A FRAMEWORK FOR AN AFFORDABLE PRICING STRATEGY AT THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

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DECLARATION WITH REGARD TO INDEPENDENT WORK

I, LOUISE MANCY SMIT, hereby declare that the research project submitted by me in the fulfilment of the degree DOCTOR OF TECHNOLOGIAE: COST AND MANAGEMENT ACCOUNTING at the Central University of Technology, Free State is my own independent work and has not been previously submitted by myself or any other person in the fulfilment of any qualification.

LM SMIT

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SUMMARY

The focus area of this research project is on the pricing function in an organisation. The discussion of the pricing function commences with a generic perspective and concludes with the pricing of academic programmes at a typical public higher education institution, namely the Central University of Technology, Free State.

The following summary sets out the key issues addressed in this study:

a) The pricing function

- Pricing management is part of the marketing strategy of an organisation.
- Pricing is a critically important management activity as it affects the revenue of the organisation.
- Pricing is a difficult and a highly complex management activity.
- Many researchers believe that the pricing function in organisations has largely been neglected by managers, that prices are generally set by guesswork, and not by means of scientific methods, which indicates that there is no framework for the setting, implementation, management and control of the pricing process.

b) The pricing plan

- The pricing function in an organisation can successfully be managed through the implementation of a comprehensive pricing plan.
- The pricing plan should be within the framework of the legal and institutional parameters of the organisation, and it should be based on clear attainable pricing objectives that provide direction to the pricing plan and outline the goals that the organisation plans to achieve with the pricing of the products/services.

- There are a number of internal and external factors affecting pricing decisions such as the choice of a pricing strategy. The role of costs in pricing, and customers' perceptions of value are important because the costs of a product/service set the price floor, and customers' perception of value sets the price ceiling.

- An organisation can select one or a combination of pricing strategies to determine price. A number of nonparametric statistical tests are available to assist management in the selection of the most suitable pricing strategy, or combination of pricing strategies, when determining the price of a product or a service.

c) Pricing and its effect on the affordability of public higher education

- Tuition fees, the price for instruction, form a major component of the total cost associated with the attendance of public higher education. The cost of studying at public higher education institutions may influence the affordability of public higher education which may, on the other hand, affect the equity principle of the National Plan for Higher Education of 2001.

The analyses conducted proved that a comprehensive pricing plan does not exist at the Central University of Technology, Free State for the pricing of the various academic programmes, and that higher education has, despite the increasing trend in government funding, become less affordable for students at the institution. The affordability issue at the Central University of Technology, Free State can be partly attributed to the lack of a comprehensive pricing plan with clear attainable pricing objectives, and a pricing strategy to accomplish the stated pricing objectives. Another contributing factor to the affordability issue is the lack of an integrated cost accounting system and costing policies that outline measures to address the cost efficiency of the institution.

Implementation of the recommended pricing plan should assist management in determining tuition fees on a scientific basis, and will also enable the management of the Central University of Technology, Free State to explain to all relevant stakeholders how the tuition fees of the various academic programmes are calculated.

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CHAPTER 1

BACKGROUND AND PROBLEM STATEMENT

1.1 INTRODUCTION

The focus of this study is on the pricing of instruction at a public higher education institution in South Africa, the Central University of Technology, Free State (CUT, pronounced as C.U.T). The study provides a framework for determining, implementing, managing and controlling tuition fees at the CUT which are within the context of the equity goals of the National Plan for Higher Education of 2001.

The pricing function in an organisation is a critical and complex aspect of management activities, and it has major strategic and operational implications, because this function is the only element of the marketing mix that generates income for the organisation (Shipley & Jobber, 2001:301) (Nagle & Holden, 2002:124). The pricing function is, however, one of the most neglected and worst administered marketing responsibility areas in many organisations. The following comments support this point:

- Monroe & Cox (2001:1) drew on a study that found that only 8% of the companies, which participated in a survey on pricing strategies, conduct serious pricing research for the development of an effective pricing strategy, and that the majority of the companies in the study, do not have serious pricing strategies in place.
- Hinterhuber (2004:765) maintains that pricing is not only one of the most poorly managed functions in an organisation, but that it is also one of the least researched areas in marketing, as well as being an area that has not received the necessary attention from academics.
- Cram (2006:4) argues that in many organisations "pricing is just guess work", and is also the worst managed of all marketing areas." He states that most organisations do not use scientific methods to determine price.
- "Pricing is a much neglected and ineptly administered marketing responsibility, and numerous errors are made" (Shipley & Jobber, 2001:301).

1.1.1 Goal of the chapter

This chapter introduces the background and rationale of the study. The problem statement and the objectives of the research are outlined followed by a review of the research design and methodology. The chapter concludes with a brief description of each chapter of the study.

1.1.2 Layout of the chapter

The following is an outline of chapter one. The numbers in the presentation correspond with the paragraph numbers used in the chapter.

1.1	**Introduction**
1.1.1	Goal of the chapter
1.1.2	Layout of the chapter
1.2	**Background and the rationale of the research**
1.2.1	National higher education policies
1.2.2	The funding of public higher education
1.2.3	The levels of tuition fees at public higher education institutions
1.2.4	The costs of public higher education institutions
1.2.5	The affordability of higher education at public higher education institutions
1.2.6	The pricing function
1.3	**Problem statement and research hypothesis**
1.4	**Objectives of the study**
1.4.1	Main objective
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1.5.1	Literature review
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	1.5.2.3 Research population
	1.5.2.4 Data collection
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1.2 BACKGROUND AND THE RATIONALE OF THE RESEARCH

1.2.1 National higher education policies

National higher education policies applicable to South Africa are set out in the National Plan for Higher Education of 2001 and in the 1997 Education White Paper on Higher Education. The National Plan for Higher Education of 2001 stipulates the following five key policy goals for higher education:

- Producing the graduates needed for social and economic development in South Africa;
- Achieving equity in the South African higher education system;
- Achieving diversity in the South African higher education system;
- Sustaining and promoting research and
- Restructuring the institutional landscape of the higher education system (CHE, 2006:3).

All studies conducted on public higher education in South Africa should always be in the framework of these five key policy goals of the National Plan for Higher Education of 2001.

Government funding of public higher education forms a significant portion of the total funding of any public higher education institution in South Africa (HESA, 2008:12). The funding of public higher education by government is set out in the New Funding Framework of 2004 with the objective to improve the overall efficiency of the public higher education system (Unisa, May 2005:9). The funding

of public higher education will also play a vital role in the achievement of the goals of the National Plan for Higher Education of 2001 (De Villiers & Steyn, 2006:3).

1.2.2 The funding of public higher education

Public higher education in South Africa is funded by a combination from mainly three sources: state subsidies, student fees, and other third stream income (CHE, 2009a:65).

Since the introduction of the National Plan for Higher Education of 2001, and the New Funding Framework of 2004 there have been major changes in the funding of public higher education in South Africa. One of the main changes is the diminishing state funding of public higher education in South Africa, a trend that expects students to pay more of the cost of public higher education, but which is also a trend that may jeopardise the achievement of the goals of the National Plan for Higher Education of 2001 (Akor & Roux, 2006:422) (De Villiers & Steyn (2006:35). This declining trend in government funding of public higher education is, however, not limited to South Africa but appears to be a world-wide trend (HESA, 2008:9).

The decline in state funding of public higher education in South Africa has put public higher education institutions under financial pressure, and forced these institutions to compensate for the reduced state funding by generating alternative revenue.

Most public higher education institutions in South Africa responded to the declining state funding by increasing tuition fees to compensate for the "loss" of income (De Villiers & Steyn, 2006:35). The shift in the funding of at least part of the higher education costs from governments to students, referred to as cost-sharing, has become a reality in the South African public higher education system (Johnstone, 2003:403). The major argument to defend cost-sharing is that

students will get substantial private benefits from higher education through future premium wages, in contrast to the lower wages earned by students who have only a secondary school education (Vossensteyn, 2002:145). Johnstone (2003:403) argue for an appreciation of the public benefits of higher education, which is presumed to bring social, cultural and economic well being to countries.

The diminishing state funding, together with the accompanying increases in tuition fees, has resulted in changes in the proportions of the main sources of income at public higher education institutions in South Africa. Table 1.1 shows the trends in the composition of the income of public higher education institutions in South Africa for the period 2001 to 2008.

Table 1.1: Proportions of income of public higher education institutions from main sources for the period 2001 to 2008

Year	State funds	Tuition fees	Other income
2001	47%	24%	29%
2002	46%	26%	28%
2003	44%	28%	28%
2004	43%	29%	28%
2005	41%	29%	30%
2006	40%	28%	32%
2007	40%	27%	33%
2008	40%	28%	32%
Average	**42,63%**	**27,37%**	**30,00%**

(CHE, 2009a:65) (Bunting *et al*. 2010:20)

Table 1.1 clearly shows a decrease in government funding of public higher education from 47% in 2001 to 40% in 2008. It is also evident from table 1.1 that the income from tuition fees increased from 24% in 2001 to 28% in 2008 in order

to compensate for the loss of state funding. Income from other sources increased from 29% of the total funding of public higher education in 2001 to 32% in 2008.

In order to see to what extent the income structure of South African higher education institutions matches up to international institutions, a comparison was drawn between the income sources for higher education institutions in South Africa, and for those in the United Kingdom. The comparison indicates that higher education institutions in South Africa are more dependent on government funding than those in the United Kingdom. Student fees, as a proportion of the total income, are also higher than those in the United Kingdom. Other income sources, including research grants, are significantly higher at higher education institutions in the United Kingdom than at those in South Africa. The results of the comparison, especially the higher student fees, should be disturbing information to the leaders of higher education in most South African institutions (HESA, 2007:14).

An investigation, by the Department of Education, into tuition fees identified the following four main areas of challenges or constraints concerning the funding of public higher education in South Africa:

- Because of the decline in government funding, increases in tuition fees are essential to enable public higher education institutions to keep up with inflation, promote equity, enhance efficiency, protect and maintain academic quality and, simultaneously, remain competitive in a global knowledge economy (HESA, 2008:13).
- Regrettably there is a lack of a tuition fee model that is relevant to the cost structure of public higher education institutions in a context where significant disparities in income and participation in higher education remain, and in a context where the national focus is on human capital, and high-level skills development (HESA, 2008:13).

- There is inadequate funding for the National Student Financial Aid Scheme (NSFAS). The current demand for funds from NSFAS exceeds the supply. The focus should thus shift to ways in which financial support can be sustained over time, in order to make possible increased participation in higher education to meet both equity and growth targets (HESA, 2008:13).
- There is an increase of student debt at many public higher education institutions (HESA, 2008:13).

1.2.3 The levels of tuition fees at public higher education institutions

As was discussed in paragraph 1.2.2, student fees as a source of income at public higher education institutions in South Africa continue to increase. Students and their parents have become increasingly concerned about the rising costs of public higher education, and have raised questions about the affordability of public higher education, and the exclusion of students from participating in public higher education because of insufficient funds (MacGregor, 2008b:1) (HESA, 2008:12). The leaders of higher education acknowledge that the rising cost of public higher education is often a barrier to accessing public higher education, and this may jeopardise the equity principle of the National Plan for Higher Education of 2001 (CHE, 2009a:28).

The following matters regarding the tuition fees at public higher educations institutions in South Africa are concerns to the leaders of public higher education:

- The increasing proportion of income from tuition fees compared to other sources of income within the context of declining government funding (paragraph 1.2.2) (table 1.1).
- The annual increase in tuition fees that has, over the past years, outpaced the inflation rate at most public higher education institutions (Wellman & O'Brien, 2001:1).

- The trend to increase tuition fees at a higher rate than government's contribution to NSFAS (HESA, 2008:3).

Because analysts predict that the trend to increase tuition fees will continue and because, this will place higher education policies and especially equity policies under threat, the Minister of Education has considered measures to control these increases in tuition fees (Moyo, 2006) (HESA, 2008:3).

A task team was appointed by the Minister of Education to investigate the increases in tuition fees, and the measures contemplated to control tuition fees at public higher education institutions. The measures of control considered include the capping of tuition fees at public higher education institutions in South Africa. The task team recommended that a model for system-wide tuition fee regulation should not be adopted as the capping of tuition fees will:

- Undermine the autonomy and flexibility of higher education institutions.
- Negatively impact on the overall quality of higher education.
- Discourage institutional differentiation and will advance institutional homogenisation.
- Have an unintended consequence of making higher education cheaper for the wealthy students, and will negatively impact on the equity goals of the National Plan for Higher Education of 2001.
  (HESA, 2008:5) (MacGregor, 2008b:1)

The Minister of Education thereby acknowledges that the problem of declining government subsidies, and insufficient NSFAS funding should be addressed rather than placing upper limits on tuition fees levied by public higher education institutions in South Africa (HESA, 2008:51).

1.2.4 The costs of public higher education institutions

Another factor, besides the diminishing state funding, that contributes to the high tuition fees of public higher education institutions in South Africa is the high cost of running these institutions. Martin & Elgar (2005:1) are of the opinion that higher education costs have been increasing faster than costs in every other sector of the economy, with the possible exception of health care.

The following are some of the many opinions that explain the reasons for the rising costs in higher education:

- Boehner & McKeon (2003:5) believe that wasteful spending by higher education institutions is the number one reason for the high costs of higher education institutions.
- Adams & Shannon (2006:61) are of the opinion that higher education costs have escalated for reasons rooted primarily in organisational culture and market forces.
- Martin & Elgar (2005:17) maintain that there are a variety of explanations for the rising costs in higher education, but the primary cost drivers are the rising labour costs per student, rising administration costs, increased government regulation, technology, and the problem that every institution aspires to be like other institutions that have more status.

Boehner & McKeon (2003:4) believe that the ongoing higher education cost explosion is a disturbing trend, and one that cannot be allowed to continue as education is the equaliser in a nation, and that it can bridge social, economic, racial, and geographic divides.

1.2.5 The affordability of higher education at public higher education institutions

The affordability of public higher education is determined by student fees, the amount and types of financial aid available to students, and the part of the family income that is available for students (Dickson, 2006:237).

The NSFAS was introduced in 1995 with the aim of ensuring that capable students can afford higher education, and are not excluded from participating in public higher education (CHE, 2006:193). NSFAS provides funds to students through low interest loans, which can be converted to bursaries, depending on the academic achievement of students (CHE, 2009a:28).

Studies done by the Council on Higher Education (CHE), and Higher Education South Africa (HESA) indicate that NSFAS has contributed substantial amounts to higher education institutions. The number of financial aid awards granted increased from 113 691 in 2004 to 140 901 in 2007 (HESA, 2008:48). The value of NSFAS awards granted also increased by 72% from 2004 to 2007 (CHE, 2009:69). The general observation on financial aid is that NSFAS is, despite the increased contributions, not contributing sufficiently to meet the increasing demand for financial aid, nor the actual cost of study programmes (HESA, 2008:48). Data from various higher education institutions indicate that many students who qualify for NSFAS funding fail to secure loans from the scheme owing to inadequate resources (HESA, 2008:48).

The rising tuition fees, discussed in paragraph 1.2.2, and the insufficient financial aid available have caused higher education to become less affordable. To support this point, the following comments have been made:

- Naidoo (2008:1) claims that a shocking 50% of students entering higher education institutions in South Africa are dropping out without receiving any qualification, largely because of poverty, and a lack of finances.

- Boehner & McKeon (2003:5) maintain that increasing tuition fees do not only outpace the inflation rate, but also outpace the increases in family income and, therefore, put the opportunity of attending higher education institutions out of reach for low-income people.

- Feemster (2005:36-38) and Williams (2006:53) argue that the rising costs of higher education, and shrinking financial aid make attendance at higher education institutions very difficult for many students because tuition fees go up faster than family incomes. Unfortunately, need-based financial aid does not keep pace with rising tuition fees either.

1.2.6 The pricing function

Effective pricing management in any organisation can be obtained by adopting and implementing a comprehensive pricing plan that is in line with the overall strategies of the organisation, and that will address price setting, price implementation and price management and control (Myers, 2004:591) (Shipley & Jobber, 2001:313). A comprehensive pricing plan has three stages. The first stage deals with the setting of the price, and incorporates the development of pricing objectives; estimating the demand for the product/service; determining the cost of the product/service; evaluating the pricing environment; selecting a pricing strategy, and developing pricing tactics. The second stage focuses on the implementation process, and involves the publication of the price list, and the effective communication of the prices to all relevant parties. The last stage of the pricing plan involves the managing and controlling of the price, which requires the analyses of how customers, competitors and the market respond to the price (Solomon & Stuart, 2000:323) (Shipley & Jobber, 2001:312).

The rising tuition fees at public higher education institutions have raised questions about the process of setting tuition fees (HESA, 2008:22). A survey by a Higher Education South Africa task team found the following shortcomings concerning the setting of tuition fees at public higher education institutions:

- There is no single and system-level model to guide institutional practices regarding the setting of tuition fees (HESA, 2008:22).
- There is no standard procedure for the setting of tuition fees (HESA, 2008:23).

1.3 PROBLEM STATEMENT AND RESEARCH HYPOTHESIS

Public higher education institutions need comprehensive pricing plans to address the following issues, which are discussed in paragraph 1.2, and which may impact on the equity principle of the National Plan of Higher Education of 2001, namely:

- The current trends of diminishing state funding with the accompanying increases in tuition fees.
- The rising costs of delivering instruction.
- Inadequate funding to NSFAS.
- The lack of a comprehensive pricing plan for effective pricing management.

Against this background the following problem statement/research hypothesis was formulated:

Problem statement/research hypothesis: The Central University of Technology, Free State (CUT) lacks a comprehensive plan for the setting, implementation, and control of tuition fees that may impact on the equity principle of the National Plan for Higher Education of 2001 in terms of affordability.

1.4 OBJECTIVES OF THE STUDY

The following objectives have been derived from the formulation of the problem statement:

1.4.1 Main objective

The purpose of the study is to develop a framework for determining, implementing and controlling of tuition fees at the CUT that will be in line with the equity goals of the National Plan for Higher Education of 2001.

1.4.2 Sub-objectives

The following sub-objectives have been identified to fulfill the main objective:

- To conduct a literature review on the pricing function in an organisation.
- To investigate the policies and procedures that drive the current system of tuition fees by means of determining, implementing and controlling them.
- To determine the internal and external factors that are taken into account when determining tuition fees.
- To investigate the costing system, policies, and procedures in use concerning cost allocations, and the determination of the costs of the academic programmes offered.
- To investigate the proportions, levels and trends of the three main sources of income.
- To compare the annual increases in tuition fees with the annual inflation rate (CPIX).
- To determine the total income coverage of total recurrent expenditure.
- To determine the profile, levels, and trends in the recurrent expenditure.
- To analyse remuneration and composition of personnel.
- To examine the amount and extent of financial aid allocations.

- To investigate the affordability of higher education.

1.5 RESEARCH METHODOLOGY

Two research methods are used in the study, namely a literature review and an empirical research.

1.5.1 Literature review

In preparation for the development of the proposed framework for the pricing of instruction, a literature review was conducted on various aspects of the pricing function in an organisation including pricing principles, practices and strategies. In the literature review qualitative research methods were employed because the emphasis lay on gathering information from relevant and recent literature on the topic of pricing. The literature, which was reviewed, includes journals, textbooks, articles and internet publications. The objectives of the literature review are to provide a theoretical background of the pricing function in an organisation, and to systematically present the factors to be considered in a framework for the setting, implementing and controlling of the pricing of instruction.

1.5.2 Empirical research

A description of the empirical research follows the literature study. The focus of the empirical research is on the pricing of instruction at a single public higher education institution in South Africa, The Central University of Technology, Free State.

1.5.2.1 Research design

The case study design using the secondary data analysis approach of research has been used. The research focuses on a set of issues within a single

organisation, and existing data, mostly quantitative, will be reanalysed to address the problem statement, and the main objectives of the study.

The use of case studies in research has grown substantially over the past several decades, and has become a popular research approach within the disciplines of education and social sciences (Rule & John, 2011:1) (Grünbaum, 2007:78). Case studies are also becoming a popular and widely used research approach in the field of accounting, and especially in management accounting (Cooper & Morgan, 2008:166).

A case study entails an intensive study of an individual case to answer specific research questions (Gillham, 2000:1) (Rule & John, 2011:1). Yin in Noor (2008:1602) maintains that the term "case" refers to an event, an entity, an individual or a unit of analysis while the term "study" refers to an investigation. Rule & John (2011:4) offer the following definition of a case study: "A case study is a systematic and in-depth investigation of a particular instance in its context in order to generate knowledge". Simons (2009:3) describes a case study as "a study of the singular, the particular, the unique". Yin in Simons (2009:20) provides the following more detailed definition of a case study: "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident".

The purpose of a case study is, thus, to analyse and generate a clear and in-depth understanding of a single case and, thereby, reach conclusions concerning particular research questions. Simons (2009:3) mentions that, in a case study, reference may be made to other cases, but the purpose of a case study is to understand the uniqueness of an individual case in relation to a particular research question.

According to Rule & John (2011:8) case studies can be classified into two broad categories namely the intrinsic case study and the instrumental case study. The interest, in an intrinsic case study, lies in the case itself, whereas, the focus in an instrumental case study is on analysing the case to gain insight, and a general understanding of a specific issue.

Case studies are classified, depending on their purpose, into the following categories:

- Descriptive case studies: These start with an existing descriptive theory and, thereafter, give a complete description of the case that is being studied within its context.
- Explanatory case studies: These attempts to explain what happens in the particular case that is being investigated. Often researchers wish to continue investigating a case study to explain why an event occurred in a certain case study. Researchers usually use explanatory case studies to conduct casual investigations, test existing theories, or to develop a new theory.
- Exploratory case studies: These case studies describe and explain a phenomenon that has not been investigated previously, and which may become a springboard for further studies (Rule & John, 2011:8) (Simons, 2009:21).

Kendra (2012:1) explains that case study methods may be prospective or retrospective in nature. In a prospective case study method, a researcher will observe, or analyse for example events that occur in a case so as to predict the outcome of these events. They try to predict the outcome because there is no outcome at the time the study is initiated. A retrospective case study method looks back at historical information in relation to an outcome that was predicted at the start of the study.

There are advantages and disadvantages attached to case-study research. When "how" or "why" questions are posed about a current set of events and, when a researcher has little control over these events, case-study research is exceptionally valuable (Kohibacher, 2006:2). Another advantage of case-study research is that it may shed light on other similar cases and, therefore, allows for generalisations. Case-study research can be used to generate new theories, or it may be used for testing existing theories relating to the case (Noor, 2008:1602) (Rule & John, 2011:7). According to Cooper & Morgan (2008:173) case studies are valuable tools in understanding complex phenomena.

On the other hand, case studies are difficult to conduct and may require significant resources of time and money (Cooper & Morgan, 2008:173). Case studies have been criticised for lacking scientific thoroughness, reliability, and for not providing an acceptably large enough basis for scientific generalisations (Kohibacher, 2006:2) (Noor, 2008:1603). Yin, in Kohibacher (2006:2), answers the issue of generalisations by stating that case studies are able to provide a basis for generalisations for theoretical propositions, but not for populations or universes. He also argues that the aim of a case study should be analytical generalisation, and not statistical generalisation. Further arguments about the potential limitations of case studies may include:

- Conservatism, because the case study is locked in time, whereas the people in it have moved on,
- The personal involvement and/or subjectivity of the researcher (Simons, 2009:24).

1.5.2.2 Reporting period

The reporting period covers a period of eight years, from 2001 to 2008. The 2009 and 2010 data for costing and other relevant information per academic programme and per FTE student provided by the Management Information System, PSP Icon: Academic and Affordability Models, which are discussed in

chapter six, are not available because the CUT ceased to use this Management Information System and, therefore, the data for these two years could not be included in the analysis. The CUT have not replaced, since 2008, the PSP Icon Models by any other system that should be providing important costing, revenue, demand value, and other information about academic programmes and FTE students, as discussed in paragraphs 6.6 and 6.7 (Van der Merwe, 2012).

However, the information gathered for the period 2001 to 2008 was sufficient to determine trends, and to draw conclusions to address the problem statement, and the main objectives of the study.

1.5.2.3 Research population

The population includes all academic programmes at the main and distant campuses in all the faculties of the CUT. The research will thus be done on the complete pricing structure for instruction at the CUT.

No sampling is therefore needed.

1.5.2.4 Data collection

The document analysis method of data collection will be used.

Data will be collected from documents in use at the financial-, administrative- and support services- departments of the CUT for the period 2001 to 2008. The Consumer Price Index was acquired from Statistics South Africa (online: http://www.statssa.gov). Other relevant information on public higher education institutions in South Africa was supplied by the Department of Higher Education and Training (online: http://dhet.gov.za).

The data collection was built up from information gathered to determine and describe the current tuition fees system; the current costing system in terms of cost allocations, and the determination of the cost of the different academic programmes as well as institutional income; recurrent expenditure; student enrolment numbers, and financial aid allocations.

1.5.2.5 Data analysis and interpretations

The data analysis process consists of two phases. The first phase includes content analyses of the Institutional Regulatory Code of the CUT to determine the policies and procedures that drive the current tuition fees and costing systems.

The second phase involves secondary data analysis of data collected by making use of various mathematical formulae, and standard statistical techniques to evaluate student enrolment numbers at the CUT, the income of the CUT, the recurrent expenditure of the CUT, and the affordability of higher-education learning at the CUT.

1.6 CHAPTER LAYOUT

Chapter 1: Background and problem statement

This chapter is an introduction to the study, and outlines the background and rationale of the study. It puts forward the problem statement and the research hypothesis, describes the objectives of the study, and also discusses a review of the research design and methodology.

Chapter 2: An introduction to the pricing function in an organisation

The purpose of the chapter is to introduce the topic of pricing.

Chapter 3: The role of costs in pricing

Chapter three examines the role of costs in pricing. The discussion includes the importance of costs in pricing, the nature of costs, determining costs, and managing costs.

Chapter 4: Pricing methods

Chapter four explores the different methods that can be used to determine the price of a product/service.

Chapter 5: Public higher education in South Africa: An overview on selected themes

This chapter provides an overview of public higher education in South Africa concerning selected themes such as legislation, funding, costs, participation, demand, supply and affordability.

Chapter 6: The Central University of Technology, Free State: Policies and procedures

This chapter describes the CUT as a public higher education institution in South Africa with emphasis on the policies and procedures regarding the pricing of instruction.

Chapter 7: Central University of Technology, Free State: Data collection and analysis

Chapter seven explains the process employed in the collection and analysis of data in order to have been in a position to finally draw conclusions concerning the pricing of instruction at the CUT.

Chapter 8: Central University of Technology, Free State: Conclusions and recommendations

Conclusions reached from the literature study, and the findings from the data analysis that led to recommendations being made about the pricing of instruction at the CUT are presented in this chapter.

1.7 BIBLIOGRAPHY

The Harvard method of reference is used throughout the text and in documenting the resources. There are various adaptations and versions of the Harvard referencing system (Struwig & Stead, 2001:178). In this regard the guidelines outlined by Van der Walt (2006:1-89) will be adhered to.

1.8 SUMMARY

This chapter provides a review of the research plan. The problem statement and the objectives of the research indicate that tuition fees at the CUT, and the impact thereof on the equity principle of the National Plan of Higher Education of 2001 in terms of affordability, is the focus area of the research. The case study design, using the secondary data analysis approach to research, was used to address the problem statement, and to fulfil the objectives of the study.

The next chapter will introduce the literature study of the research with an introduction to the pricing function in an organisation.

CHAPTER 2

AN INTRODUCTION TO THE PRICING FUNCTION IN AN ORGANISATION

2.1 INTRODUCTION

This chapter introduces the literature review of this study, and provides a theoretical framework for the pricing function in an organisation. Pricing is a critically important but highly complex management activity in an organisation, and management cannot afford to make uninformed and untimely pricing decisions, because pricing has major strategic and operational implications for any organisation (Anon., 2003:1). Yet, many researchers believe that the pricing function in an organisation has been largely neglected by managers. They maintain that managers operate blindly concerning pricing because they have neither the information nor the tools available to make smart effective pricing decisions (Anon., 2003:1) (Hinterhuber, 2004:765) (Eugster *et al.* 2000:1) (Bruck, 2010:1).

The discussion on the pricing function in an organisation is from a generic perspective, and is not specifically about a particular type of organisation, such as retail or service organisations. The focus area of this study is on public higher education institutions but researchers such as Lamal (2001:65) and Marginson & Considine (2000:235) are of the opinion that the model for higher education institutions should be the business-world, and that institutions of higher education should adopt more business-like structures and practices to meet their challenges.

2.1.1 Goal of the chapter

The purpose of this chapter is to introduce the topic of pricing. The emphasis of the chapter is on the nature of pricing; the pricing plan; the pricing environment; legal and ethical issues in pricing; and general pricing errors made by organisations.

2.1.2 Layout of the chapter

The following is an outline of chapter two. The numbers in the presentation correspond with the paragraph numbers used in the chapter.

2.2 THE NATURE OF PRICING

2.2.1 Definitions of key concepts

Pricing is not a single concept, but a multidimensional one with different meanings and implications for the manufacturer, the middleman, and the end consumer (Hollensen, 2006:187) (Saxena, 2009:315).

The concept, price, has a number of names such as rent, tuition fees etc. These names reflect the nature of the relationship between the customer and the provider when the exchange of goods/services takes place (Palmer, 2005:344).

The following are a number of the variety of definitions for the concept of pricing:

- Cant (2003:2) describes price as: "Price is the amount of money charged for a product/service. More broadly, price is the sum of the values that consumers exchange for the benefits of having or using the product/service".
- Lamb *et al*. (2001:498) define price as the agreed value placed on the exchange, by a buyer and seller, to acquire a product/service.
- According to Perreault *et al*. (2009:G-8) price is "the amount of money charged for something of value".
- Dibb & Simkin (2001:149) describe price as the "value placed by a marketer on a product/service".
- A price is ultimately a number that captures the costs involved in providing a product/service to a customer (Schindehutte & Morris, 2001:11).

The various definitions given above, clearly state that there is a relationship between price, value, and perceived benefits. The relationship between the three elements can be expressed as:

Value = Perceived benefits – Price (Salvador *et al.* 2007:42).

The deduction from this equation price can be expressed as:

Price = Value – Perceived benefits.

Cram (2006:11) goes further, and states that the customer is trading money for more than simply a product/service. Customers are buying a combination of product/service performance, plus an emotional association, because prices generate emotions. Therefore, value should be expressed as:

Value = Perceived benefits + Perceived emotional associations – Perceived price.

Schindehutte & Morris (2001:12) further explain that price is not only value, but price also has other characteristics such as:

- Price is a variable. Price can be manipulated in many ways including the amount of payment, the time of payment, the terms of payment, and the person doing the payment.
- Price is variety. Organisations that sell multiple products/services may use price to accomplish various objectives for different items.
- Price is visible. Customers can see and are aware of the price of products/services.
- Price is virtual. Organisations can make adjustments to prices instantaneously because of technology.

2.2.2 Where does price fit in?

Pricing management is part of the marketing strategy of an organisation (Hollensen, 2006:190) (Pasura & Ryals, 2005:47).

The development of marketing objectives, and a marketing strategy is set out in the marketing framework as illustrated by Cant (2003:vi) in figure 2.1.

Figure 2.1: The marketing framework
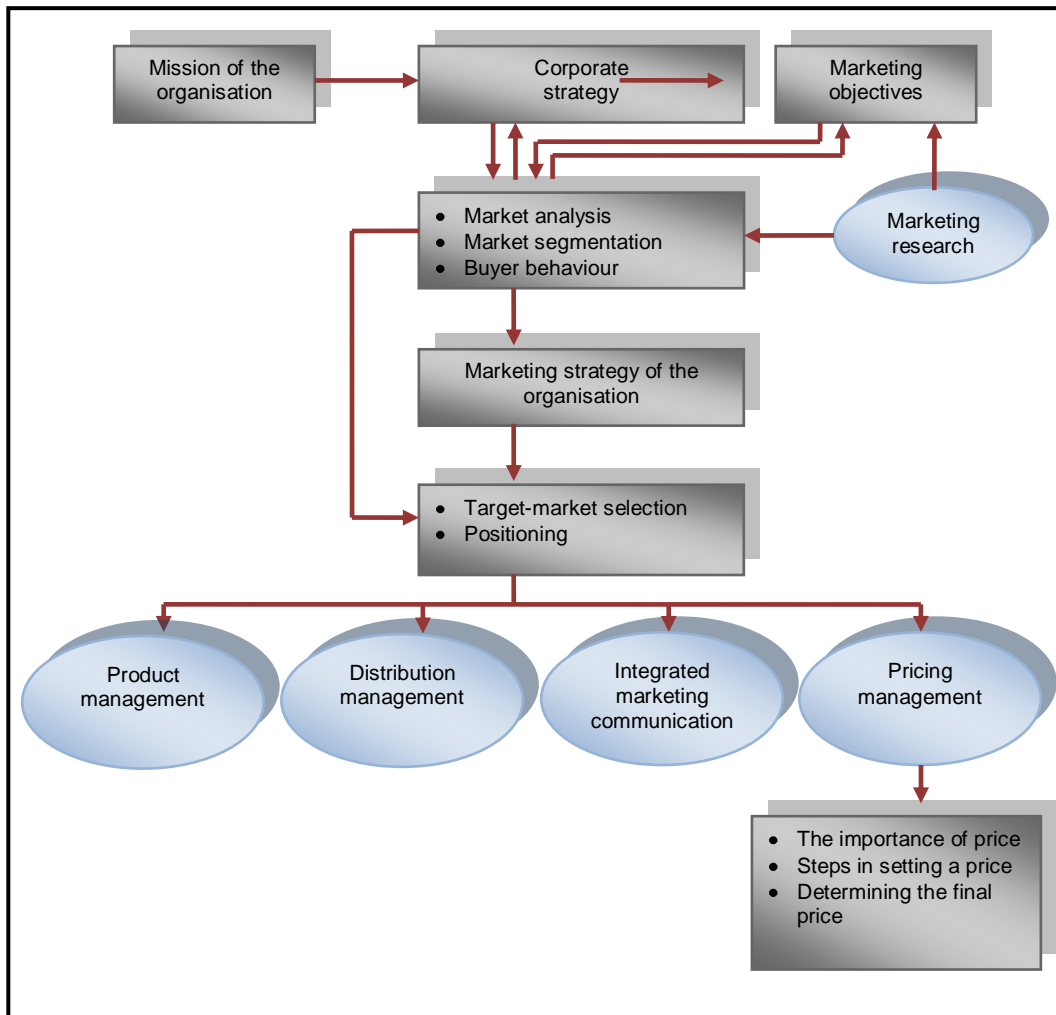
(Cant, 2003:vi)

Figure 2.1, reveals that an evaluation of the mission statement and the corporate strategy of an organisation is the starting point for the development of marketing objectives. The purpose of the organisation is outlined in the mission statement, and the corporate strategy is the plan that an organisation uses to achieve its

objectives (Grant, 2002:17). The marketing objectives are formulated after thorough marketing research as well as a comprehensive analysis of the market to obtain the profile of the target market (Cant, 2003:vii).

Once the marketing objectives are defined the next step will be the development of the marketing strategy of the organisation. The marketing strategy consists of the following elements: (a) the identification of the specific target market of the organisation (b) the strategy to be followed to position the product/service in the market (c) the development of a marketing mix that will allow the organisation to market its product/service to the target market (Cant, 2003:vii). The marketing mix can be defined as a set of tools in an organisation that can shape the nature of its offer to customers (Palmer, 2005:10). The marketing mix consists of four elements: product, price, promotion, and place. Product, promotion, and place are the elements in the marketing mix that represent costs. The price element, on the other hand, is the only element in the marketing mix that generates revenue (Jobber & Fahy, 2006:195) (Vithala, 2009:9).

2.2.3 Why is pricing important?

Pricing is an important marketing tool, as Raymond Corey at the Harvard Business School explains: "Pricing is the moment of truth – all of marketing comes to focus in the pricing decision" (Nagle & Holden, 2002:xi).

Why is pricing important? Pricing is important because it is the key to revenues, and revenues are the key to the profits of an organisation (Lamb *et al*. 2001:498). Setting the correct price is therefore crucial for any organisation as it creates profits, and influences customers to purchase or not to purchase an organisation's product/service. A price that is too high can cause customers to abandon an organisation, transfer their support to an organisation's competitors, or buy alternative products. A price that is too low may result in insufficient profits, and may also affect the image of an organisation. Clearly, therefore, setting the right

price is of utmost importance because high prices are likely to mean lost sales, and low prices mean a decrease in the profit margin (Cram, 2006:5).

Price is also important because it is intimately linked to the other elements in the marketing mix, and may have an impact on these elements in numerous ways such as: The price of a product/service can influence customers' perception of the product/service as price always represents value to the customer; price is an indicator of quality, and can therefore determine the type of marketing institutions used in distributing the product; price affects how the product/service is promoted, and price also affects the organisation's competitive position, and its share of the market (Cant, 2003:5) (Solomon & Stuart, 2000:320).

Pricing also fulfils an important role in the economy (Saxena, 2009:315). It is considered to be the key activity within the capitalistic system of free enterprise. The price of a product/service has a direct impact on wages, rent, interest, and profits, and can therefore influence the price paid for certain aspects of production, such as: labour, property, capital and entrepreneurship. Price regulates the economic system through the allocation of scarce resources that determine what will be produced, and who will benefit from the goods/services produced (Cant, 2003:4) (Saxena, 2009:315).

Therefore, pricing a product/service is thus one of the most important decisions management has to make, but research indicates that it is also one of the most neglected marketing areas in an organisation. Cram (2006:4) explains that price setting and price management are not easy tasks, and states that leading thinkers agree that pricing is generally poorly managed in organisations. Hinterhuber (2004:765) claims that price is one of the least researched areas in marketing, and that pricing decisions have not received the necessary attention by academics. Pratt (2007:1) also argues that prices are generally set by guesswork, and not by means of scientific methods, which means that there is no framework for setting the prices of a product/service. Garda, in Avlonitis & Indounas

(2004:343) points out that although pricing is always a matter of concern, the management of most organisations have the point of view that not much can be done about the situation.

The truth is, however, that price can be controlled, it can be managed, and it can be a powerful tool for an organisation.

2.2.4 Conceptual orientation to pricing

According to Monroe (1990:13), Ingenbleek *et al.* (2003:290) and Saxena (2009:315) the following five essential factors should be taking into consideration when setting the price of a product/service. *Demand* for a product/service establishes the price ceiling, which is the maximum price that can be charged for a product/service. The maximum price depends on the customers' value perception of the product/service. Direct variable *costs* set the price floor, which is the minimum possible price that can be charged for the product/service. The difference between the ceiling and the floor represents an initial pricing discretion. The initial pricing discretion may be influenced by *competitive factors, corporate objectives,* and *regulatory constraints.* The competition in the market may lead to a reduction in the price ceiling, whereas corporate objectives*,* concerning the recovery of fixed costs and overheads, as well as meeting the profit goals, and the regulatory constraints, may increase the price floor, resulting in an increase in prices. These five factors are illustrated in figure 2.2 on the conceptual orientation to pricing.

Figure 2.2: Conceptual orientation to pricing
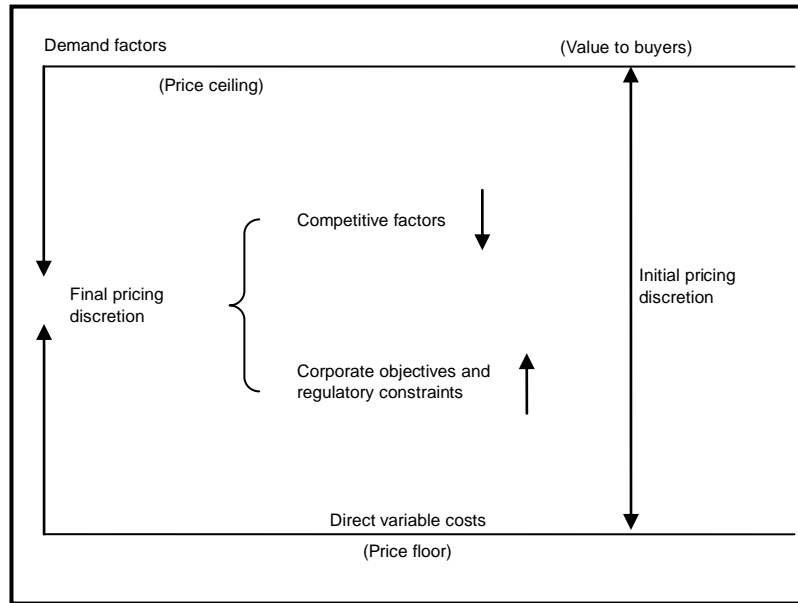
(Ingenbleek *et al.* 2003:291)

Thus, to deal with the complexity of pricing, several factors have to be considered in the pricing decision, and the focus should not only be on costs. The factors, which have to be considered when the pricing decision is made, are discussed in paragraph 2.7 of this chapter.

2.3 THE PRICING PLAN

To set, manage and control the price of a product/service an organisation needs a pricing plan, a framework for the pricing of a product/service. A pricing plan is a process consisting of six major steps: developing pricing objectives; estimating demand; determining costs; evaluating the pricing environment; choosing a pricing strategy, and developing pricing tactics (Solomon & Stuart, 2000:323) (Mullins *et al.* 2008:273) (Dibb & Simkin, 2001:153). Each of these steps will be discussed in full in this chapter. Figure 2.3 indicates the steps in price planning.

