1999). In most cases the virtual trading environment helps complement the bricks and mortar operations.

This study is only the first step in Bioproducts e-commerce decision making process. Having established there is an interest in e-commerce amongst customers and that customers have the resources to purchase online, Bioproducts can now invest resources in answering the other aspects of the decision. This study serves as a good basis upon which Bioproducts can continue with the decision making process.

### 5.2.2 E-COMMERCE SYSTEM DESIGN

It is recommended that Bioproducts enlist the help of e-commerce consultants to establish the costs of implementing an e-commerce system. This will include the development of an interactive web site, installation of back office systems to handle the processing of orders as well as payment

systems. The other important factor that needs to build into the system is a firewall to prevent any security breaches when transacting. Apart from the set-up cost there are also on going and operating costs associated with an e-commerce infrastructure. This needs to be factored into the overall cost of implementation.

The findings have revealed that all aspects of e-commerce need to be implemented ranging from price inquiries to the final payment. If Bioproducts considers a phased implementation of e-commerce then it should consider making prices available over the Internet in the early stages of the project. Customers rated price inquiry as the main use for the Internet. Posting prices on the Internet is a slightly more complicated with an industrial product as compared to a consumer product. In industrial buying different customers fall into different price categories depending on the volumes they purchase. It is possible for different clients to have unique passwords, and the e-commerce system would quote different prices based on volumes and their passwords. This adds an additional dimension to maintenance of the system where Bioproducts needs to ensure that prices are always kept up to date on the electronic databases. Bioproducts needs to ensure that it has the necessary resources to maintain the online price lists.

The other benefit of e-commerce that customers had rated very highly was the ability to track orders. Bioproducts needs to develop Internet links with customers via its website to enable customers to establish stock levels before placing orders. After orders are placed customers need to be notified

when the stock is available for dispatch. They then need to be notified when the stock is scheduled to leave the warehouse and when it is expected to arrive at the customers' premises. When the product is on route, customers need to have an updated estimated time of arrival. All of these features need to be built into the new business-to-business e-commerce system. However in the interim it is recommended that these requirements be executed manually as far as it is possible. This will help improve customer satisfaction and will also help highlight new requirements that customers may have concerning order tracking. Having the protocol operating on a manual basis will facilitate the implementation of the computer-based system.

### 5.2.3 MARKETING PROGRAM

This study has helped identify the innovators within the animal feed industry in South Africa. If e-commerce is implemented in South Africa the initial marketing programs should be aimed at the innovators. It was apparent from the study that local traders do not form part of the innovator group. The innovators can be used in the commissioning exercise and they could help eliminate any problems before the full-scale rollout of the project. Once innovators have purchased Lysine online they will influence other customers to engage in business-to-business e-commerce. The innovators comes of all segments including, premix companies, farmers and feed mills. From a marketing perspective this makes the introduction of an innovation a little more challenging for an industrial marketer. If all

innovators belong to a single industry type then the same industrial marketing strategy could be used for customers within that segment. In this case since the innovators are spread across three segments the initial Bioproducts marketing strategy will need to be tailored for all three market segments.

There seems to be a trend that the larger companies are innovators as they are able to tolerate risk better than small companies. When working with innovators it is recommended that larger companies be chosen for the initial implementation. Technically larger companies have better resources to help with the implementation of e-commerce. Further, they will be in a better financial position to fund any additional infrastructure that may be required to implement e-commerce. Bioproducts should take full advantage of the “bandwagon” effect by successfully implementing B2B e-commerce with larger companies first and then get other customers to follow suite. By introducing B2B to larger companies first adds more credibility to the innovation thus prompting others to adopt.

Bioproducts customers indicated that they would like to use e-commerce to reach a wider network of suppliers. In the instance they will have easier access to foreign suppliers of Lysine which could be to the detriment of S.A Bioproducts, as this would increase the competition in the local market. This tends to indicate that customers may not be content with having only one local manufacturer of Lysine. Bioproducts need to ensure that it remains competitive within the local market. It needs to provide high

quality product at globally competitive prices. It is evident that customers would be keen to seek alternate suppliers should they not be satisfied with the overall product offering. Bioproducts needs to keep in regular contact with customers and regularly monitor the level of customer satisfaction and work at continuously improving its service.