Figure 2.3: The steps in price planning
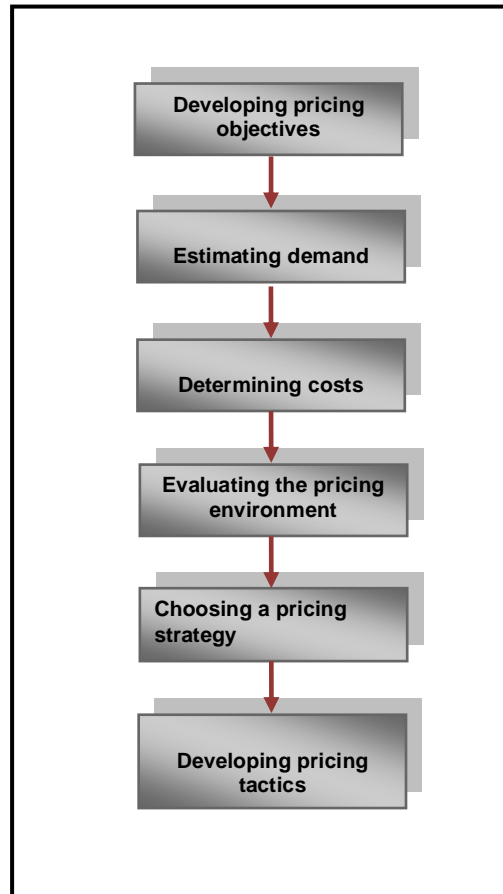
(Solomon & Stuart, 2000:323) (Mullins *et al*. 2008:273) (Dibb & Simkin, 2001:153)

2.4 PRICING OBJECTIVES

The first step in the pricing plan is to develop pricing objectives that provide the directions for actions aimed at achieving the goals of the organisation (Avlonitis & Indounas, 2004:344). The benefits of having objectives are to know what is expected and how to measure the efficiency of the operations (Tzokas *et al*. 2000:193). Many categories of pricing objectives exist. This study will describe the categories according to Diamantopoulos. According to Diamantopoulos in Avlonitis & Indounas (2005:48) pricing objectives can be divided into three main

categories relating to their content, the desired level of attainment, and the associated time horizon.

Avlonitis & Indounas (2004:344) and Avlonitis & Indounas (2005:48) explain the three main categories of pricing objectives as follows:

The *content* category of pricing objectives includes both quantitative and qualitative objectives as part of the objective functions of the organisation. Quantitative objectives refer to an organisation's profit, sales, market share, cost coverage and production output. The main advantage of quantitative objectives is that they can be measured easily. A disadvantage is that an excessive emphasis on quantitative objectives may place at risk the long-term position of an organisation in the market. Qualitative objectives are related to the relationships with customers, competitors, distributors, and the long-term survival of an organisation and the achievement of its social goals. The main advantage of qualitative objectives is that they can lead the organisation to be market orientated when making the pricing decision.

Pricing objectives in the category of the desired *level of attainments* are those objectives that aim at achieving maximisation, which means maximum profits, maximum market share, and maximum sales or production volume.

The pricing objectives in the last category are linked to the *time horizon* of attainment, and can be divided into short-term or long-term objectives. Short-term pricing objectives are objectives that will enable an organisation to reach specific goals within a year, while long-term objectives will only be realised after a year.

In the light of the above, Jain (2004:413) and Saxena (2009:317) are of the opinion that organisations may pursue more than one pricing objective, but the pricing objectives should be mutually consistent, and the interrelationship between the objectives clearly defined.

Because this study focuses on service organisations, of which higher education institutions are a part, pricing objectives of service organisations must be examined. McDonald & Payne (2006:208) maintain that the pricing approach and objectives for services are broadly similar to those organisations that are involved in products. Avlonitis & Indounas (2005:48) summarise the fundamental pricing objectives for service organisations in table 2.1.

Table 2.1: Pricing objectives of service organisations

Pricing objectives	Description
Profit maximisation	Achievement of satisfactory profits
Sales maximisation	Achievement of satisfactory sales
Market share maximisation	Achievement of a satisfactory market share
Market share increase	Cost coverage
Return on investment	Return on assets
Coverage of the existing capacity	Liquidity maintenance and achievement
Price differentiation	Service quality leadership
Satisfaction of distributors' needs	Creation of prestige image for the company
Price stability in the market	Avoidance of a price war
Sales stability in the market	Market development
Discouragement of new competitors' entering into the market	Price similarity with competitors
Maintenance of existing customers	Satisfaction of customers' needs
Determination of "fair" prices for customers	Attraction of new customers
Long-term survival	Achievement of social goals

(Avlonitis & Indounas, 2005:48)

2.5 DEMAND, SUPPLY AND PRICES

2.5.1 Demand and prices

2.5.1.1 The concept of demand

Before the concept of demand can be discussed there must be a clear understanding of the term, quantity demanded. Quantity demanded refers to the number of products/services that a given individual or group of individuals will choose to consume at a given price (Landsburg, 2002:2).

There are numerous definitions for demand. Machado (2005:32) defines demand as "the quantity of a product that will be sold in the market at various prices for a specific period of time." Whereas Pape (2000:94) maintains that demand encapsulates the desire and the ability of customers to buy a product/service. Colander (2010:85) explains demand as a schedule of quantities of a product/service that will be bought per unit of time at various prices, other things remaining constant.

These definitions clearly indicate the relationship between quantity and demand. The relationship between quantity and demand forms the foundation for the law of demand. The law of demand for a product/service states that there is an inverse relationship between quantity demanded and the price, which means that the demand will be higher if the price is lower, and the demand will be lower if the price is higher (Pape, 2000:95) (Colander, 2010:84).

2.5.1.2 The demand curve

The relationship between the demand for a product/service and the price can be graphically expressed in terms of the demand curve. Landsburg (2002:3) explains that the demand curve is a graph of the quantity of a product/service that is

expected to be sold at various prices during a specific time period. The demand curve usually slopes downwards from left to right because of the demand law that maintains that the lower the prices of a product/service the higher the demand for the product/service (Pape, 2000:100) (Colander, 2010:84). It should however be noted that there are different types of demand and not all demand curves are downward-sloping curves (Machado, 2005:35).

An illustration of a demand curve follows:

Figure 2.4: The demand curve
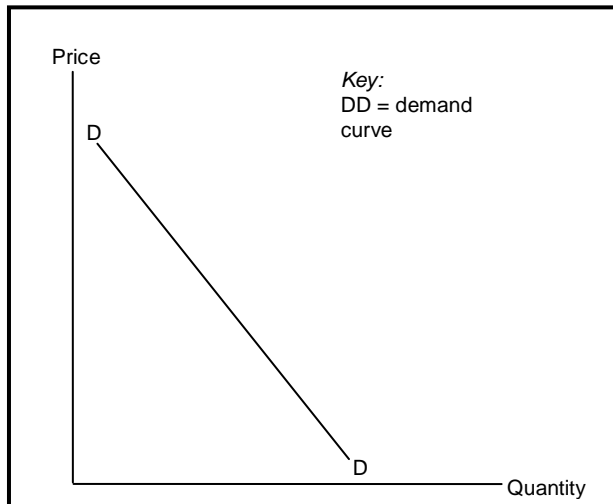
(Pape, 2000:99)

A change in price leads to a change in the quantity demanded, which will lead to movements along the existing demand curve (Landsburg, 2002:2). The movement along the demand curve can be either a contraction, when the quantity demanded is falling and prices are higher, or an extension, when the demand is rising and prices are lower. Figure 2.5 illustrates the effect of a change in price on the quantity demanded for a particular product/service. The figure illustrates clearly that at price P_1 a quantity of Q_1 is demanded. A price increase of the product/service to P_2 will result in a contraction of the demand to a quantity of Q_2.

Conversely, a price decrease to P_3 will result in an extension in the quantity demand to Q_3 (Mulhearn & Vane, 1999:28).

Figure 2.5: The effect of a change in price on the quantity demanded of a particular product/service
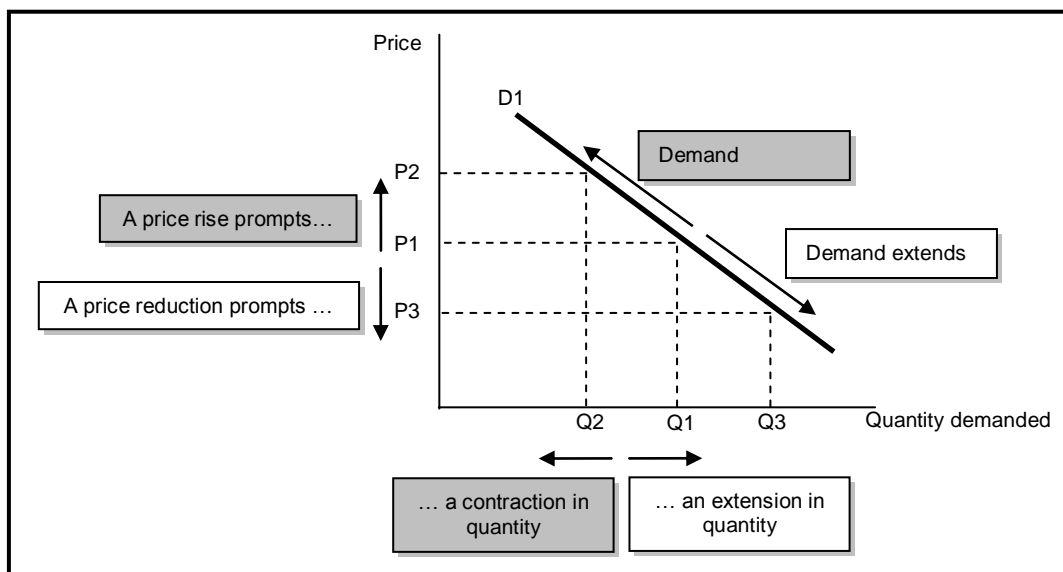
(Mulhearn & Vane, 1999:28)

There are a number of factors, other than price, that can affect the quantity demanded for a product/service. Grant (2004:1) and Colander (2010:86) analyse these factors as follows:

- Changes in consumer incomes. A change in the income of consumers will affect the demand curve. If the income of consumers increases, the demand for a product/service will also increase.
- Change in the price of substitutes and complementary products/services. Some products/services have substitutes. In general the price of substitutes and complementary products/services affect the demand negatively of the given product/service.

- Changes in preference or taste. Consumers' tastes or preferences change constantly as new styles or new products/services enter the market.
- Changes in consumers' expectations. Consumers also increase or decrease their demand with changes in expectations. If it is expected that the price of a product/service is about to increase in the near future, the demand is likely to increase.

Figure 2.6 illustrates the effect of a change in income (or any of the other factors discussed) on the quantity demanded for a normal product/service.

Figure 2.6: The effect of a change in income on the demand for a normal product/service
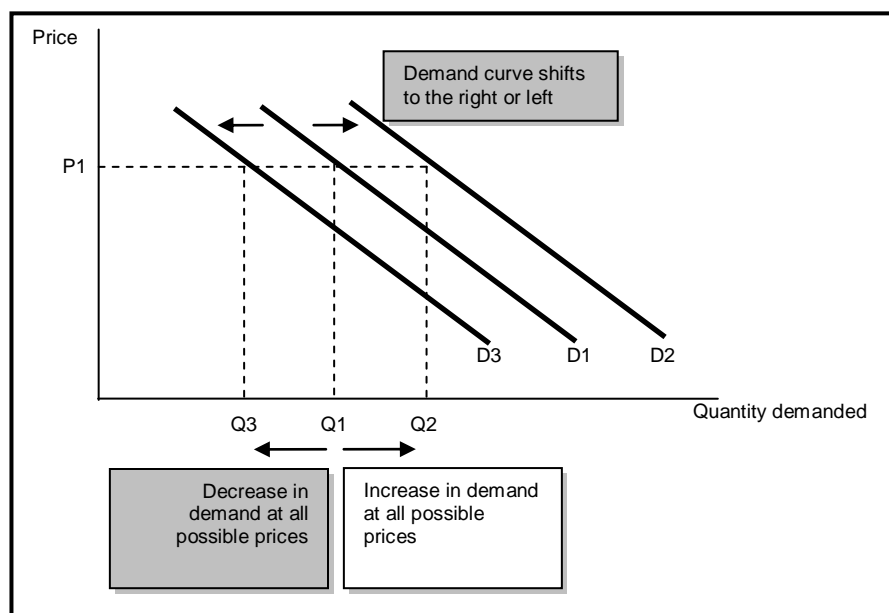
(Mulhearn & Vane, 1999:29)

In figure 2.6 the demand curve, D_1, represents the relationship between the quantity demanded and the price at an initial level of customers' income. As the income of customers increases, the demand for a product/service will also increase regardless of the price level, P_1. The price, P_1, remains constant. The

demand curve now shifts from left to right, from D_1 to D_2 and the quantity demanded shifts from Q_1 to Q_2. A drop in customers' income will lead to a leftward shift in the demand curve from D_1 to D_3, and the quantity demanded will shift to Q_3. The price, however, remains at the same level, P_1 (Mulhearn & Vane, 1999:29).

2.5.1.3 Demand forecasting

Demand forecasting refers to the ability to forecast what the demand for a product/service will be across the customer base of an organisation (Loudin, 2000:34). Estimating the demand is one of the most difficult but important aspects of management, because this is an integral requirement for both strategic and tactical planning decisions (Brennan, 2004:1).

Demand forecasting can be done on a weekly or monthly basis, depending on the type of organisation and begins with the integration and collaboration of the finance, marketing, sales, and production departments in terms of their respective forecasting methods, technologies and agendas (Hennel, 2002:9).

Demand forecasting methods can be classified by two dimensions namely: the degree of objectivity, where a distinction is made between subjective and objective forecasting methods, and the extent of the analytical nature of the approach, where a distinction is made between heuristic and analytical methods (Lambin, 2000:326).

Demand forecasting methods, according to Lambin (2000:326), can be classified into the following four categories:

- *Subjective methods*: The process used for forecasting is not explicit and is inseparable from the person doing the forecast. These methods are qualitative in nature.

- *Objective methods*: Forecasting is clearly defined and can be reproduced by other people. Objective methods are quantitative in nature.
- *Analytical methods*: In this forecasting method the explanatory factors of demand are identified, and the probable values for these factors are predictable.
- *Heuristic methods*: The forecast is based on rule of thumb or extrapolation of historical facts.

Figure 2.7 illustrates the four categories of demand forecasting methods.

Figure 2.7: Demand forecasting methods
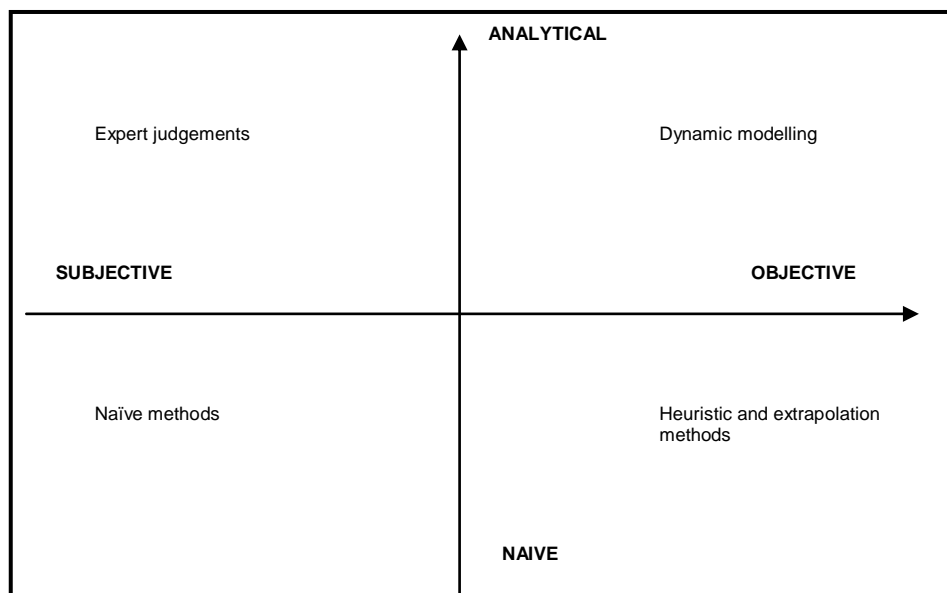
(Lambin, 2000:327)

There are numerous methods available in each category to forecast demand, and the following are just some of the approaches as discussed by Palmer (2005:207) and Whitwell *et al.* (2003:299).

- Trend extrapolation. In trend extrapolation, an organisation will identify the historic and long-term trends in the demand for a product/service. When the underlying variable in the demand changes, it is identified and analysed to predict future changes in demand.

- Expert judgements. The Delphi method is one of the structured methods of gaining the opinion of experts. A scenario about the future is compiled by an organisation and posted to a number of experts that are, preferably, from outside of the organisation. The experts discuss and analyse the scenario handed to them, and make recommendations to the organisation. This process may run a number of times before the final scenario is arrived at.

- Scenario-building. Scenario- building is an attempt to predict the future by building a small number of alternative scenarios each based on different assumptions. An analysis of the different scenarios can assist the organisation to predict the most likely outcome and plan accordingly.

2.5.2 Supply and prices

2.5.2.1 The concept of supply

Supply can be defined as the quantity of a product/service that producers are willing and able to supply at each possible price during a certain period (Mohr *et al.* 2000:185) (Levin & Bantjes, 2005:76). The law of supply states that there is a direct relationship between the price of a product/service and the amount of the product/service that will be supplied. Therefore, if the price of a product/service increases, the quantity supplied will also increase, and if the price of a product/service decreases the quantity supplied will also decrease (McConnell & Brue, 2008:50) (Colander, 2010:90).

Gwartney *et al*. (2003:72) and Levin & Bantjes (2005:76) identified the following factors that will determine the quantity of a product/ service that will be supplied by the producers:

- The price that consumers are willing to pay for the product/service.
- The price that consumers are willing to pay for other products/services.
- The price of producing/providing the products/services.
- The changes in the current level of technology.
- The production/service technique that is used.
- Resource (input) prices.
- Elements of nature, such as the weather, or political disruptions.
- The number of organisations in the market.

2.5.2.2 The supply curve

The relationship between the supply of a product/service and the price can be graphically expressed in terms of the supply curve. Levin & Bantjes (2005:77) explain that the supply curve is a graph that shows the quantity of a product/service that suppliers are willing and able to supply at different prices, during a specific time period. The supply curve usually slopes upwards from left to right, because the supply law maintains that the quantity of a product/service will increase as the price of the product/service increases (Muradzikwa *et al*. 2004:101) (Colander, 2010:91). Figure 2.8 illustrates the supply curve.

Figure 2.8: The supply curve
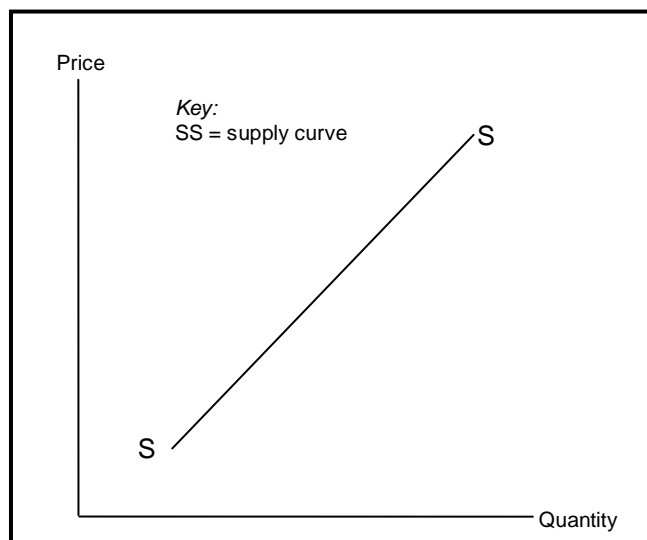
(Pape, 2000:99)

Changes in the price of a product/service will result in movements along the supply curve. These movements are referred to as contractions and extensions and are illustrated in figure 2.9 below. At price P_1 producers are willing to supply a quantity of Q_1. A price increase of the product/service to P_2 will result in an extension in the quantity supplied to Q_2. Conversely, a price decrease to P_3 will result in a contraction in the quantity supplied to Q_3.

Figure 2.9: The effect of a change in price on the quantity supplied of a particular product/service
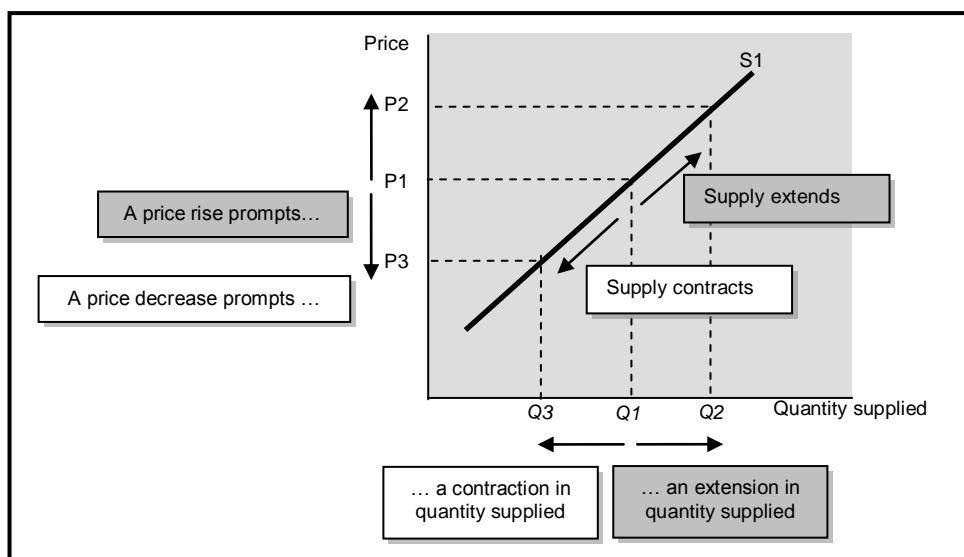
(Mulhearn & Vane, 1999:31)

2.5.3 The equilibrium price

Landsburg (2002:733) refers to the equilibrium price as the price at which demand and supply are equal. At the equilibrium there is thus no surplus or shortage in the supply of the product/service.

The equilibrium price can be determined by applying a mathematical equation, or it can also be graphically determined. Shone (2001:31-33) explains that the mathematical equation for the equilibrium condition can be written as:

$q = qd = qs$
$qd(t) = a - bp(t)$
$qs(t) = c + dp(t-1)$

Where:

q = equilibrium point.

qd = quantity demanded.

qs = quantity supplied.

a = the vertical intercept of the demand curve.

b = the slope of the demand curve.

c = the vertical intercept of the supply curve.

d = the slope in the supply curve.

p = equilibrium price.

t = period.

The equilibrium price can be graphically determined as illustrated in figure 2.10.

Figure 2.10: The equilibrium price
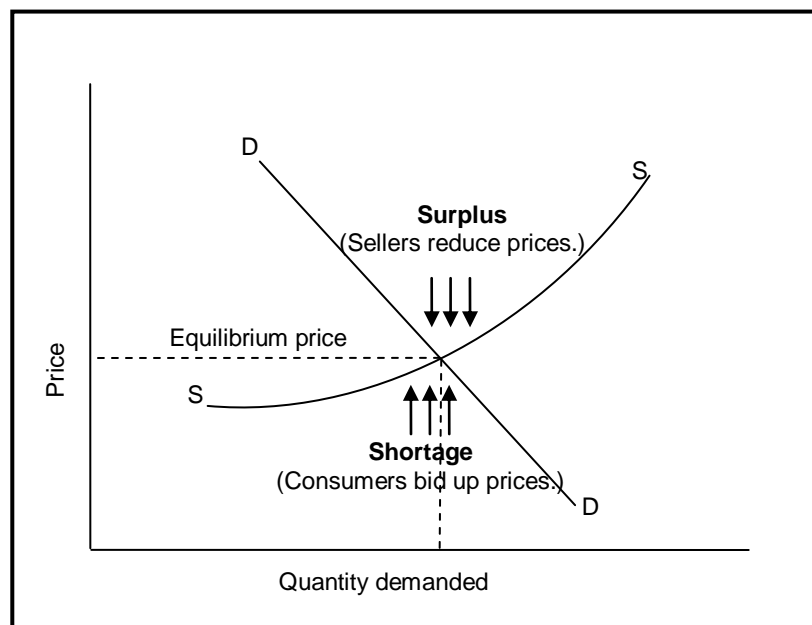
(Machado, 2005:35) (Colander, 2010:97)

Figure 2.10 clearly illustrates that if the supply (S) exceeds the demand (D) (excess supply) there is a surplus of the product/service in the market and this will exert pressure on the suppliers to reduce prices. If the demand exceeds the supply (excess demand) there is a shortage of the product/service in the market that leads to higher prices for the product/service (Mulhearn & Vane, 1999:34).

2.5.4 Price elasticity

The concept of price elasticity can help managers of organisations to understand consumer responses to the pricing structures set in particular markets, and to forecast the size of surpluses or shortages caused by price floors and price ceilings. Price elasticity can also help managers to analyse the changes in demand caused by changes in income, or changes in the prices of other products/services (Mulhearn & Vane, 1999:63).

According to Whitwell *et al.* (2003:297) and Saxena (2009:320) the elasticity of demand measures the change in the quantity demanded, which is the result of a change in price. The concept of elasticity, therefore, describes how sensitive demand is to changes in price.

For most products/services a decrease in the price of the product/service will cause an increase in the quantity demanded, while an increase in the price will lead to a decrease in the quantity demanded for the product/service. If a percentage change in the price produces a greater percentage change in demand, the demand is elastic, and can be called a price-elastic demand. If the demand is not very responsive to price changes it will be termed a price-inelastic demand (McDonald & Payne, 2006:209).

According to Machado (2005:37) and Colander (2010:154) price elasticity (E) of demand can be calculated as follows:

Percentage of change in quantity demanded for a product/service
Percentage of change in the price of a product/service

In terms of price elasticity the following generalisations can be made:

- If E > 1, demand is elastic.

- If E < 1, demand is inelastic.

- If E = 1, demand is unitary.

   (Machado, 2005:37) (Colander, 2010:155)

In the assessment of the price elasticity of demand the following factors should be considered:

- *Availability of substitutes.*   The more substitutes for a product/service available, the greater the price elasticity.

- *Other uses for the product/service*. The more uses a product/service has, the greater the price elasticity.

- *Price is relative to purchasing power*. If the ratio between the price of the product/service and the income of the customer is high, the price elasticity will be greater.

   (Lamb *et al.* 2001:503) (Du Plessis *et al.* 2001:347)

2.6 COST DETERMINATION

The role of cost in pricing, and the determination of the costs of a product/service are discussed in chapter three.

2.7 THE PRICING ENVIRONMENT

A whole set of complex factors affects the pricing decision. When developing pricing strategies, analysing factors that are internal to the organisation, as well as

factors that are external to the organisation's operations should be done (Forman & Hunt, 2005:133).

The factors that affect the pricing decision are illustrated in figure 2.11.

Figure 2.11: Factors affecting the pricing decision
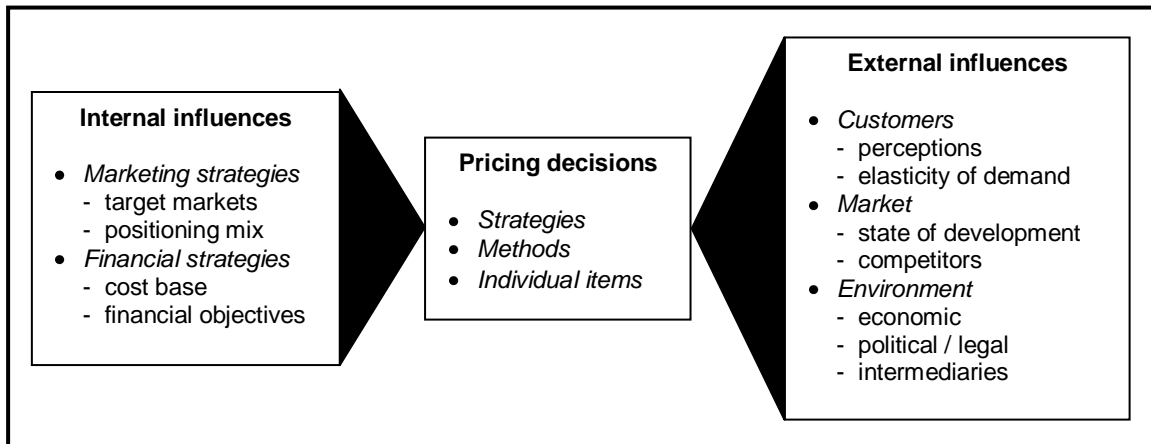
(Stokes, 2002:219)

The following is a concise discussion of the factors affecting the pricing decision by Stokes (2002:219), Mullins *et al.* (2008:272) and Saxena (2009:319).

2.7.1 Internal factors

As depicted in figure 2.11 the internal factors comprise the marketing and financial strategies of an organisation.

Marketing strategies include the selection of target markets, the positioning of the product/service in the market, and the design of a strategic marketing mix that will enable the organisation to achieve its marketing goals.

Financial strategies are about the cost base, and the financial objectives of an organisation.   The financial objectives affect the cost base for providing products/services, as well as the expected returns on these products/services.

Pitt (2002:165) and McDonald & Payne (2006:208) are of the opinion that pricing is often the subject of conflict between the marketing, and the financial departments, because each of these departments has to have a strategy.   The accountant is concerned about covering the costs, while the marketer is more concerned about the market share even if it means reducing prices.   However, if their respective roles are appropriately defined, the possibility exists for marketing and finance to work together towards profitability through strategic pricing.

2.7.2 External factors

Figure 2.11 illustrates external factors, which are comprised of customers, competition, and the environment of the organisation.

Customers are a key parameter affecting the pricing decision. Customers influence the pricing decision by their perceptions of quality and value. How the customers perceive the value of a product/service may also impact on the demand for the product/service.   The demand for a product/service sets the maximum price that can be charged for a product/service (paragraph 2.2.4).

Market influences addresses the development in the market including competition. Competition in the market is an important factor in determining the price of a product/service, and it is of utmost importance to understand the cost as well as the pricing behaviour of competitors.   The various positions of the competitors concerning profitability, cost position, and market share have to be considered when making a pricing decision.

Other external environmental influences, such as the state of the economy, taxes, legal, and ethical issues, can also impact on the pricing decision of an organisation.

2.8 PRICING STRATEGIES

Pricing is critical to any retail and service organisation, and the wrong pricing strategy can be fatal as it can destroy an organisation's value more and faster than any other business mistake (Florissen *et al.* 2001:1). A successful and strong pricing strategy, on the other hand, is able to maintain a clear and consistent value proposition in the mind of customers over time, and can also lead to improved margins (McKenzie, 2006:11).

Palmer (2000:4) describes strategy "as the means by which an organisation seeks to achieve its objectives". The formulation of a pricing strategy must, therefore, be based on a clear understanding of an organisation's objectives otherwise the value of any pricing strategy may be in question (Myers, 2004:591). Pricing strategies must also take into consideration the type of organisation because pricing strategies may vary between organisations in the same type of business (Wichmann & Clark, 2006:72).

A variety of different pricing strategies have been formulated by marketing academics, but the feasibility of any pricing strategy depends on:

- The characteristics of the environment;
- The general marketing strategy of an organisation; and
- The pricing objectives of an organisation.
  (Hollensen, 2006:191) (Saxena, 2009:326)

The formulation of a pricing strategy starts by setting pricing objectives that are in line with the overall objectives of an organisation. The next step in the

development of a pricing strategy is the analysis of the pricing situation in terms of the strength of demand, costs of the organisation, the strength of competitors, and legal and ethical factors. These analyses will give an indication of the flexibility in the pricing of a new product/service, or changing the pricing strategy of an existing product/service. Once the analyses of the pricing situation are done, and the pricing objectives are set, the pricing strategy can be selected and finally be implemented through the development of pricing policies. Pricing policies include the operating guidelines for the pricing function in an organisation and serve as the basis for managing the pricing strategy. The pricing policies may be in written form, but many organisations operate without formal written pricing policies (Cravens & Piercy, 2006:333).

Organisations can adopt one of three generic types of pricing strategies for new products/services, namely price skimming, penetration pricing, and trail pricing.

- *Price skimming strategy.* This is a higher price strategy, with the objective of achieving an early breakeven point in order to maximise profits at an early stage (Saxena, 2009:327)*.* Gebhardt (2006:242) defines price skimming as charging the highest possible price for a newly launched product/service, on the basis of the uniqueness of the product/service, and thereafter reducing the price over time to attract the next segment of customers. This process can be repeated until all potential markets are satisfied (Stokes, 2002:231). In addition Jobber & Fahy (2006:233) maintain that the price skimming strategy is most suitable where customers are the least price sensitive because the product/service provides high value to customers, customers have the means to pay the price, and customers need to buy the product/service.

  Stokes (2002:233) describes the main advantages of price skimming strategies as delivering a fast payback of the investment in the new product/service; obtaining high profits while there is little competition, and

the additional reward of being able to reduce prices gradually over time. The main disadvantage of price skimming strategies is that they may encourage new entrants to the market and, thereby, increase competition. Another disadvantage may be that this strategy may limit sales potential.

- *Penetrating price strategy*. This is a lower price strategy with the objective of attaining a share of the market, or of penetrating the market (Saxena, 2009:327). Hall (2005:31) explains that during penetrating pricing, the price of the product/service is set deliberately low in an attempt to gain a large share of the market. Once the required market share has been gained, prices are gradually increased to maintain an adequate profit margin. The objective of penetrating pricing is, therefore, to penetrate the market as thoroughly as possible, at the highest level of sales (Jain, 2004:421).

  Penetrating pricing is most suitable for organisations that have goals for dominating the market, and creating a barrier to prevent competitors from entering the market. Other organisations, that have as key marketing goals the rapid adoption and awareness of a new product/service, will find penetrating pricing a suitable approach to adopt (Jobber & Fahy, 2006:202). The main advantages of penetrating pricing, according to Stokes (2002:235) are: a fast growth in sales; wide product awareness, and a strong market position. The main disadvantages of this strategy are reduced profits because of lower prices, and the difficulty of eventually increasing prices.

- *Trail pricing strategy.* With trail pricing a new product/service carries a low price for a limited period of time in order to limit the risk for the customer. The idea with trail pricing is to win the acceptance of the customer. Trail pricing can be an alternative to free samples or services (Solomon & Stuart, 2000:359).

Pricing strategies need to be translated into methodologies for setting prices. There are many methods and techniques available for the calculation of prices. The following is a brief description of some common pricing methods. These methods will be discussed fully in chapter four.

- *Cost-based pricing strategies.* Miller & Layton (2000:360) and Dibb & Simkin (2001:153) explain that in cost-based pricing the costs of a product/service is the starting point in price setting. Once the cost of the product/service has been determined, a percentage mark-up is added to the cost to arrive at the final selling price. Cost-based pricing is therefore product/service driven.

- *Demand-based pricing strategies / Customer-based pricing strategies.* The customer is the frame of reference for this pricing strategy. Customer-based pricing uses the customer's perceived value as the starting point in price setting, and the main objective is therefore to determine how much the customer is willing to pay for the product/service (Zeithaml *et a*l. 2006:523) (Saxena, 2009:325).

- *Competition-based pricing strategies.* The competition is the frame of reference in competition-based pricing. This strategy considers competitors' prices primarily (Mullins *et al*. 2008:283). Miller & Layton (2000:368) explain that costs may set the minimum price for a product/ service, and customers' demand reflects the maximum price that can be charged, while the competitors' prices set the price somewhere between the maximum and minimum price of a product/service.

2.9 PRICING TACTICS

Once the price of a product/service has been determined, an organisation may use fine-tuning tactics that allow the organisation to adjust the price according to competition in certain markets, to meet government regulations, to take advantage of unique demand situations, and to meet promotional and positioning techniques

(Lamb *et al.* 2001:516). As most of the tactics will not be applicable to higher education institutions only a brief overview of these tactics will be given to complete the discussion on pricing.

Fine-tuning pricing tactics include discounts and allowances, geographic pricing, and special pricing tactics.

- *Discounts and allowances*. The normal selling price of a product/service can be reduced through the use of discounts and allowances. The most common discount and allowance tactics are: quantity discounts, cash discounts, trade discounts, seasonal discounts, and promotional allowance (Stauble, 2000:293).
- *Geographic pricing*. Geographic pricing involves the pricing of a product to customers in different locations, regions, or countries and establishes the impact of freight costs on the price of a product to distant customers. The following are the most common methods of geographic pricing: Free on board, uniform delivered pricing, zone pricing, freight absorption pricing, and basing-point pricing (Stauble, 2000:294).
- *Special pricing tactics*. The following are special pricing tactics that may be used by organisations:

  ➢ Single-price tactic. A pricing tactic that offers all products/services at the same price to all customers (Lamb *et al.* 2001:518).
  ➢ Flexible pricing tactic. In flexible pricing various customers pay different prices for essentially the same product/service (Jain, 2004:442).
  ➢ Leader pricing. This is an attempt by an organisation to attract customers by selling a product/service near or even below the cost price of the product/service with the expectation that the customers will buy other products once they are in the store (Lamb *et al.* 2001:544).

➢ Odd-pricing. Is a pricing tactic that prices a product/service at a price just below the exact rand amount to make customers perceive that it is a lower price and, therefore, a bargain (Zeithaml *et al.* 2006:532).

➢ Price bundling. The pricing of products/services as a package rather than individually, for a special price (Zeithaml *et al.* 2006:536).

2.10 LEGAL AND ETHICAL ISSUES IN PRICING

2.10.1 Legal issues in pricing

When making pricing decisions organisations must also adhere to the laws and regulations set by the various levels of government. An organisation is therefore not always free to set any price for its products/services because of the legal issues in pricing (Langfield-Smith *et al.* 2003:947).

Throughout the world there are a wide variety of laws prohibiting business practices that involve the abuse of price. The focus of this legislation is on fair trade, competition, and consumer protection. The Department of Trade and Industry (DTI) outlines the following legislations and regulations in this regard:

- Competition Act 89 of 1998.
- Competition Second Amendment Act 39 of 2000.
- Consumer affairs (unfair business practices) Act 71 of 1988.
- Credit Agreement Act 75 of 1980.
- Expropriation (establishment of undertakings) Act 39 of1951.
- National Supplies Procurement Act 89 of 1970.
- Sale and Service matters Act 25 of 1964.

(The Department of Trade and Industry: Fair trade, competition and consumer protection)

Using the price of a product/service to restrain competition is prominent amongst the abuses of price. The Competition Act 89 of 1998 contains provisions placing restrictions on a wide range of activities, including pricing.   This Act particular prohibits the following pricing approaches:

- Predatory pricing. This occurs when an organisation reduces the price of a product/service to such a low level that a competitor is forced out of the market. Once the competition has disappeared the organisation raises the price again (Baker, 2006:289).
- Price discrimination. This occurs when an organisation sets diverse prices, discounts, or payment terms for various customers for the same products/services without a primary cost basis for the discrimination. Price discrimination is demand motivated, and not cost motivated (Baker, 2006:189).
- Price fixing. Price fixing occurs when competitors agree to fix, control, and maintain the prices of products/services (Miller & Layton, 2000:404).
- Resale price maintenance.   This pricing practice refers to restrictive agreements between manufacturers and the resellers of their products. Resale price maintenance is the pricing approach where a supplier sets the minimum price for a product/service to be resold to a buyer by retailers or wholesalers (Miller & Layton, 2000:404).

In addition to the legislation on competition there are many legal constraints on consumer pricing, such as government regulations that specify the manner in which price information is communicated to potential customers, and there is legislation that will protect consumers from being misled by artificial prices when an organisation sets high prices for a short period, and then reduces them to the normal price. This pricing practice is called deceptive pricing (Jobber & Fahy, 2006:209).

Other legal factors that have a direct impact on the pricing policies of organisations include value-added tax, and price controls. An increase in value-added tax will usually lower overall demand, and government-regulated parastatals need to work closely with the government for price setting. Factors with an indirect impact on pricing decisions are, for instance, interest rates and inflation (Kotabe & Helsen, 2004:392). These factors affect the product costs, and therefore have an impact on price.

2.10.2 Ethical issues in pricing

The Collins English Dictionary (2000:530/1010) defines ethics as "the moral fitness of a decision, course of action etc." and moral as "concerned with or relating to human behaviour, esp. the distinction between good and bad or right and wrong behaviour". The concept of ethics in business has developed over the years and managers of organisations now recognise that if the ethics of an organisation are of the highest quality, this is the best investment that an organisation can possibly make (Hall, 2002:18).

Sele (2006:102) and Dibb & Simkin (2001:242) suggest that organisations should have practical guidelines to operationalise their ethical principles and codes. The principles and codes should support the decisions with ethical implications, such as pricing. But codes, principles, and rules do not guarantee that decision makers will adhere to them. To ensure that decision makers adhere to the ethical principles and codes of organisations, top management has to present the ethical topic as a serious and credible matter, and adopt and incorporate the role of moral leaders in the organisation.

The following are some of the ethically problematic fields in pricing:

The fair determination of prices is one of very sensitive points in international marketing strategies, and the central question is: At what point is a price fair for

the buyer and the seller (Sele, 2006:100)? This is however a difficult question to answer. One of the pricing objectives in an organisation is normally the maximisation of profits that may result in higher or lower selling prices. Higher selling prices can suggest that an organisation is making more money than is reasonable, while low prices may suggest low value and that the organisation just wants to get rid of the goods and, therefore, is passing them on to customers.

O'Leary (2001:142) and Sele (2006:95) include price fixing, price differentiations, deceptive pricing, predatory pricing, product dumping, and the disclosure of full price as problematic fields in ethical pricing.

2.11 PRICING ERRORS AND PRACTICES

Feldman (2002:14) maintains that pricing is the most important element of the marketing mix because it can affect the profitability of organisations, but pricing is complex and is often seen as the difficult area in the marketing mix in which to set objectives, and measure results. As a result of these challenges many organisations develop their pricing strategies and tactics naively, and therefore do not get the results that they expect.

Below is a review of some of the most common mistakes that organisations make when pricing a product/service, as explained by Hall (2006:8) and Monroe & Cox (2001:42-46):

- Many organisations do not have a serious pricing strategy, and do not conduct research to develop the pricing strategy. This indicates that there is not really a pricing system in place. Ogilvy in Cram (2006:4) is of the opinion that "pricing is just guesswork", that pricing is poorly managed, and that marketers do not use scientific methods when determining the price of a product/service. The fact is that an effective pricing strategy, based on pricing research, should be formulated and integrated into the corporate

strategy, and it should be recognised as one of the main determinants of shareholder value (Lester, 2002:1). The value of a pricing strategy is questionable if it is not congruent with the overall strategy of the organisation (Myers, 2004:591). Lancioni *et al.* (2005:123) are of the opinion that managers should examine how pricing is done in their organisations, and develop an overall pricing plan which is supported by all departments in an organisation.

- Price setting does not require continuous managerial attention between annual reviews. The truth is that pricing is a continuous process. Davidson & Simonetto (2005:25) maintain that pricing is a moving target because of the changes in the markets, particularly in highly competitive markets. Shipley & Jobber (2001:301) also claim that pricing is not a once-off decision, but is an activity that has to be repeated when market and organisation conditions vary.

- Misconceptions about buyers and their perception of price. Customers' responses to price are based on much more than rational calculation. Cram (2006:11) believes that customers trade money for more than simply a product/service. They buy a combination of the product/service performance as well as an emotional association. Failing to consider the complex underlying emotional and psychological dimensions of price can lead to several errors, such as believing that customers do not evaluate price comparatively. The concept of 'reference price' supports the fact that customers evaluate prices comparatively. The reference price is the price that customers have in mind, and that is based on their past experiences. They refer to the reference price, when evaluating the price of a product/ service in the market place.

- Letting the customer dictate the price is another common mistake that organisations make. They will do whatever it takes to get the customer's business. The rationale behind this mistake is that the organisation will use this approach to establish the product/service, and then raise prices to a more reasonable rate. The truth is that a pricing system should be fair and

logical, and should allow for ample business while securing what is important, namely profit.

- There is just one acceptable price for a product/service. There are, however, variations of acceptable price levels or ranges in existence. The acceptable price will vary between the upper and lower limits of the price range. The upper and lower limits of the price range are not constant, and they shift as customers obtain more information about the actual price range of the product/service in the market.

- Basing prices only on what the competitor is charging. In this situation, organisations set prices primarily by reference to other players in the market. The assumption is that the products/services of the organisation are identical to that of the competitors, with price as the only basis of choice. Adopting this assumption disregards differentiation, and ignores the value created for the customer (Cram, 2006:25).

- The way price information is communicated cannot change customers' preferences between products/services. Anderson & Simester (2003:96) claim that customers do not have an accurate sense of what the price of a product/service should be, and that they rely on the organisation to tell them whether they are getting a good price. There are many pricing cues that an organisation can use to communicate price such as numbering, signalling, and price guarantees. The effective communication of price can build trust with customers, and can influence preferences and choices.

2.12 SUMMARY

Pricing is a critically important management activity in an organisation as it impacts on the revenue and therefore also on the profits of an organisation. The pricing of a product/service is however a highly complex activity but can successfully be managed through the implementation of a comprehensive pricing plan. Because of the complexity of the pricing function, many researchers, as

explained previously, believe that pricing is one of the most neglected and poorly managed areas in an organisation.

A summary of the key issues addressed in this chapter follows:

- Pricing management is part of the marketing strategy of an organisation.
- Pricing is important because it is the key to revenues, and revenues are the key to the profits of an organisation.
- The conceptual approach to pricing indicates that the cost of a product/service sets the price floor, while the customers' perception of value sets the price ceiling.
- To set, manage and control the price of a product/service, an organisation needs a pricing plan.
- The pricing objectives and strategies should be in line with the overall objectives of an organisation. Several internal and external factors should be taken into account when selecting a pricing strategy.
- Demand, supply and prices. Prices cause adjustments for each product/service concerning the quantity demanded and supplied. The law of demand states that there is an inverse relationship between changes in price, and the changes in the quantity demanded. The law of supply states that there is a positive relationship between changes in price and changes in the quantity supplied. For any given set of demand and supply curves, there is one equilibrium position where price, the quantity demanded, and the quantity supplied are in balance. It is important for the managers of an organisation to understand how customers and suppliers respond to price changes as this may affect the demand and supply for a product/service, and eventually impact on sales volume and revenue.
- There are a number of legal and ethical issues involved in pricing, such as price fixing, predatory pricing, deceptive pricing, and price discrimination.
- Pricing decisions are complicated and difficult. The discussion of the general pricing errors, and pricing practices by organisations clearly states

that for pricing to be effective, a pricing strategy based on pricing research should be incorporated in the overall strategy of an organisation. Managers need to understand customers' perceptions of price and the effect of price changes on demand and supply and, finally, they must recognise that pricing is a continuous process and not a once-off decision.

The next chapter will explore the role of costs in pricing.

CHAPTER 3

THE ROLE OF COSTS IN PRICING

3.1 INTRODUCTION

Chapter two introduces the pricing function in an organisation with regards to pricing principles, practices and strategies. In this chapter the focus is on the role of costs in pricing.

The costs of a product/service are central considerations in pricing decisions as these set the floor, which is the lower or minimum level of the pricing discretion of an organisation (Monroe, 1990:157). The price of the product/service should therefore at least cover the costs of the product/service otherwise the organisation will go out of business.

Many pricing strategies and related product/service decisions are based on cost consideration. Hollensen (2006:191) agrees with this statement, and states that the most widely used methods of price setting are based on costs, such as the cost-plus or full-cost method. Cravens & Piercy (2006:324) and Dyke (2000:19) also hold the opinion that effective pricing is not possible without a clear understanding of cost concepts, the cost composition, the cost structure and the cost behaviour of the product/service.

3.1.1 Goal of the chapter

The purpose of this chapter is to examine the role of costs in pricing. The focus areas for the discussion will be on the importance of costs in pricing, the nature of costs, cost determination, and cost management.

3.1.2 Layout of the chapter

The following is an outline of chapter three. The numbers in the presentation correspond with the paragraph numbers used in the chapter.

3.2 THE NATURE OF COSTS

3.2.1 Cost concepts and terminology

Managers rely on accounting and managerial reports and statements to provide useful cost information to support decision making. These reports and statements contain a variety of cost concepts and cost terms. A common understanding of the meaning of these cost concepts and terms facilitate clear communication between managers and management accountants and, therefore, prevents the misuse of accounting and managerial information (Maher *et al.* 2006:4) (Vanderbeck, 2010:2).

Explanations of important cost concepts and terminology:

- What are *costs*? The term cost is used in many ways. Langfield-Smith *et al.* (2003:39) describe costs as "the resources given up to achieve a

particular objective and are measured in monetary terms". Warren *et al.* (2002:M5) refer to a cost as "a payment of cash or its equivalent or the commitment to pay cash in the future for the purpose of generating revenues". Neish & Banks (2003:722) explain costs as "given away some benefit in order to obtain some other thing of value".

Langfield-Smith *et al.* (2003:39) explain the difference between the terms costs and expenses as follows: costs are incurred to obtain benefits immediately, or are deferred to a future financial period. If the benefits extend beyond the current financial period, the costs will be classified as an asset. If the benefits from the costs are used in the current financial period, the costs become expenses. An *expense* is thus a cost used up in the generation of revenue. Expenses are matched against the revenue for the current period to calculate the profit or loss for the accounting period. Figure 3.1 illustrates the cost concept.

Figure 3.1: The cost concept
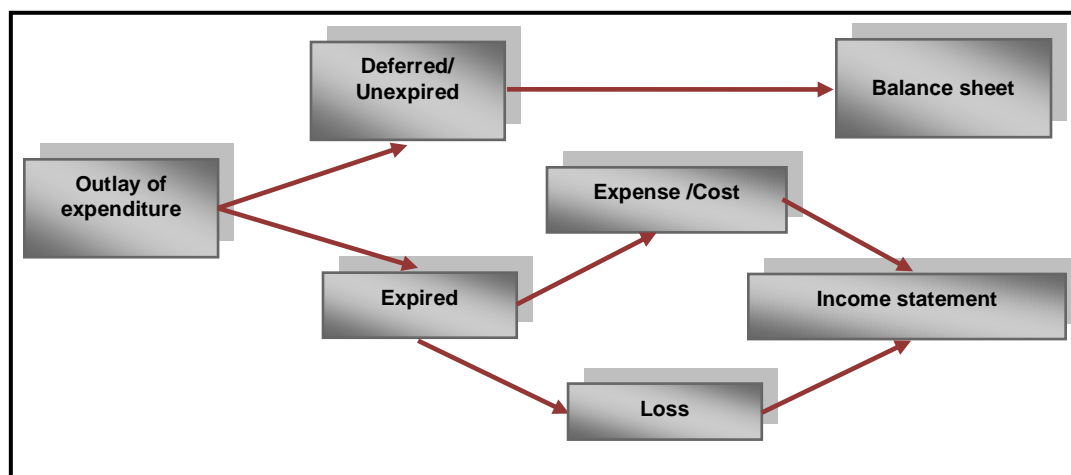
(Niemand *et al.* 2006:18)

- A *cost centre* is "a business segment whose manager has control over costs, but has no control over revenue or the use of investment funds" (Garrison & Noreen, 2000:579). Drury (2008:52) and Lucey (2002:11)

explain cost centres as production or service locations, a function or an activity in an organisation to which overhead costs are initially assigned.

- The costs accumulated in a cost centre are allocated to *cost objects*. Cost objects are products, services, or any other activity or object which costs must be measured (Niemand *et al*. 2006:27).

- A *cost pool* is the grouping of individual cost items (Horngren *et al*. 2003:837).

- A *cost driver* is any factor that affects total costs, meaning that a change in the level of the cost driver will result in a change of the total cost of an activity (Drury, 2008:596).

3.2.2 Cost classifications

Cost classification refers to the process of grouping together cost items which are similar. An accurate cost classification system is a vital prerequisite for any form of analysis and control, and for keeping track of all costs in detail, which will help to provide meaningful cost reports (Lucey, 2002:24).

Before costs are classified, management accountants must know how cost information will be used by managers. The same costs can be classified in a number of ways, depending on the intended use of the cost information. How costs will be used will thus dictate how they will be classified (Langfield-Smith *et al*. 2003:38).

The discussion on cost classifications will be based on the literature of Langfield-Smith *et al.* (2003:39). Costs can be classified according to:

a) *Behaviour*.   Cost behaviour indicates how costs will react to changes in the level of an activity in a business.   As the activity level increases or decreases the particular costs may also increase or decrease, or they can remain constant (Garrison & Noreen, 2000:57).   Costs are therefore either fixed or variable.

Fixed costs are those costs that remain unchanged as the volume changes within a business activity.   Fixed costs can be further divided into committed fixed costs and discretionary fixed costs.   Committed fixed costs are those fixed costs arising from an organisation's basic structure and facilities and cannot be changed in the short run.   Discretionary fixed costs results from management's decisions and can easily be changed in the short run (Langfield-Smith *et al.* 2003:39).

Variable costs are costs that change in total in direct proportion to changes in the volume within business activity levels (Langfield-Smith *et al.* 2003:39).

If a cost contains both variable and fixed elements it is referred to as a mixed cost, also called a semi-variable cost (Vanderbeck, 2010:170).

b) *Traceability.*   A cost can be classified under traceability, if the cost can be assigned to a cost object.   Costs can therefore be direct, if the cost can be traced to a specific cost object, or indirect, if the cost cannot be traced to a cost object in an economic manner (Drury, 2008:28).

c) *Controllability.*   Controllability refers to the degree of influence that a specific individual in an organisation has over costs.   Controllable costs include any cost that is primarily subject to the influence of a person for a given period, while uncontrollable costs refers to costs that no one can influence significantly (Neish & Banks, 2003:14).

d) *Value chain*. The value chain is a set of linked activities and provides a useful framework for examining the areas where costs are incurred in an organisation.

Upstream costs refer to all the costs involved in the development of new products or activities such as research and development costs. These costs also include the costs assigned to produced goods and are, thus, production costs. Downstream costs include all the costs in the last segment of the value chain and include marketing-, distribution- and customer service costs (Langfield-Smith *et al.* 2003:39).

e) *Manufacturing costs.* Manufacturing costs are all the costs associated with the production of goods, and include direct material, direct labour, and manufacturing overheads (Niemand *et al.* 2006:27).

f) *Timing of costs.* Cost classifications on the basis of the timing of costs are used to prepare statements for financial performance and financial position. Classification of costs according to timing includes product/service costs and period costs (Langfield-Smith *et al.* 2003:39). Product/service costs refer to the total amount of the costs assigned to a product/service. Period costs entail all costs that are not product/service costs, and which are associated with a given accounting period rather than with products produced or services rendered (Niemand *et al.* 2006:27).

3.3 COST DETERMINATION

The costs of a product/service can be determined in a number of ways. The following approaches to determining costs will be examined:

- Cost accounting.
- Statistical estimation.
- Simulation modelling.
   (Brinkman, 2000:11)

3.3.1 Cost accounting

Lucey (2002:1) defines cost accounting as: "the establishment of budgets, standard costs, and actual costs of operations, processes, activities or products; and the analysis of variances, profitability, or the social use of funds". Faul *et al.* (2001:6) identified the five distinctive activities in a cost accounting system as: cost determination, cost recording, cost analysis, cost management, and cost reporting. Neish & Banks (2003:3) add the following two characteristics of a cost accounting system: the provision of timely and relevant cost information for determining the costs of a product/service, and providing information for managerial decisions. To summarise, information that will be provided by cost accounting systems will include the cost per unit of a product, service or activity as well as the costs of running a section or department. Management can then use the information to make pricing decisions, in organisational planning, and in cost control etc.

In cost accounting the total cost of a cost object (product, service or activity) is determined by the total of the direct costs assigned to a cost object, which is called cost tracing, plus cost allocations that are the total indirect costs assigned to a cost object. The full cost of a product/service is therefore a combination of direct and indirect costs (Maher *et al.* 2006:33-35). Figure 3.2 illustrates the total costs of a product/service through cost tracing and cost allocations.

Figure 3.2: Cost tracing and cost allocations
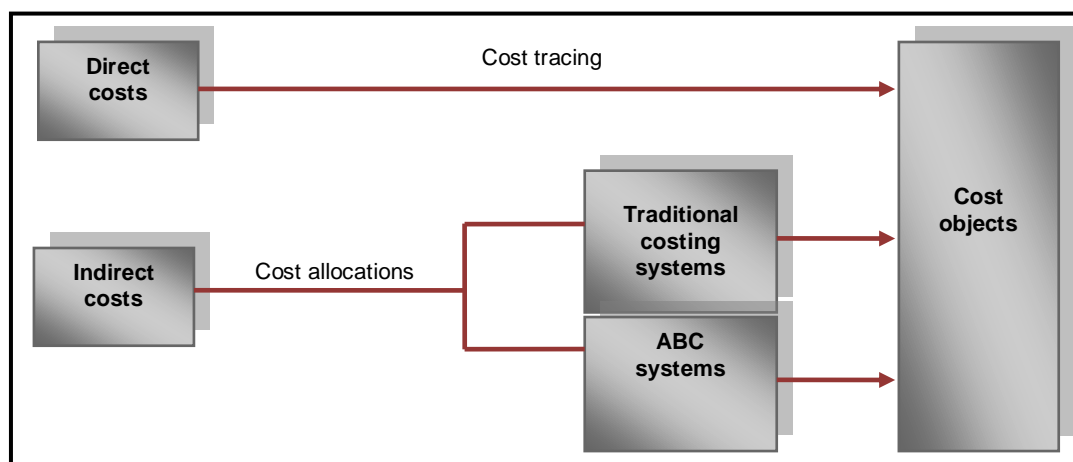
(Drury, 2008:48)

The cost accounting approach to determine costs often becomes complex because of the cost allocation process. Modell (2006:1) claims that the issue of cost allocations is one of the most debated topics in management accounting literature. In practice, cost allocation is a problem in almost every organisation because it can affect the total cost of a product/service and therefore also affect the price charged for the product/service (Jiambalvo, 2004:197). Cost allocations can thus lead to distorted product/service costs, and misleading information about the profitability of a department, product or service (Collier, 2003:159). Because of these problems, caused by cost allocations, it is necessary to have a closer look at cost allocations.

3.3.1.1 Cost allocations: Traditional costing systems

a) What is cost allocation, and what is the purpose of cost allocation?

Cost allocation is the assignment of indirect costs to a cost object (Warren *et al.* 2002:GL-2). Horngren *et al.* (2003:483) explain that the main purposes of cost allocation are: (i) to provide information for economic decisions such as the selling

price for a product/service; (ii) to motivate managers and employees, for example, to consume more or less of an organisation's resources; (iii) to justify costs or compute reimbursement; (iv) and to measure income and assets for reporting to external parties by using generally accepted accounting practices.

b) Cost allocation bases/cost drivers

To assign overhead costs to cost objects, a cost allocation basis, also called a cost driver, is needed. Warren *et al*. (2002:M12) explains that a cost allocation base is the measure used to allocate overhead costs to cost objects. This allocation base should reflect the consumption of the overhead costs by the cost object.

Jiambalvo (2004:193) identified the following four criteria to choose a cost allocation base for the allocation of overhead costs to cost objects: (i) Cause and effect: This criterion relates costs to the cost objects that caused the costs to be incurred, and resources to be consumed. (ii) Benefits received: This criterion for cost allocation allows for more costs to be allocated to the cost objects that benefit the most from the costs incurred. (iii) Ability to bear costs: Using this criterion, more costs will be allocated to cost objects that are more profitable, and can therefore bear more costs. (iv) Fairness of equity: The cost allocation under this criterion will result in allocations that are perceived to be fair and equitable.

The cost allocation bases can be volume-based or non-volume-based**.** Volume based cost drivers refer to measures of the volume of production, and include cost drivers such as units produced, direct labour hours, direct labour costs, direct material quantities or direct material costs. Non-volume-based cost drivers are cost drivers that are not directly related to production volume such as the number of employees (Langfield-Smith *et al*. 2003:312) (Neish & Banks, 2003:166).

c) The predetermined overhead allocation rate

Predetermined overhead allocation rates, based on cost drivers, are used to allocate overhead costs to the cost centres and cost objects. The predetermined overhead allocation rate is determined on a yearly basis, and can be calculated as the budgeted overhead costs divided by the budgeted level of the cost driver (Hilton *et al.* 2003:102).

The predetermined overhead allocation rate can be calculated as a business-wide rate, that is a single overhead rate for the whole organisation, or separate overhead rates can be calculated for each cost centre (Neish & Banks, 2003:169). Collier (2003:162) is of the opinion that a separate overhead rate for cost centres is preferable and more accurate, because a separate overhead rate facilitates the task of differentiating between different cost structures and cost centres.

Based on the predetermined overhead allocation rate, overheads are applied to the products/services. The applied overhead costs to the products/services can be calculated as the predetermined overhead allocation rate multiplied by the quantity of the cost driver, which has been consumed by the product/service (Hilton *et al.* 2003:107).

At the end of the year the actual overhead costs are compared to the applied overhead costs. If the actual overhead costs are less than the applied overhead costs, the result is referred to as over applied overheads. When the actual overhead costs exceed the applied overhead costs the result is referred to as under applied overheads (Faul *et al.* 2001:70). Jiambalvo (2004:53) is of the opinion that most organisations simply adjust the cost of goods sold with the over- or under applied overhead costs.

d) The cost allocation process

The cost allocation process has three steps that are divided into two stages. The first step in the cost allocation process is the identification of the cost object that is the product, service or department that will receive the overhead costs. The second step is the grouping of individual costs into cost pools. The third step is the allocation of the overhead costs to the cost objects by using a suitable allocation base (Jiambalvo, 2004:192). The three steps of the cost allocation process are illustrated in figure 3.3.

Figure 3.3: The cost allocation process
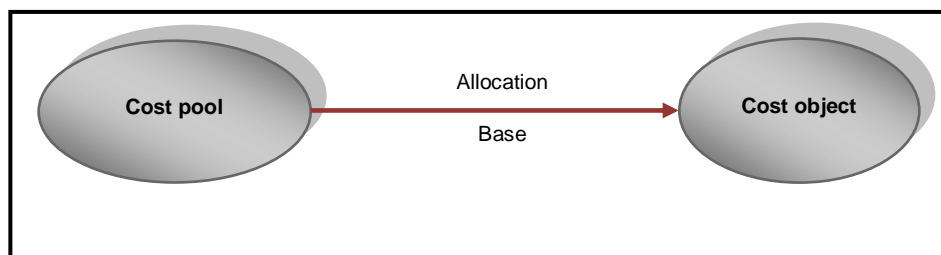
(Jiambalvo, 2004:192) (Maher *et al.* 2006:145)

The cost allocation process is divided into two stages, called the two-stage allocation process. In the first stage, the first step is to assign overhead costs to all production and service cost centres. This step is also referred to as cost distribution. The second step is to re-allocate the costs of the service cost centres to the production cost centres, referred to as support department cost allocation. In the second stage the production cost centre overheads are assigned to the cost objects using appropriate allocation bases (Le Roux & Lötter, 2006:89) (Maher *et al.* 2006:145). The two-stage allocation process, for traditional costing systems, can be illustrated as follows:

Figure 3.4: An illustration of the two-stage allocation process for traditional costing systems

First stage allocations

Second stage allocations (Direct labour or machine hours)

Direct costs

Overhead cost accounts (for each individual category of expenses e.g. property taxes, depreciation etc.)

Cost Centre 1 (Normally Departments)

Cost Centre 2 (Normally Departments)

Cost Centre N (Normally Departments)

Cost objects (Products, services and customers)
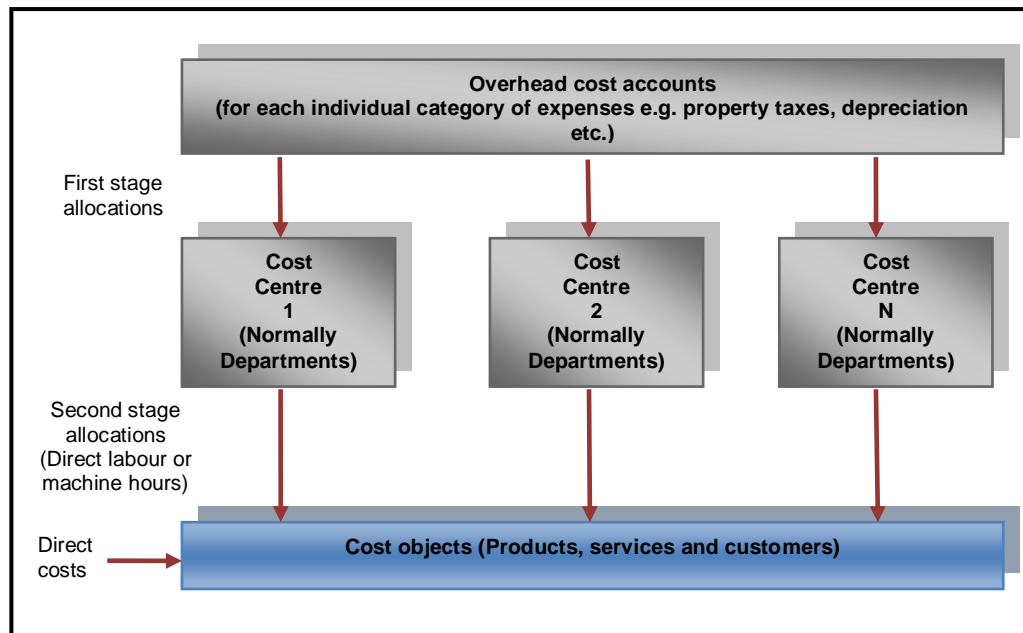
(Drury, 2008:53)

e) The allocation of service/support department costs

Stinson (2002:1) maintains that the departments in an organisation can be divided into two broad groups:

- Operations/production departments are those departments where the central purposes of the organisation are performed. Operations departments are engaged in the direct activities of the organisation.
- Service departments, also referred to as support departments, are those departments in an organisation that exist to provide services to operations departments, as well as other service departments, called interdepartmental or reciprocal services, within the organisation (Lucey, 2002:100). Service departments do not engage directly in the operation

activities of an organisation, but provide indirect support to operation activities (Jiambalvo, 2004:194).   Another characteristic of service departments is that these departments do not directly produce revenues or profits, but reduce income because of the costs generated in the departments (Stinson, 2002:1).

Three approaches are used to allocate the costs of service departments to other departments. These approaches are the direct allocation method, the step-down allocation method, and the reciprocal allocation method (Garrison & Noreen, 2000:758).

> *The direct allocation method*

The direct allocation method allocates the costs of support departments directly to operations departments, using any appropriate allocation basis (Horngren *et al*. 2003:527). The method used to allocate the costs of service departments to operations departments must be related to the benefits that the operations departments derive from the services rendered (Drury, 2008:57).

Horngren *et al.* (2003:527) are of the opinion that the direct allocation method is the most widely used method for allocating the costs of support departments. The benefit of the direct allocation method is its simplicity. The disadvantage of this method is that it is less accurate than other methods, because it ignores interdepartmental services and can therefore lead to distorted product/service costs (Garrison & Noreen, 2000:759).   This method will thus only be recommended when inter-service allocations are relatively insignificant (Drury, 2008:71).

➤ *The step-down allocation method*

The step-down allocation method provides for the allocation of the costs of service departments to other service departments, as well as to operations departments (Langfield-Smith *et al*. 2003:321). The starting point in the step-down allocation method is to choose the sequence in which to allocate the costs of service departments. Therefore, the service departments have to be arranged according to rank. Normally the sequence starts with the department that provides the largest number of services to other service departments. The next step is the allocation of the costs of each service department to the operations departments, and other service departments according to the correct sequence (Langfield-Smith *et al.* 2003:321). Once the costs of support departments have been allocated, the costs of other service departments are not reallocated back to it (Langfield-Smith *et al*. 2003:321). The step-down method always allocates costs only in one direction – that is forwards and never backwards (Garrison & Noreen, 2000:761). Therefore managers must be aware that this allocation method does not recognise the total services that service departments provide to one another (Horngren *et al*. 2003:529). The method chosen to allocate the costs of service departments, as in the direct method, should be based on some measure that represents the usage of the service activity (Lucey, 2002:97).

➤ *The reciprocal allocation method*

This is a method of allocating the costs of a service department that gives full recognition to interdepartmental services, making it the most accurate but also the most complex method (Stinson, 2002:2). In contrast with the step-down allocation method, the reciprocal method allocates the costs of service departments in both directions – forwards and backwards (Garrison & Noreen, 2000:761).

The reciprocal allocation method requires the application of more sophisticated techniques such as simultaneous linear equations and matrix algebra (Drury,

2008:69).   These techniques can be very complex and Garrison & Noreen (2000:761) are therefore of the opinion that this method is rarely used in practice because of its complexity. Keller (2005:24) disagrees and explains that the use of the reciprocal allocation method has increased because of the availability of Microsoft Excel spreadsheets. The combination of the matrix method with the spreadsheets makes use of the reciprocal method more efficiently and can increase the use of this method in practice.

To summarise: The three methods for the allocation of the costs of service departments range from the simple, the direct method, to the more complex, the reciprocal method. The method that will be used in an organisation will depend on the goal of the allocation, simplicity or the greatest possible accuracy, or somewhere in the middle, the step-down allocation method (Garrison & Noreen, 2000:758).

f) Methods of overhead allocation

The alternative methods for the allocation of overheads are:

- Absorption costing.
- Variable costing.
  (Collier, 2003:161)

The following example will be used to explain and illustrate the absorption and variable costing methods.

	Period 1	Period 2
Selling price per unit	R15	R15
Direct material per unit	R4	R4
Direct labour per unit	R2	R2
Variable manufacturing overheads per unit	R1	R1
Variable selling and administrative costs per unit	R1	R1
Fixed manufacturing costs	R30	R30
Fixed selling and administrative costs	R10	R10
Number of units produced	10	15
Number of units sold	20	20
Opening inventory in units	20	10
Closing inventory in units	10	5

Inventory valuation method: First in first out (FIFO)

i) Absorption costing

Absorption costing, also referred to as full costing, is a costing method that includes all (fixed and variable) production/service costs in the unit cost of a product/service, and all non-production/service costs are treated as period costs (Collier, 2003:161). The product/service costs, therefore, consist of direct material, direct labour, variable manufacturing overhead costs, and fixed manufacturing overhead costs.

The unit cost, used in the absorption costing method, can be calculated as:

	Period 1	Period 2
Direct material	R4	R4
Direct labour	R2	R2
Variable manufacturing overheads	R1	R1
Total variable production/service costs	*R7*	*R7*
Fixed manufacturing overheads (fixed manufacturing costs divided by the number of units produced)	R3	R2
Unit product/service cost	**R10**	**R9**

The unit cost, therefore, includes all production/service costs, regardless of whether they are fixed or variable. Obviously, the unit cost changes when there is a change in units produced.

In a service organisation all costs, fixed and variable, in providing the service should be taken into account in the calculation of the unit cost of the services rendered. The service provider will not use direct material, but uses other input such as consumable goods (Opperman *et al.* 2005:280).

The following formula models the profit function for an absorption costing system.

$$OPBT_{AC} = (ucm - ufmc) Q_s + (ufmc \times Q_p) - FC$$

Where

ucm	=	Contribution margin per unit (i.e. selling price per unit minus the variable cost per unit).
ufmc	=	Pre-determined fixed manufacturing overhead costs per unit of output.
Q_p	=	Number of units produced.

Q_s	=	Number of units sold.
FC	=	Total fixed costs (manufacturing and non-manufacturing).
$OPBT_{AC}$	=	Operating profit before tax for the period.

(Drury, 2008:147)

The profit is calculated by applying the profit function in the example as follows:

Profit period 1: (7 - 3) 20 + (3 x 10) - 40 = R70.

Profit period 2: This formula can only be used when unit costs remain unchanged throughout the period. In the example the unit cost in period 2 changed from R10 to R9 and the formula can therefore not be used to calculate the profit of period 2.

An income statement prepared under the absorption costing method, will calculate the profit as follows:

	Period 1	**Period 2**
Sales (number of units sold at selling price)	R300	R300
Less: Cost of sales/ Cost of providing the service (number of units sold at cost price using FIFO)	R200	R190
Gross profit	**R100**	**R110**
Less: Selling and administrative expenses		
Variable	R20	R20
Fixed	R10	R10
Operating profit	**R70**	**R80**

The cost of sales for a manufacturing/retail organisation can also be calculated as:

	Period 1	Period 2
Opening inventory	R200	R100
Production/Purchases	R100	R135
Less: Closing inventory	R100	R45
Cost of sales	**R200**	**R190**

The above descriptions demonstrate clearly that the net income, under absorption costing, was affected by the changes in the levels of production/services regardless of the fact that there were no changes in sales. The operating profit increased from period 1 to period 2 in response to the increase in the production for period 2, although there was no change in sales and the same number of units sold in both years. The reason for this can be explained as the shifting of fixed production/service costs between periods as a result of fixed manufacturing costs included in the inventory. Fixed manufacturing costs will thus be charged against the income generated in the period when the units are sold.

An organisation that provides services does not have tangible inventory on hand. Lubbe & Watson (2006:152) explain that the inventory of a service provider consists of the time and services that have already been rendered, but for which the related income has not yet been recognised.

Criticisms against absorption costing are:

- In absorption costing the fixed overhead costs appear to be variable with respect to the number of units sold (Garrison & Noreen, 2000:299).
- The misallocation of indirect costs to products/services on the basis of production/service volume, which causes the unit cost to become a function of the production volume (Lucas, 2000:3). This misconception, that unit cost is variable, can lead to many managerial problems, such as when pricing decisions need to be taken, or when decisions about continuing or dropping a certain product/service are necessary. Sometimes a

product/service may be dropped because of the misallocation of indirect costs but, the product/service may, in fact, be profitable (Garrison & Noreen, 2000:299). Langfield-Smith *et al.* (2003:339) agree with this statement and explain that, as absorption product/service unit costs include fixed overhead costs, this can lead to erroneous decisions especially over the short term, because fixed costs do not change within a short period of time.

- The shifting, between periods, of fixed manufacturing costs, included in inventory, can cause the net income to move in an unstable manner and cause confusion, and bad decisions (Garrison & Noreen, 2000:302).

- Absorption costing lacks logic (Baxter, 2005:3).

Arguments in support of absorption costing are:

- Absorption costing prevents fictitious losses from being reported. Fixed overheads are recorded as an expense in the period in which the goods are sold, because it is deferred and included in the value of the closing inventory (Drury, 2008:150).

- Absorption costing provides a full picture of the costs of a product/service and that is important in pricing decisions, particularly in cost-based pricing. An organisation needs to cover all its costs, and that is why many organisations prefer to use the absorption costing method (Langfield-Smith *et al.* 2003:339).

- International Accounting Standards 2 (IAS 2) (AC108) requires the use of the absorption costing method for external reporting (Lubbe & Watson, 2006:377). IAS2 (AC108) clearly state that "the costs of inventories shall comprise *all* costs of purchases, costs of conversion and other costs incurred in bringing the inventories to the present location and condition" (Stegman *et al.* 2005:151). The inventory for a service provider should also be recognised on the balance sheet and, should meet the recognition criteria of an asset.

- Generally Accepted Accounting Practice requires the matching of relevant expenses against the revenue recognised (Flynn & Koornhof, 2005:17-5). Absorption costing is consistent with the matching concept as fixed costs, which are included in inventory, and which will only be recovered during the revenue period (Niemand *et al.* 2006:155).

- Absorption costing does not understate the importance of fixed manufacturing costs, and recognises that they are essential for production, and should therefore be included in the cost of a product/service (Drury, 2008:150).

ii) Variable costing

Variable costing, also referred to as direct costing, marginal costing or the contribution approach, is a costing method that allocates only variable costs to the unit cost of a product/service (Niemand *et al.* 2006:155). These variable/marginal costs include direct material, direct labour, and production/service overheads that vary with the rate of production (Warren *et al.* 2002:M133). All fixed costs are treated as period costs, and are written off in the income statement in the period in which they were incurred (Niemand *et al.* 2006:155).

The unit cost*,* under the variable costing method*,* can be calculated as:

	Period 1	Period 2
Direct material	R4	R4
Direct labour	R2	R2
Variable manufacturing overheads	R1	R1
Total variable production/service costs	*R7*	*R7*
Fixed manufacturing overheads	R0	R0
Unit product/service costs	**R7**	**R7**

The unit cost includes, thus, only variable production/service costs, and the cost per unit remains the same regardless of the number of units produced (Adams *et al.* 2000:48).

The following formula models the profit function for a variable costing system.

$$OPBT_{VC} = ucm \times Q_s - FC$$

Where

$OPBT_{VC}$	=	Operations profit before tax for the period.
ucm	=	Contribution margin per unit (selling price per unit minus the variable cost per unit).
Q_s	=	Number of units sold.
FC	=	Total fixed costs (manufacturing and non-manufacturing).

(Drury, 2008:148)

Applying the profit function to the example will enable us to calculate the profit for both periods1 and 2 as:

Operations profit = (7 x 20) – 40 = R100

The profit in an income statement prepared under the variable costing method will be calculated as follows:

	Period 1	Period 2
Sales (number of units sold at selling price)	R300	R300
Less: Variable costs		
Variable cost of goods sold (number of units sold at cost price, using FIFO)	R140	R140

Variable selling costs (number of units sold multiply by
the selling costs per unit)   R20   R20

Contribution margin   **R140**   **R140**

Less: Fixed costs

Fixed manufacturing costs   R30   R30

Fixed selling and administrative expenses   R10   R10

Net income   **R100**   **R100**

The cost of sales for a manufacturing/retail organisation is calculated in the following way:

	Period 1	**Period 2**
Opening inventory	R140	R70
Production/Purchases	R70	R105
Less: Closing inventory	R70	R35
Cost of sales	**R140**	**R140**

The income statement indicates that all fixed manufacturing costs were written off in total during the period they were incurred, and that the net income was not affected by the changes in production. Changes in production have therefore no impact on the net income under the variable costing system.

Criticisms against variable costing are:

- Variable costing gives the impression that fixed manufacturing costs are not important for production and should therefore be separated from the variable costs in production (Lucey, 2002:303).
- Variable costing is not consistent with external reporting, as the value of inventory only consists of direct and variable costs and does not include the fixed manufacturing overhead costs. An adjustment of the value of

inventory should be done for the recognition of inventory in the balance sheet (Lubbe & Watson, 2006:161).

- The variable costing method does not comply with the matching concept as fixed manufacturing costs are written off in total in the period they were incurred in, and are not matched with the revenue recognised (Lubbe & Watson, 2006:161).

- Variable costing may lead to price setting below the total cost of a product /service, as the unit cost of a product/service only includes direct and variable manufacturing overheads (Lucey, 2002:303).

Arguments in support of variable costing are:

- The separation of fixed and variable manufacturing costs is a powerful planning tool, and is a necessary step in performing cost-volume-profit analysis, and the accompanying planning and decision making. The contribution margin ratio can also be used to analyse the impact of changes in sales on profit (Jiambalvo, 2004:173). Adams *et al.* (2000:55) agree that this costing method better supports managerial decisions than the absorption costing method.

- Variable costing is simple to operate (Lucey, 2002:302).

- In variable costing there is no apportionment of fixed manufacturing overheads to products/services. Problems with over/under absorption of overheads therefore does not exist (Lucey, 2002:302).

iii) Reconciling profit under absorption and variable costing

The following calculation represents the reconciliation of the absorption costing profit with the direct costing profit:

	Period 1	Period 2
Profit: Absorption costing	R70	R80
Fixed manufacturing cost in opening inventory	R60	R30
Fixed manufacturing cost in closing inventory	(R30)	(R10)
Profit: Variable costing	R100	R100

The reconciliation clearly indicates that the fixed manufacturing costs included in the inventory, under the absorption costing method, reflects the difference in the profits, as calculated according to the absorption and variable costing methods. In the variable costing method, fixed manufacturing overheads are expensed in the period they were incurred and they are not included in the unit cost, therefore, they are not included in inventory. While under the absorption costing method, fixed manufacturing overheads are included in inventory and are only expensed when the units are sold (Drury, 2008:154).

3.3.1.2 Cost allocations: Activity-based costing system (ABC)

The ABC system emerged in the mid 1980s as an alternative costing system to the traditional costing systems (Driver, 2001:95) (Niemand *et al.* 2006:112). However, research does not clearly state whether most organisations have replaced the traditional costing systems with the ABC system. Latshaw & Cortese-Danile (2002:30) believe that the ABC system has become extremely popular in recent years, and has attracted the interest of academics and management accountants. Brown *et al.* (2004:340), on the other hand, mention that, despite the great interest in the ABC system, organisations seems to be reluctant to implement the system. Cohen *et al.* (2005:997) state that service organisations seem to implement the ABC system to a greater extent than manufacturing and retail organisations do. Concerning higher education institutions Cropper & Cook (2000:67) maintain that of these institutions only a few have implemented a full ABC system, but they say that this situation may be about to change.

The following are a number of definitions of activity-based costing: Warren *et al.* (2002:GL-1) defines the ABC system as "an accounting framework based on determining the cost of activities and allocates these costs to products/services, using activity rates". Adams *et a*l. (2000:G1) describe the ABC system as "the allocation of overhead costs directly to cost objects (products, customers) based on the cost drivers that cause costs to occur in overhead activities". Brewer *et al.* (2003:3) maintain that the ABC system "assigns resource costs to activities, and uses volume or non volume related cost drivers to assign activity costs to products/services".

Some of the main differences between the traditional costing systems and the ABC system are:

- The traditional costing systems divide costs into variable and fixed categories, and the ABC system divides the same costs according to activities (Lere, 2000:23).
- In the traditional costing systems costs are assigned to functional departments, while in the ABC system costs are assigned to activities (Driver, 2001:95).
- Traditional costing systems usually use direct labour as the only cost driver for the allocation of overheads, while the ABC system may use a number of cost drivers to allocate overhead costs (Lockamy, 2003:592).
- In the ABC system the allocation of costs is based on cause-and-effect relationships, while the absorption costing system is based on subjective and arbitrary cost allocations (Collier, 2003:169).
- The ABC system provides more accurate and reliable cost information than traditional costing systems (Nitza & Boaz, 2005:134). Maiga & Jacobs (2003:285) believe that the use of the ABC system leads to improved product/service costing, decision making and competitive advantage. Collier (2003:166) explains that the ABC system is a more accurate method

of allocating overheads to products/services because of the use of cost pools to accumulate the cost of activities.

- The traditional costing systems allocate costs by mainly using volume-based cost drivers. The ABC system recognises that costs and activities can be driven by volume-related or non-volume-related variables (Briner *et al.* 2003:8).

- The ABC system is more suitable for service organisations than traditional costing systems (Nitza & Boaz, 2005:135).

- Under the traditional costing systems (absorption costing) all non-production costs are treated as period costs. The distinction between production and non-production costs is not that important in the ABC system (Collier, 2003:161).

- The ABC system uses cost drivers (activity cost pool/activity volume) to assign the costs from the cost pools to products/services. Traditional costing systems use a budgeted overhead rate (cost centre costs/unit of activity) to allocate costs (Collier, 2003:161).

- The ABC system is more expensive to develop and maintain than a traditional costing system (Jiambalvo, 2004:208).

- The ABC system does not conform to Generally Accepted Accounting Practice as the cost of the product should include the total manufacturing costs. In the ABC system product costs exclude some manufacturing costs, and include some non-manufacturing costs (Garrison & Noreen, 2000:347).

a) The cost allocation process

The ABC system is a six-step process, divided into two stages, that is used to allocate costs to the final product/service. Latshaw & Cortese-Danile (2002:31), Lere (2000:24), Faul *et al.* (2001:122) and Cropper & Cook (2000:61-68) discuss these six steps:

The *first* step is to determine the direct costs of the product/service.

The *second* step is the identification of the most important activities of the organisation, and the grouping of overhead costs (including selling and administrative costs) into the activities. Activities can be described as an event, a task, or a unit of work being done in an organisation to make or deliver a product/service (Maher *et al.* 2006:239). It is important not to choose too few activities, as this can lead to cost distortions, or too many activities because that can make a system uneconomical.