In order to fully understand the attitudes of all customers Bioproducts will need to commission a similar study amongst the overseas clients. It is possible that the use of e-commerce may help eliminate the use of agents in the international markets. Bioproducts will then be able to save the commission paid to agents and create closer links with its overseas clients via direct distribution. However, direct distribution overseas will increase the logistical planning and infrastructure requirements. This disintermediation exercise needs to be explored in a separate study.

This study showed that people are very concern about the “lack of human contact” that is normally associated with e-commerce. Bioproducts should ensure that even if e-commerce is introduced it should not be a substitute for human contact. The industrial marketers of Bioproducts should still maintain regular human contact with their customers. This can take the form of regular customer visits or telephone calls. This will help build relationships and make for strong partnerships between supplier and customers. The routine correspondents could take place electronically however, it is imperative that if there are deviations from the norm then



there has to be human contact between the two parties to resolve any problems or deviations.

#### 5.2.4 TIMING

The study indicates that most local customers are keen to purchase lysine online within one year. This information is vital for Bioproducts, as it tends to indicate that it should commence with further investigations as soon as possible. Considering that only the first stage of the investigation has been done as represented by this study, it is highly unlikely that further studies plus the implementation of e-commerce will be achieved within a year.

#### 5.2.5 OVERCOMING BARRIERS

According to literature, the shortage of qualified IT personnel has been a major stumbling block in the implementation of business-to-business e-commerce in Australia and other parts of the world. Bioproducts needs to ensure that it employs adequately qualified IT personnel early in the conceptual phases if it wants to successfully implement e-commerce. This will ensure continuity from the conceptual design phase through to the final implementation of e-commerce. These resources could also be gainfully employed for the on-going maintenance of the e-commerce system. Further, identifying and employing the right IT personnel would fast-track the project and ultimately reduce the cost of the overall project.

This study revealed that difficult economic conditions in the feed industry did not deter customers from adopting e-commerce. This implies that in the South African scenario the implementation date of e-commerce does not

need to depend on the state of the economy. This however needs to be confirmed with overseas clients, which will help guide the launch date overseas.

### 5.3 FURTHER RESEARCH

Bioproducts needs to conduct further research amongst its international customers to ascertain whether they have the same interest in e-commerce as the South African customers. In order to add to the body of knowledge within South Africa further research is recommend in the animal feed industry. The research should focus on the Lysine customer's ability to engage in the full scope of business-to-business e-commerce. It will need to delve into customers' abilities to procure well as sell good via the Internet including electronic links up and down its supply chain.

The scope of the research can be increased by including all customers that form part of the animal feed industry and not limit itself to current customers of Bioproducts. This will increase the sample size making it possible to perform statistical analyses on the cross tabulation when examining how the factors of industrial buying behaviour affect the interest in e-commerce.

Further research is required by Bioproducts to establish the cost of implementing an e-commerce strategy. The study also needs to evaluate the financial benefits that will accrue to Bioproducts if it embarks on an e-commerce strategy. Bioproducts also need to examine if its suppliers are in a position to embark on business-to-business e-commerce. If Bioproducts

were able to employ e-commerce for procurement and for sale of its products it would increase the financial justification for e-commerce.

There was mixed response on the price benefit of e-commerce. 20% of respondents saw it as having a large benefit on lysine prices while another 20% thought e-commerce will have no benefit on Lysine price. These varying opinions could be based on the fact peoples understanding of e-commerce varies. Customers may also be of the impression that the large investments required to implement e-commerce will need to be offset by any savings attributable to the new way of doing business. Other customers may feel that any savings achieved by Bioproducts would not necessarily be passed on to them. Further research is required to explore why people had such varying opinions on the effect of e-commerce on the price of Lysine.

In trying to ascertain the customer's company attitude to risk or technology it is recommended that further research be conducted by surveying several people within the same organisation. This likely to yield a more balanced view of the company stance. Secondly the research should also include some quantitative criteria which can be used to rate a company's attitude to risk or new technology. Further, in trying to ascertain the size of companies, customers' current Lysine usage was used as an indicator. It is recommended that other factors like turnover, sales volumes or net asset values be used to complement the classification of the company into different sizes.

In trying to study the effect of different factors affecting the attitude to e-commerce, a much wider range of factors needs to be studied with a much larger sample size. This will ultimately be able to yield those factors, which have an impact on the interest to adopt e-commerce.