The *third* step is the identification of cost drivers for every activity. Cost drivers must be measurable, in direct relationship with activities, and be the most significant cause of activities. Examples of cost drivers are:

Activities	*Cost drivers*	*Activity classification*
Grading papers	Number of papers	Unit level activities
Accounting services	Headcount	Facility sustaining activities

The *fourth* step is the creation of a cost centre for each activity, where the cost of each activity is accumulated. The nature of the organisation and the type of products/services will determine the number of cost centres. When determining the number of cost centres, the cost of the activity must be material in size, and the cost driver should be the most suitable for the cost centre.

The *fifth* step is to determine cost rates per activity. The activity rate can be determined as the total activity cost in each cost centre divided by the activity volume.

The *sixth* step is the assignment of overhead costs to products/services with the cost drivers as the basis. The overhead costs for each product/service cost can be determined as the activity volume multiplied by the activity rate.

The unit cost of a product/service can be calculated as:

Direct costs

Direct material	X
Direct labour	X
Indirect costs	
Overhead costs allocated in step six	X
Unit cost	**X**

The cost allocation process is divided into two stages. In the first stage, overheads are assigned to the major activities, called activity cost centres. In the second stage, costs are assigned to cost objects through the use of activity cost drivers (Drury, 2008:52). Figure 3.5 illustrates the allocation of overhead costs in the ABC system.

Figure 3.5: An illustration of the two-stage allocation process for activity-based costing systems
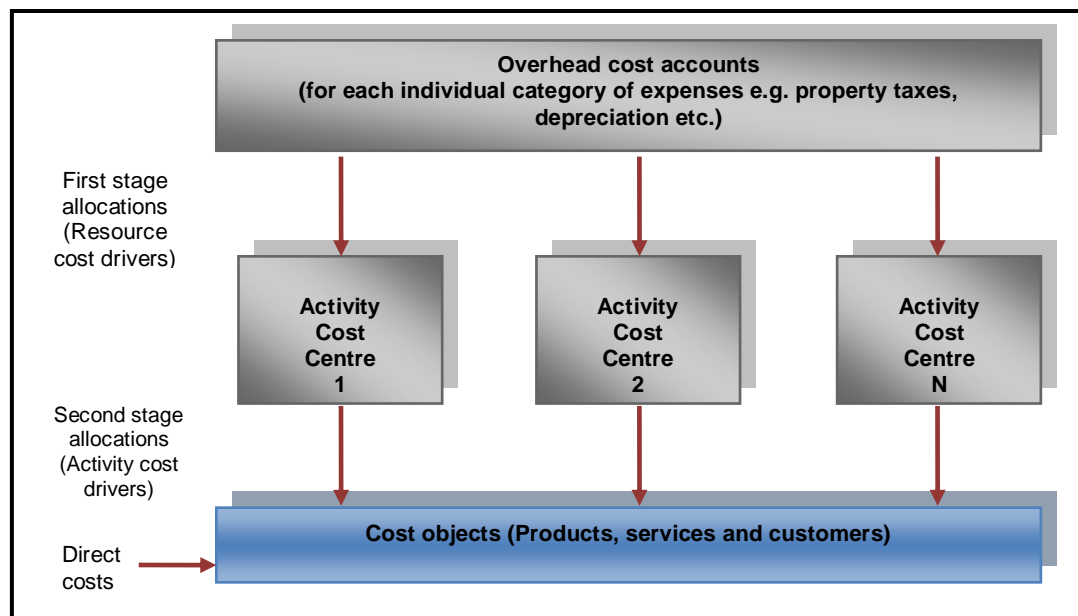
(Drury, 2008:53)

b) Example: The application of Activity-Based Costing to higher education

Figure 3.6 demonstrates how the ABC system can be used to calculate the cost of a degree at a higher education institution.

Figure 3.6: Activity-based costing: An application to higher education
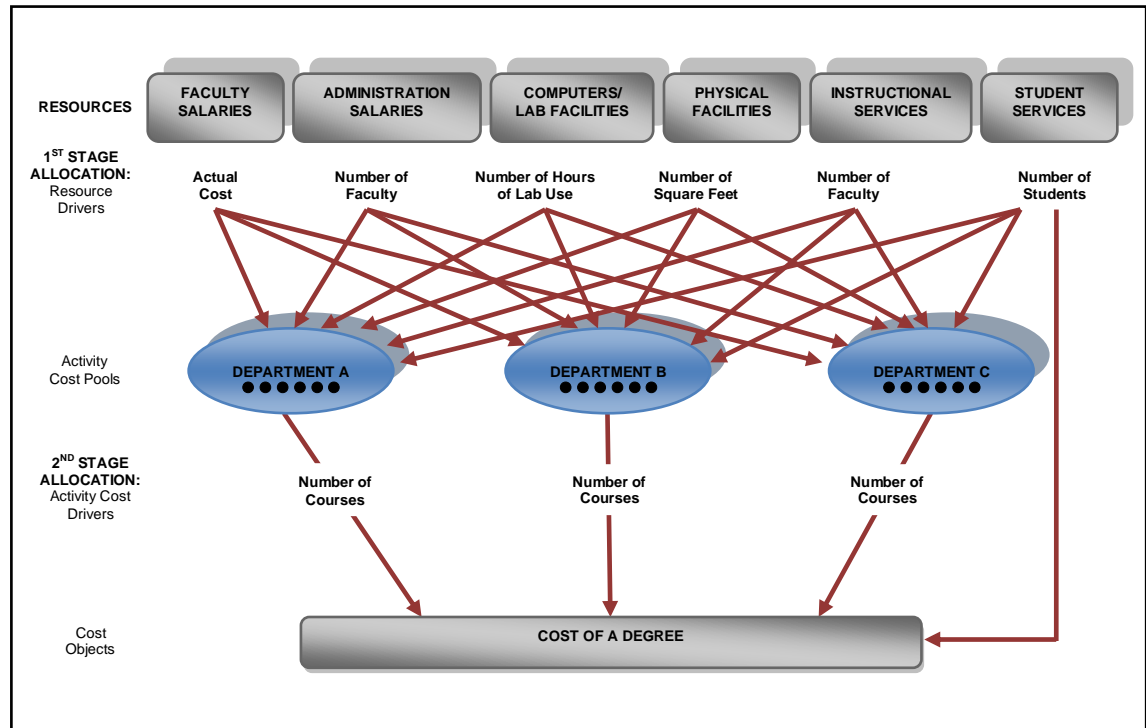
(Tatikonda & Tatikonda, 2001:22)

3.3.2 Statistical cost estimation

Hamilton (2004:1) defines cost estimation as: "the determination of quantity and the predicting or forecasting, within a defined scope, of the cost required to construct and equip a facility, to manufacture goods, or to furnish a service". Hilton *et al.* (2003:426) describes cost estimation as the process of estimating the cost behaviour of a specific cost item. Swain *et al.* (2005:B2) state that cost behaviour is the way costs are affected by changes in activity levels and explain

thus the relationship between a cost and the cost driver. The estimation of the cost behaviour of a specific cost item, therefore, clearly provides the basis for predicting the future costs of that specific item.

Sandberg *et al.* (2005:1) emphasise that cost estimation should not be confused with budgets. Cost estimations are professional judgements, supported by calculations, of the final costs. There is always an element of uncertainty involved in cost estimations. Budgets, on the other hand, are the domain of managers, and are only an administrative given figure with no uncertainties.

Hamilton (2004:12.1) adds the following two characteristics of a cost estimate: the estimation of the final cost has an equal chance of over-running or under-running, referred to as a 50/50 probability and, cost estimations should be based on optimal conditions, and should not reflect unusual events.

The following figure by Langfield-Smith *et al.* (2003:78) summarises the relationship between cost estimation, cost behaviour and cost prediction.

Figure 3.7: **Cost estimation, cost behaviour and cost prediction**

Cost Estimation	→	**Cost Behaviour**	→	**Cost Prediction**
Cost estimation		**Cost behaviour**		**Cost prediction**
The process of determining cost behaviour		The relationship between cost and activity		Using knowledge of cost behaviour to forecast the level of cost at a particular level of activity
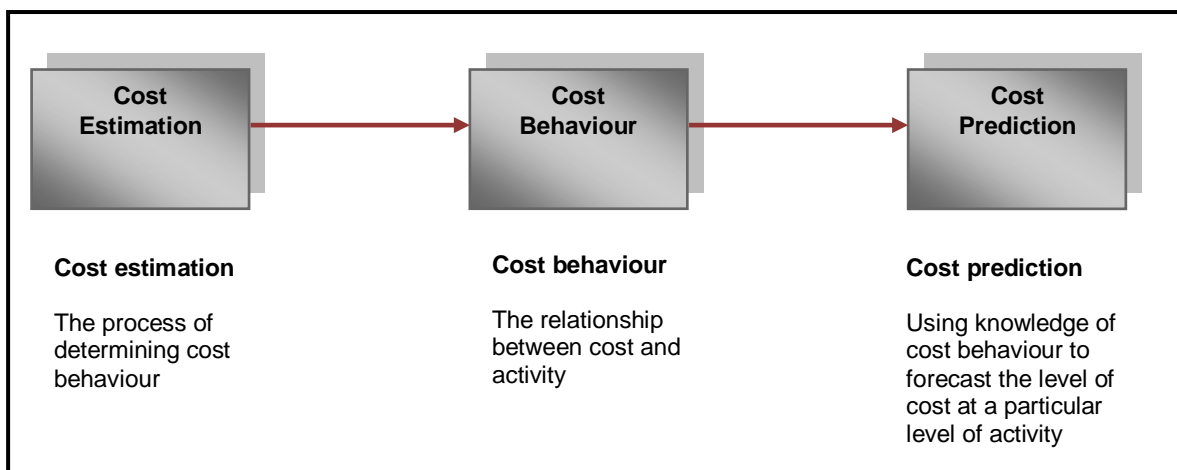
(Langfield-Smith *et al.* 2003:78)

Why estimate costs? There are a number of reasons for estimating costs. Cost estimations can assist management in the comparison of the costs of the various alternatives available when making decisions that add value to the organisation (Maher *et al.* 2006:107). Hilton *et al.* (2003:426) name the three primary reasons for cost estimation: firstly for managing costs, secondly for planning and setting standards and, finally, for decision-making about, for instance price setting, and determining whether to continue carrying a particular product/service etc.

To plan the income for a period of time, managers must be able to predict the costs for the duration of that time, and to do this there must be estimates of fixed and variable costs. There are several ways available to estimate the fixed and variable components of costs, ranging from simple to sophisticated methods (Louderback & Holmen, 2003:80). Louderback & Holmen (2003:80) also believe that each of these methods has advantages and disadvantages, and that organisations will, therefore, use more than one cost estimation method.

The following methods for cost estimation will be examined:

- Engineering methods.
- Account analysis method.
- Scattergraph method.
- High-low method.
- Least-squares method.
- Regression analysis (multiple regression).

a) *Engineering methods*

Engineering methods measure what future costs should be, and not what the costs have been. Engineering methods, thus, work with the present and the future and not with the past (Horngren *et al.* 2002:95).

Hilton *et al*. (2003:447) and Maher *et al*. (2006:108) describe engineering estimates as cost estimates that are based on the measurement and pricing of the work involved in the various activities that go into producing a product/service. Therefore, the estimation of the costs needed to produce a product, or deliver a service, entails a step-by-step analysis of the activities. A service organisation, using engineering methods to estimate costs, will need to do a performance of task analysis with the focus on factors such as the time needed to complete the task, the number and type of employees required for the task, and other input. The results of the task analysis should then be converted into cost estimates in order to determine how much it should cost to complete the task.

The advantages of the engineering methods are that these methods are reliable and useful for decision-making. Engineering methods can also be applied in situations where there are no historical data to analyse past cost relationships.

The disadvantages are that this method is costly and time consuming, because of the analysis of each activity (Horngren *et al*. 2002:95).

b) Account analysis method

The account analysis method shows what the costs have been, and not what the costs should be. The account analysis method is thus based on the past costs associated with each cost driver. In the account analysis method each account is classified, by scanning the accounts for several periods as a fixed or variable cost, that corresponds with the cost drivers (Hilton *et al*. 2003:454) (Maher *et al*. 2006:109). Once the costs have been classified, future costs can be estimated by examining the past costs in each account and, then, estimating the variable cost per unit or the periodic fixed costs (Horngren *et al*. 2003:96).

According to Louderback & Holmen (2003:81) the most important weakness of this method is that it is subjective, as the analyst decides if a cost is variable or fixed based on personal judgements, it is of limited usefulness and indicates what the costs have been and not what it should be.

c) Scattergraph method

The scattergraph method, also called the visual fit method, is a method where the total costs at several activity levels, from previous periods, are plotted on a graph. A line is then drawn through most of these points by visual inspection, which represents the trend shown by most of the data (Maher *et al.* 2006:111) (Vanderbeck, 2010:174).

The main disadvantage of this method is that it is subjective, because the fitting is done by the hand and eye of the user and therefore a variety of users will get various results (Horngren *et al.* 2003:102). The reliance on what costs have been, and not on what costs should have been, is another disadvantage (Vanderbeck, 2010:176). The main advantages of this method are that it uses all of the available data and not just two points, as in the high-low method, and it is also easy to get an idea of how closely costs follow changes in the activity of the cost driver (Louderback & Holmen, 2003:85) (Vanderbeck, 2010:176).

d) High-low method

The high-low method of cost estimation is a simple, yet widely used method that uses historical data to measure the cost function, graphically or mathematically. The high-low method uses the total costs incurred at two past levels of activity that reflect the highest and lowest levels of activity within a relevant range (Le Roux & Lötter, 2006:14). The high-low approach also uses the formula for a straight line, $y = a + bx$, for the estimation of costs (Vanderbeck, 2010:173).

According to Faul *et al.* (2001:59) the main advantage of the high-low method is that it is quick and easy to calculate, but Horngren *et al.* (2002:101) believe that this method is unreliable and inefficient, because it only uses two past periods of cost information.

e) Least-squares method

The least-squares method, also called regression analysis or simple regression, measures the cost function by using statistics to fit a cost function to all the historical data (Horngren *et al.* 2002:103). Regression analysis also uses cost and volume data from previous periods, and other than the high-low method, uses all observations available and not just two observations, and relies on statistical techniques rather than subjective judgements, as the scattergraph method does, to draw the regression line. The least squares method of cost estimation only uses one cost driver (independent variable) to measure the cost function, which is different from multiple regression where more than one cost driver is used to measure the cost function. The two equations, of the least squares method, below, clearly indicates the relationship between one fixed and one independent variable factor (Faul *et al.* 2001:60).

The least-squares method, simple regression, is a mathematical technique where the following two equations must be solved:

1. $\sum xy = a\sum + b\sum x^2$
2. $\sum y = na + b\sum x$

Where

a = fixed costs

b = variable cost rate

n = number of observations

$\sum$ = the sum of all historical data

x = activity level

y = total (predicted) costs

(Swain *et al.* 2005:74-76)

The least-squares method is a more sophisticated method, and is mathematically more correct than the scattergraph and the high-low methods. This method is easy to use; measures a cost function objectively, and it is reliable in the measurement of cost behaviour (Horngren *et al.* 2002:103).

f) Regression analysis (multiple regression method)

Multiple regression is a regression equation that shows the influence of one dependent component, and two or more independent variable components (Hilton *et al.* 2003:440).

The format of the multiple regression equation is:

$Y = a + b_1X_1 + b_2X_2\ldots\ldots b_nX_n$

Where

Y	=	the dependent variable to be predicted
$X_1\ldots X_n$	=	values of the various independent variables influencing the value of Y
$b_1\ldots b_n$	=	the coefficient of the various independent variables
a	=	the fixed component

(Louderback & Holmen, 2003:99)

Solving the equation can be difficult but spreadsheets are available to produce regression outputs. The users of the regression outputs should however fully understand the methodology and its limitations, understand the meaning of the statistics, know the limitations of the data, and must be able to determine whether the statistical assumptions of regression are satisfied by the cost data (Horngren *et al.* 2002:109).

Multiple regression produces more accurate cost predictions than simple regression (least square method). An organisation can learn more about cost behaviour by using multiple regression analyses, than by using simple regression, however, more data is required, and multiple regression analyses can be time consuming (Hilton *et al.* 2003:440).

3.3.3 Simulation modelling

Simulation modelling is about the breaking up of the processes involved in the production of a product or the rendering of services into basic components. Once the breaking up of processes is done, the next step is putting back the pieces by using alternative ways to achieve alternative levels of costs. Thus, in higher education the various roles that class size, modes of instruction, such as e-learning etc. can play to lower the cost per student, can be considered (Brinkman, 2006:13).

One of the most important benefits of simulation modelling is that it can help organisations to achieve a sustained competitive advantage by considering the impact of cost reduction programmes, and by considering alternative programmes in decision-making processes (Keegan, 2003:2). Whiteside (2003:1) agrees, and he explains that the ultimate performance in cost estimations are obtained through cost simulation models, because these simulation models allows organisations to explore hundreds of project options to develop competitive plans.

3.4 COST MANAGEMENT

Milano (2000:3) defines cost management as "a discipline that focuses on the management of activities as a route to improving the value received by the customer, and the profit achieved by providing this value". Stenzel & Stenzel (2003:3) describe cost management as "the use of cost accounting systems and methods to guide current and future operations toward specified objectives".

The definition of cost management by Hamilton (2004:5), states clearly that cost control is one of the three major areas of cost management. The AACE (International Recommended Practices and Standards), describes cost control as "the application of procedures to monitor expenditures and performance against the progress of projects or manufacturing operations, to measure variances from authorised budgets, and allow effective action to be taken to achieve minimum costs" (Hamilton, 2004:5). Cost control also refers to a process of reducing costs while maintaining the same level of productivity, or maintaining the same cost levels, but increasing the productivity levels (Collier, 2003:240). Drury (2008:537), on the other hand, states that the focus of cost management is on cost reduction, and maintains that the term cost reduction could be used instead of cost management.

Cullen (2004:2) maintains that effective cost management is dependent on a consistent methodology; the utilizing of appropriate standards, as it is essential to communicate information; concentrating efforts for maximum effectiveness by focusing on cost drivers, planning, programming and early design decision-making processes, and utilizing all the tools that are available such as value management/engineering, all of which should improve the cost management process.

A number of approaches are available to manage costs, including:

- Target costing.
- Activity-based management.
- Business process re-engineering.

3.4.1 Target costing

Target costing is a cost management tool that can be used in manufacturing-, retail- and service organisations (Collier, 2003:134). Target costing is aimed at managing costs when developing new products/services but it can also be used to manage the costs of existing products/services (Langfield-Smith *et al.* 2003:732).

Dekker & Smidt (2003:294) describe target costing as a strategic management accounting system for the management of product/service costs. It is a costing technique that manages an organisation's future profits by including target costs in the development process of a new product/service, or in the upgrading of an existing product/service. Target costing is a strategy that takes the market price of an existing product/service, or the estimated market price of a new product/service, and uses it as a parameter to define the feasible cost for a desired profit margin (Zanella, 2007:161). These definitions for target costing clearly indicate that target costing has two prime focus areas namely cost management and profit planning.

Targeting costing is based on the following five key principles as explained by Swenson *et al.* (2003:12) and Stenzel & Stenzel (2003:202):

- Price-led costing: Market prices are used to determine the target costs.

- Focus on customers: An organisation should establish the product/service features and quality requirements that will meet the expectations of the customers, prior to setting the target costs.

- Cross-functional involvement: Involves managers and teams for the entire product/service from the initial concept through to the final production and service rendering.

- Value-chain involvement: All members of the value chain are included in target costing.

- Life cycle management: The management and the minimisation of the total life-cycle costs are established for both the organisation and the customer.

The target costing process begins with top management and is a systematic approach for the establishment and communication of cost objectives and performance metrics within an organisation and with the external suppliers (Ellram, 2006:13). The target costing process consists of six steps and is illustrated in figure 3.8.

Figure 3.8: The target costing process

New product marketing input → **Step 1 Product / services characteristics desired** ← Customer input

Competitive market conditions → **Step 2 Target selling price** ← Customer input

Competitive market conditions **Step 3 Target cost = Target price – Desired profit margin** Management input/ strategic plan

Supply management / supplier input → **Step 4 Cost breakdown to materials / component level** ← Engineering / R & D input

Supply management / Suppliers/ marketing → **Step 5 Cost management activities**
- **Supplier development**
- **Design change**
- **Material change**
- **Specific change**
- **Cost trade-offs**

← R & D / design / Manufacturing

Step 6 Continuous improvement

(Ellram, 2006:15)

Ellram (2006:17) identifies three phases in the target costing process. The first phase (steps 1, 2 and 3) is market-driven costing. This phase includes the identification of the needs of the marketplace and the characteristics of the

product/service to fulfil that needs; competitors' behaviour; market conditions, and management strategic objectives. The second phase (steps 4 and 5) is product-level and component-level costing.   In the second phase target costs are apportioned to the relevant parts and components of the product/service.   This stage also includes cost management activities to achieve the target-cost goals. The gap between the target cost and the actual cost should be resolved by multidisciplinary teams. During the third phase (step 6) the emphasis is on target cost monitoring and continuous improvement efforts.   The continuous improvement approach is often referred to as Kaizen costing.   Kaizen costing starts where target costing ends. Kaizen costing focuses on improving the cost of a product/service once it has been introduced to the market (Ellram, 2006:22).

3.4.2 Activity-based management

Swain *et al.* (2005:472) define activity-based management as: "the identification and use of cost drivers and performance measures to manage the costs, quality, and timeliness of activities."   Armstrong (2002:110) explains activity-based management as a way in which an organisation can direct, measure and control its goal for more effective performance through the creation and use of an activity-based performance measurement framework. Activity-based management therefore basically focuses on managing activities aimed at improving the efficiency and effectiveness of business processes, reducing non-value-adding activities, and performing value-adding activities more efficiently (Louderback & Holmen, 2003:133).

Barrett (2004:30) believes that the use of activity-based management can lead to the reduction in the total costs of an organisation by as much as 3% to 5%, and can also help the organisation to identify underperforming assets and non-value-adding activities.   This information enables managers to realign resources to improve financial performance. Plowman (2007:25) and Milano (2000:3) add the following five key benefits of activity-based management:

- Activity-based management can lead to greater profitability in the private sector, and better utilisation of resources in the public sector.
- Activity-based management provides reliable profit/cost information, based on the accurate assignment of the costs of a product/service.
- Activity-based management enables an organisation to forecast the impact of projected business volumes on staffing, and on the other resources of the organisations.
- Activity-based management increases the quality of services rendered to customers.
- Activity-based management reduces the operating costs of an organisation.

According to Jiambalvo (2004:212) the following four basic steps should be followed during activity-based management:

- Step 1: Identifying the major activities by breaking down an organisation into processes. Each process is then examined to identify all the activities that make up the processes.
- Step 2: This step involves the identification of the resources used by each activity.
- Step 3: Evaluating the performance of the activities.
- Step 4: Identifying ways to improve the efficiency and effectiveness of the activities.

What is the relationship between activity-based costing and activity-based management?

Activity-based costing focuses on the costs of activities in order to determine the cost of a product/service. Activity-based management focuses on the costs of activities in order to manage the activities to improve the management of processes. Activity-based management uses the information generated by activity-based costing to control the cost of activities (Leslie & Thomas, 2004:60).

Figure 3.9 illustrates the linkage between activity-based costing and activity-based management.

Figure 3.9: Activity-based costing and activity-based management
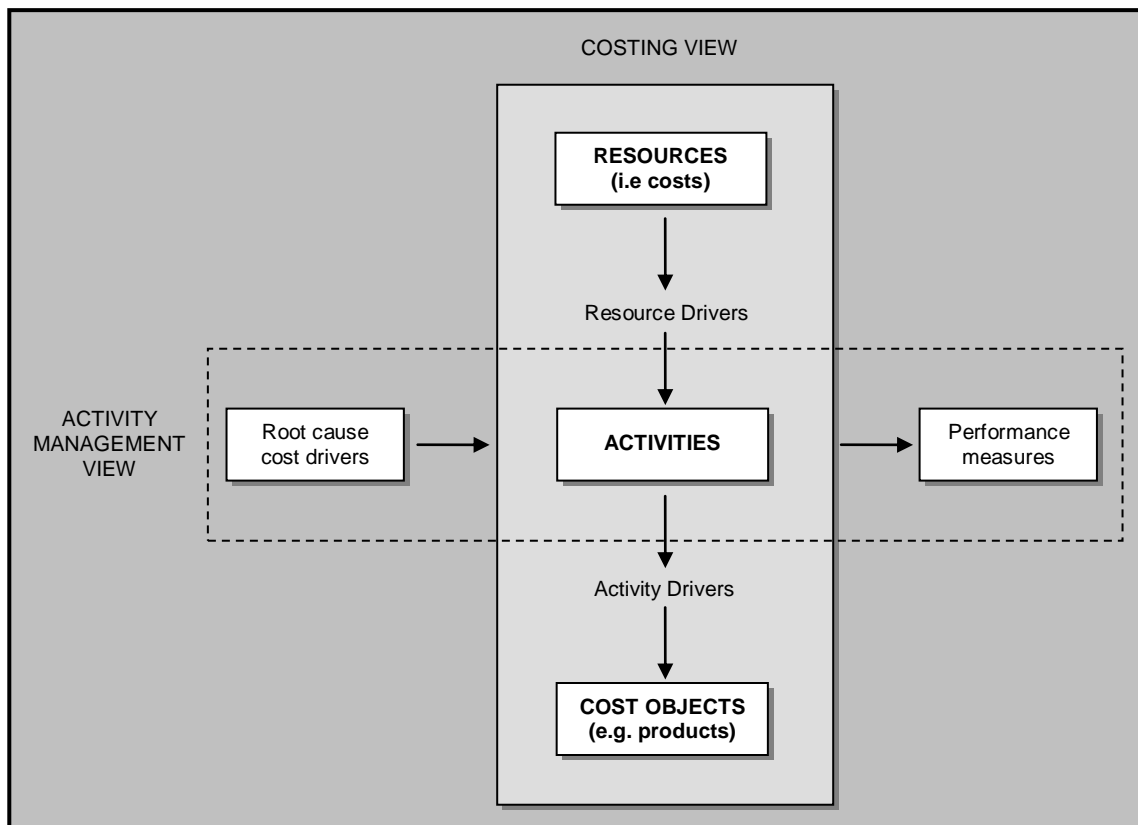
(Langfield-Smith *et al.* 2003:714)

3.4.3 Business process re-engineering

Business process re-engineering is a term introduced by Hammer & Champy that refers to "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvement in critical contemporary measures of performance, such as cost, quality, services and speed" (Liu *et al.* 2004:89). The aim is thus to totally change how the organisation currently operates by identifying and enhancing the value-added activities, and eliminating the non-value adding

activities in the business processes to reduce costs, improve quality, and enhance customer satisfaction (Sarkar & Singh, 2006:19). Business process re-engineering is not about introducing new products/services into the market, but about the rethinking of existing processes with the help of new technology (Scarlett, 2006:39). The difference between business process re-engineering and other approaches is that business process re-engineering radically changes the way an organisation works and is based on the idea that an organisation starts from scratch defining its processes and deleting all old routines and processes (Stern & Stalk, 2005:46).

Business process re-engineering involves the following sequential steps, architecture by Petrozzo & Stepper, in Sarkar & Singh (2006:21):

- Select a re-engineering team and leadership.
- Assess business opportunities.
- Define the project scope and establish goals.
- Study and analyse problems.
- Understand the current processes thoroughly.
- Understand the current information architecture.
- Prepare for the redesign.
- Evolutionize software development.
- Traverse process space, aided by information technology.
- Apply the redesigning principles.
- Execute step-by-step the redesigning process.
- Validate testing of decisions, taken on the basic business process re-engineering principles.
- Run through reorganisation cycles.
- Implementing the reorganisation process, structures and strategies to maximise the benefits.

3.5 SUMMARY

Higher education institutions are currently in a state of turmoil for a number of reasons such as escalating costs, diminishing resources, and increased competition. These factors demand accountability of higher education institutions to manage costs better (Tatikonda & Tatikonda, 2001:19). Brinkman (2000:5) also believes that at no time in history has the subject of higher education costs had a higher profile than at present. The reason for this is that the costs of higher education impact on tuition fees and can therefore impact on the affordability of higher education with the accompanying impact on policies, such as the equity policies of higher education.

The pressure of escalating costs in higher education is not very different from that experienced by other industries such as the manufacturing industry. Higher education institutions can therefore use the same tools and techniques used in the business-world, such as activity-based costing, activity-based management, business process re-engineering and others that have been discussed in this chapter, to gain a better understanding of the costs of the institution, eliminate waste, and cut costs (Tatikonda & Tatikonda, 2001:19).

In this chapter the following key issues were addressed:

- Costs play a vital role in the pricing of a product/service as costs set the minimum level for the price, and all costs should be recovered for an organisation to stay in business.
- Cost is the most common measure of success as it is an easy to comprehend indicator of how well a product/service is performing, or is likely to perform, or has performed (Tichacek, 2006:27).
- A common understanding of cost concepts and terminology are needed for clear communication between all the role players in the organisation.

- The cost of a product/service can be determined in a number of ways, for instance by means of cost accounting, statistical estimation, and simulation modelling which have all been discussed.

- Cost management methods consist of two value analysis methods, namely activity-based management and business process re-engineering. The value analysis methods strive to reduce costs by identifying non-value adding activities and, on the other hand, by performing value-adding activities more efficiently (Louderback & Holmen, 2003:133). Cost management methods include target costing that focuses on cost reductions throughout the life of a product/service.

The emphasis of the next chapter will be on the different pricing methods that can be used by an organisation to price products/services.

CHAPTER 4

PRICING METHODS

4.1 INTRODUCTION

In the previous chapters the core areas of the pricing function were discussed with emphasis on the pricing plan, the pricing environment, and the role of costs in pricing. In this chapter the focus is on the various pricing methods that can be used to determine the price of a product/service. Special reference will be made to the pricing methods and policies at higher education institutions.

4.1.1 Goal of the chapter

An organisation, including higher education institutions, can select one or a combination of a number of pricing approaches to determine the price of a product/service.

The purpose of this chapter is to explore the various methods that can be used in determining the price of a product/service.

4.1.2 Layout of the chapter

The following is an outline of chapter four. The numbers in the presentation correspond with the paragraph numbers used in the chapter.

4.1	**Introduction**	
	4.1.1	Goal of the chapter
	4.1.2	Layout of the chapter
4.2	**Pricing methods**	
	4.2.1	Cost-based pricing methods
		4.2.1.1 Total-cost pricing
		4.2.1.2 Product-cost pricing
		4.2.1.3 Variable-cost pricing
		4.2.1.4 Break-even pricing
		4.2.1.5 Target-profit pricing
	4.2.2	Market-based pricing methods

4.2 PRICING METHODS

One of the major decisions that organisations face is the pricing of products/services, because price is the most important factor in determining profit. Once an organisation has selected a pricing strategy, this strategy needs to be translated into methodologies to actually set the price of a product/service. There are a number of methods available to determine the price of a product/service. Oxenfeldt in Avlonitis & Indounas (2005:48) defines pricing methods as "the explicit steps or procedures by which firms arrive at pricing decisions". Lambin (2000:615) maintains that the method used in price setting should in the first place respect the constraints of costs and profitability, but should also be compatible with customer's price sensitivity as well as the price of competitors. Brink (2005:58) and Kotler (2000:465) agree, and explain that the selling price set for a product/service must satisfy both the customers and the profit objectives of an organisation, and that managers cannot ignore market forces when setting the price of a product/service, nor can costs be ignored. They are also of the opinion

that one or more pricing approaches should be taken into account when setting prices.

Shapiro & Jackson in Jobber & Fahy (2006:211) identified the following three methods for setting the price of a product/service, namely:

- Cost-based pricing.
- Competitors-orientated pricing.
- Market-led pricing.

These pricing methods can be illustrated as follows:

Figure 4.1: Pricing methods
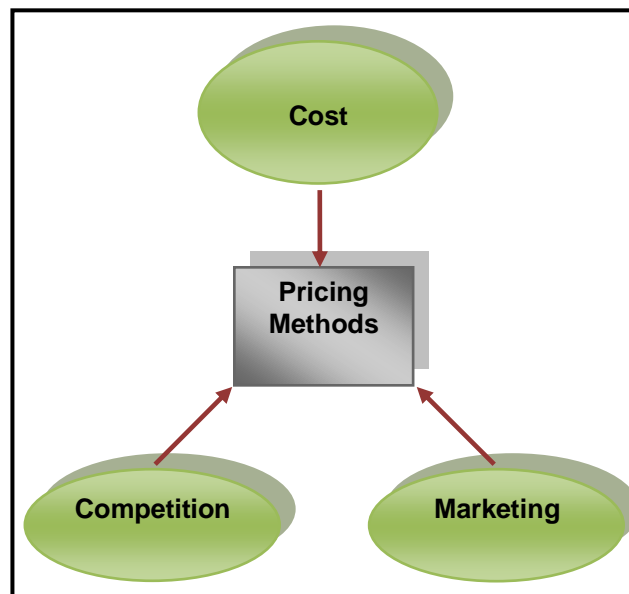
(Jobber & Fahy, 2006:195)

Brink (2005:60) adds profit-based pricing methods to the classification of pricing methods and identifies the following four pricing methods:

- Cost-based pricing.
- Profit-based pricing.
- Demand-based pricing.
- Competition-based pricing.

Warren *et al.* (2002:M308), on the other hand, distinguish between two major categories of pricing methods, namely market-based and cost-based pricing methods, and classify the basic approaches to setting prices as follows:

Market-based pricing methods	*Cost-based pricing methods*
Demand-based methods	Total-cost concept
Competition-based methods	Product-cost concept
	Variable-cost concept

The various cost-based and market-based pricing approaches are discussed, explained and illustrated. Although these pricing approaches are discussed separately, an organisation will, very seldom, use only one approach exclusively (Kotler, 2000:465).

4.2.1 Cost-based pricing methods

The cost-based pricing methods are also referred to as cost-plus pricing or mark-up pricing.

Shipley & Jobber (2001:301) and Paleologo (2004:23) claim that cost-based pricing methods are the most widely used pricing methods and have been since the end of the 18th century.

Cost-plus pricing refers to the pricing of a product/service at a predetermined profit margin over the estimated production/service costs (Vithala, 2009:26). Solomon & Stuart (2000:351) define cost-plus pricing as "a method of setting

prices in which the seller totals all the costs for the product and then adds the desired profit per unit". Anderson & Vince (2000:399) define cost-plus pricing as "a pricing strategy whereby a firm establishes a desired profit margin and adds this amount to the total costs of manufacturing, distributing, and marketing a product". Cost-based pricing methods use historical-cost information to calculate the unit cost of a product/service, to which a predetermined percentage profit mark-up is added to determine the selling price of the product/service (Shipley & Jobber, 2001:301).

The formula for the calculation of the selling price of a product/service, using cost-based pricing, can be expressed as:

Selling price = Unit cost + Mark-up on cost (Collier, 2003:111).

The mark-up can also be expressed as a percentage of the selling price, and the formula for the determination of the selling price is then as follows:

$$\text{Price} = \frac{\text{Unit cost}}{1 - \text{Mark-up percentage}}$$

(Cravens & Piercy, 2006:333)

Both of these above formulas will result in the same selling price.

The cost-based pricing formulas above clearly show that there are two key issues:

- The definition of the cost of a product/service, by answering the question: What costs should be used? Diverse cost bases can be used in cost-based pricing approaches such as the total cost, product cost and variable cost (Horngren *et al.* 2003:432). Each of these approaches is discussed below.
- Determining the mark-up percentage.

Mark-up is an amount that is added to the cost of a product/service to determine the selling price of the product/service. Thus mark-up is the amount by which the price of a product/service exceeds the cost of the product/service (Horngren *et al*. 2002:198).

The mark-up depends on the definition of cost used in cost-based pricing. A variety of mark-ups are added depending on the cost base that is used. There will thus be diverse mark-ups for absorption-cost pricing, product-cost pricing and variable-cost pricing (Langfield-Smith *et al*. 2003:940).

Horngren *et al*. (2003:421) cites that the mark-up not only depends on the costs of a product/service, but also includes the demand of customers and competition, and is ultimately determined by the market. Drury (2008:258) states that the mark-up of a product/service relates to the demand of the product/service, but also maintains that mark-ups are influenced by competition in the market, and that a well-established mark-up will correspond with the diversity of customers, competitive position, and demand.

Mark-ups vary from product to product, from service to service, and from company to company. However, what is of importance, is that the mark-up, when pricing a product/service, must be high enough to cover all costs, and also provide a reasonable return on investment (Swain *et al*. 2005:544) (Arruńada, 2001:285).

The steps to be followed when cost-based pricing methods are used to calculate the selling price of a product/service are illustrated in the following cost-plus pricing model.

Figure 4.2: Cost-plus pricing model

Logic	Application
Result is price set for customers	**Price to customer R75 Based on stream of costs**
Resellers mark-up price to achieve desired margins	**Price to Retailers R37.50 based on 50% retail margin**
Set price to yield desired margin and profits	**Price to Wholesalers R30 based on wholesale margin 20%**
At target volume, what margin is needed for set profitability	**Desired unit Margin = R10 % Margin = 33%**
What is the total cost of making a product?	**Pricing logic starts here** → **Fixed costs R10 Variable costs R10 Total costs R20**

(Anderson & Vince, 2000:401)

There are various reasons for using cost-based pricing methods in calculating the price of a product/service, such as:

- Simplicity. Prices are simple and quick to calculate (Kotler, 2000:466).
- It enhances customer relationships. Customers generally understand, that an organisation must make a profit, must cover all costs to remain in business, and that this approach is fair and necessary. Knowing that costs have to be covered, also helps to improve customer relationships, because customers are more likely to accept a price increase, which is caused by an increase in costs, rather than accept higher profit margins taken by organisations (Shipley & Jobber, 2001:310).

- It is a standard operating procedure. Indounas (2006:416) maintains that a number of empirical studies indicate that cost-based pricing methods have dominated the pricing practices of organisations, making them standard operating procedures in organisations.

- It provides price stability over time because prices are based on the internal factors of an organisation. Where all the organisations in the industry use cost-based pricing methods to determine the selling price of a specific product/service, prices tend to be similar and stable (Brink, 2005:60) (Kotler, 2000:466).

- It is the most profitable method. Cost-based pricing methods will result in the full recovery of all costs of the product/service (Solomon & Stuart, 2000:351).

- It is less risky as it is based on a known factor, namely cost (Brink, 2005:60).

- It can help predict the prices of competitors as the average mark-up in the industry is known and, assuming that the organisations in the industry have similar cost structures, it may be possible to predict that competitors will add the same mark-up percentage (Drury, 2008:259).

- Cost-based pricing sets a pricing floor, the minimum level of the price, and can therefore shield organisations from making a loss. The argument that an organisation cannot suffer losses because in cost-based pricing all costs of the organisation will be covered by the price, is only true if the sales volume is equal to, or more than the activity level that was used to determine the total unit cost (Indounas, 2006:418).

- Cost-based pricing methods force management to calculate the cost of products/services that provides an indication of the minimum price of the product/service (Jobber & Fahy, 2006:197).

- Cost-based pricing methods are useful when customers demand and preferences are not available (Monroe, 1990:229).

Criticisms against cost-based pricing methods include the following:

- Cost-based pricing methods ignore demand. These methods assume that there is no relationship between price and demand, and that the price depends solely on costs (Kotler, 2000:466). Horngren *et al.* (2003:432) defend this viewpoint and explain that the selling price of the product/service, determined by a cost-based method, only forms the starting point for pricing decisions. Once the price has been determined it is then modified on the basis of customers' reactions, and competitors' responses. Hall & Hitch in Paleologo (2004:23) argue that the cost-based pricing process should start with the estimation of a certain demand level followed by the estimation of the unit cost, which is associated with the assumed production volume. Finally, the price of the product should be calculated by adding a mark-up associated with the product. Hall & Hitch in Paleologo (2004:23), therefore, include demand in the formula of the cost-based pricing approach as follows:

$$P_{cp} = (1 + GPM)C(q_{cp})/q_{cp}$$

Where:

P_{cp} = Price of product

GPM = Gross profit margin

C = Production costs associated with the assumed production volume

q_{cp} = Demand level

- Cost-based pricing ignores customer needs and preferences when setting a price (Matanovich, 2004:14).
- Cost-based pricing ignores customers' price sensitivity (Paleologo, 2004:23). The price determined by cost-based pricing methods may be

below that which customers are willing to pay for the product/service, and the organisation could lose profit. On the other hand, the calculated price can be above that which customers are willing to pay and, again, the organisation will lose sales and profits (Blythe, 2003:173). Cost-based pricing methods can thus easily lead to the under pricing or overpricing of products/services (Indounas, 2006:417).

- Cost-based pricing ignores all other objectives other than the achievement of the mark-up (Paleologo, 2004:23).

- In cost-based pricing methods, costs are the dominant basis for price determination. Kaschyk (2006:1) is of the opinion that knowing the costs of a product/service is critical for survival, but cost should not be the only factor in determining the optimal price of a product/service.

- Because cost-based pricing methods are easy to calculate, management tends to leave the pricing of products/services to junior managers who lack an understanding of the market (Paleologo, 2004:23).

- The estimation of fixed costs, and the allocation thereof to the multiple products/services of an organisation in multiple markets, is difficult and sometimes impossible (Paleologo, 2004:23).

- Cost-based pricing methods take no cognisance of competitors' prices and, therefore, make no contribution to the competitive advantage of an organisation (Blythe, 2003:173).

- Pricing according to cost-based pricing methods starts with an estimation of sales volume before the price of a product/service is set. The fact is that price determines volume. If the price of a product/service is too high for customers, it will lead to a decrease in sales volume resulting in an increase in the average cost estimates that will lead to a higher price (Jobber & Fahy, 2006:197).

- Cost-based pricing methods can lead to misleading product/service costs owing to the allocation of overheads on arbitrary grounds (Ahmed & Scapens, 2003:173).

In the light of the above, obviously, cost-based pricing methods can be used with a variety of cost definitions.   There are three types of cost-based pricing approaches, each responding to specific cost and profit requirements.   Cost bases, often used in the application of cost-based pricing, include total costs, product costs, and variable costs (Saxena, 2009:323).   The choice of the cost-based pricing method will affect both the unit cost of the product/service and the net income of an organisation (Ingram *et al.* 2005:M172).

4.2.1.1 Total-cost pricing

The total-cost pricing method is also referred to as full-cost pricing or absorption-cost pricing.

The total-cost pricing method includes in the total (full) cost all the costs of an organisation.   These costs include all fixed costs and variable costs, all costs of producing and delivering goods or services, and all marketing, selling, finance and administration costs (Collier, 2003:111) (Saxena, 2009:323).   The calculation of the full cost of a product/service is discussed in chapter three in the section on the absorption-costing method.

The following formula is used to calculate the selling price of a product/service when using the total-cost pricing approach:

Selling price = Total cost per unit + Mark-up percentage on total cost per unit (Faul *et al.* 2001:360).

The following formula is used to determine the mark-up percentage when using the total-cost pricing method:

Mark-up percentage = $\dfrac{\text{Desired profit}}{\text{Total costs}}$

(Niemand *et al.* 2006:450)

Only profit is thus included in the mark-up, because all costs are included in the cost amount to which the mark-up is added (Niemand *et al.* 2006:450).

4.2.1.2 Product-cost pricing

Product/service costs include all manufacturing/service costs to which a mark-up percentage is added to the product/service cost to calculate the selling price.

Determining the selling price, when using the product-cost pricing approach can be expressed as follows:

Selling price = Product-unit cost + Mark-up percentage on product-unit cost (Warren *et al.* 2002:M310).

The mark-up percentage for the product-cost pricing method is determined by applying the following formula:

$$\text{Mark-up percentage} = \frac{\text{Desired profit + selling expenses + administrative expenses}}{\text{Total-product costs}}$$

(Niemand *et al.* 2006:451)

The mark-up thus consists of profit, budgeted selling, and administrative expenses.

4.2.1.3 Variable-cost pricing

The variable-cost pricing method is also referred to as the marginal-cost pricing method or contribution-pricing approach.

According to the variable-cost pricing method only variable costs are included in the unit cost of the product/service. The calculation of the product/service unit

cost, using the variable-cost approach, is discussed in chapter three in the section on the variable-costing method.

The following formula is used for calculating the selling price of a product/service, using the variable-cost pricing approach:

Selling price = Variable cost per unit + Mark-up percentage on variable cost (Faul *et al.* 2001:362).

The formula can also be expressed as:

$$\text{Selling price} = \frac{\text{Unit cost}}{(1 - \text{desired return on sales})}$$

Where unit cost = Variable cost plus fixed cost (Kotler, 2000:465).

The mark-up percentage for the variable cost pricing method is determined by applying the following formula:

$$\text{Mark-up percentage} = \frac{\text{Desired profit + Total fixed costs}}{\text{Total variable costs}}$$

Total fixed costs and profit are thus included in the mark-up percentage (Niemand *et al.* 2006:452).

Govender (2000:47) reports that a study that was done on a choice between full-cost and variable-cost pricing, indicates that 74,5% of firms use full cost for pricing products/services, and only 25,5% use variable costs for pricing purposes. Palmer (2000:7) also believes that pricing based on marginal costs may only work on a short-term basis because the full costs have to be recovered and, the calculation of marginal costs can be difficult. The main advantage of marginal-cost pricing is that it does not require the allocation of fixed costs to individual products/services (Langfield-Smith *et al.* 2003:939).

Table 4.1 summarises cost-based pricing methods based on the three cost concepts.

Table 4.1: Cost-based pricing methods

Cost concept	Covered in cost amount	Covered in mark-up
Total cost	Total cost	Desired profit
Product/service cost	Total manufacturing/ service cost	Desired profit + Total selling and administrative costs
Variable cost	Total variable cost	Desired profit + Total fixed costs

(Warren *et a*l. 2002:M317)

Example of cost-based pricing methods based on the three cost concepts.

The following example by Faul *et al.* (2001:360) illustrates the cost-based pricing methods based on the three cost concepts. A manufacturing company will be used to illustrate the cost-based pricing methods.

The costs are as follows:

Variable costs per unit

Direct material	R9,00
Direct labour	R30,00
Manufacturing costs	R4,50
Selling and administrative costs	R4,50

Fixed costs

Manufacturing overheads	R120 000
Selling and administrative costs	R80 000

The desired rate of return is 20% and the investment is R2 500 000.

The organisation budgeted to manufacture and sell 100 000 units.

The calculation of the selling price using cost-based pricing methods based on the three cost concepts is outlined in table 4.2.

Table 4.2: An illustration of the calculation of the selling price of a product using the different cost-based pricing methods

	Cost-based pricing approach based on:		
	Total cost	Product cost	Variable cost
Variable costs			
Direct material	R9,00	R9,00	R9,00
Direct labour	R30,00	R30,00	R30,00
Manufacturing costs	R4,50	R4,50	R4,50
Selling and administrative costs	R4,50	Not applicable	R4,50
Fixed costs			
Manufacturing overheads	R1,20	R1,20	Not applicable
Selling and administrative costs	R0,80	Not applicable	Not applicable
Cost per unit	**R50,00**	**R44,70**	**R48,00**
Mark-up percentage	10%	23,04%	14,58%
Selling price			
Cost price	R50,00	R44,70	R48,00
Mark-up amount	R5,00	R10,30	R7,00
	R55,00	**R55,00**	**R55,00**

The calculation of mark-up percentage and mark-up amount follows:

Approach	Mark-up percentage		Mark-up amount
Total cost	$\dfrac{20\% \times R2\ 500\ 000}{100\ 000 \times R50,00}$	= 10%	R50,00 x 10% = R5,00
Product cost	$\dfrac{R500\ 000 + R450\ 000 + R80\ 000}{100\ 000 \times R44,70}$	= 23,04%	R44,70 x 23,04% = R10,30
Variable cost	$\dfrac{R500\ 000 + R120\ 000 + R80\ 000}{100\ 000 \times R48,00}$	= 14,58%	R48,00 x 14,58% = R7,00

4.2.1.4 Break-even pricing

Break-even analysis, and therefore break-even pricing, is one of the elements of cost-volume-profit analysis (Garrison *et al.* 2003:228).

Neish & Banks (2003:722) explain cost-volume-profit analysis as "the analysis of the relationships between costs, sales, margins of safety, and volume of activity so as to advise management on the consequences of various decisions". According to Solomon & Stuart (2000:334) and Perreault *et al.* (2009:496) break-even analysis evaluates the number of units that an organisation must produce and sell at a specific selling price to cover all its costs. It thus indicates the relationship between total revenue and total cost and determines the different levels of profitability at different levels of output (Machado, 2005:41).

Research clearly indicates the usefulness of break-even analysis in planning and in the decision-making process. Yunker (2006:161) and Weil & Noi (2003:306) maintain that the break-even analysis is one of the most popular analytical tools being utilised in decision-making, because it provides a good indication of the economic realities of an organisation. Break-even analysis is also a useful tool in

studying the relationships of price, cost and volume, and it is a way to evaluate the profit potential and risk associated with a pricing decision (Anderson & Vince, 2000:404). It is also useful in analysing pricing alternatives (Cravens & Piercy, 2006:49). Break-even analysis is also helpful in evaluating alternatives, and it is easy to use (Perreault *et al.* 2009:498). On the other hand, Lovemore & Brümmer (2003:199) maintain that the break-even analysis also has weaknesses, such as the assumption that costs and revenues are function on a linear scale. It is also not applicable in an organisation that produces and sells more than one kind of product, as the costs and prices per unit would not necessarily be the same and could, therefore, not be included in the same calculations.

Cost-volume-profit analysis can be used to calculate the break-even point. The break-even point refers to the level of sales at which all costs, variable and fixed, are covered, but no profit is generated (Ingram *et al.* 2005:G1) (Vanderbeck, 2010:491). It therefore indicates a zero-profit condition (Landsburg, 2002:207). The break-even point can be expressed as break-even quantity, break-even value and break-even pricing (Hall, 2005:27).

a) Break-even computations

The two ways to calculate the break-even point are through the equation method and the unit-contribution method (Ingram *et al.* 2005:M169). These two methods are equivalent (Garrison *et al.* 2003:228).

- Equation method

The equation method is based on the relationship between sales, total costs, and profit.

According to Ingram *et al.* (2005:M169) the equation for the break-even point (in sales volume) can be written as:

Sales = Variable costs + Fixed costs + Profit

Alternatively:

Profit = Sales – (Variable costs + Fixed costs)

If refined further, the equation can also be stated as:

Break-even quantity represented by (Units sales price x sales volume in units)
= (Unit variable cost x units sold) + Fixed costs + Profit (Yunker, 2001:129).

The profit will be zero because the break-even point is the point where there is no profit or loss.

The equation for the break-even point (in sales value) can be written as:

Break-even value = Break-even quantity x Selling price per unit (Neish & Banks, 2003:260).

- The unit- contribution method, contribution margin or marginal income per unit method.

This method emphasises the unit contribution margin/ marginal income per unit, which is the difference between the selling price per unit and the variable cost per unit, expressed as:

Selling price per unit – Variable cost per unit (Maher *et al.* 2006:68).

The formula, according to Weil & Noi (2003:306), for determining the break-even point, expressed in the break-even quantity, under the contribution-margin method can be expressed as:

$$\text{Break-even quantity} = \frac{\text{Total fixed costs}}{\text{Unit contribution margin}}$$

Or it can also be written as:

Sales volume in units x (Unit sales price – Unit variable costs) – Fixed costs = Profit

Where the profit, as explained above, is zero.

The equation for the breakeven point (in sales value), when using the contribution-margin method, can be written as:

$$\text{Break-even value} = \frac{\text{Total fixed costs}}{\text{Marginal income ratio}}$$

(Garrison *et al.* 2003:229) (Maher *et al.* 2006:71)

Where the marginal-income ratio is calculated as:

Marginal income per unit
Selling price per unit

(Niemand *et al.* 2006:392)

b) Break-even pricing

Break-even pricing is a cost-based pricing approach that may be used to determine the selling price of a product/service (Cravens & Piercy, 2006:332). Break-even pricing is based on break-even analysis, and represents the selling price of a product/service at a certain level of sales where no profit is generated (Landsburg, 2002:731).

By rearranging the break-even formula, according to the unit contribution approach or the equation approach, it is possible to determine the break-even selling price as follows: (Hall, 2005:27).

Sales volume in units x (Unit sales price – Unit variable costs) – Fixed costs = Profit

□Sales volume in units x (Unit sales price – Unit variable costs) = Fixed costs

□ Unit-sales price – Unit-variable costs = $\dfrac{\text{Fixed costs}}{\text{Sales volume in units}}$

□ Unit-sales price = Unit-variable costs + $\dfrac{\text{Fixed costs}}{\text{Sales volume in units}}$

Profit will not affect the equation as it is zero.

(Lambin, 2000:576)

An example to illustrate break-even pricing using the following assumed information:

Fixed costs   R2 700 000 per year

Unit variable cost   R31,50 per unit

Expected sales volume   3 600 units

Selling price = R31,50 + $\dfrac{\text{R2 700 000}}{\text{3 600 units}}$

Selling price = R781,50

To prove that the break-even price is R781,50, the break-even price is applied to the break-even point formula as follows:

Sales = Variable costs + Fixed costs + profit

□(3 600 x R781,50) = (3 600 x R31,50) + R2 700 000 + 0

□R2 813 400 = R113 400 + R2 700 000 + 0

□R2 813 400 = R2 813 400

4.2.1.5 Target-profit pricing

Target-return pricing or rate-of-return-pricing, contains all the basic elements of cost-orientated pricing approaches, but brings the cost of capital tied up in producing and distributing the product, or rendering the service into the pricing decision (Cant *et al*. 2006:342). In target-return pricing the price of the product/service is determined at a rate that yields the target rate of return on the investment (Du Plessis *et al*. 2001:347). When using this pricing approach, managers will have to estimate the unit-sales volume of the product/service, determine the unit cost, estimate the amount of capital involved in producing and selling the product or rendering the service, and finally select a target rate of return on the investment.

The price of the product/service when using the target-profit pricing approach can be calculated as follows:

$$\text{Price} = \text{Unit cost} + \frac{\text{Target return x invested capital}}{\text{Unit sales}}$$

(Whitwell *et al*. 2003:285)

An example to illustrate the target-profit pricing approach using the following assumed information:

An organisation has invested R15,6 million of capital and wants to make a 20% return on this investment. The unit cost amounts to R120 and the organisation plans to sell 120 000 units annually. The target price per unit would be:

$$\text{Price} = \text{R120} + \frac{20\% \text{ x R15 600 000}}{120\ 000}$$

Price = R146

4.2.2 Market-based pricing methods

The costs of a product/service set the lowest limit on prices, while the market and demand for the product/service set the upper limit (Kotler & Armstrong, 2006:315). The price of a product/service will therefore be somewhere between one that is too low to produce the product, or render the service, and one that is too high to produce any demand for the product/service.

Anderson & Vince (2000:399) explain market-based pricing as "establishing a desired target profit after considering the target customers, key competitors' products, and product benefits provided". Undoubtedly, market-based pricing methods look at the marketplace and focus on customers and competitors.

Lambin (2000:578) explains that market-based pricing methods start with the price the market is most likely to accept after considering factors such as customer needs, competition, and benefits provided by the product/service. This is referred to as the target price. From the target price, working backwards, the contribution margin and the target cost of the product/service can be determined.

The market-based pricing model is illustrated in figure 4.3.

Figure 4.3: Market-based pricing model

Logic	Application
Price set to meet customer needs, competition, and product positioning	Price = R100 Based on desired product positioning
Price discounted to achieve desired reseller margins	Price = R50 Based on 50% retail margin
Net price set is selling price less distribution costs	Price = R40 Based on 20% wholesale margin
Target margins established based on profit goals	Net price = R40 To the manufacturer
Cost targets established to meet marketing objectives	Cost = R20 Unit margin = R20 % Margin = 50%

Pricing logic starts here

(Anderson & Vince, 2000:400)

Market-based pricing methods include demand-based and competition-based pricing methods.

4.2.2.1 Demand-based pricing methods

Demand-based pricing is also referred to as customer-based pricing, because customers are the frame of reference in demand-based pricing methods. The objective of demand-based pricing is to determine how much the customer is willing to pay for the product/service of the organisation, based on the contribution of the product/service to the customer's needs and wants (Pasura & Ryals,

2005:48). Demand-based pricing thus look outwards from the organisation to the customers and their responsiveness to different price levels.

Solomon & Stuart (2000:353) define demand-based pricing as "a price-setting method based on estimates of demand at different prices". Before setting prices an organisation should gather information on the relationship between the price and demand of the product/service. If the demand for the product/service is high, the price set may be high, while a lower demand for the product/service will result in a lower price. High prices thus temper demand, and low prices stimulate demand (Rafi, 2005:84). The relationship between the demand and price of a product/service is discussed in chapter two.

According to Shipley & Jobber (2001:311) and Perreault *et al.* (2009:512) the following are the main arguments for and against demand-based pricing methods. Arguments for demand-based pricing methods are:

- Prices are set according to what customers are willing and able to pay.
- Recognition of the difference between customer value perceptions and spending power will persuade management to set disparate prices in different segments to enhance overall profitability.

Arguments against demand-based pricing methods are:

- No cognisance is taken of the cost structure of organisations.
- No cognisance is taken of competition in the marketplace.
- Because there are major difficulties in gathering information, the results of demand estimates will be imperfect.
- The demand curve is difficult to estimate.

Some of the demand-based (customer-based) pricing approaches are discussed below.

a) Value-based pricing

Saxena (2009:325), Rafi (2005:84) and Davey *et al.* (2006:29) believe that most organisations are currently using cost-based pricing methods, but that an increasing number of organisations are moving in the direction of using the perceived value of a product/service to determine prices.

Sullivan (2008:8) and Pasura & Ryals (2005:49) refer to value-based pricing as a pricing principle that prices a product/ service according to the value it brings to customers.   To understand value-based pricing there must be a clear understanding of what customers mean by the term, "value"?   Zeithaml *et al.* (2006:526) believe customers define value in the following four ways:

- Value is a low price;
- Value is whatever a customer wants in a product/service;
- Value is the quality that a customer gets for the price paid;
- Value is what the customer gets for what was sacrificed in total (time, effort, money).

Ferrell & Hartline (2005:121) are of the opinion that value is difficult to define as it has diverse meanings for a variety of people. For some customers value is high quality, while other customers see value as a low price.   Hume (2006:51) maintains that value is more than price, and that price is only one of the components of value.

The most common definition of value relates customer benefits to customer costs and can be expressed as:

$$\text{Perceived value} = \frac{\text{Perceived benefits (quality)}}{\text{Perceived sacrifice (price)}}$$

(Ferrell & Hartline, 2005:121) (Pasura & Ryals, 2005:49)

An explanation of the two components in the perceived value definition follows:

Perceived sacrifice (price) to a costumer equals the purchase price plus any other costs involved with the product/service such as installation fees, order handling, transportation, contract fees etc. (Dingkun, 2002:175). Salvador *et al.* (2007:43) maintain that the cost is not only the monetary price of a product/service but contains the following three elements: (a) the amount paid; (b) the cost and effort required to obtain the product/service; (c) the costs and effort required for the proper use of the product/service (poor quality, or time needed to solve problems).

Perceived benefits (quality), as explained, has different meanings for various people, and is therefore a combination of physical attributes, service attributes, and technical support available in relation to the use of the product (Dingkun, 2002:175). Perceived quality can also be defined as the belief in the overall "goodness" of what is received (Wu & Hsing, 2006:126).

However, managers of organisations must remember that this equation of perceived value is not an exact mathematical formula, but only represents a comparison of perceived benefits to perceived sacrifice (Monroe, 1990:74). Haylock (2005:18) agrees with this view, and is of the opinion that setting prices based on value to customers can be extremely difficult as no straightforward mathematical formula can be used to calculate value prices, and that setting a price based on value is essentially a subjective activity.

How do organisations determine price using value-based pricing? Anderson & Vince (2000:403) explain the steps in value-based pricing as follows: Firstly, customers, by making use of a number of contextual factors, will make a comparison between a perceived reasonable price for a product/service (called the reference product), and the actual price (called the focal product) of the product/service that the customer is considering to purchase. The purpose of this comparison is to establish perceptions of the reasonableness of the price for the

reference product, and a perception of the quality of the focal product/service. Once this is done the customer enters the next stage of the process that involves the development of the perceived expected sacrifice, based on the perceived reasonable price of the reference product, and a perceived perception of the expected benefits from the focal product/service. The customer then performs a cost comparison, based on these two parallel perceptions that result in the expected value that the customer perceives in the purchase situation. A high expected value will usually result in purchases by the customer, and a low expected value will result in the purchases being declined by the customer.

Figure 4.4 illustrates the value-based pricing model. The model clearly indicates that customers make a comparison between the reference product and the focal product in terms of perceived reasonable price and perceived quality, as well as perceived sacrifices and perceived benefits.

Figure 4.4: Value-based pricing model
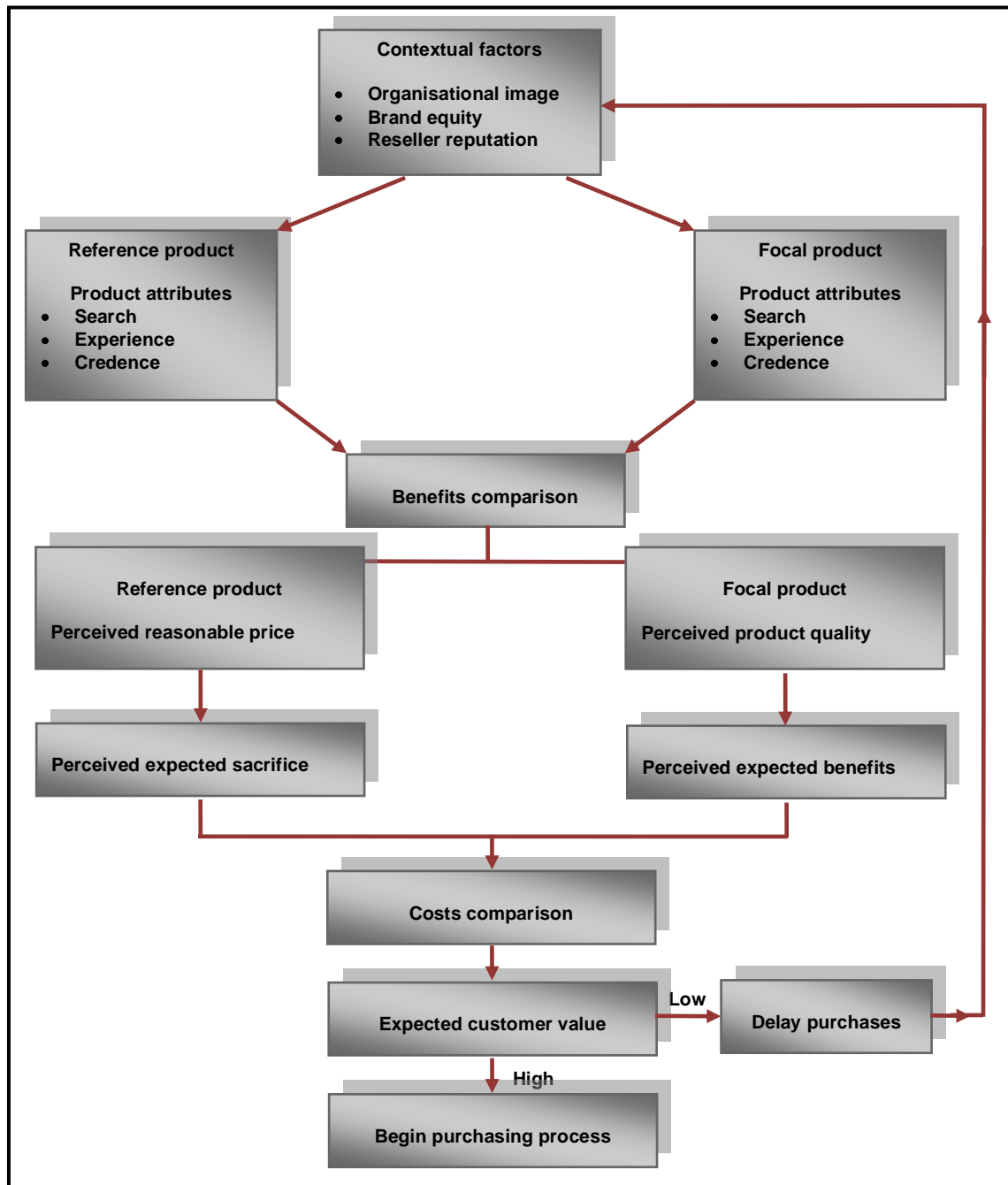
(Anderson & Vince, 2000:402)

How does value-based pricing differ from cost-based pricing? Kotler & Armstrong (2006:322) and (Pasura & Ryals, 2005:47) explain that cost-based pricing is

product driven and starts with the design and production of the product/service, and then sets a price that covers costs plus a target profit. The marketers of the organisation then need to convince the customers that the value of the product/service at that price is justified. Value-based pricing reverses this process and starts with the customers' perception of the value of the product/service and then sets the price. The target value and price then drives the design of the product/service as well as the costs that can be incurred. Pricing thus starts with an analysis of the customers' needs, and their perceived value of the product/service. Then the price is set to meet these needs and the perceived value.

Figure 4.5 compares cost-based pricing with value-based pricing.

Figure 4.5: Cost-based pricing versus value-based pricing
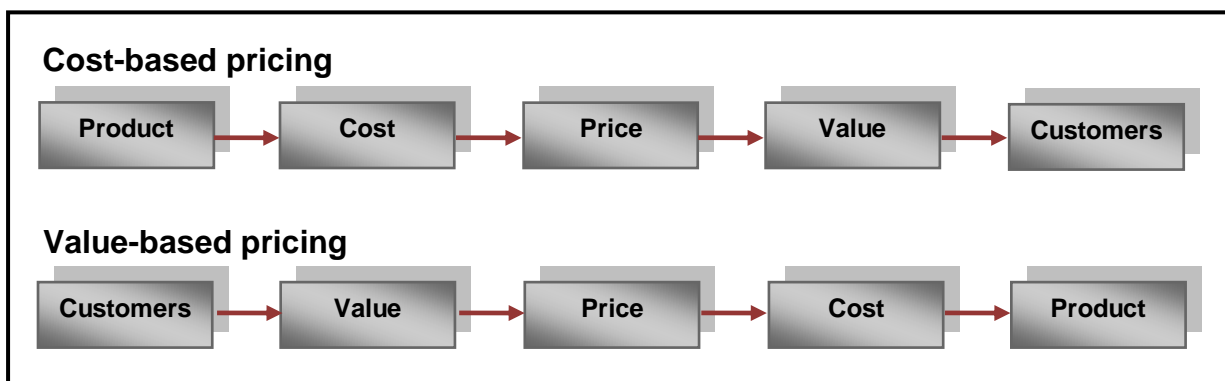
(Nagle & Holden, 2002:4)

b) Prestige pricing

Avlonitis & Indounas (2006:347) define prestige, or image pricing, as "the practice of setting high prices for products/services with unique or unusual distinctiveness". Prestige pricing implies that in setting a high price more units of the prestige product/service can be sold than at a lower price. This is because customers

often associate the price of a product/service as a measurement of quality, and price is therefore an indicator of quality (Rafi, 2005:2000) (Perreault *et al*. 2009:508).

In prestige pricing prices are set without taking the cost structure of the organisation or the competition into consideration (Ferrell & Hartline, 2005:193). Prestige pricing is common in service organisations, and Brink (2005:75) believes this is because customers cannot see the service in advance, and they consider the price of the service to be the stamp indicating the quality of the service (Perreault *et al*. 2009:508).

c) Demand-backward pricing

Demand-backward pricing starts with an acceptable customer price for the product/service, and then works backwards to the costs of the product/service. The costs are then deducted from the customers' price to determine if the profit margin is adequate (Cant *et al.* 2006:346) (Perreault *et al*. 2009:507).

d) Optimal price

The optimal price for a product/service is that price at which the profit is maximised (Collier, 2003:112). If the price elasticity for the product/service, as discussed in chapter two, is known, the optimal price can be calculated as follows:

Optimal price = Unit direct cost x Cost mark-up

Where:

Cost mark-up = $\dfrac{\text{Price elasticity}}{\text{Price elasticity} + 1}$

(Lambin, 2000:583)

4.2.2.2 Competition-based pricing methods

The competition is the frame of reference in competition-based pricing methods. The price of a product/service can be used as an instrument of competition because price is a way to attack competitors in the market, or to position the organisation away from direct competition. The competition in the market will also guide an organisation when deciding where to set prices (Cravens, 2000:330).

Miller & Layton (2000:368) define competition-based pricing as "a pricing method in which a firm ascertains what the market price is and after allowing for customary mark-ups for intermediaries, arrives at its own selling price". Competition-based pricing thus recognises the influence of competition in the marketplace and, therefore, prices are based on what that competitors charge for similar products/services. Ferrell & Hartline (2005:189) strongly believe that organisations should be aware of the prices of the competitors in the market, but that they should resist the temptation to blindly meet or beat the prices of competitors. Organisations should think in terms of staying within a price range, as illustrated in figure 4.6, when there are competitors in the marketplace.

Figure 4.6: Competitive pricing: Possible pricing range

A = Marginal cost per unit
B = Lowest price limit in the market
C = Average cost per unit
D = 'Going rate' price in the market
E = Top end price limit in the market

Possible price range
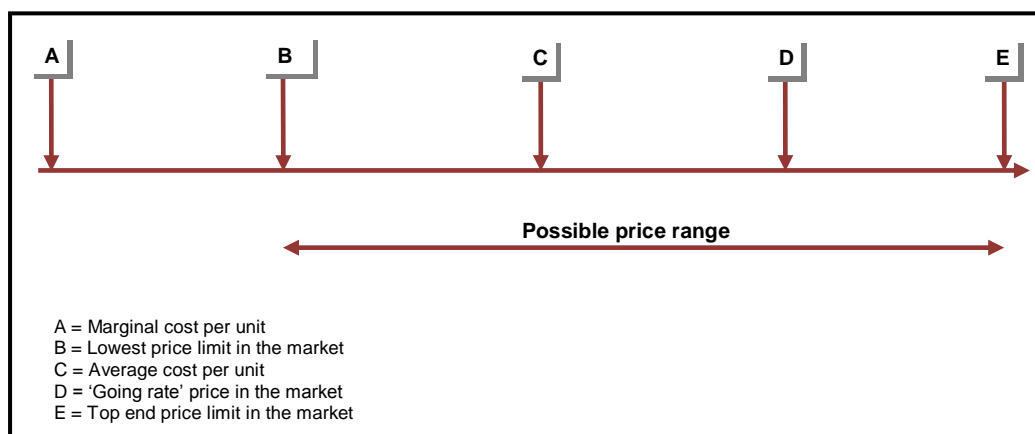
(McDonald, 2002:377)

Figure 4.6 clearly shows that the costs (A) of the product/service set the floor to the price of a product/service. No profits will be generated below this price. Customers' value perception (E), establishes the upper limit of the price of a product/service. There will be no demand for the product/service above this price. Competitors' prices (B, C and D) are a price range in between the costs and customers' perceived value. These two limits provide a definite price range that an organisation may use when deciding on a pricing strategy (Hutt & Speh, 2004:396). If the organisation operates in a more competitive market, a buyer's market, the price will be closer to the floor price (A) and if the market is more of a seller's market the price will be closer to the price ceiling (E) (Hatton, 2000:185).

According to Cant (2003:72) there are two aspects of competition that influence the price strategy of an organisation. The first is the *competitive environment* in which the organisation operates, and the second is the *competitors' pricing strategies.*

a) *The competitive environment.* Solomon & Stuart (2000:340) and Ferrell & Hartline (2005:194) explain the four general types of competitive markets as follows:

- Oligopolistic competition. In an oligopolistic environment there are only a few large sellers of a product/service who are aware of, and sensitive to one another's prices and marketing strategies. The main characteristic of an oligopoly is the avoidance of price competition, and organisations make use of non-price competition. In an oligopolistic environment care must be taken when making price changes because there are no guarantees that other organisations in the market will follow and, therefore, changes can jeopardise the customer base of an organisation.
- Monopolistic competition. In a monopolistic environment there are many buyers and sellers, exchanging relatively heterogeneous products/services, and the focus is on both price and non-price competition.

- Pure monopoly. In pure monopoly conditions, only one firm provides the product/service in a certain area, and there is, therefore, no competition in the market. An unregulated monopolist might charge a high price for a product/service, because there is no competition, while a regulated monopolist, in public interest, will be required to charge a lower price for the product/service.

- Pure competition. In purely competitive markets, called perfect competition, there are many competitors in the market, exchanging homogeneous products/services, and none of them will have much influence on the price. There is almost no price competition as the market sets the price for the product/service.

b) *Competitor's pricing strategies*. An analysis should also be done on the pricing strategy of the competition because competitors' prices can be used as an indication of acceptable prices. According to Cravens (2000:339) each competitor should be evaluated to determine: (i) which organisation represents the strongest competition in the target market; (ii) how competitive organisations are positioned in the market, and the extent to which price is used in the marketing strategies of these organisations; (iii) how successful each organisation's price strategy has been, and (iv) what the probable reaction will be of competitors to alternative price strategies.

Once the analysis on the competitive environment and competitors has been completed, the organisation needs to decide on a pricing method, relative to the competition, that will be followed. Hiebing & Cooper (2003:240) and Miller & Layton (2000:371) explain the various competition-based pricing methods as follows:

- Going-rate pricing, also called meet-the-competition or perfect competition pricing. In going-rate pricing the organisation sets a price equal to that of the competition for the product/service. This method of pricing pays little

attention to the costs of an organisation, or the demand for the product/service.

- Above-market pricing. In above-market pricing an organisation uses the price of competitors as a point of departure, and then sets a price at a specified percentage above that of the competition.
- Below-market pricing. In below-market pricing the price of the product/service is set at a specified percentage below that of the competition.

There are many arguments for and against competition-based pricing methods. Shipley & Jobber (2001:311) and Gorelick (2004:2) identified the following major arguments for and against competition-based pricing methods:

Arguments for competition-based pricing approaches are:

- Simple to administer.
- May prevent price wars as rivals know that cuts will be copied.
- Allows followers in the market to benefit from common price increases, and avoid being disadvantaged by competitors' price cuts.

Arguments against competition-based pricing approaches are:

- No cognisance is taken of opportunities for using initiatives for the gain of organisations.
- No action to counteract discounts given by rivals is taken, because these discounts are often negotiated in secret.
- Price equality does not ensure equal competitiveness, because this is also affected by non-price benefits.
- Competition-based pricing has a destructive nature because it focuses on competition and price as the only issues in price setting, and ignores

customers' demands and needs. It also ignores the costs of organisations in providing a product/service.

4.3 METHODS AND POLICIES FOR THE PRICING OF INSTRUCTION AT HIGHER EDUCATION INSTITUTIONS

4.3.1 Tuition-fee pricing methods

Noorbakhsh & Culp (2002:278) state that administrators of public higher education institutions have paid little attention to the development of formal pricing methods for their products. They believe that public higher education institutions followed a trend of just setting the tuition fees at a level that is necessary to compensate for the shortfall between other sources of operating revenue and expenditure.

Foskett *et al.* (2006:33) on the other hand states that there is evidence that indicates that higher education institutions use a combination of cost and demand factors plus other factors that relate to the reputation, the brand positioning, and the levels of social justice to determine the amount of tuition fees. Other researchers such as Wellman & O'Brien (2000:7) believe that tuition prices are disconnected from cost information, and that is the reason why cost analysis is rarely used to answer questions about price at higher education institutions.

HESA (2008:22-23) indicates that the setting of tuition fees by South African public higher education institutions is generally characterised by the following:

- There is no single and system-level model to guide institutional practices regarding the setting of tuition fees. While some institutions have a single fee that includes tuition and all associated services, other institutions set a 'tuition fee' and then add extra charges (such as notes, levies and internet connection charges).

- Processes for determining tuition-fee increases also vary widely within the higher educational system. In some cases these processes provide for active and ongoing involvement of Student Representative Councils, while in other cases such involvement appears to be somewhat sporadic.

- Several institutions set tuition-fee levels in relation to changes in the general-consumer inflation. Institutions recognise that their costs rise at a greater rate than the general-consumer inflation rate, and calibrate their tuition-fee increases against an estimate of this higher rate. Some institutions (and particularly those that are still regularising fees after mergers) are seeking to raise the base level of their fees by accelerated increases.

- Most institutions set their tuition fees by taking cognisance of fee levels at competitor institutions.

- A limited number of institutions set tuition fees based on the total direct and indirect cost of study programmes.

4.3.2 Tuition-fee pricing policies

Tuition-fee pricing policy in higher education is set at two levels: Firstly, this is done by higher education institutions, governed by the authority of boards or trustees; and secondly, by the government through laws or budget practices.

Several different tuition-fee pricing policy approaches exist in higher education and these are discussed below.

4.3.2.1 Flat rate tuition-fee policy

A flat rate tuition-fee policy, also referred to as a uniform tuition-fee policy, is based on the principle of a uniform tuition-fee rate nationally, normally set by government. The uniform tuition fees could apply to all academic programmes across the higher education system, or they can be applicable to similar

programmes across the higher education system. Flaws in the flat rate tuition-fee policy is that the actual costs of higher education, and institutional differences are ignored, which inhibits competition amongst higher education institutions (HESA, 2008:20).

4.3.2.2 Free tuition-fee policy

The principle of a free tuition-fee pricing policy is that there is no charge for higher education. This policy ensures that the price for tuition fees at higher education institutions is zero, and the financing of higher education is therefore the sole responsibility of the government. Psacharopoulos & Papakonstantinou (2005:103), Foskett *et al.* (2006:33) and Schwarz & Rehburg (2004:523) maintain that although students at these higher education institutions pay no tuition fees, there are other private and social costs that are associated with the attendance of higher education institutions such as the direct costs of attendance that are funded by the taxpayer including the parents of the student; the costs of forgone earnings of the student while studying; the costs of preparing for higher education entry such as examinations; rent and living expenses; transport and so on. A study done by Psacharopoulos & Papakonstantinou in Greece also shows that although the tuition fees are zero, families spend more on higher education per student than the government spends per student (Psacharopoulos & Papakonstantinou, 2005:106). Higher education is thus not free - only tuition fees are free.

According to Marcucci & Johnstone (2007:26) there are several rationales for a free tuition-fee policy:

- The return from higher education to society is high.
- Education is, or should be, a fundamental human right.

- Tuition fees may discourage the participation in higher education of students from low-income families, rural areas or ethnic minorities, which may have a negative impact on social equality and social benefits.
- The costs of attending higher education are high and financially out of reach for many students and their families.

4.3.2.3 Fixed tuition-fee policy

Morphew (2007:34-39) explains that a fixed tuition-fee pricing policy works as follows: The principle of a fixed tuition-fee policy is that students pay the same annual tuition fees over a pre-determined period, which is the time required to complete the qualification they have enrolled for. The higher education institution will forecast what the tuition fees will be for the graduation period, and calculate the average tuition fees for each academic year over this period. Students who do not graduate within the pre-determined time will be charged at a higher rate for any subsequent credit hours required to graduate.

Figure 4.7 illustrates the difference between the fixed tuition-fee policy and the traditional tuition-fee policy. Figure 4.7 assumes a total tuition fee of R 4 640. The study period for the qualification is 4 years. Using the fixed tuition-fee policy the total amount for tuition fees, R 4 640, will be divided by four, and the student will then pay R1 160 per annum for tuition fees over four years. The traditional tuition-fee policy will start with tuition fees of R1 000 in the first year and then add, for example a 10% annual increase, resulting in tuition fees of R1 100, R1 210 and R1 331 in years two, three and four respectively.

Figure 4.7: Traditional tuition fee policy versus fixed tuition fee policy
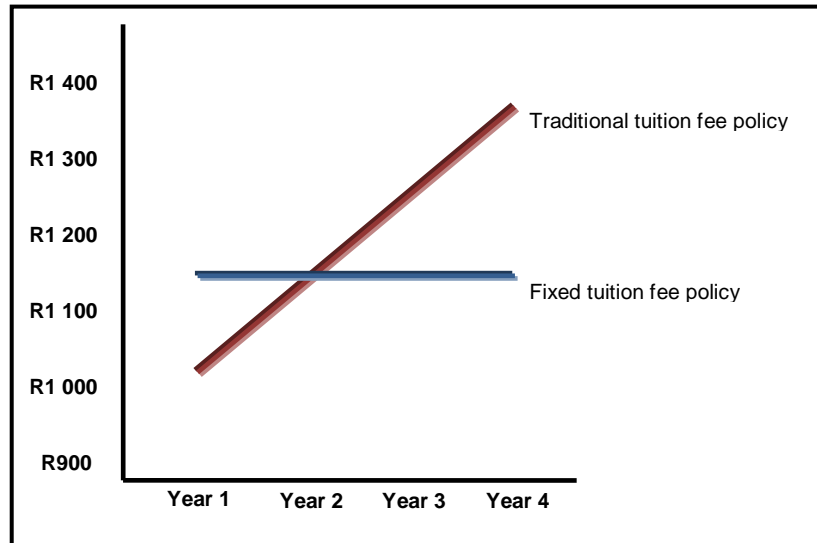
(Morphew, 2007:37)

An advantage of the fixed tuition-fee policy is that it provides comfort to parents and students because they know exactly how much the tuition fees will be for each year of the study period. This pricing policy may also encourage more students to persist in attending higher education institutions and to graduate (Morphew, 2007:34-39).

A disadvantage of the fixed tuition-fee policy is that it assumes that the administrators of the higher education institution can predict the future cost of highly inflationary items with the added complication of predicting what level of state appropriations it will receive (Morphew, 2007:34-39).

4.3.2.4 Variable tuition-fee policy

A variable tuition-fee policy, also referred to as a differentiated tuition-fee policy, is based on the principle of differential tuition fees between provinces, higher education institutions, and even levels of instruction within the same higher

education institution (HESA, 2008:21). In a higher education institution there may be, for example, differentials in tuition fees between undergraduate and graduate programmes, and there may even be much higher tuition-fee levels for professional qualifications (Ward & Aubrey, 2005:31). According to Shin & Milton (2007:720) the principle of variable tuition fees is that programmes that require the higher education institutions to provide laboratories, field experiences etc. should charge students higher tuition fees than for those programmes with fewer associated costs. Adnett & Tlupova (2007:14) summarise the principle of variable tuition-fee policy by stating that those who will benefit more from higher education should pay more.

4.3.2.5 Redistributive tuition-fee policy

A redistributive tuition-fee policy is based on differential tuition fees according to the available disposable income of the student or the family of the student. Students from low-income families only pay what they can afford while the other students, from middle- and higher income families, pay the entire amount of the tuition fees. In the redistributive tuition-fee policy financial aid will be used to keep tuition fees consistent and affordable for the more needy students and their families (HESA, 2008:21).

According to HESA (2008:21) a redistributive tuition-fee policy is difficult and expensive to apply because all students and their families must take a means test. This system is open for abuse, and the responsibility is therefore generally transferred to the student to apply for means-testing through the financial aid system. This policy is then referred to as the modified redistributive tuition-fee policy (HESA, 2008:22).

4.3.2.6 Non-resident tuition-fee policy

A non-resident, tuition-fee policy is based on the principle that the taxpayers of a country are not responsible, and should not be burdened with the cost of the higher education of non-residents (Noorbakhsh & Culp, 2002:277). The practice of the non-resident tuition-fee policy is to charge international students a higher tuition fee than that charged for domestic full-fee paying students. Students that are not residents of the country will be charged a tuition fee that equals the full costs (total cost) of higher education (IHEP, 1999:24).