Further research is also recommended in the field of adoption of innovation theory. More work is required to test whether the “ trial “ phase of the adoption of innovation theory is applicable to the adoption of e-commerce. All five stages of adoption of innovation model, which was originally used for consumer marketing, were found to be applicable to industrial marketing except the ‘trial’ phase (Ozanne and Churchill, 1971). They performed their study on the adoption of an automatic machine tool and it will be useful to test if the same applies to adoption of e-commerce.

If Bioproducts eventually implement e-commerce it will form an interesting study to establish who the actual innovators will be and compare it to this study which highlights the potential innovators.

## 5.4 CONCLUSION

The study, which was aimed at establishing Bioproducts customers' perceptions about e-commerce, has achieved its objectives. However, this study only forms a small part of the whole decision making process that Bioproducts needs to undertake in order to finally make a decision whether to implement e-commerce or not. The study examined the industrial decision making process from the Bioproducts customer perspective. The main finding of the study is that customers are keen on e-commerce and they also have the means to adopt e-commerce. Most customers would like to purchase Lysine within one year. The study also helped identify the innovators, which will assist Bioproducts in designing the marketing campaign during the launch phase of e-commerce. The study also showed that customers are keen to use all facets of e-commerce including the transaction capability, logistics and communication aspects. Combined with further research, which should include a financial analysis and a survey including international customers, Bioproducts will be able to use this information to make decisions regarding the implementation of e-commerce.

The decision making process regarding e-commerce operates at two levels with the organisation. The initial decision whether to adopt e-commerce is a major strategic decision involving several role players with diverse expertise within the organisation. After the e-commerce adoption decision is made and implemented then the industrial buyer makes a lower level

decision whether he uses e-commerce as a criterion in selecting suppliers. At the operational level industrial buyers use business-to-business e-commerce to execute their purchases. The Buygrid model describes the different decision steps that are taken for different purchase situations. E-commerce finds greater application in the routine and modified rebuy situations than the new-buying situations.

The AIETA model has proved to be a useful tool in studying the adoption of e-commerce in the South African animal feed industry. The results show that members within the feed industry are at various levels of the adoption cycle. There is a high level of awareness of e-commerce and most people are very interested in adopting e-commerce. Approximately 23.3% of the respondents are already purchasing goods online. Most respondents would like to purchase Lysine online within the next year.

The results tend to indicate that larger companies are more likely to adopt an innovation sooner than smaller companies, which is in keeping with the finding of Fredrick & Webster (1969). There is an indication that the risk profile of the firm is related to the time of adoption. Innovators tend to take higher risks than the general population, which is consistent with literature.

Due to the complexity of e-commerce it has diffused slowly through the market which is consistent with the findings of Roger (1962). Due to the highly competitive nature of the animal feed industry, the “bandwagon effect” identified by Mansfield (1968) will have a significant effect in

increasing the rate of diffusion of e-commerce with the animal feed industry in S.A.

The framework for industrial buying behaviour described in Fig 2.1 did not prove as useful as the AIETA model in studying e-commerce in the industrial environment. Due to the limited factors studied and the small sample size the industrial buying behaviour model did not yield any strong relationships between the factors and interest in e-commerce.

B2B e-commerce makes up the majority of the online sales and is rapidly gaining ground. By the end of 2002 it is expected the B2B e-commerce will account for 83% of the total online sales in the world and this is expected to grow to 88% by 2006 (Internet 5). Africa's implementation of e-commerce has been lagging behind Europe and U.S due mainly to the lack of infrastructure. By the end of 2002 South Africa is expected to spend R35 billion online, the bulk of which will be B2B e-commerce (Internet 9). South Africa's B2B e-commerce is expected to grow to approximately R310 billion by 2005 (Augustine, 2001). Some critics however believe that the South African market is too small for e-business initiatives (Stones, 2001).

This study has shown that despite eagerness to adopt e-commerce Bioproducts customers would still like to maintain the human contact.

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## APPENDIX 1

### COPY OF QUESTIONNAIRE AND INTRODUCTORY LETTER

## S.A. BIOPRODUCTS PTY LTD

# MEMORANDUM

<b>SUBJECT</b> : e-Commerce Survey
------------------------------------

Dear Sir/ Madam

S.A Bioproducts (previously known as AECI Bioproducts) is a local manufacturer and supplier of Lysine.