4.3.2.7 Up-front and deferred tuition-fee policy

Once a higher education institution has decided to charge tuition fees the question is: When should the tuition fees be paid? Using the up-front tuition-fee policy, tuition fees are payable when students receive their matriculation certificates, thus, they pay before they enrol as higher education students (Marcucci & Johnstone, 2007:26). An up-front tuition-fee policy is based on the assumption that parents have a responsibility to cover a portion of the student's higher-education costs, and up-front tuition fees are, therefore, normally paid by the parents of the student. The proportion of tuition fees to be paid, or the amount of financial assistance available depends on the income of the family (Chapman, 2001:196).

In a deferred tuition-fee policy the assumption is that the parents are not responsible for the higher education of a student, and that students cannot cover the costs of higher education while they are studying. Income-contingent loans are a way of deferring tuition fees to the future (Marcucci & Johnstone, 2007:31). Johnstone (2005:9) describes income-contingent loans as "a contractual obligation to repay some percentage of future earnings until the loan is repaid at a contractual rate of interest, or until the borrower has repaid either a maximum amount or has repaid the money for a minimum number of years". Another form

of deferred tuition fees are graduate taxes "whereby the student, in return for government subsidisation of higher education, becomes obligated to pay an income surtax, generally for the rest of the student's lifetime" (Johnstone, 2005:10).

4.3.2.8 Dual-track tuition-fee policy

In countries where there is strong resistance to tuition fees, dual-track tuition-fee policies are likely to be implemented. In a dual-track tuition-fee policy a certain number of students (government-sponsored students) do not have to pay tuition fees, or they pay very low tuition fees based on certain criteria. Students who do not qualify for free tuition fees may attend a higher education institution but on a tuition-fee paying basis (Marcucci *et al*. 2008:105).

4.3.2.9 Free market tuition-fee policy

A free market tuition-fee policy is based on the market demand and supply for academic programmes, the cost of providing these academic programmes, the potential-earning capacity of programme graduates, and competitive pressures. Free-market tuition fees will therefore vary according to subjects and academic programmes (HESA, 2008:22).

4.3.2.10 Administered tuition-fee policy

The alternative to the free market tuition-fee policy is the system of administered prices. Lehohla (2005:1) describes an administered price as "the price of a product that is set consciously by an individual producer or group of producers and/or any price that can be determined or influenced by the state, either directly or through any government agency or institution, without reference to market forces".

HESA (2008:27) states that an administered tuition-fee pricing policy is unlikely to be successful, that efficient pricing is hardly possible under this policy, and it could have devastating effects on government's objectives for higher education.

To summarise: HESA (2008:22) states that the trend in South Africa is for higher education institutions to use various combinations of the variable tuition-fee policy, some of the aspects of the free market tuition-fee policy, as well as the modified redistributive tuition-fee policy.

4.4 SUMMARY

This chapter analysed the pricing methods that an organisation can use to determine the selling prices of products/services.

An organisation can select one or a combination of three general pricing approaches to determine the price of a product/service, namely: cost-based pricing, demand-based pricing, and competition-based pricing.

- Cost-based pricing sets prices based on the cost structure of an organisation, but competition and customers in the market do not play a role.
- Demand-based pricing relies on consumer perception of value to drive pricing decisions, but the cost structure of an organisation, and the competition in the marketplace has no importance.
- Competition-based pricing sets prices based on what competitors are charging, but the cost structure of an organisation and the customers in the marketplace are unimportant (Phillips, 2005:22).

This chapter concludes the discussion of the pricing function in an organisation.

The next chapter will provide an overview of public higher education in South Africa with regards to legislation, funding, recurrent expenditure, student enrolments and affordability.

CHAPTER 5

PUBLIC HIGHER EDUCATION IN SOUTH AFRICA:
AN OVERVIEW ON SELECTED THEMES

5.1 INTRODUCTION

This chapter concludes the literature study and, together with chapter six and seven, will address the pricing of instruction at a public higher education institution in South Africa namely, the Central University of Technology, Free State.

Public higher education institutions are classified as non-profit organisations, and especially as commercial non-profit organisations because these organisations deliver services to individuals with concomitant social benefits (Mensah & Werner, 2003:296) (Johnes, 2006:273). Students as well as society benefit from investment in higher education, therefore, the costs of providing higher education services should be borne by the student, and be subsidised by government (Mensah & Werner, 2003:296). The price for public higher education can, therefore, be calculated as:

Price (tuition fees) = Costs – Government grants (Reindl, 2000:99).

The price of instruction at public higher education institutions therefore consists of two components, firstly, the cost of the service rendered by the public higher education institution and secondly, the government grants. These two components are discussed in this chapter.

According to research there is a great need for further research on the relationships between the level of tuition fees, affordability and access to public higher education institutions. As tuition fees are viewed as an indicator of the affordability of higher education the changes in tuition fees, participation and financial aid contributions at public higher education institutions will also be examined.

5.1.1 Goal of the chapter

The purpose of this chapter is two-fold:

- To provide background information for the discussion on the pricing of instruction at a public higher education institution in South Africa.
- To discuss national trends in funding, costs, financial aid, and student enrolments at public higher education institutions in South Africa.

5.1.2 Layout of the chapter

The following is an outline of chapter five. The numbers in the presentation correspond with the paragraph numbers used in the chapter.

5.1	**Introduction**	
	5.1.1	Goal of the chapter
	5.1.2	Layout of the chapter
5.2	**The legal framework for public higher education in South Africa**	
5.3	**The funding of public higher education in South Africa**	
	5.3.1	The sources and flow of funding to public higher education institutions
	5.3.2	Funding legislative and policy frameworks
	5.3.3	The funding framework
5.4	**Government funding of public higher education in South Africa**	
	5.4.1	State allocations to public higher education
	5.4.2	Government funding as a source of income
5.5	**Income from tuition fees at public higher education institutions in South Africa**	
	5.5.1	The legal framework for tuition fees
	5.5.2	Tuition fees: A theoretical framework
		5.5.2.1 Definition and characteristics of tuition fees
		5.5.2.2 The principle of cost sharing
	5.5.3	Trend in tuition fees as a source of income
		5.5.3.1 Trend in tuition fees at universities of technology
5.6	**Third-stream income at public higher education institutions in South Africa**	
5.7	**The costs of public higher education institutions in South Africa**	

5.2 THE LEGAL FRAMEWORK FOR PUBLIC HIGHER EDUCATION IN SOUTH AFRICA

Public higher education is the exclusive responsibility of the National Department of Education.

The *governance* of higher education in South Africa is constituted in:

- The South African Constitution of 1996 – Chapter two: Bill of Rights.
- The Higher Education Act of 1997, as amended. The Higher education Act of 1997 provides for a single, nationally co-ordinated system of higher education in South Africa, overseen and quality assured by the statutory Council on Higher Education (CHE) (OECD, 2008:40).

The current higher education *policy* is set out in:

- The National Plan for Higher Education of 2001. The National Plan provides the strategy for realising the policy goals for a new South African higher education system, and outlines an implementation framework for achieving the vision and goals in the Education White Paper of 1997.

- The 1997 White Paper on Higher Education. The White Paper on Higher Education outlines the driving policies and strategies for the transformation of the higher education system as a single national co-ordinated system (CHE, 2007:89) (Education White Paper, 1997:3).

- The *funding* of higher education is set out in The New Funding Framework of 2004. The objective of the new funding framework is to improve the overall efficiency of the system of higher education (Unisa, May 2005:9).

5.3 THE FUNDING OF PUBLIC HIGHER EDUCATION IN SOUTH AFRICA

5.3.1 The sources and flow of funding to public higher education institutions

The sources and flow of funds to a public higher education institution may be direct or indirect. The direct flow of funds would be funds given directly to institutions, such as government grants or tuition fees. The indirect flow of funds is allocated through an intermediary, who is responsible for the tuition fees of public higher education institutions (UNESCO Institute of Statistics, 2007:41).

Section 40 of the Higher Education Act of 1997 outlines the typical funds of a public higher education institution as:

- Funds allocated by the Minister in terms of section 39 of the Act.
- Donations and contributions.
- Money raised by means of loans and overdrafts.
- Money raised by the institution.

- Income derived from investments.

- Money received for services rendered to other institutions or persons.

- Money payable by students for higher education programmes provided by the institution.

- Money received from students or employees of the institution for accommodation or other services provided by the institution.

- Other receipts from whatever source.

From the above list of the sources of public higher education funds it is clear that government is not the sole and exclusive provider of finance for public higher education. Individuals also contribute through fees, and higher education institutions may also have other sources of revenue (Bray, 2001:677). The Ministry of Education has direct control over only government grants to public higher education institutions, and does not take into account the income raised from student fees, and other private sources, when distributing grants to individual institutions (Ministry of Education: The new funding framework, 2004:2).

Figure 5.1 illustrates the sources of funds of public higher education institutions, and offers a broad summary of the ways in which funds flow to public higher education institutions.

Figure 5.1: The sources and flow of public higher education funding

(a) Sources of funds of public higher education institutions
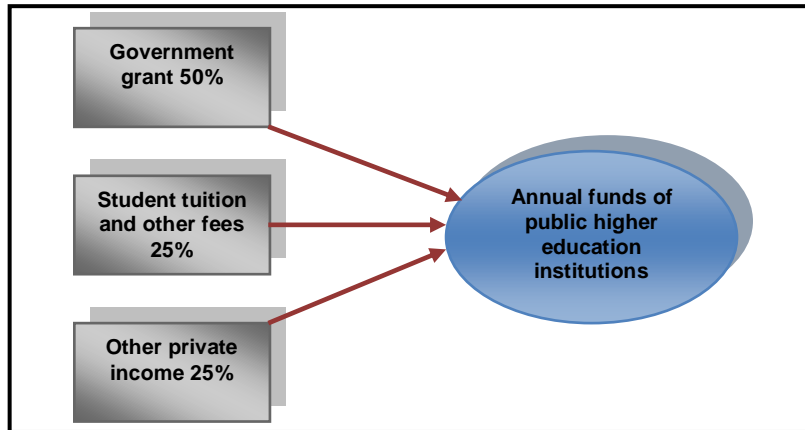
(Ministry of Education: The new funding framework, 2004:2) (Jones, 2000:80)

(b) Flow of funds of public higher education institutions
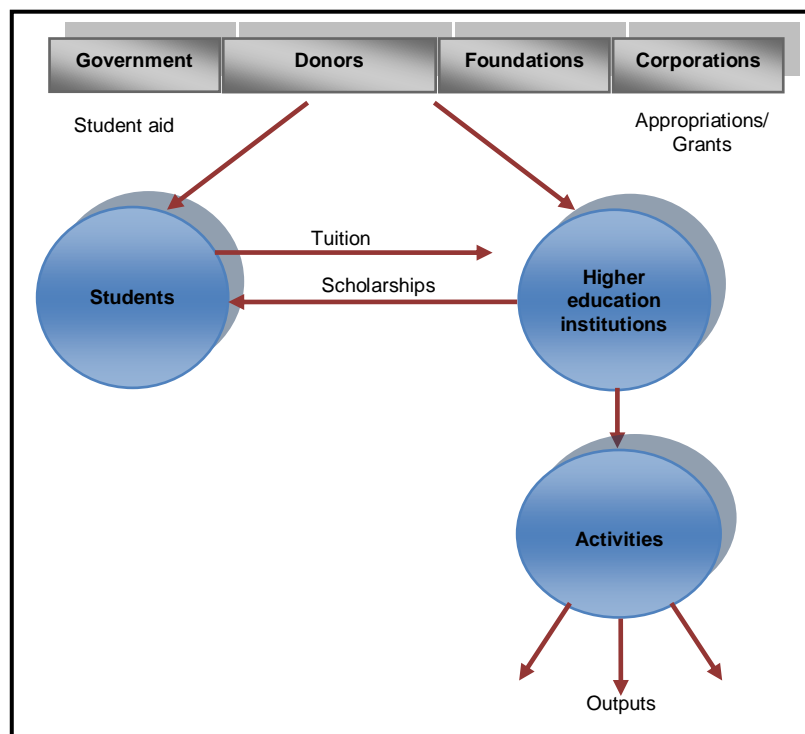
(Ministry of Education: The new funding framework, 2004:2) (Jones, 2000:80)

Figure 5.1 indicates that:

- Funds for public higher education come from multiple sources, but mainly from government grants (50%) and tuition fees (25%) (Koshal & Koshal, 2000:80).

- The proportions between government grants, student tuition and other fees, and private income are: 50%, 25% and 25% respectively. These are averages for the higher education system as a whole, but they can differ widely between institutions (Ministry of Education: The new funding framework, 2004:2).

- The funds of public higher education support a single (or common) set of activities.

- These activities provide multiple outputs that respond to the various needs of a variety of clients (Jones, 2000:80).

5.3.2 Funding legislative and policy frameworks

a) Legislative framework

The Higher Education Act of 1997, paragraph 39, states:

- That the Minister, after consulting with the Council for Higher Education and the Minister of Finance, determines the policy on the funding of public higher education institutions, which must include appropriate measures to redress past inequalities.

- Funding must be done with an appropriate balance between institutional autonomy, public accountability, as well as with procedures that are transparent, flexible, manageable, and fair.

- The Minister may impose diverse conditions in respect of the various public higher education institutions, dissimilar instructional programmes, or dissimilar allocations, if there is a reasonable basis for such differentiation.

b) Policy framework

The Education White Paper (1997:45-55) outlines the principles and policy framework for the funding of higher education, which can be summarised as follows:

- The planning process, in conjunction with funding, will be the main levers through which the Ministry of Education will ensure the realisation of the targets and goals, which are outlined in the National Plan of 2001.
- The funding formula has two main elements, firstly, there is, on a three-year rolling plan basis, block funding, which is allocated for general purposes to institutions; secondly there are earmarked funds to achieve specific purposes such as targeted redress of inequities of access and capacity, and for the development of curriculum and research.
- The funding formula makes provision for teaching and support activities, including funds for academic development and foundation programmes, as well as funds for research.

5.3.3 The funding framework

The basic principle of the funding framework is that it links government grants to national and institutional planning (Mubangizi, 2005:1123). The funding/planning link makes the framework a goal-oriented, steering mechanism for the distribution of government grants to institutions, in accordance to (a) national planning and policy priorities, (b) the funds made available in the national budget, and (c) the approved plans of individual institutions (Gouws *et al*. 2006:221) (Ministry of Education: The new funding framework, 2004:2).

The funding system is a cyclical process that depends on the three-year rolling plans that higher education institutions are granted to develop their equity targets, research outputs, and graduation rates. The funding framework will be discussed

with reference to Jinabhai (2003:56), Akor & Roux (2006:423) and documents from the Ministry of Education.

Government grants, to higher education institutions, consist of the following two categories:

- Earmarked grants. Earmarked funds are allocated to higher education institutions to fund the National Student Financial Aid Scheme (NSFAS). A small portion of the earmarked funds are available for other specific purposes such as interest and redemption payments on government approved loans (Ministry of Education: The new funding framework, 2004:5).
- Block grants. Block grants are undesignated amounts to cover the operational costs of higher education institutions that are linked to the provision of teaching and research-related services (Ministry of Education: Funding of public higher education, 2003:2.1).

Higher education block grants consist of the following sub-categories:

- Teaching input grants. Teaching input grants are generated by approved Full-Time Equivalent (FTE) student enrolments. Funding for an agreed number of publicly subsidised FTE enrolments will be announced three years in advance in order to give institutions a predictable basis for planning. The Ministry of Education will negotiate the number of publicly subsidised FTE places with the institution each year in respect of the following three years (Education White Paper, 1997:48). Government funding rates per FTE student will vary according to the broad field of study and the level of study, but will be standard for all institutions of higher education (Education White Paper, 1997:49).
- Teaching output grants. The National Plan for Higher Education, 2001 emphasises that student graduation rates must improve. Incentives

designed to encourage higher education institutions to ensure higher pass rates, throughput and graduation rates have been included in the funding framework (Ministry of Education: Funding of public higher education, 2003:3.2.1).

- Research output grants. Research output grants are based on publication outputs and on actual research graduates. The allocation of research funds to institutions of higher education will be determined on the basis of the actual weighted total of the research outputs produced by an institution and, a normative weighted total of the research output, which the higher education institution should have produced in accordance with benchmarks laid down by the Minister of Education (Ministry of Education: Funding of public higher education, 2003:3.1.3).

A diagrammatic representation of the funding framework follows in figure 5.2.

Figure 5.2: Division of government budget between grant categories
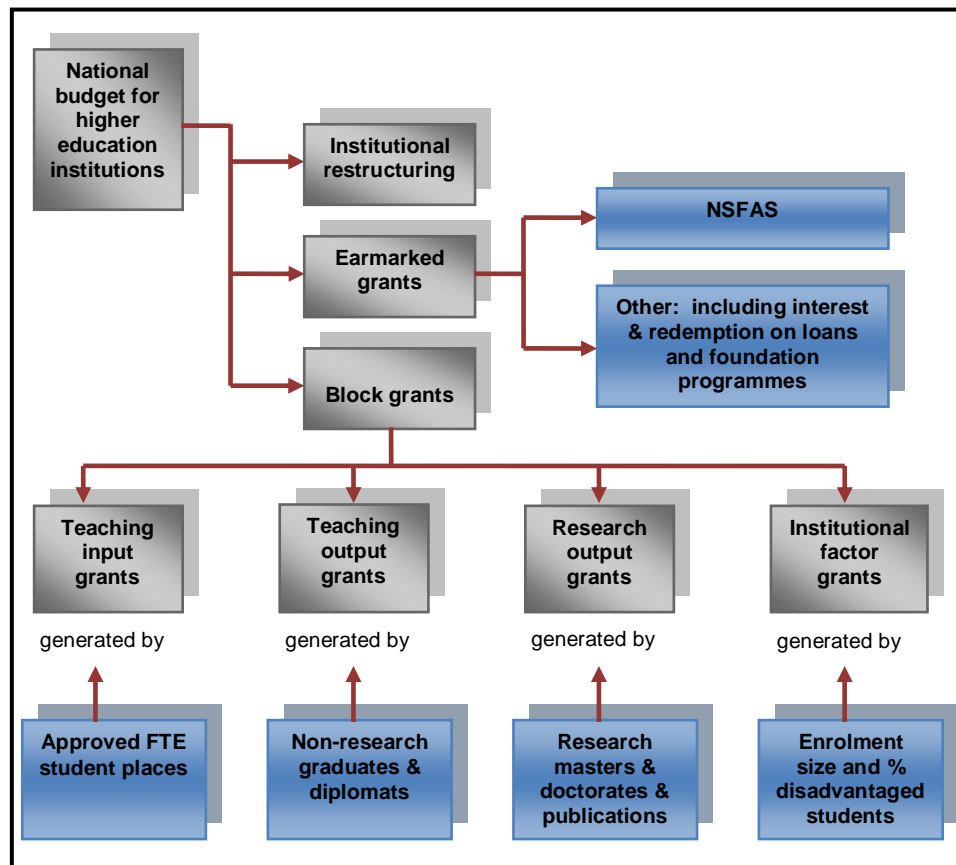
(Ministry of Education: The new funding framework, 2004:5)

5.4 GOVERNMENT FUNDING OF PUBLIC HIGHER EDUCATION IN SOUTH AFRICA

5.4.1 State allocations to public higher education

Funding from government subsidies is the main source of income of public higher education institutions in South Africa (CHE, 2009a:65). Government funding is allocated to public higher education institutions through the use of the new funding framework discussed in paragraph 5.3.3.

There are two main indicators for the measurement of government commitment to education. The first indicator expresses education expenditure as a share of the national gross domestic product (GDP). The second indicator represents the share of the total public budget devoted to education (UNESCO, 2007:8). Table 5.1 illustrates government allocations to public higher education in South Africa for the period 2001 to 2008 expressed as:

- A percentage of the total state budget.
- A percentage of the GDP.

Table 5.1: State allocations to public higher education for the period 2001 to 2008

Year	State allocation R(m)	% of state budget	% of GDP
2000/2001	6 978	2,98	0,77
2001/2002	7 522	2,86	0,75
2002/2003	7 924	2,72	0,72
2003/2004	8 635	2,58	0,72
2004/2005	9 364	2,53	0,68
2005/2006	10 215	2,44	0,67
2006/2007	11 957	2,54	0,66
2007/2008	13 323	2,46	0,65

(SAUVCA, 2004:3) (CHE, 2006:89) (HESA, 2008:16) (CHE, 2009a:10)

Table 5.1 illustrates the following trend in the government funding of public higher education:

- Since 2001 there has been a steady increase in state allocation to public higher education. However state funding of public higher education as a

percentage of total state funding shows a declining long-term trend. During the period 2001 to 2008 this percentage dropped from 2,98% to 2,46%.

- Government allocations to public higher education as a percentage of the GDP shows a declining trend. This percentage decreased from 0,77% in 2001 to 0,65% in 2008.

- Government allocations to public higher education as a percentage of the GDP at an average of 0,65% during 2008 was below that of other Sub-Saharan African countries such as Botswana, Ethiopia, Kenya, Lesotho, Rwanda, Senegal and Swaziland (UNESCO Institute of Statistics, 2008) (CHE, 2009a:9).

De Villiers & Steyn (2006:35) state that there is a world-wide trend that shows a decrease in the funding of higher education by government, a trend that expects students to pay more of the cost of their higher education. This is also the case in South Africa where higher education institutions are confronted with diminishing state funding as indicated by the above statistics (Akor & Roux, 2006:422).

Longanecker (2006:16) and De Villiers & Steyn (2006:47) believe that the diminishing share of public resources devoted to higher education is proof that higher education has become less of a priority for government, and that government has lost faith in higher education, and particularly public higher education. Akor & Roux (2006:422) believe that the decline in government funding of higher education may also jeopardise higher education policies of increased access and participation rates.

5.4.2 Government funding as a source of income

An analysis of the sources of income of public higher education institutions in table 1.1 confirms the declining trend in government funding of public higher education. Table 1.1 shows that government funding, as a source of income of

public higher education institutions, decreased from 47% of the total income in 2001 to 40% of the total income in 2008.

5.5 INCOME FROM TUITION FEES AT PUBLIC HIGHER EDUCATION INSTITUTIONS IN SOUTH AFRICA

5.5.1 The legal framework for tuition fees

The mandate given to higher education, through legislation, concerning tuition fees are the following:

➢ *Higher education institutions may levy tuition fees and fees for services provided by the institution*

The Higher Education Act 101 of 1997 indicates that higher education institutions are allowed to raise funds from the sale of services, in the form of tuition fees, accommodation to students, and other services provided by the institution. Paragraph 40 of the Higher Education Act 101 of 1997, as amended, states that the funds for higher education institutions consist mainly of:

- "Money payable by students for higher education programmes provided by the institution, but the council may discriminate in a fair manner between students who are not citizens or permanent residents of the Republic, and students or permanent residents of the Republic when the amount payable is determined".
- "Money received from students or employees of the institution, for accommodation or other services provided by the institution".

The Education White Paper 3 of 1997, paragraph 4.7, states: "Fee-free higher education for students is not an affordable or a sustainable option for South Africa" (Education White Paper, 1997:46).

5.5.2 Tuition fees: A theoretical framework

5.5.2.1 Definition and characteristics of tuition fees

Marcucci & Johnstone (2007:26) define tuition fee as "the fee charged for instruction and all direct and indirect costs associated with the education process". Tuition fees are however more than the amount of money charged for teaching because tuition fees are one of the important key concepts that have a defining influence on the quantitative and qualitative development of the higher education system (Turner *et al.* 2000:397). The setting and payment of tuition fees can also be a symbolic expression of a range of attitudes towards higher education.

Turner *et al.* (2000:397-408) and HESA (2008:28-32) describe some of the characteristic features of tuition fees in the higher education system structures as follows:

Higher education as an *investment* in the future life of the student and a means to maximise lifetime earnings through knowledge and higher productivity. The rewards for studying at higher education institutions can be access to better jobs and higher earnings compared to high school graduates (Cooper, 2004:5) (Education White Paper, 1997:46). The prospects of higher earnings and better jobs can serve as a motivation to students to accept the increasing financial commitments, in the form of tuition fees for higher education.

Higher education as the *consumption* of goods/services. Consumption refers to the acquisition of goods/services for their intrinsic utility value without the expectation of increased future earnings. If the motivation to attend higher education is not that of an investment in future life, possibly students merely wish to be consumers who use goods/services to satisfy their desires to own brand-name goods, because other people can do this, or for the image of the product/service. If higher education is perceived as consumption, then the only

beneficiaries will be the student and their parents and, therefore, they can be expected to pay the tuition and other fees for the benefits they will receive from higher education.

Higher education as a social *prestige* symbol. The status of a higher education institution has an impact on the investment and consumption value of the institution. There are three typical patterns associated with prestige and higher education institutions:

In the type 1 relationship, the relationship between high prestige and high tuition fees correlates positively. Institutions with a high quality product/service can charge a premium rate for their product/service. Students attending these institutions expect a better position and higher return after graduation because of the high tuition fees. This type of institution is usually one of a number of private institutions with a range of academic standards and reputations.

In the type 2 relationship, when the more prestigious institutions become less expensive than the less prestigious institutions, the relationship between high prestige and high fees correlates negatively. The argument for this situation is that the more prestigious institutions wish to secure the entry of the most able students. The entry requirements in these institutions are very high while the financial obstacles for admission to these institutions are low. Institutions in this category are better able to attract money from other sources such as government subvention, donations etc.

The type 3 relationship represents a condition where all higher education institutions charge the same tuition fees irrespective of their prestige. The tuition fees have, therefore, nothing to do with the prestige of the higher education institution. This model for tuition fees is typical of public higher education institutions where there is public control over the setting of tuition fees.

The three types of relationship between tuition fees and prestige are illustrated in figure 5.3.

Figure 5.3: The relationship between tuition-fee levels and prestige
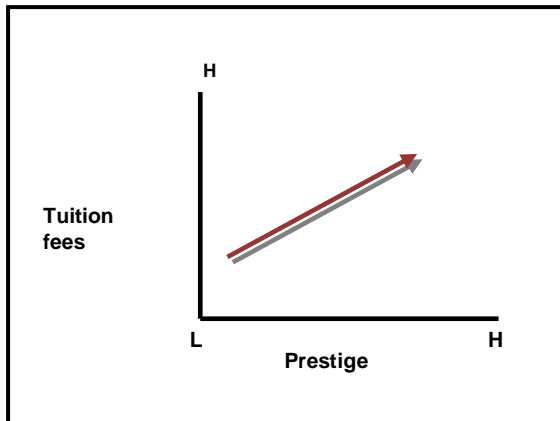
Turner *et al.* (2000:405)
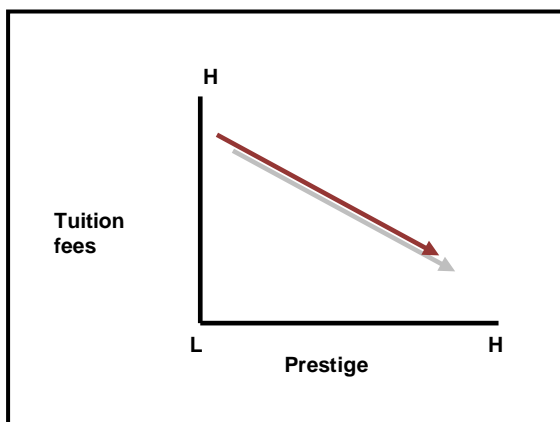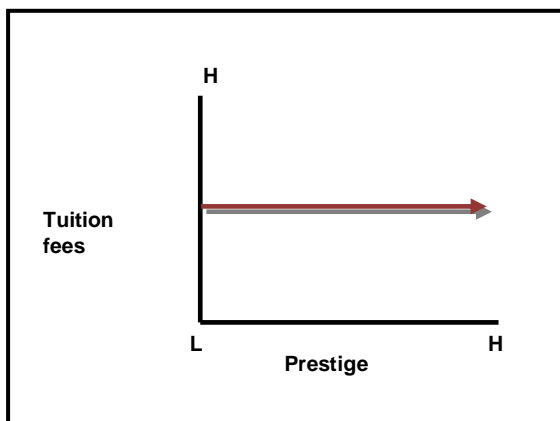
Higher education as a *public benefit.* There are a number of beneficiaries of higher education. As explained previously, the private returns from education as an investment for the student are high. However, others such as employers and society will also benefit from individuals studying at higher education institutions. Society benefits from an investment in higher education because graduates can make a significant contribution to labour productivity, which in turn promotes economic growth (Koshal & Koshal, 2000:81). Higher education institutions also produce highly trained leaders, the specialists needed in modern societies, and also provides indirect benefits to society, such as improved social justice, higher levels of social security, and social cohesion. Society is thus clearly one of the main beneficiaries of higher education and, therefore, one may rightfully expect that society, in the form of government funding of higher education, should carry some of the financial burdens for providing higher education.

Higher education as a *human right.* Higher education as a human right implies that only the government is responsible for funding higher education and, should therefore, offer free education to students. If higher education is considered to be a human right, then most countries are currently violating this human right (Srbijanka, 2003:350).

5.5.2.2 The principle of cost sharing

Tuition fees represent the share of the costs of higher education that students need to bear, and is referred to as cost sharing. Johnstone & Shroff-Mehta in Vossensteyn (2002:145) define cost sharing as "the predominant development towards a gradual transfer of financial responsibilities for higher education from government towards the students and their families". The costs of higher education should therefore be shared between the government and the individual (Woodhall, 2007:22). Johnstone (2004:404) maintains that cost sharing assumes that the costs of higher education in all countries and in all situations are borne by

four principle parties namely the government (taxpayers), the parents, the student, or institutional donors.

Cost sharing is a world-wide trend and may take different forms, such as the introduction of tuition fees at higher education institutions where it did not exist; a sharp increase in tuition fees at higher education institutions where it already exists; a reduction in subsidies; and a stronger reliance by students on loans rather than on grants and scholarships (Johnstone, 2003:351) (Vossensteyn, 2002:145).

One of the most important reasons for cost sharing is that higher education benefits society and the individual (the student) (Woodhall, 2007:22). Table 5.2 provides a summary of the costs and benefits of higher education for society and the individual student.

Table 5.2: Private and social costs and benefits of higher education

	Private costs and benefits	**Social costs and benefits**
Costs	- Tuition, fees and study material - Forgone earnings	- Operating costs of programmes - Student support - Forgone national production related to students
Monetary benefits	- Higher productivity and thus higher net earnings - Better job opportunities - Higher savings - Personal and professional mobility	- Higher national productivity - Higher tax revenues - Greater flexibility in labour force - Higher consumption - Less dependency on

		government
Non-monetary benefits	• Educational enrichment • Better labour conditions • Higher personal status • Higher job satisfaction • Better health and life expectancies • Improved spending decisions • More hobbies and value of leisure activities • Personal development	• Social cohesion, appreciation of social diversity, and cultural heritage • Higher social mobility • Lower crime rates • More donations and charity work • Increased capacity to adapt to new technologies • Democratic participation

(Vossensteyn, 2007:33)

According to Johnstone (2006:34) there are also arguments against cost sharing such as:

- Higher education is a public benefit, a social entitlement, a basic necessity and should be offered at no cost to students and their families. This argument is constructed on the view that society is the major beneficiary of higher education and not the individual.

- Cost sharing, without properly administered means-tested financial assistance and other financial aid schemes, can affect accessibility to higher education by students from low income families.

- Revenues from taxpayers are not allocated on an assessment of the costs and benefits of all competing claims, but are allocated according to which claims muster the greatest political pressure.

5.5.3 Trend in tuition fees as a source of income

What is the situation in South Africa regarding the trend in tuition fees at public higher education institutions?

As was discussed in paragraph 1.2.2, student fees as a source of income at public higher education institutions in South Africa continue to increase. From table 1.1 it is evident that the income from tuition fees increased substantially from 24% in 2001 to 28% in 2008 of the total funding of public higher education institutions to compensate for the loss of state funding.

A study done by Van Heerden *et al.* (2007:12) at 16 higher education institutions in South Africa confirms the high tuition-fee income as a percentage of the total institutional income. This study also indicates that tuition fees comprised an average of 28,1% of the total income of public higher education institutions. The contribution of tuition fees as a percentage of the total institutional income at these higher education institutions ranges from between 21% to 37,8% which indicates a large difference between the income compositions reported by these 16 higher education institutions.

What are the reasons for the rising tuition fees? There are two main reasons: firstly, the increase is because of the reduction of public subsidies for higher education (Martin, 2002:88), and secondly, the increase in the costs of providing higher education. De Villiers & Steyn (2006:35) and Longanecker (2006:17) maintain that as a result of the decrease in government funding higher education institutions have been forced to increase tuition fees to compensate for the "loss" in income. However, Winston, in Martin (2002:89), argues that tuition increases are driven by cost increases in higher education. Mumper (2001:58) explains that the denial factor is another reason for the rising tuition fees. The denial factor assumes that higher tuition fees do not prevent access to higher education because enrolments at higher education institutions are higher than they were

because a larger proportion of the population is acquiring higher education. The perception is, thus, that higher education is affordable, and the rising tuition fees are no problem. This is cause for serious concern for those who advocate controlling the costs of higher education. According to Biffl & Isaac (2002:433) and Martin & Elgar (2005:15), another reason for rising tuition fees are the reduced government subsidies to higher education, which is related to the fact that governments in many countries face severe budgetary pressure from expenditure in competing programmes. Higher education is one of a very few government departments that has its own external sources of revenues and, with this in mind, the state withholds financial support, knowing that higher education institutions will increase tuition fees in order to cover the costs of higher education.

5.5.3.1 Trend in tuition fees at universities of technology

The focus of chapter seven of this study is on tuition fees at a public higher education institution namely, the Central University of Technology, Free State (CUT). To be in a position to comment on tuition fees at the CUT, there must be a comparison between the tuition fees at the CUT, and those levied at the other universities of technology in South Africa.

The average tuition fee per student is used to compare the tuition fees levied at universities of technology in South Africa. The formula for the calculation of the average tuition fee per student is as follows:

[Tuition fees per course x number of students enrolled per course] for all programmes
Total number of students enrolled

(CUT, 2008: Documents Student Fees Committee)

Table 5.3 shows the average annual tuition fee per student, as well as the annual increase in tuition fees at universities of technology in South Africa in 2008.

Table 5.3: Average tuition fee per student, as well as the annual increase in tuition fees at universities of technology in 2008

University of technology	Average annual tuition fee per student	Annual increase in tuition fees
Central University of Technology, Free State	R10 943	7,5%
Cape Peninsula University of Technology	R9 853	6,25%
Durban University of Technology	R14 004	6,85%
Vaal University of Technology	R8 283	7,0%
Tswane University of Technology	R9 497	8,5%
Mangosuthu University of Technology	R10 313	7,5%
Average	**R10 482**	**7,27%**

(CUT, 2008: Documents Student Fees Committee)

From table 5.3 it is evident that:

- The average annual tuition fee per student during 2008 at universities of technology ranged between R8 283 at the Vaal University of Technology and R14 004 at the Durban University of Technology.
- The average annual tuition fee per student at universities of technology during 2008 amounted to R10 482.
- The average annual increase in tuition fees during 2008 at universities of technology ranged from between 6,25% at the Cape Peninsula University of Technology and 8,5% at the Tswane University of Technology.
- The average annual increase in tuition fees at universities of technology during 2008 was 7,27%.

5.6 THIRD-STREAM INCOME AT PUBLIC HIGHER EDUCATION INSTITUTIONS IN SOUTH AFRICA

Duncan (2009:6) defines third-stream income at higher education institutions in South Africa as: "all income derived from sources other than public subsidies, tuition fees, and other student fees". Third stream-income includes income from the following sources/activities:

- Contract or sponsored research.
- Entrepreneurial and commercial activities.
- Philanthropic funding.
- Provision of services.
- Investment income.
- Long- and short-term financing.

(CHE, 2009a:69) (Duncan, 2009:6)

Against the background of declining government funding for public higher education, and the increasing pressure from government on institutions to contain the increasing tuition fees in reaction to declining government funding, public higher education institutions are forced to pursue the generation of income through third-stream activities (MacGregor, 2008a:1).

Table 1.1, on the composition of income of public higher education institutions, indicates that income from third-stream activities increased, as part of the total income of public higher education institutions, from 29% in 2001 to 32% in 2008. The analysis on third-stream income at higher education institutions by the Council on Higher Education illustrates clearly that the ability to raise third-stream income varies substantially between institutions and ranges from 13% to 54% of the total income of public higher education institutions (CHE, 2009a:70).

Stumpf (2006:20) maintains that it is difficult for some higher education institutions to generate third-stream income based on the following reasons: (a) generally weak relationships between higher education institutions and business; (b) the limited industrial-business base of South Africa; (c) the few tax breaks for companies and individuals; (d) weak alumni and fund-raising structures, and the absence of a culture of giving; (e) the limited research capacity of some higher education institutions; (f) and the impoverished geographic and economic environments of several institutions.

5.7 THE COSTS OF PUBLIC HIGHER EDUCATION IN SOUTH AFRICA

5.7.1 An overview of public higher education costs

What is the meaning of higher education costs? The word costs can have different meanings, but in this context it refers to the costs entailed when providing education to a student enrolled in public higher education or how much is invested each year in public higher education (Moak, 2000:11).

A clear understanding of cost classifications by public higher education institutions is essential for creating cost databases, and for use in inter-institutional analyses (Dyke, 2000:29). Cost classifications in general are discussed in chapter three of this study. Higher education follows the same costs classifications but Brinkman (2000:9) states that a discussion of the following two categories is important:

- Opportunity costs versus accounting costs. Opportunity costs represent the value of foregone opportunities when choices are made. With economic and cost analyses opportunity costs should be added to accounting costs to reflect the true economic costs of a function or item (Gitman, 2009:386) (Cohn & Cooper, 2004:588). The focus of opportunity

costs is on the costs of the use of resources rather than on expenditure (Brinkman, 2006:45).

- Average versus marginal costs. Brinkman (2006:49) maintains that average costs are calculated and reported on more frequently than any other costs in public higher education. Average costs are the total costs divided by the number of units produced. Marginal costs are more difficult to calculate than average costs and refer to the change in total costs associated with different levels of output. Marginal costs are relevant when deciding where to allocate incremental resources, and can be useful when designing funding formulas for higher education institutions as a whole or for units within the institutions (Brinkman, 2006:51).

In public higher education institutions there are two major functional cost categories that are grouped according to whether the cost in the category is directly or indirectly related to the core mission of higher education (Dyke, 2000:21). The following discussion, based on the work of Wellman & O'Brien (2000:12) and Dyke (2000:21-30), is about these two functional cost categories in higher education:

Direct costs of higher education. Direct costs are costs in direct support of a programme, a project or a department and are related to the output of higher education institutions. Direct costs include:

- Instruction costs: Instruction costs provide instructional services, and include teaching salaries, costs of instructional supplies, the costs of departmental support personnel, related office supplies and so on.
- Research costs: Research costs fund institutional activities designed to produce research output, and include salaries of full-time researchers, research administration costs and so on.
- Public-service costs: Public-service costs are used to produce, between a higher education institution and the public, a flow of productive resources

and activities, which may serve as a training programme or have an information function (Cohn & Cooper, 2004:579).

Indirect costs of higher education.   Indirect costs are those costs that are associated with activities that support the core functions of higher education institutions and include:

- Academic and institutional support: These costs are of an administrative nature. Academic support activities relate directly to the core business of higher education institutions which is instruction, research, and public services, and which also includes the costs of the deans' office, costs of the academic administration, and so on. Institutional support activities relate to the general operations of higher education institutions, and include costs such as general administrative services, budgeting, and the human resource department.

- Operation and maintenance of the institution: These are costs that relate to the maintenance of the facilities and grounds. Costs reflecting significant renovations and repairs will offset depreciation and should not be included in operating costs, but should be added to the capital investments (Winston, 2000:37).

- Student services: Student services provide support to students for activities that are not directly related to the academic activities of instruction and research, but which include costs such as admissions, registration, counselling, and career guidance.

- Scholarships and fellowships: Costs in this category provide grants to students in the form of scholarships and fellowships. Winston (2000:31) is of the opinion that financial aid in the form of scholarships and fellowships are not costs concerning education, but are a discount on the price of instruction, and should be subtracted from gross tuition revenue.

- Mandatory and non-mandatory transfers.   Mandatory transfers are transfers from current funds to other fund groups arising from legal

agreements and grant agreements. These transfers may be for debt, retirement, interest and so on. Non-mandatory transfers are discretionary transfers from current funds to other fund groups, or from other fund groups back to current funds.

5.7.2 Cost efficiency

Questions have been raised on whether higher education institutions operate efficiently. Many researchers believe higher education institutions to be inefficient in their operations, and that they should be made to become more accountable for the services they provide (Robst, 2000:715) (Casu & Thanassoulis, 2006: 417) (Adams & Shannon, 2006:61).

Johnes (2006:273) maintains that higher education institutions have characteristics that make measuring efficiency difficult because they are non-profit organisations; the absence of output and input prices; and higher education institutions produce multiple outputs from multiple inputs. SAV (2004:607) and Robst (2000:715) also consider higher education institutions to be multi-product institutions that produce undergraduate students, graduate students, and research.

There are two basic approaches that can be used in estimating higher education efficiency namely:

- Stochastic frontier analysis.
- Data envelopment analysis.

(Trout *et al.* 2000:816) (Johnes, 2006:274) (Mensah & Werner, 2003:300)

Stochastic frontier analysis (SFA) is a statistical or econometric approach. This frontier cost function is a frequently used tool for the analysis of production costs in manufacturing plants and industries. SFA predicts the minimum cost for

producing a given amount of output. In higher education the output is measured by the number of students and research. The difference, between the predicted minimum costs and the actual costs of higher education institutions, is regarded as "excess" costs. The factors leading to the "excess" costs of providing higher education should then be addressed (Robst, 2000:716) (Robst, 2001:732).

Data envelopment analysis (DEA) is a linear programming methodology used in the evaluation of the performance/efficiency a Decision Making Unit (DMU) such as educational institutions. The DEA assigns weights to the input and output of a DMU that gives the best possible efficiency. A DEA is thus an extreme point method as it compares each DMU with the "best" DMU. The DEA provides every other DMU with the same weights and compares the resulting efficiencies with the particular DMU that is under consideration. The efficiency of each DMU is measured as the ratio of the sum of weighted output divided by the sum of weighted input. If the DMU under consideration is as good as any other DMU, the maximum efficiency score is obtained. If the DMU under consideration does not perform as well as any other DMU then it will obtain an efficiency score that is less than the maximum efficiency score (Cooper *et al*. 2000:1) (Johnes, 2006:274) (Hayes, 2007).

5.7.3 The profile of recurrent costs

The total recurrent costs of public higher education institutions have two main components, which are staff remuneration, and goods and services. These two recurrent costs categories represent 90% of the total recurrent costs of public higher education institutions (HESA, 2007:11).

Figure 5.4 illustrates a breakdown of the recurrent costs of public higher education institutions.

Figure 5.4: Breakdown of recurrent costs of public higher education institutions
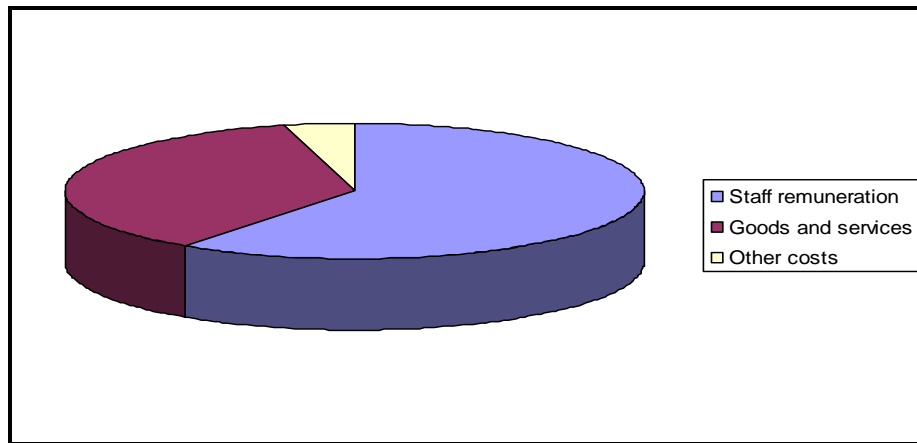
(HESA, 2007: Executive summary)

5.7.4 Trend in public higher education costs

The trend in public higher education costs will be outlined in table 5.4 and figure 5.5.

Table 5.4 illustrates the total higher education expenditure on all activities for the period 2001 to 2008.

Table 5.4: Total higher education expenditure on all activities for the period 2001 to 2008

Year	Total expenditure (Rand billions)
2001	R14,2
2002	R16,0
2003	R18,7
2004	R20,1
2005	R19,5
2006	R22,9
2007	R24,8
2008	R27,6

(Bunting *et al.* 2010:19)

Table 5.4 indicates that:

- The total expenditure of public higher education on all activities increased substantially from R14,2 billion in 2001 to R27,6 billion in 2008, an increase of 94,4%.

Figure 5.5 illustrates the total expenditure per FTE student in public higher education for the period 2000 to 2008.

Figure 5.5: Total expenditure per FTE student for the period 2000 to 2008

	2000	2002	2004	2006	2008
Total expenditure per FTE student	R 27,000	R 28,000	R 31,000	R 36,000	R 41,000
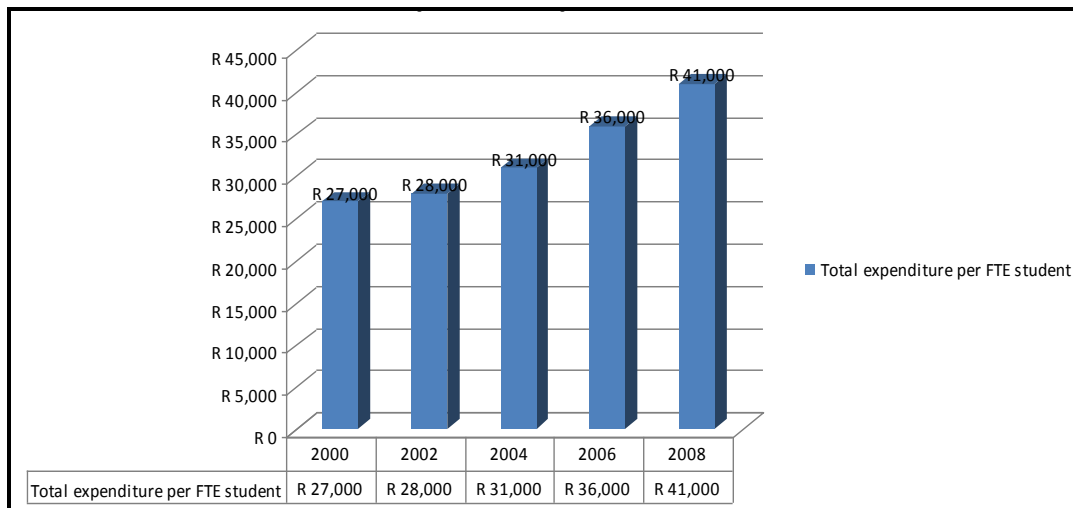
(Bunting *et al*. 2010:21)

Figure 5.5 indicates that:

- The total expenditure per FTE student increased dramatically from R27 000 in 2000 to R41 000 in 2008, an increase of 51,9%.
- The average annual increase in the total expenditure per FTE student for the period 2000 to 2008 amounts to 5,3% (Bunting *et al*. 2010:21).

A number of other studies also indicate that higher education costs in general, expressed per FTE student, and per qualification awarded, has increased dramatically over the past number of years (CHE, 2006:163) (De Villiers & Steyn, 2006:44) (Archibald & Feldman, 2008:1) (Adams & Shannon, 2006:61) (Wellman & O'Brien, 2001:1). Martin & Elgar (2005:1) state that higher education costs have been increasing faster than costs in every other sector of the economy, with the possible exception of health care.

Boehner & McKeon (2003:4) believe that the ongoing public higher education cost explosion is a disturbing trend, and one that cannot be allowed to continue as

education is the equaliser in a nation that can bridge social, economic, racial, and geographic divides. There are many views that explain why there are rising costs in public higher education. Boehner & McKeon (2003:5) believe that wasteful spending by public higher education institutions is the number one reason for the high costs of public higher education institutions. Adams & Shannon (2006:61) believe that higher education costs have escalated for reasons rooted primarily in organisational culture as well as market forces. Martin & Elgar (2005:17) maintain that there are a variety of explanations for the rising costs in higher education, but that the primary cost drivers are the rising labour costs per student, rising administration costs, increased government regulations, technology, and the problem that every institution aspires to be like the institution that has more status.

According to David Breneman in Archibald & Feldman (2008:268) there are two competing theories explaining the rise of costs in public higher education, firstly, the "cost disease theory" and, secondly, the "revenue theory of costs". Archibald & Feldman (2008:272) explain the cost disease theory as follows: The cost disease theory is based on similarities between higher education institutions and other industries. The main concept of the cost disease theory is that progress in technology leads to an increase in labour productivity, which results in a reduction in the unit cost of a product. This idea is, however, not randomly distributed across industries and time as the probability of productive growth being related to the concept of how labour is used in the industry. Baumol, in Archibald & Feldman (2008:272), explains: "in some cases labour is primarily an instrument – an incidental requisite for the attainment of the final product, while in other fields of endeavour, for all practical purposes, the labour is itself the end product." Manufacturing organisations are examples of labour as an instrument in the manufacturing of a final product, whereas, higher education institutions are examples of industries where labour is the end product. In manufacturing organisations the higher productivity gains can be transferred to the workers in the form of higher wages, or it may lead to a lower selling price for a product. In service organisations, higher productivity can be considered by customers as a

decrease in the quality of the service. Service organisations also have to increase wages to compete for workers, and this can cause the price of services to rise faster than the price of the product. Thus, labour-intensive industries, such as higher education institutions, have more difficulty controlling costs than do manufacturing industries (Martin, 2002:99).

To illustrate the cost disease theory in higher education the example of web-based distance learning can be used. Web-based learning has the potential to increase productivity as the class-size can be increased, or the institution can use less expensive lecturers to deliver the service to students. This type of teaching can be perceived as a drop in the quality of teaching by the students.

The revenue theory of costs is based on the specifics of higher education as an industry. Howard Bowen, in Archibald & Feldman (2008:275), explains how his revenue theory of costs as a "unit cost is determined neither by rigid technological requirements of delivering educational services, nor by some abstract standard of need. It is determined rather by the revenue available for education that can be raised per student unit. Technology and need affects unit cost only as they influence those who control revenues and enrolments". In brief, the revenue theory can be summarised as a theory that is based on the idea that costs in higher education are determined by the revenue of an institution, or that the revenue of the institution determines the costs. This means that higher education institutions, therefore, spend what revenue they manage to gather. (Moak, 2000:11).

5.8 EMPLOYMENT PROFILE OF PUBLIC HIGHER EDUCATION IN SOUTH AFRICA

In 2008 a total of 45 012 permanent staff members were employed by public higher education institutions of which 35,4% were instruction and research staff, 52,3% were administrative staff, and 12,3% were service staff. At universities of

technology, instruction and research staff represented 36,5% of the total permanent staff employed, the administrative staff was 47,9%, and the service staff equalled 15,6% (DoE, 2001 – 2008: Education statistics in South Africa).

A report by the Council on Higher Education maintains that the growth in the number of academic staff does not correspond with the growth in student numbers, and should be addressed (CHE 2009b:6). Table 5.5 confirms these concerns of the Council on Higher Education. Student headcount enrolments increased from 638 162 in 2001 to 799 387 in 2008, an increase of 25,3% (table 5.5). The permanent instruction and research personnel category of public higher education increased from 14 810 in 2001 to 15 936 in 2008, which is an increase of 7,6% (DoE, 2001 – 2008: Education statistics in South Africa).

The staff category, instruction and research, fall into the most important staff category used for instruction. The ratio between the number of students and the number of instruction and research staff members indicates whether efficient use is made of lecturing staff, and the efficiency of the teaching (CHE, 2006:120). The average students to staff ratios for the period 2001 to 2008 were as follows:

- Student headcount enrolments to permanent instruction/research staff at public higher education institutions = 47,8: 1.
- Student headcount enrolments to total permanent staff at public higher education institutions = 16,8: 1.

(DoE, 2001 – 2008: Education statistics in South Africa)

5.9 PARTICIPATION IN AND DEMAND FOR PUBLIC HIGHER EDUCATION IN SOUTH AFRICA

5.9.1 Participation in public higher education

The funding of public higher education, as discussed in paragraph 1.2.2, has shifted from the government to the individual, which makes participation in public higher education very expensive, because students need to contribute more to the cost of public higher education through the payment of tuition fees (Abbott & Leslie, 2004:69). Berger & Kostal (2002:101) are concerned that the current trends in the financing of higher education may have a negative effect on the participation in public higher education. If this is the case, these trends will also affect the policy objectives concerning higher education. One of the policy goals and strategic objectives of the National Plan for Higher Education of 2001 is aimed specifically at increasing the participation rate in higher education to meet the developmental needs of the country (National Plan for Higher Education, 2001:20). Shifting the financial burden in the form of increased tuition fees may jeopardise the objective of increased participation, or broad access to higher education (Berger & Kostal, 2002:102).

The following question needs to be answered: Will the participation in public higher education be affected by the constant increases in tuition fees at public higher education institutions. There are various opinions about this issue:

➢ A model by Cameron & Heckman, as explained by Lauer (2002:443), has been reformulated to view the role of cost, and return expectations when higher education attendance decisions are taken. This model maintains that the decision to attend higher education institutions will depend on the ratio of the marginal cost of attending these institutions and the marginal return expected from attending higher education. If the ratio is below a certain threshold, a student will choose to participate in higher education.

➢ The study done by Lauer (2002:499-456), in West Germany, to examine whether cost and return expectations affect participation in higher education states that:

- Cost and return expectations do have an effect on the decision to participate in higher education.

- Participation in higher education is strongly influenced by social origin, such as parental education, occupation, and position. However, participation also depends on the prospects of being able to enter the labour market, and the possible benefits resulting from the achievement of such expectations.

- The overall level of expenditure for students attending higher education does not have a significant impact on their participation in higher education.

- The extent of the repayable part of financial aid has a limited influence on participation in higher education.

➢ A study done by Pennell & West (2005:131) in England, shows that the responsiveness of poor and working-class students to tuition increases is very high. The study indicates, too, that increases in tuition fees, dramatically reduces the probability of students entering and completing higher education studies.

➢ Pyke (2004:201) also maintains that the increasing cost of higher education may lead to fewer students pursuing higher education.

➢ Anon. (2006:55-57) however, believes that the cost of attending higher education is only one of many factors that impact on higher education participation, such as the need to earn money, poor academic preparation, and lack of interest.

Did the higher tuition fees affect the overall participation rate in public higher education in South Africa?

Table 5.5 shows the number of student headcount enrolments in public higher education in South Africa for the period 2001 to 2008.

Table 5.5: Student headcount enrolments at public higher education institutions for the period 2001 to 2008

Year	Student headcount enrolments	% Increase from previous year
2000	589 018	
2001	638 162	8,3%
2002	675 162	5,8%
2003	717 807	6,3%
2004	744 488	3,7%
2005	737 472	-0,9%
2006	741 383	0,5%
2007	761 087	2,7%
2008	799 387	5,0%

(DoE, 2001 – 2008: Education statistics) (CHE, 2006:24)

The following can be deduced from table 5.5:

- In 2008, 799 387 students were enrolled in public higher education institutions in South Africa. This represents 1,64% of the projected population of 48 687 000 for 2008 (Statistics South Africa, 2008:3).
- The 799 387 number of students enrolled at public higher education institutions during 2008 represents 16,71% of the population for the age group between 20 and 24 (Statistics South Africa, 2008:8). This figure is below the 20% target participation rate of the National Plan for Higher Education (2001:19).

- There has been a steady increase in the number of headcount enrolments from 2001 to 2008, except for 2005 when the number of enrolments decreased with 0,9%. To explain this decrease cognisance must be taken of the capping of student numbers that was introduced by the Minister of Education in 2004 (DoE, 2005: Student enrolment planning in public higher education).

- The number of headcount enrolments increased from 638 162 in 2001 to 799 387 in 2008, an increase of 25,3%.

During 2003 to 2005 the public higher education system in South Africa underwent extensive restructuring. Data for the determination of trends in student enrolments at universities of technology, in the current public higher education structure, was therefore only available from 2005.

Table 5.6 shows the number of student headcount enrolments at universities of technology for the period 2005 to 2008.

Table 5.6: Student headcount enrolments at universities of technology for the period 2005 to 2008

Year	Number of student headcount enrolments
2005	149 776
2006	141 108
2007	138 912
2008	140 330

(DoE, 2001 – 2008: Education statistics in South Africa)

Table 5.6 indicates that:

- A total number of 140 330 students were enrolled at universities of technology in South Africa during 2008. This number represents 17, 6% of the total number of students enrolled at public higher education institutions.
- The number of headcount enrolments at universities of technology decreased from 149 776 in 2005 to 140 330 in 2008, a decrease of 6, 3%.

Figure 5.6 below indicates that the size of the universities of technology in 2008 differ substantially and range from between 51 613 students enrolled at the Tshwane University of Technology and 9 128 enrolled students at the Mangosuthu University of Technology. Figure 5.6 also confirms the observation by the Council on Higher Education that the provision of public higher education in South Africa is unevenly distributed across the country with the urban centres, and economically active provinces better provided with public higher education institutions (CHE, 2009a:15).

Figure 5.6: Student headcount enrolments at universities of technology in 2008
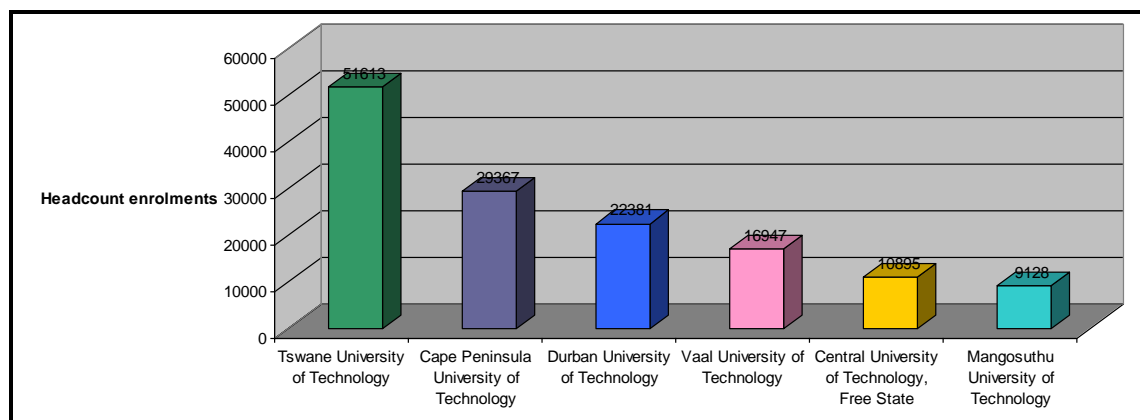
(DoE, 2001 – 2008: Education statistics in South Africa)

5.9.2 The demand for public higher education

The administrators of public higher education institutions need to determine the demand for the available slots for an academic year in order to budget for classroom space, new buildings etc. (Mueller & Rockerbie, 2005:469). There are different approaches for measuring the demand for higher education.   The following are some of the approaches:

Mueller & Rockerbie (2005:474) maintain that the demand for higher education is measured by the number of applications received for the available space at institutions. They claim that the number of applications is a better measure of the demand for higher education than enrolments because demand studies, that attempt to estimate how changes in income and prices affect higher education enrolments, can be influenced by the choice, and the definition of the dependent and independent variables, the type of database, and the functional form of the underlying equation.

Berger & Kostal (2002:104) argue that it is more useful to distinguish between higher education as a consumption and as an investment, as is discussed in paragraph 5.5.2.1. If higher education is a consumption, the demand for higher education may vary with the own price of the institution, the price of substitute higher education institutions, and income. The own price of an institution consists of two components firstly, the direct price that represents tuition and fees etc. and secondly, the indirect price, the opportunity costs, which represent the loss of income while a student attends a higher education institution. If higher education is an investment, then the direct and indirect costs of higher education, and future earnings determine the demand for it.

Berger & Kostal (2002:104) suggests the following demand equation to calculate the aggregate demand for public higher education:

$$Enrollpub^{D}_{it} = \alpha_1 + \alpha_2 tuitionpub_{it} + \alpha_3 avgwage_{it} + \alpha_4 tuitionpriv_{it} + \alpha_5 income_{it} +$$

$$\alpha_6 wagediff_{it} + \alpha_7 unemp_{it} + \alpha_8 educ_{it} + \alpha_9 nonwhite_{it} + \alpha_{10} urban_{it.} + \varepsilon_{it}$$

Where:

i	=	The applicable public higher education institutions
t	=	The academic years
enrollpub	=	The total enrolments at public higher education institutions
tuitionpub	=	Average tuition fees at public higher education institutions
avgwage	=	Average wage of workers across provinces and over time
tuitionpriv	=	Average tuition fees at private higher education institutions
income	=	Median household income
wagediff	=	Reflects the difference in future earnings of workers with and without higher education qualifications
unemp	=	Reflects the current labour market conditions and expresses the total unemployment rate as a %
educ/ nonwhite/ urban	=	Environmental conditions for higher education expressed as a % of the total population

5.10 THE SUPPLY OF PUBLIC HIGHER EDUCATION IN SOUTH AFRICA

5.10.1 The providers of public higher education

The South African public higher education system consists of a total of 23 public higher education institutions:

- 11 universities.
- 6 comprehensive universities.
- 6 universities of technology.
  (CHE, 2009a:7)

Public higher education institutions offer a wide range of programmes:

- Programmes offered by universities include career-oriented degree courses, professional programmes, general formative programmes, and research masters and doctoral programmes (WENR, 2004:3).
- Universities of technology offer "vocational education at degree and sub-degree level" (Reddy, 2006:36).
- Comprehensive universities offer programmes and degrees across the spectrum (CHE, 2009a:8) (WENR, 2004:2).

5.10.2 The supply equation of public higher education

The supply offered by higher education is determined by the number of places available for study at public higher education institutions (Berger & Kostal, 2002:104-105).

To model the number of places available at public higher education institutions across provinces and over time, the linear approximation of the aggregate supply for public higher education is specified as:

$$Enrollpub_{it}^{s} = \beta_1 + \beta_2 tuitionpub_{it} + \beta_3 stateapprop_{it} + \beta_4 otherrev_{it} + \beta_5 facsalary_{it} +$$

$$\beta_6 admiflex\_med_{it} + \beta_7 admiflex\_hi_{it} + \beta_8 acadflex\_med_{it} + \beta_9 acadflex\_hi_{it} +$$

$$\beta_{10} instnumber_{it} + \beta_{11} enrollpriv_{it} + u_{it}.$$

From the above equation clearly illustrates that the supply for public higher education is dependent on the following variables:

- The number of spaces available to students is a function of available financial resources that include mainly tuition fees (*tuitionpub*), state appropriations (*stateapprop),* and other revenues (*otherrev*). The

relationship between the variables depends on the objectives and the autonomy of the institutions.

- Two of the most important objectives of public higher education institutions are to improve the quality of education, and the reputation of the institution. The average annual salary of the faculty (instructional) (*facsalary*) can be used as a proxy for the quality and prestige of an institution.

- Public higher education institutions are subject to state regulations. Two combined indicators, namely academic and administrative indicators measure the autonomy of public higher education in a given province. These two qualitative measures are dummy variables in the supply model (*admiflex_med, admiflex_hi* and *acadflex_med, acadflex_hi*).

- The variables *instnumber* and *enrollpriv* are employed to control differences from province-to-province, and the extent of the private sector alternatives. (Berger & Kostal, 2002:104-105)

5.11 THE AFFORDABILITY OF PUBLIC HIGHER EDUCATION IN SOUTH AFRICA

5.11.1 The equity principle of the National Plan for Higher Education of 2001

The equity of access to public higher education institutions is firmly entrenched in the following legislative and policy documents:

➢ The Bill of Rights (1996:Section 9) reflects the basic principle of equity and emphasises the fact that everyone is equal before the law, and that the state may not unfairly discriminate directly or indirectly against anyone on one or more grounds including race, gender, sex, pregnancy, marital status, ethnic or social origin, colour, sexual orientation, age, disability, religion, conscience, belief, culture, language, and birth.

The principle of equality also applies to education. The Bill of Rights (1996: Section 29) outlines that:

Everyone has the right-

- To a basic education, including adult basic education; and
- To further their education, which the state, through reasonable measures, must make progressively available and accessible.

➢ The achievement of equity of access in public higher education is one of the goals of the Education White Paper 3 of 1997 that stipulates that there should be fair opportunities to enter and succeed in public higher education (Education White Paper, 1997:11).

➢ The Higher Education Act of 1997 also refers to the equity principle and states that a public higher education institution must provide appropriate measures for the redress of past inequalities, and may not unfairly discriminate in any way.

➢ The principle of equality also implies that students, who do not have the necessary financial means, should not be excluded from higher education. The Ministry of Education is committed to ensuring that academically able students, who do not have sufficient financial resources, are not excluded from pursuing higher education studies (National Plan for Higher Education, 2001:45).

➢ The Education White Paper 3 of 1997 also emphasises that "the direct cost to students should be proportionate to their ability to pay. Financial need should not be an insuperable barrier to access and success in higher education. A realistic fee structure, must therefore go hand-in-hand with a sustainable programme of student financial assistance" (Education White Paper, 1997:46).

5.11.2 The affordability of public higher education

The California Postsecondary Education Commission (2006:1) defines affordability as "the ability of students and families to have access to and success in pursuing a postsecondary education". Hill & Winston (2001:5) also associate access with affordability and explain that access to higher education consists of two parts: admission and affordability.

The question to ask is: Can a student, who qualifies for admission to a public higher education institution, afford to pay the fees?

Research is proving that public higher education has becomes less affordable because of rising tuition fees. Naidoo (2008:1) maintains that a shocking 50% of students entering higher education institutions in South Africa are dropping out without receiving any qualification, largely because of poverty and a lack of finances. Boehner & McKeon (2003:5) believe that the rising tuition fees are outpacing the increases in family income, and are thus pushing the dream of a higher education out of reach for low-income people. Feemster (2005:36-38) and Williams (2006:53) argue that the rising costs of higher education, and shrinking financial aid make it harder for many students to afford higher education because tuition fees go up faster than family income, and need-based financial aid does not keep pace with the rising tuition fees.

In South Africa the NSFAS scheme was introduced in 1995 with the aim of ensuring that capable students can afford public higher education, and are not excluded by poverty from participating in higher education (CHE, 2006:193).

Table 5.7 illustrates the NSFAS awards to students in public higher education for the period 2001 to 2008.

Table 5.7: National Student Financial Aid Scheme (NSFAS) awards for the period 2001 to 2008

Year	Amounts awarded (Rand millions)	Number of students assisted at public higher education institutions
2001	R761	80 516
2002	R733	86 149
2003	R894	96 555
2004	R985	98 810
2005	R1 217	106 852
2006	R1 358	108 416
2007	R1 791	113 617
2008	R2 375	118 445

(NSFAS, Statistics)

Table 5.7 clearly indicates:

- That the NSFAS scheme has helped many students, who would otherwise not be able to afford higher education as the number of students assisted with financial aid increased substantially with 47,1% from 2001 to 2008.
- In 2008 NSFAS made awards to the amount of R2 375 million, an increase of 212,1% from 2001.

De Villiers & Steyn (2006:172) are, however, concerned about the fact that, despite the large annual NSFAS allocations, student debt is still increasing at an alarming rate, which indicates that financial aid awards are not enough to cover the full cost of study at public higher education institutions.

5.12 SUMMARY

The focus of this chapter is on a number of key issues regarding public higher education in South Africa and can be summarised by answering the following three questions:

Who should pay for higher education? The answer to this question depends on the attitude towards higher education which may vary from the view that higher education is a commodity to be purchased for consumption, higher education is an investment in the future life of a student, higher education is a public benefit for society, and that higher education is a human right, which is, therefore, the responsibility of government (paragraph 5.5.2.1).

Who benefits from higher education? There are personal and societal benefits from the investment in higher education. For the individual who participates in higher education the most easily measurable benefits are the higher lifetime earnings that are accrued in comparison to the individual who did not participate in higher education. There are also broad social and economic benefits from the investment in higher education for the country such as improved labour productivity with the accompanying economic growth, lower crime rates, reduced social expenditure etc. (Wellman & O'Brien, 2001:11) (paragraph 5.5.2.2).

Who pays for higher education? There are three main sources of public higher education funding in South Africa: government grants, tuition fees and other income. The proportions for these three sources of public higher education funding have changed. Government funding of public higher education has decreased significantly, thereby forcing higher education institutions to increase their income from tuition fees to compensate for the loss of government appropriations. The financing of public higher education has, thus, shifted from the public sector, the government, to the private sector, the student and their families. Decreasing government funding is a worldwide trend, but the level of

public higher education funding by government in South Africa is low when compared to some Sub-Saharan African countries standards (paragraph 5.4.1). The substantial private benefits that individuals gain from acquiring higher education qualifications, is the rationale behind the shift towards decreasing government financing of higher education institutions (paragraphs 1.2.2 and 5.5.2.2).

The next chapter introduces the empirical section of the study and investigates the pricing policies, procedures and strategies at the Central University of Technology, Free State.

CHAPTER 6

THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

POLICIES AND PROCEDURES

6.1 INTRODUCTION

This chapter introduces the empirical section of the study. As mentioned in chapter one, the case study research approach will be used to address the problem statement, and to fulfill the objectives of this study. The CUT is the public higher education institution that was selected for this case study.

Concerning the discussion on the CUT as a public higher education institution, it is important to note that the CUT Council approved an institutional restructuring programme during 2008, which is planned to be finalised at the end of 2020. The institutional restructuring is linked to the 2020 vision which also includes a strategic plan. The 2020 vision can be divided into the following three aims:

- The creation of an inclusive democracy which seeks to effectively and innovatively respond to the diverse needs of its people.
- The realisation of a single-coordinated higher education system that affects the quality of higher education.
- Using the State's future planned funding and quality assurance to steer this higher education system.
  (CUT: Vision 2020)

In an effort to achieve this vision an elaborate strategic plan, the Strategic Transformation of Educational Programmes and Structures (STEPS) was established in 2010 to serve as a vehicle to get the institutional restructuring process started.

The above-mentioned institutional-restructuring programme will have a bearing on the composition of the various academic structures, but will not affect the current academic policies and procedures. Because this study covers the period 2001 until 2008 the present academic structure and processes will be used in the empirical section of this study.

6.1.1 Goal of the chapter

The purpose of this chapter is, firstly, to introduce the CUT as a public higher education institution by providing a brief background of the CUT, as well as an exposition of the CUT's core business, which is teaching and learning, research and community engagement. Secondly, to investigate the policies and procedures that drive the current tuition-fee system at the CUT in terms of determining, implementing managing and controlling of tuition fees. Thirdly, to examine the costing system of the CUT in terms of determining the costs of academic programmes offered, as well as the role of cost management. Finally, to investigate the determination of the strategic value, financial viability, and the academic viability of the academic programmes offered at the CUT.

6.1.2 Layout of the chapter

The following is an outline of chapter six. The numbers in the presentation correspond with the paragraph numbers used in the chapter.

6.1	**Introduction**
6.1.1	Goal of the chapter
6.1.2	Layout of the chapter
6.2	**A brief background of the Central University of Technology, Free State**
6.3	**The core business of the Central University of Technology, Free State**
6.3.1	Academic faculties and schools
6.3.2	Academic programmes per school
6.3.3	Academic qualifications per faculty
6.4	**Policies and procedures regarding tuition fees at the Central University of Technology, Free State**
6.4.1	Policy for financial planning
6.4.2	Policy and procedures for determining student fees
6.4.3	Policy for student financial obligations
6.4.4	Policy for the exclusion of students on financial grounds

6.2 A BRIEF BACKGROUND OF THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

The CUT, formerly known as the Technikon, Free State, is situated in the Free State Province in South Africa. The CUT was established on 1 January 1981 with 285 students enrolled mainly in secretarial-, art- and design programmes. Over the past years the CUT has grown to become a public higher education institution that is able to take its place in the national and international higher education landscape (CUT, 2008: Official calendar).

Currently, the CUT offers a wide range of academic programmes in three faculties namely the Faculty of Engineering, Information and Communication Technology, the Faculty of Health and Environmental Sciences, and the Faculty of Management Sciences. The CUT has two regional learning centres, one in Welkom, which caters for students in the Goldfields area of the Free State, and one in Kimberley which was incorporated into the National Institute for Higher Education, Northern Cape during June 2009. Only selected learning programmes are offered at these two regional learning centres.

Vision

The current vision of the CUT is to be a "globally connected African university of technology that focuses on the needs of Southern Africa, and supports graduates for citizenship with skills, and competencies in appropriate technologies" (CUT, 2007-2009: Corporate strategic plan).

Mission

The mission of the CUT in aspiring to fulfill its vision is to:

- "Deliver high-quality appropriate science, engineering and technology (SET) academic programmes, supported by applied research;
- Engage with the community for mutually beneficial development;
- Promotes access with success in attracting potentially successful students and supporting them to become employable graduates;
- Attract and retain expert staff members and support their development and wellbeing; and
- Forges strategic partnerships".
  (CUT, 2007-2009: Corporate strategic plan)

Core values

The following are the core values of the CUT:

- Customer service.
- Integrity.
- Diversity.
- Innovation.
- Excellence.
  (CUT, 2007-2009: Corporate strategic plan)

6.3 THE CORE BUSINESS OF THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

The core business of the CUT is teaching and learning, research and community engagement. In order for these activities to be executed in an orderly and scientific manner it is imperative that an academic structure should be in place, as is outlined in figure 6.1 below.

Figure 6.1: Academic structure
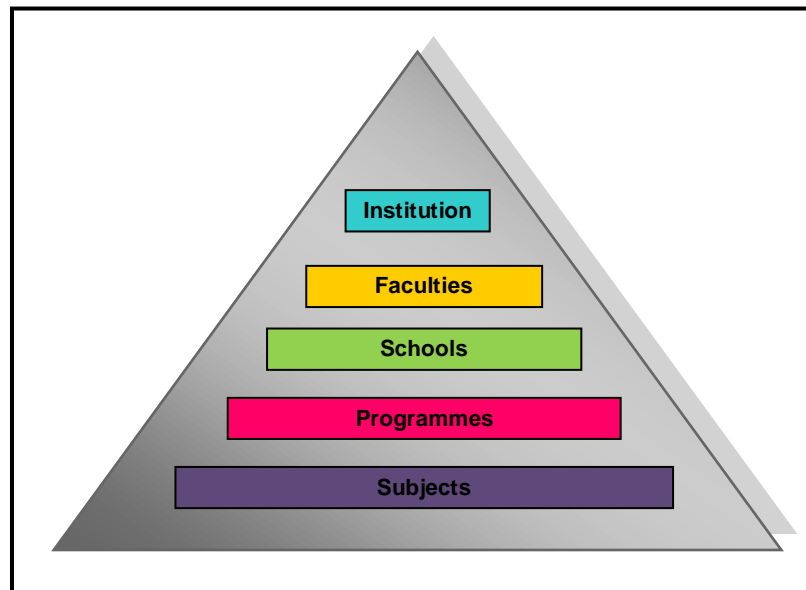
(CUT, 2008: PSP Icon Affordability Model)

6.3.1 Academic faculties and schools

The CUT consists of 3 academic faculties which are subdivided into 12 academic units, known as schools. The academic faculties and schools of the CUT are outlined in table 6.1.

Table 6.1: Academic faculties and schools of the Central University of Technology, Free State

Faculty	Schools
Management Sciences	School for Entrepreneurship and Business Development
	School for Accounting
	School for Government Management
	School for Tourism, Hospitality and Sport
	School for Teachers Education
Engineering, Information and Communication Technology	School for Civil Engineering and Built Environment
	School of Electrical and Computer Systems Engineering
	School of Information Technology and Communication Sciences
	School of Mechanical Engineering and Applied Mathematics
	School of Design Technology and Visual Art
Health and Environmental Sciences	School for Health Technology
	School for Agriculture and Environmental Sciences

(CUT: Documents on academic structure from Deputy Vice Chancellor - Academic)

6.3.2 Academic programmes per school

The various schools offer a variety of academic programmes which are listed in table 6.2.

Table 6.2: Academic programmes per school

Faculty/ School	Academic programme
Faculty of Management Sciences	
School for Entrepreneurship and Business Development	Business Administration
	Human Resources Management
	Marketing
	Office Management and Technology
	Project Management
	Management
	Import/Export Management
School for Accounting	Financial Information Systems
	Cost and Management Accounting
	Internal Auditing
	Accounting
School for Government Management	Public Management
	Academic Service Unit
School for Tourism, Hospitality and Sport	Tourism Management
	Hospitality Management
	Sport Management
School for Teachers Education	Economic and Management Sciences
	Technical/ Technological Education
	Natural Sciences
	Post Graduate Education
	Computer Sciences

Engineering, Information and Communication Technology	
School for Civil Engineering and Built Environment	Civil Engineering
	Built Environment
School for Electrical and Computer Systems Engineering	Electrical Engineering
	Computer Systems Engineering
School of Information and Communication Sciences	Language Practice
	Service Subjects (Communication)
	Web-design and Applications
	Software Development
	Service Subjects (Information Technology)
School of Mechanical Engineering and Applied Mathematics	Mechanical Engineering
School of Design Technology and Visual Art	Clothing and Fashion
	Fine Arts
	Graphic Design
	Photography
	Jewellery Design
Health and Environmental Sciences	
School for Health Technology	Radiography
	Clinical Technology
	Biomedical Technology
	Somatology
	Emergency Medical Care
	Dental Assisting
School for Agriculture and Environmental Sciences	Environmental Health
	Agriculture Management
	Fire Technology

(CUT: Documents on academic structure from Deputy Vice Chancellor - Academic)

6.3.3 Academic qualifications per faculty

The CUT offers an impressive range of qualifications on various levels via the various faculties. Table 6.3 outlines the number and types of qualifications offered by the faculties during 2008 at the CUT.

Table 6.3: Number and types of qualifications offered

Qualification type	Number of qualifications		
	Faculty of Management Sciences	**Faculty of Engineering, Information and Communication Technology**	**Faculty of Health and Environmental Sciences**
National certificates	4		2
Advanced certificates	8		
National diplomas	11	13	10
National higher diploma		1	
Baccalaureus Technologiae degrees (B Tech)	12	12	8
Baccalaureus specialisation programmes	6		
Post graduate certificates	1		
Bachelor of education	1		

Magister Technologiae degrees (M Tech)	11	10	8
Doctor Technologiae degrees (D Tech)	8	5	5
Postdoctoral studies		3	1

(CUT, 2008: Official calendar)

6.4 POLICIES AND PROCEDURES REGARDING TUITION FEES AT THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

The Institutional Regulatory Code (IRC) of the CUT is a central source of policies, procedures, regulations, forms, manuals and constitutions that are designed to, amongst other stipulations, enhance the accomplishment of the vision, mission and core values of the CUT, and clarify how the CUT conducts business (CUT, 2009: IRC).

In this section the following policies and procedures from the Institutional Regulatory Code that have an effect on the pricing of teaching and learning, at the CUT, are identified and discussed.

6.4.1 Policy for financial planning

Policy 502.4, of the Institutional Regulatory Code of the CUT, regulates financial planning at the CUT in terms of financial policy and procedure. This policy was implemented on 27 March 1998.

The objectives of policy 502.4, for financial policy and procedures, are the determining of procedures, methods and systems concerning such aspects as cost calculations, cost and management accounting, determining income, internal auditing and control, and the budget.

Policy 502.4 for financial planning, maintains that a strategic financial plan must be in place for a five year period and must be renewed annually before the budget is compiled for a specific year. The strategic financial plan must address the sources of income, expenditure categories, and provident funds.

The policy identifies tuition fees as one of the sources of income of the institution, and states that tuition fees should only be determined after the budget has been compiled for a specific year, in order to obtain guidelines for determining tuition fees. Tuition fees will, however, finally be determined by relevant market forces (CUT: Policy on financial policy and procedures).

On investigation it was found that no strategic financial plan exists for the CUT.

6.4.2 Policy and procedures for determining student fees

Student fees are regulated by policy G12.1, which was implemented on 3 March 2006. Policy G12.1 encapsulates the policy and procedure for determining student fees at the CUT and will be discussed in terms of: (a) the policy statement; (b) general principles for determining student fees; (c) authority of approval; (d) the process for determining student fees at the CUT, and (e) pricing methods.

a) The policy statement

The policy declares that the CUT shall review student fees for South African and foreign students on an annual basis to ensure that there is a balance between the

recovery of costs for the services received by students in terms of tuition and other fees charged.

b) General principles for determining student fees

The following general principles should be maintained when determining student fees:

- Principle one

The financial sustainability of the CUT and the effective management of its resources is a shared responsibility. In particular,

a. Students should make a fair and reasonable contribution towards the running costs of the institution; and

b. Staff and students should contribute towards the effective management of the financial and other resources of the institution.

- Principle two

The CUT will determine fees by taking into account national and regional trends in public higher education fee pricing, and by acknowledging the responsibility to responsibly advance both access to higher education and to improve service quality.

- Principle three

In order to promote student access to public higher education, the CUT is committed to providing affordable and sustainable levels of financial aid in the form of bursaries and loans. Financial aid provided must also take into

consideration the equity improvement demands of the relevant professions and the CUT's responsibility to contribute towards the advancement to equity.

- Principle four

As far as possible, fees charged should bear some relation to the costs of providing the service.

- Principle five

Academic programmes should be priced so as to cover direct costs, and make a positive contribution towards overheads. Cross subsidisation of loss-making academic programmes should be limited to academic programmes with high strategic value. Loss-making academic programmes that are not of strategic value should be phased out.

- Principle six

The inflation rate (CPIX) for general economic activity must be considered. Student fees should at least increase with this rate. Increases over and above the prevailing inflation rate should correspond with an appreciable increase in quality. The inflation associated with the provision of higher education should also be considered.

- Principle seven

International students should be charged an applicable rate over and above the fees charged for South African students to compensate for the fact that they are not subsidised by the State. However, the fees charged should be competitive so as to continue to attract good quality international students.

- Principle eight

Residence fees should be set at an appropriate level to cover the costs of operating the residences. Residences may not be cross subsidised by the other activities of the institution.

- Principle nine

Application and registration fees should cover the costs of the application and registration processes.

- Principle ten

Tuition fees should be standardised as far as possible, but may be differentiated when the cost differences of providing tuition are significant.

c) Authority of approval

The Student Fees Committee will review tuition and other fees annually and submit its recommendations on student fees to the CUT Council.

The Student Fees Committee consists of:

- The Vice-Chancellor (ex officio).
- Deputy Vice-Chancellor: Academic.
- Executive Director: Finance and operations (Chairperson).
- Financial Manager.
- Manager: Student accounts.
- Senior Director: Student administration.
- Deans of the faculties or representatives.
- Deputy Vice-Chancellor: Student Services.

- Four student representatives from the Student Representative Council, of whom at least one, should serve on the CUT Council.

The Executive Director: Finance and Operations is responsible for the implementation of this policy.

d) The process for determining student fees at the Central University of Technology, Free State

The Student Fees Committee will initially convene during February of each year to plan activities for the revision of student fees for the following year. During this first meeting, responsibilities to gather data or information, while bearing in mind the principles as listed in the policy, or any other information that is deemed necessary, will be allocated to the respective team members.