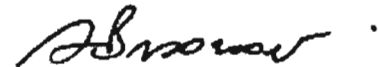
In order to improve our service levels to your organisation, S.A. Bioproducts intends to implement e-commerce some time in the near future. This will enable you to make on-line purchases of Lysine. In making this decision we would like to solicit your opinion on whether you see a need for e-commerce.

As part of my MBA dissertation I am conducting this survey amongst our customers. Your input will help guide our decision making regarding e-commerce and will assist me in completing my MBA.

Could you please fill out the attached questionnaire and e-mail, fax or post to me at your earliest convenience. If you are filling a hard copy of the form could you please tick the relevant block or if your filling out an electronic version please insert an asterix (\*) in the relevant block.

We assure you that your input will be treated confidentially and neither your name nor the name of your company will appear in my final report.

We would like to thank you in advance and look forward to your input.



Yours sincerely

S. BISSASSER  
Product Manager

1 Name

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2 Age (years)

< 25	26 to 30	31 to 35	36 to 40	41 to 45	>46

3 Company

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4 Which function are you responsible for?

Information Systems	Purchasing	Other

5 Please categorise your business type

Feed Mill	Premix	Feedlot	Trading	Farmer	Co-op	Other

6 Please rate your **personal** approach to risks.

1 Avoid risk at all cost	2 take small risks	3 take moderate risk	4 take high risk	5 take very high risks

7 Please rate your **organisation's** approach to risks

1 Avoid risk at all cost	2 take small risks	3 take moderate risk	4 take high risk	5 take very high risks

8 Is your lysine purchased on a centralised or decentralised basis

Centralised	Decentralised

9 Please indicate if Lysine buying-decision is made by an individual or a group?

Individual	Group

10 What is your Plant's average Lysine consumption – Tons/month?

<5	6 to 10	11 to 20	21 to 30	31 to 40	41 or more

11 Indicate how far in advance your organisation purchases Lysine?

Less than one month	2 months	3 months	6mths

12 Please indicate if your company has the following facilities

Fax	Personal Computer	e-mail	Internet access	Web page	Intranet

13 Does your company purchase any products via the Internet?

Yes	No

14 Do you use the Internet for any of the following activities?

Obtaining Quotes	Comparing prices	Placing orders	Order Tracking	Communication with Supplier	Receipt of proof of delivery	Receipt of Invoice	Final Electronic Payment

15 Which of the following activities would you like to use the Internet for?

Obtaining Quotes	Comparing prices	Placing orders	Order Tracking	Communication with Supplier	Receipt of proof of delivery	Receipt of Invoice	Final Electronic Payment

16 How would you rate your level of awareness of e-commerce

1 Low	2	Average (3)	4	High (5)

17 Indicate whether your company has evaluated the use of e-commerce

1- Nil	2	3	4	5 Extensive

18 What is your company's attitude to e-commerce

Not Interested	Somewhat interested	Very interested	Currently using

19 Please indicate the level of benefit your company would derive from procuring Lysine using e-commerce.

	1 No benefit	2 Small benefit	3 Moderate benefit	4 Large benefit	5 Very Large benefit
Lower Lysine price					
Faster delivery of product					
Quicker generation of order					
Lower cost of order generation					
Better order tracking					
Wider reach of suppliers					
Ability to hold smaller inventories					

20 Please indicate which of the following barriers prevents you from using e-commerce

	1 Does not hold me back	2 Slightly holds me back	3 Strongly hold me back	4 Prevents me
Reliability of Internet				
Set-up and maintenance costs				
Lack of in-house competence				
Company not ready for e-commerce				
Security				
Don't know enough about e-commerce				
No perceived benefit				
Lack of human contact				
Suppliers not ready				
Potential loss of jobs				

21 Any other barriers to adoption of e-commerce?.....

22 When will you potentially like to use e-commerce to purchase lysine?

6 mths	1 year	2 years	3 years	4 yrs and longer

23 How would you rate your organisation's enthusiasm to embrace new technology?

Not keen (1)	Somewhat keen (2)	Very keen(3)	Extremely keen(4)

23 Any other comments?