All departments are expected to submit their requests for course specific costs to be recovered through the fee structure, before the end of March each year.

The Executive Director: Finance & Operations submits recommendations for increases in student fees to the Management Committee who has to provide a mandate. The proposed increases are also shared with the Student Representative Council via the Student Fees Committee.

A report on the outcome of the consultation process is submitted to the Management Committee for approval for inclusion in the budget.

Financial Services then submits, *via* the Finance Planning and Resource Committee, the final proposal to Council for approval.

The Council considers the acceptance of the suggested student fees for the following year during June, at a meeting held to approve the budget.

A detailed procedure manual on the reviewing of student fees does not exist at present but will be compiled in future, and be contained in a financial manual (CUT: Documents from the Chief Director: Financial Management and Services).

e) Pricing methods

Chapter four analyses the various pricing methods that an organisation can use to determine the selling prices of products/services. On investigation it was found that, at present, no procedure manual exists for the determination of the price of a subject that will be offered for the first time at the CUT. The pricing of such a subject is in the hands of the relevant programme heads that may have no pricing or financial knowledge.

6.4.3 Policy for student financial obligations

Policy 502.13 of the Institutional Regulatory Code of the CUT regulates students' financial obligations, and was implemented on 20 August 1998.

This policy states that students are responsible for the prompt settlement of their financial obligations, including tuition fees, to the CUT. Students that do not settle their financial obligations to the CUT will not have access to their academic records which, in turn, will restrict students from registering for a subsequent semester, adjusting their academic programme schedule, receiving a qualification, and having official transcripts furnished (CUT: Policy on student financial obligations).

The policy on student financial obligations will be discussed in terms of: (a) fees payable; (b) conditions of payments; (c) interest; (d) discounts, and (e) default of payment.

a) Fees payable

The fees calendar (CUT, 2009: Fees calendar) specifies the following fees that are payable by all students:

- A non-refundable application fee on application for admission.
- Enrolment fee, payable on enrolment.
- Tuition fees of which a minimum tuition fee is payable on enrolment.

b) Conditions of payments

Payment dates, and minimum payments are agreed upon through consultations with students, and are finally approved by the Council of the CUT (CUT: Policy on student financial obligations).

The following conditions of payment are set out in the fees calendar of the CUT:

- Undergraduate year students

A student enrolled for a year course is given nine months in which to pay off the total account (total registration fee for the year in equal instalments over nine months), starting at the end of February of the year of registration, and ending at the end of October of the same year. Monthly overdue accounts will be interest bearing at prime plus 1%.

- Undergraduate semester students

A student enrolled for a semester course will be allowed to pay the outstanding account for the semester in four equal instalments.

The payment dates for the first semester are as follows:

End of February (25% of the total registration fee).
End of March (50% of the total registration fee).
End of April (75% of the total registration fee).
Full and final settlement at the end of May.

The payment dates for the second semester are as follows:

End of August (25% of the total registration fee).
End of September (50% of the total registration fee).
End of October (75% of the total registration fee).
Full and final settlement at the end of November.

- Postgraduate students (MTech and DTech)

Fees are payable over a two-year period and are adjusted to the increase applicable for the second year of enrolment, with an extension fee applicable to the subsequent year of enrolment.

- International students

Foreign students (excluding those from Southern Africa Development Countries) are responsible for regular tuition fees, plus the portion of the government subsidy that is forfeited. Tuition fees are calculated at 50% of the normal fees charged (CUT, 2009: Fees calendar).

c) Interest

Monthly overdue accounts will be interest bearing at prime plus 1% (CUT, 2009: Fees calendar).

d) Discounts

A discount is granted to a student who pays the tuition fees in full on enrolment/ registration.

A discount is granted to a second, third, and fourth family member, in cases where members of the same family, who are not financially independent, are enrolled simultaneously at the CUT (CUT, 2009: Fees calendar).

e) Default of payment

If a student fails to settle debts with the CUT, the institution is entitled to hand over the account to an attorney for collection. The student will be accountable for all collection fees and legal costs incurred in the collection of any account owed to the CUT (CUT, 2009: Fees calendar).

6.4.4 Policy for the exclusion of students on financial grounds

Policy G/12.5 of the Institutional Regulatory Code regulates the exclusion of students from the CUT on financial grounds. The principles of this policy is that the CUT will financially assist academically deserving and financially needy students by not excluding these students on financial grounds, provided that funds can be made available (CUT: Policy for the exclusion of students on financial grounds).

6.5 CORPORATE STRATEGIC GOALS AND STRATEGIES OF THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

The CUT Corporate Strategic Plan for the period 2007 to 2009 was scrutinized for goals and strategies that could have an effect on the pricing of instruction.

The Corporate Strategic Plan for 2007 to 2009 contains nine goals and strategies to fulfill the vision, mission and core values of the CUT. For this study it is important to look at the financial goals and strategies of the CUT as set out in the Corporate Strategic Plan.

The financial goal, goal eight of the Corporate Strategic Plan, is to ensure financial sustainability.

The strategies to accomplish financial sustainability include the following:

- Incurring expenses based on the value for money.
- Exploring opportunities for commercialization.
- Creating a focused vehicle for third-stream income activity.
- Exercising sound financial control.
- Increasing reserves and investments.
- Optimizing tuition fees.
- Maximizing the state grant.
- Implementing transparent revenue-generating strategies.
- Enhancing fund raising.
- Implementing a financial turnaround strategy.
  (CUT, 2007-2009: Corporate strategic plan)

The optimisation of tuition fees is thus one of the key strategies of the CUT to obtain financial sustainability. The operational plans of the CUT, however, do not address the issue of the optimisation of tuition fees.

6.6 COST ACCOUNTING SYSTEMS IN USE AT THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

In chapter three cost allocations, the determining of costs, and cost management are discussed. In this section the emphasis falls on the cost accounting systems in use at the CUT.

In the past, the CUT lacked costing systems to identify revenue, costs and margins per faculty, school and academic programmes. In 2004 the PSP Icon (Pty) Ltd (PSP Icon), the Affordability Model was developed as a management information tool to address these costing issues.

A key output of the PSP Icon Affordability Model is to supply management with information on the costs of each academic programme offered by the CUT. Proper cost information for academic programmes will allow management to analyse trends in the costs for an academic programme, and management will be able to compare the costs of the various academic programmes. Such comparisons can be a valuable tool in decision making and policy development. Policy G12.1, for determining tuition fees, discussed in 6.4.2, also requires the calculation of the costs for providing teaching and learning, to enable academic programmes to be so priced that they cover the direct costs of the academic programmes. This clearly indicates that costs should play a role in determining tuition fees at the CUT (CUT, 2008: PSP Icon Affordability Model).

6.6.1 Cost allocations and determining costs

An absorption, or full costing method, is used to determine the costs of an academic programme at the CUT. The costs of an academic programme are determined by the total direct costs plus the total indirect costs. The total direct costs of an academic programme are calculated as direct academic instructional costs, plus direct academic operating costs. The total indirect costs of the

academic programme are represented by the costs of administration departments and of the support service departments assigned to the academic programmes through cost allocations.

Table 6.4 outlines the total costs of an academic programme as determined by the PSP Icon Affordability Model.

Table 6.4: Total costs of an academic programme

Direct labour	XX
• Instructional full time staff costs	X
• Instructional part time staff costs	X
• Staff split allocation	X
• Non instructional staff costs	X
Direct academic operating costs	XX
Support service allocation	XX
Total costs of an academic programme	XX

(CUT, 2008: PSP Icon Affordability Model)

Direct academic instructional costs consist of instructional full time and part time staff costs, as well as non instructional staff costs that refer to the costs of the academic programme support personnel. Staff costs are allocated to academic programmes using staff numbers and staff hours as cost drivers. Where a staff member is involved in more than one academic programme, the costs are split amongst the various academic programmes according to the hours the staff member is allocated to each of the academic programmes on the time table of the staff member or another suitable allocation percentage.

Direct academic operating costs include the operating costs of academic departments, and academic support departments. The costs of the academic-

and the academic support departments are allocated to the academic programmes using student numbers, full-time equivalent student numbers (FTE) or staff numbers as cost drivers.

The support service and administration cost allocations to academic programmes includes the non instructional staff costs of support service and administration departments, as well as the operating costs of these departments. The costs of the support service, and administration departments are assigned to the different academic programmes using mainly FTE numbers as cost drivers.

Figure 6.2 illustrates the allocation of costs to various academic programmes to finally determine the costs of an academic programme offered at the CUT.

Figure 6.2: Cost allocations, and determining the cost of academic programmes
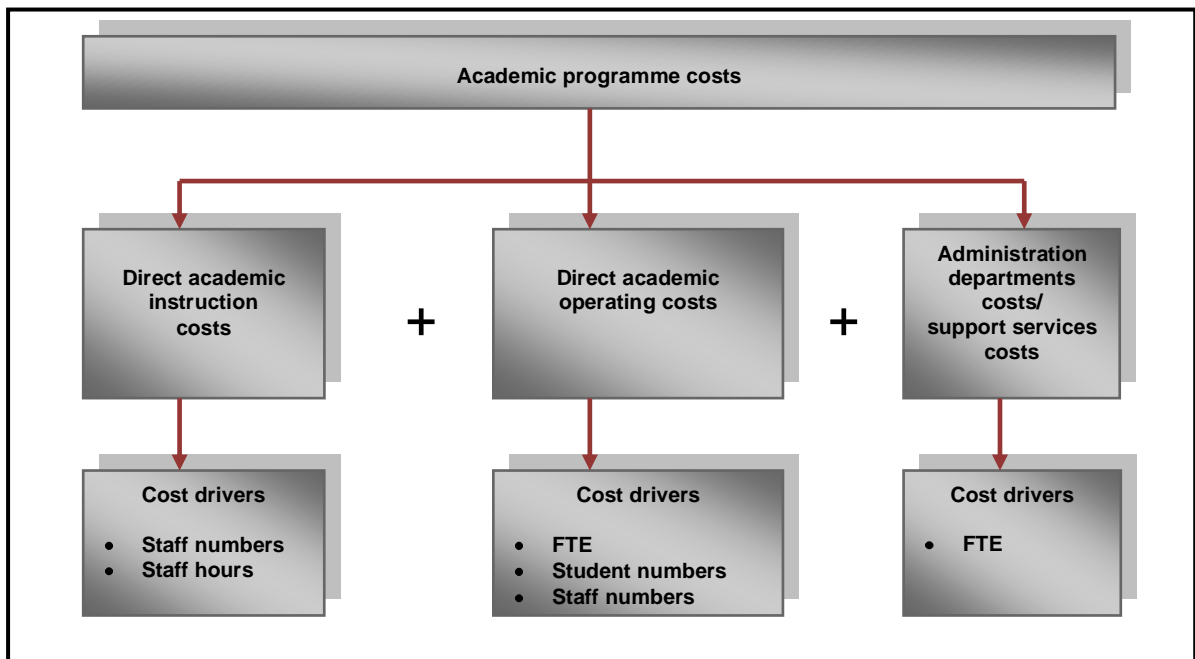
(CUT, 2008: PSP Icon Affordability Model)

6.6.2 Cost management

The policies and procedures included in the Institutional Regulatory Code of the CUT that affect cost management and cost control will be discussed in terms of: (a) Policy G/4.1: Budget policy; (b) Policy 502.73: Policy and procedure regarding financial obligations, and (c) Policy 502.74: Policy and procedure regarding the administration and control of the operating budget.

a) Policy G/4.1: Budget policy

The purpose of this policy is to outline the principles and the guidelines with regard to the budgeting process, and to ensure that this process is transparent and is communicated to all interest parties.

The objectives of the budget policy, Policy G/4.1, are to allocate funds in a viable and sustainable manner; to align funding with the strategic goals and objectives of the institution; and to support the allocation of funds on value for money basis.

The budget process focuses on the annual allocation of income from government grants and student fees. The allocation is accomplished through an open budget review process, which focuses on an annual overview of the budgetary and financial status of various academic programmes, and the functions that have a significant impact on the operations of the CUT. Priority is given to academic programmes, although administrative and support departments must receive adequate support to ensure effective management of the institution.

The policy indicates that the overall consolidated budget expenditure should not exceed the expected income for the ensuing year. The operating budget is financed using government grants, and income from student fees. The capital budget is financed by the current income from government grants, and student fees and/or designated funds. Strategic projects are funded by the surplus on the

budget account after providing for operating and capital expenditure. Benchmarks for budget allocation are developed by taking into account the historical background of the CUT compared to other higher education performance indicators.

The CUT uses the PSP Icon Affordability Model to compare the actual results of the annual expenditure with the budgeted amounts for the various categories of expenses in order to ascertain which costs did not conform to the original budget, to investigate the reasons for the deviations, and to take corrective action. A concern in this regard is the time lapse between the budget period and the completion of the PSP Icon Affordability Model, which may be more than a year. Ideally the budget committee should periodically compare the actual results with the budgeted results to enable management to identify the items that are not performing according to the budget, and to investigate the reasons for this situation.

b) Policy 502.73: Policy and procedure regarding financial obligations

The purpose of this policy is to ensure that no unauthorised financial obligations are entered into on behalf of the CUT. To execute this policy, the principle underpinning it is that an authorised purchase order is required for all purchases of goods or services.

c) Policy 502.74: Policy and procedure regarding the administration and control of the operating budget

The purpose of this policy is to ensure that all income and expenditure of the CUT are correctly recorded in the accounting records, and that the expenditure never exceeds the income for any budget year. The policy clearly indicates that no purchase order for goods or services may be issued if the necessary funds are not available. A budget shortfall on an expenditure item may, in exceptional

circumstances, be motivated by the approved authority for consideration. However, budgeted funds allocated, but not used in the year of allocation, are not carried forward to the next budget year. Any current surpluses on an item forms part of the accumulated funds for the year that are available to the Council that may, in its discretionary and absolute control, be allocated towards the activities of the institution.

6.7 DETERMINING THE STRATEGIC VALUE AND VIABILITY OF ACADEMIC PROGRAMMES AT THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

The CUT adopted an institutional model, The PSP Icon Affordability and Academic Model, in 2004 to monitor the financial and academic feasibility of the CUT in general. In these models all the areas pertaining to the financial and academic profile of the institution are addressed in order to serve as a management information system.

As far as the academic complement of the institution is concerned a dualistic approach is followed in such a manner that the academic viability of the various academic programmes offered by the institution, as well as the strategic alignment of academic programmes with the national strategy, are documented in order to ensure the sustainability of the institution.

6.7.1 Determining the viability of academic programmes

Determining the viability of each academic programme consists of two components namely:

- The financial viability (which represents 20% of viability score).
- The academic viability (which represents 80% of viability score).

The *financial viability* of an academic programme is determined in the PSP Icon Affordability Model. The financial viability of an academic programme is determined by the calculation of the surplus (deficit) of an academic programme for a specific year as illustrated in table 6.5.

Table 6.5: Financial viability of an academic programme

Revenue	X
Subsidy – general	X
Subsidy – interest	X
Third stream income	X
Tuition fees	X
Interest received	X
Other income	X
Less: Direct labour	**(X)**
Instructional staff	X
Instructional part time staff costs	X
Staff split allocations	X
Non instructional staff	X
Less: Direct operating expenditure	**(X)**
Gross profit margin	**X**
Less: Departmental allocation (Support service department)	**(X)**
Surplus/(Deficit)	**X**

(CUT, 2008: PSP Icon Academic Model)

The *academic viability* of an academic programme is determined by the PSP Icon Academic Model while using the following academic viability measures:

- Academic staff characteristics: These are assessed by staff qualifications, staff experience, the split between full time and part time personnel, staff development initiatives, and equity split.

- Student enrolment characteristics: These are determined by examining the equity split, maturity of students, number of international students, and students from the Southern African Development Countries.

- Graduation rates: These are measured by the graduation rates of individual academic programmes.

- Graduate employability: This is the assessment of how many graduates secure jobs in their field of study within one year after graduation.

- Research output: The measurement of the research output values are linked to specific academic programmes.

- Academic development: This is determined by initiatives that include foundation courses, academic support, e-learning supplementation, and supplementation instruction.

- Appropriate infrastructure: This is assessed according to the extent that the programme infrastructure meets the requirements for teaching the courses.

- Curriculum: The assessment of the curriculum components includes the focus on outcome-based learning, the elective variety offered, formal experimental training, and community service.

- Graduate qualities: This includes the measurement of typical graduate qualities that are embedded in programmes such as management skills, problem solving, and communication skills.

- Library skills development: This is determined by how successful academic programmes are at getting students to use information resources effectively.

- Student opinion survey: This is an assessment by students to determine to what degree they have developed a number of generic attributes, or life-long learning skills, through their studies.

These academic viability measures, and their weightings are graphically illustrated in figure 6.3.

Figure 6.3: Academic viability measures and weightings
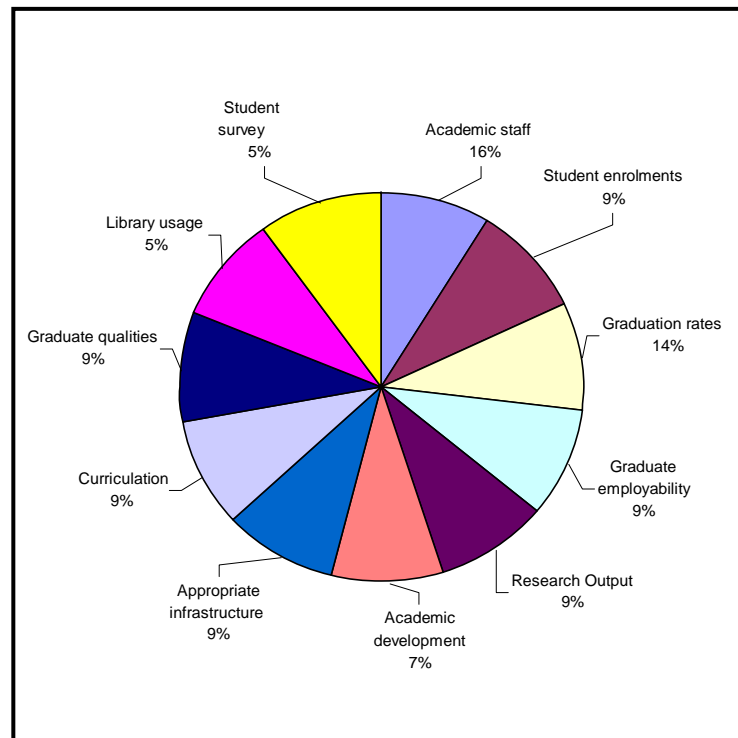
(CUT, 2008: PSP Icon Academic Model)

6.7.2 Determining the strategic value of academic programmes

The following measurements are used by the PSP Icon Academic Model to determine the strategic value of academic programmes:

- Scarce skills with the focus on SET programmes (Science, Engineering and Technology): This means distinguishing between SET programmes and non-SET programmes.

- Scarce skills – other than those developed in the SET programmes: This assesses the non-SET programmes to establish the extent of industry demand, and skills shortage that the non-SET programmes address.

- Student demand: This measurement determines student demand for an academic programme.

- Entrepreneurial focus: This measurement is used as a gauge to establish the extent of the focus on entrepreneurship that academic programmes demonstrate.

- Uniqueness of academic programmes: This is to assess the regional and national uniqueness of an academic programme compared to other universities, and universities of technology.

- International recognition and ties: This measures the existing international involvement of academic staff, and international student exchange agreements concerning academic programmes.

- Industry partnerships and joint ventures: This is to examine partnerships and joint ventures that academic programmes have with government, associations, councils, and industry.

- Higher education institutional collaboration: This measures higher education collaboration, which academic programmes demonstrate, on a regional basis.

- Community involvement and servicing: This assesses the extent of service and goodwill demonstrated to the community.

- Advisory committees: These measure the availability of the constitutions of the committees, and the minutes of meetings that have been held.

Figure 6.4 illustrates strategic measurements and weightings.

Figure 6.4: Strategic measurements and weightings
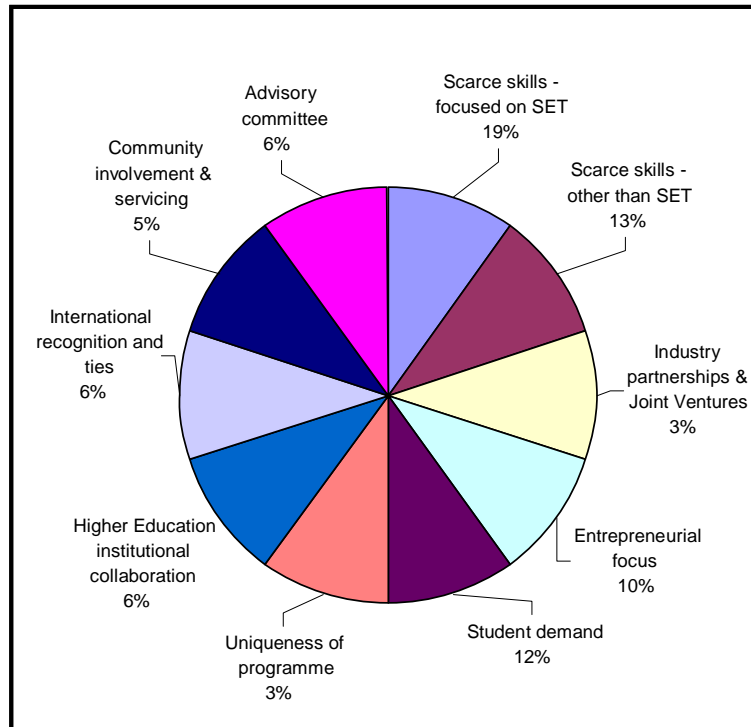
(CUT, 2008: PSP Icon Academic Model)

As discussed in chapter two, the demand for any product/service is the key factor in pricing it. This necessitates having a closer look at student demand, as this is one of the strategic measures of the PSP Icon Academic Model. Student demand at the CUT is measured in terms of the average first choice of student applications for a specific academic programme per year. The formula used by the PSP Icon Academic Model, to calculate the rating for student demand, is as follows:

- If the average first choice application per academic programme per year is > the average first choice applications then the demand for the academic programme is calculated as:

{(Average first choice applications per academic programme per year - Average first choice applications) / (Maximum first choice applications – Average first choice applications)} *2

- If the average first choice application per academic programme per year is < the average first choice applications then the demand for the academic programme is calculated as:

{(Average first choice applications - Average first choice applications per academic programme per year) / Average first choice applications} * -2

(CUT, 2008: PSP Icon Academic Model)

6.7.3 The strategic/viability chart

Once the viability and the strategic value of an academic programme are calculated, the score of the academic programme is plotted on a strategic/viability chart. According to the strategic/viability chart an academic programme can be plotted in one of the following quadrants of the strategic/viability graph, namely:

- Non-strategic / Viable.
- Strategic / Viable.
- Non-strategic / Non-viable.
- Strategic / Non-viable.

The position of an academic programme on the strategic and viability chart is of paramount importance for pricing decisions because a whole set of internal and external measures are taken into consideration in the strategic and viability score. Measures such as the international recognition of academic programmes, graduate employment, and student demand, may play a significant role in the perceived value of an academic programme by the students and must, therefore,

with the strategic value of an academic programme be considered when determining tuition fees. The calculation of the surplus or deficit of each academic programme in the financial viability score may also be useful to identify, and investigate, loss-making academic programmes.

6.8 SUMMARY

The chapter introduces the CUT as the subject of the research and focuses on current policies and procedures in use regarding tuition fees and cost management. The methods used to allocate costs, determine the costs, and the strategic value and viability of academic programmes are also examined.

According to the investigation done in this chapter, there are clearly areas for concern such as the lack of clear pricing objectives and pricing methods, the lack of comprehensive procedure manuals for the determination of tuition fees, and the fact that the pricing of especially, new academic programmes, are in the hands of personnel who have limited pricing knowledge or experience. These, and other concerns are, however, fully addressed in chapter eight.

In the next chapter information vital to the objectives of the study will be collected and analysed to finally draw conclusions on the pricing of instruction at the CUT.

CHAPTER 7

THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

DATA COLLECTION AND ANALYSIS

7.1 INTRODUCTION

7.1.1 Goal of the chapter

This chapter addresses the collection and analysis of relevant and reliable data concerning the CUT.

The data collection and analysis are divided into four categories: student enrolment numbers at the CUT, the income of the CUT, the recurrent expenditure of the CUT, and the affordability of higher-education learning at the CUT.

7.1.2 Reporting period

The analysis and the collected data range from the 2001 to the 2008 financial years.

7.1.3 Sources of data

In order to do a meaningful analysis of the captured data, use was made of the methods discussed in paragraph 1.5.2.4, and which are aimed at achieving the objectives set out in paragraph 1.4.

To facilitate the collection of relevant data a study was made of the following sources pertaining to the period 2001 to 2008, on both institutional and national levels:

- The CUT *Stats-at-a-glance* publication.
- Management information systems, namely the PSP Icon: Academic Model and Affordability Model.
- The CUT Student Fees Committee documents, as well as the minutes of meetings.

- The CUT Institutional Regulatory Code.

- The CUT Official Calendars.

- The CUT Fees Calendars.

- The CUT financial statements.

- Discussions with directors, and the heads of academic programmes at the CUT.

- Documents from the CUT Deputy Vice Chancellor: Academic affairs.

- Documents from the CUT Chief Director: Financial Management and Services.

- Documents from the CUT division for Student Accounts, Bursaries and Loans.

- Documents from the CUT division for Institutional Planning.

- The webpage of Statistics South Africa (http://www.statssa.gov.za).

- The webpage of the Department of Higher Education and Training (http://www.dhet.gov.za).

7.1.4 Layout of the chapter

The following is a visual representation of the layout of chapter seven. The numbers in the presentation below correspond with the paragraph numbers used in this chapter.

7.1	***INTRODUCTION***		
7.1.1	Goal of the chapter		
7.1.2	Reporting period		
7.1.3	Sources of data		
7.1.4	Layout of the chapter		
7.2	**STUDENT ENROLMENT NUMBERS AT THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE**		
7.2	Enrolment numbers	7.2.1	The total number of students enrolled per headcount, and per full-time equivalent

		7.2.2	Student headcount enrolments by field of specialisation expressed as a percentage of the total number of student headcount enrolments
		7.2.3	The planned targets for student headcount enrolments
7.3	**INCOME OF THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE**		
7.3.1	The profile of tuition fees per academic programme	7.3.1.1	Average tuition fee per subject for each academic programme
		7.3.1.2	Tuition fee per FTE student for each academic programme
7.3.2	The methodology used in determining tuition fees, and the influence of the pricing environment when determining tuition fees	7.3.2.1	A comparison between the tuition fee per FTE student for an academic programme, and the demand value of the academic programme
		7.3.2.2	A comparison between the number of FTE students enrolled, and the tuition fee per FTE student for an academic programme
		7.3.2.3	A comparison between the tuition fee per FTE student for an academic programme, and the strategic value of the academic programme
		7.3.2.4	A comparison between the cost per FTE student for each academic programme, and the tuition fee per FTE student for the academic programme
7.3.3	The composition of income	7.3.3.1	Proportions between the three main sources of income
		7.3.3.2	State appropriations per FTE student
7.3.4	Trends in tuition fees levied	7.3.4.1	Trends in the annual increase in tuition fees levied
		7.3.4.2	Trend to increase the tuition fee per FTE student
7.3.5	The annual increase in the tuition fees compared to the changes in the Consumer Price Index (CPIX)	7.3.5.1	The annual increase in tuition fees compared to the annual CPIX

7.3.6	Total income coverage of total recurrent expenditure	7.3.6.1	Surplus realised
7.4	**RECURRENT EXPENDITURE OF THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE**		
7.4.1	The profile of the total recurrent expenditure	7.4.1.1	Total recurrent expenditure
7.4.2	Trends in the total recurrent expenditure	7.4.2.1	The total recurrent expenditure in comparison with the CPIX
		7.4.2.2	The recurrent expenditure per FTE student
7.4.3	Remuneration and composition of personnel	7.4.3.1	Remuneration of personnel
		7.4.3.2	Employee profile
		7.4.3.3	Student enrolments to permanent staff ratios
7.5	**AFFORDABILITY OF HIGHER EDUCATION AT THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE**		
7.5	Affordability of higher education	7.5.1	Financial aid allocations
		7.5.2	Average size of financial aid awards granted
		7.5.3	Student debt
7.6 SUMMARY			

7.2 STUDENT ENROLMENT NUMBERS AT THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

This section presents the number of students enrolled at the CUT.

The number of students enrolled at a public higher education institution and the annual changes in student enrolments can be regarded as valuable determinants of the sources of income and expenditure patterns (CHE, 2006:20). Two of the three main sources of income at the CUT (paragraph 1.2.2) are largely determined by the number of full-time equivalent enrolments (FTE) which, therefore, necessitates a comprehensive overview of student enrolment numbers.

Student enrolments are expressed in headcount enrolments and FTE enrolments.

7.2.1 The total number of students enrolled per headcount, and per full-time equivalent

Table 7.1 shows the student headcount enrolments, and the FTE enrolments for the period 2001 to 2008.

Table 7.1: The total number of student enrolments for the period 2001 to 2008

Year	Student headcount enrolments	Annual increase in student headcount enrolments	Full-time equivalent enrolments	Annual increase in full-time equivalent enrolments
2000	6 163		4 894	
2001	7 133	15,7%	5 791	18,3%
2002	7 863	10,2%	6 323	9,2%
2003	9 004	14,5%	7 223	14,2%
2004	11 347	26,0%	9 494	31,4%
2005	10 320	-9,1%	8 118	-14,5%
2006	10 458	1,3%	7 937	-2,2%
2007	10 477	0,2%	8 114	2,2%
2008	10 895	4,0%	8 510	4,9%
Average		**7,85%**		**7,94%**

(CUT, 2001-2008: Stats-at-a-glance)

The following can be deduced from table 7.1:

- The average annual growth in the student headcount enrolments and FTE enrolments were 7,85% and 7,94% respectively during the reporting period.
- The student headcount enrolments were 52,7% more in 2008 than in 2001.
- The FTE enrolments were 47,0% more in 2008 than in 2001.
- The annual increase in student headcount enrolments as well as in FTE enrolments fluctuated during the reporting period.

The analysis of student enrolment numbers presents a picture of substantial growth in the participation in public higher education at the CUT.

7.2.2 Student headcount enrolments by field of specialisation expressed as a percentage of the total number of student headcount enrolments

Table 7.2 shows the profile of student enrolments according to their fields of specialisation. The student headcount enrolments according to their fields of specialisation are expressed as a percentage of the total student headcount enrolments for the period 2001 to 2008.

Table 7.2: Student headcount enrolments by field of specialisation expressed as a percentage of the total student headcount enrolments for the period 2001 to 2008

Year	Science, engineering and technology	Business and commerce	Humanities
2001	48,1%	33,4%	18,5%
2002	44,6%	36,7%	18,7%
2003	45,4%	40,4%	14,2%
2004	39,2%	39,7%	21,1%
2005	43,1%	34,9%	22,0%
2006	44,7%	33,2%	22,1%
2007	47,6%	30,8%	21,6%
2008	48,3%	31,3%	20,4%
Average	**45,12%**	**35,05%**	**19,83%**

(CUT, 2001-2008: Stats-at-a-glance)

Table 7.2 depicts the following information: A breakdown of the total number of student headcount enrolments according to their fields of specialisation reveals that, during the reporting period, an average of 45,12% of the total number of student headcount enrolments were in the field of science, engineering and technology, followed by an average of 35,05% in the field of business and commerce, and an average of 19,83% in the field of humanities.

This analysis reveals that the enrolment patterns, according to the students' fields of specialisation, are in line with the national requirements for public higher education institutions.

7.2.3 The planned targets for student headcount enrolments

Actual student headcount enrolments compared to the planned targets for student headcount enrolments are set out in table 7.3.

Table 7.3: Actual student headcount enrolments compared to the planned targets for student headcount enrolments for the period 2001 to 2008

Year	Actual student headcount enrolments	Planned targets for student headcount enrolments	Actual student headcount enrolments as a percentage of the planned targets for student headcount enrolments
2001	7 133	6 142	116,1%
2002	7 863	7 107	110,6%
2003	9 004	8 071	111,6%
2004	11 347	9 036	125,6%
2005	10 320	9 288	111,1%
2006	10 458	10 120	103,3%
2007	10 477	9 993	104,8%
2008	10 895	10 240	106,4%

(CUT, 2001 – 2008: Documents from the Division for Institutional Planning)

Table 7.3 depicts the following information: A comparison between the actual student headcount enrolments and the planned targets for student headcount enrolments shows that the actual student headcount enrolments were higher than the planned targets for student headcount enrolments for all the years during the reporting period.

This analysis shows that the planned targets for student headcount enrolments were achieved, and even exceeded during the reporting period, indicating that the CUT operates at higher than planned capacity regarding student enrolments.

7.3 INCOME OF THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

This section describes the profile of tuition fees per academic programme, the methodology used, as well as the influence of the pricing environment when determining tuition fees; the composition of income; the trends in tuition fees levied; a comparison between the increases in tuition fees and the changes in the inflation rate (CPIX), and the total income coverage of total recurrent expenditure.

7.3.1 The profile of tuition fees per academic programme

In this section of the analysis the emphasis is on the analysis of the average tuition fee per subject, and per FTE student for each academic programme.

7.3.1.1 Average tuition fee per subject for each academic programme

The tuition fee per subject is published in the Fees Calendar of the CUT. For analysis purposes the average tuition fee per subject per academic programme will be used.

The formula used to calculate the average tuition fee per subject, per academic programme is:

Sum of [tuition fee per subject x number of enrolments per subject]
Total number of students enrolled per academic programme

(CUT, 2008: PSP Icon Affordability Model)

The average tuition fee per subject for all academic programmes offered at the CUT for 2008 amounted to R1 483 (CUT, 2008: PSP Icon Affordability Model).

The average tuition fee per subject per academic programme, as outlined in Annexure A, indicates that there is no relationship between the average tuition fee per subject per academic programme. The average tuition fee per subject per academic programme varies between R472 in the academic programme: Commerce (68,2% less than the average tuition fee per subject per academic programme) and R3 854 in the academic programme: Jewellery Design (159,9% higher than the average tuition fee per subject per academic programme).

7.3.1.2 Tuition fee per FTE student for each academic programme

The tuition fee per FTE student, for each academic programme, is outlined in Annexure B. The formula for the calculation of the tuition fee per FTE student, for an academic programme is as follows:

<u>Total tuition fees received per academic programme</u>
Number of FTE students enrolled per academic programme

(CUT, 2008: PSP Icon Affordability Model)

The average tuition fee per FTE student enrolled in all academic programmes in 2008 totalled R12 566 (CUT, 2008: PSP Icon Affordability Model).

The deduction that can be made, after examining the tuition fee per FTE student per academic programme, is that there is no relationship between the tuition fee levied per FTE student in the various academic programmes. The lowest tuition fee levied per FTE student per academic programme is R5 687 for the academic programme: Commerce, which is 54,7% less than the average tuition fee per FTE student for an academic programme, while the highest tuition fee levied per FTE

student for an academic programme is R25 990 for the academic programme: Dental Assisting, which is 106,8% higher than the average tuition fee per FTE student for an academic programme.

7.3.2 The methodology used in determining tuition fees, and the influence of the pricing environment when determining tuition fees

An endeavour was made to discover, by means of analysis, whether any pattern is apparent when tuition fees are determined. For this purpose tuition fees, costs, strategic value, demand and the number of students enrolled for each academic programme are all compared in order to establish what effect these factors have on determining the tuition fees of academic programmes.

7.3.2.1 A comparison between the tuition fee per FTE student for an academic programme, and the demand value of the academic programme

The discussion on the law of demand in paragraph 2.5.1.1 maintains that the demand for a product/service will be higher if the price is lower, and the demand for a product/service will be lower if the price is higher.

The CUT makes use of a formula developed in the PSP Icon: Academic Model to determine the demand value for all academic programmes that are offered. The formula is based on the first choice of applications received for each academic programme per annum (paragraph 6.7.2).

A comparison between the demand value and the tuition fee per FTE student for an academic programme is necessary to determine the relationship between the tuition fees levied for an academic programme, and the demand value of the academic programme.

Annexure C compares the tuition fee per FTE student for a specific academic programme and the demand value for that academic programme for the year 2008 as calculated in the PSP Icon: Academic Model, discussed in paragraph 6.7.

According to the comparison between the tuition fee per FTE student for an academic programme and the demand value of the academic programme, there is clearly no relationship between the demand value and the tuition fee per FTE student of the academic programmes. This is illustrated by the following examples: The academic programme in Biomedical Technology has a demand value of +0.1 and a tuition fee per FTE student of R11 289, whereas the academic programme in Fine Arts charges relatively the same tuition fee per FTE student at R11 023, but has a demand value of -1.5. The academic programmes, Business Administration and Clothing/Fashion, both have demand values of -1.4, but the tuition fee per FTE student for the academic programme Clothing/Fashion, is R14 643, which is 38,5% higher than the tuition fee of R10 573 per FTE student for the academic programme Business Administration.

The above examples indicate that the demand value of an academic programme is not considered when determining tuition fees for an academic programme.

7.3.2.2 A comparison between the number of FTE students enrolled, and the tuition fee per FTE student for an academic programme

Annexure D compares the number of FTE students enrolled for each academic programme with the tuition fee per FTE student for an academic programme in 2008.

The comparison between the number of FTE students enrolled per academic programme, and the tuition fee per FTE student for an academic programme, clearly indicates that there is no relationship between the number of FTE students enrolled per academic programme and the tuition fees levied for the academic

programme. This can be seen in the following two examples: The tuition fee per FTE student for two academic programmes in the Faculty of Engineering, Information and Communication Technology: the academic programme in Civil Engineering, and the academic programme in Computer Systems Engineering has almost the same price at R15 728 and R15 953, respectively. However, there is a large difference in the number of FTE students enrolled for these academic programmes, at 356 and 85 respectively. A further illustration of this phenomenon is found in the academic programmes for Public Management and for Sport Management. They have FTE enrolments of 466 and 97 respectively, but have, relatively, the same tuition fee per FTE student of R10 172 and R10 561 respectively.

The above examples illustrate clearly that the number of FTE students enrolled per academic programme is not considered when determining the tuition fees of an academic programme.

7.3.2.3 A comparison between the tuition fee per FTE student for an academic programme, and the strategic value of the academic programme

The PSP Icon: Academic Model, discussed in paragraph 6.7.2, uses a set of internal and external factors to determine the strategic value of an academic programme at the CUT. In this analysis the strategic value of an academic programme is compared to the tuition fee per FTE student for the academic programme. The aim is to determine whether the strategic value of an academic programme plays a role in determining the tuition fees for the academic programme.

In Annexure C, the tuition fee per FTE student for each academic programme is compared to the strategic value of the academic programme for the year 2008 as it is calculated in the PSP Icon: Academic Model, which is discussed in paragraph 6.7.2.

The comparison between the tuition fee per FTE student and the strategic value of an academic programme clearly shows that there is no relationship between the tuition fee per FTE student, and the strategic value of an academic programme. This is illustrated by the following two examples: the academic programme for Electrical Engineering has a strategic value of +1.115, and the tuition fee per FTE student is R15 217, whereas the academic programme in Jewellery Design has relatively the same tuition fee per FTE student at R15 087 but has a strategic value of -1.108. The academic programme in Clothing/Fashion has a strategic value of + 0.666 and a tuition fee per FTE student of R14 643, whereas the academic programme in Office Management and Technology has relatively the same tuition fee per FTE student, at R14 157, but it has a strategic value of -0.601.

The above examples indicate that the strategic values of academic programmes are not considered when determining the tuition fees for academic programmes.

7.3.2.4 A comparison between the cost per FTE student for each academic programme, and the tuition fee per FTE student for the academic programme

Annexure E outlines the cost per FTE student for each academic programme compared to the tuition fee per FTE student for the academic programme for the year 2008.

Annexure E indicates that there is no relationship between the cost per FTE student of an academic programme and the tuition fee for the academic programme. This lack of a relationship is illustrated in the following examples: The academic programme in Dental Assisting has a cost per FTE student of R79 259 and a tuition fee per FTE student of R25 990. The academic programme in Fine Arts has relatively the same cost per FTE student at R72 328, but the tuition fee per FTE student is R11 023. The cost per FTE student for these two

academic programmes is, thus, relatively the same but there is, however, a large difference between the tuition fees for the FTE students who are enrolled in one or the other of the two academic programmes.

The same tendency is seen in the tuition fee per FTE student for the academic programme in Management and the academic programme in Emergency Medical Care with relatively the same tuition fee per FTE student at R17 120 and R17 511 respectively. There is, however, a large difference between the costs per FTE student for these two academic programmes, which are R39 583 and R78 802 respectively.

The above examples show that the cost of an academic programme is not considered when determining the tuition fees for an academic programme.

7.3.3 The composition of income

The three main sources of income for the CUT come from a state subsidy, tuition fees, and third stream income (paragraph 1.2.2). The composition and the trends in the composition of these three sources of income are the focus point of this section of the analysis.

The world-wide trend of decreasing government funding for public higher education with an accompanied increase in income from tuition fees, which are discussed in paragraphs 1.2.2 and 5.4.1, has resulted in changes in the proportions of the main sources of income for public higher education institutions. The purpose of the analysis is, therefore, to determine the shift in the funding at the CUT from the three main sources of income during the reporting period.

Before discussing the income of the CUT, the importance of a R40 million infra-structure grant received from the government in 2007 must be mentioned (CUT, Documents from the Chief Director: Financial Management and Services). For

analysis purposes, this amount is excluded from government subsidies, as well as the calculation of the surplus realised in 2007 in table 7.9. The reason for the exclusion of this grant is because this was a once-off conditional grant, and it does not represent recurrent income.

7.3.3.1 Proportions between the three main sources of income

Table 7.4 outlines the proportions between the three main sources of income for the period 2001 to 2008.

Table 7.4: The proportions of income from the three main sources for the period 2001 to 2008

Year	State subsidy	Tuition fees and other fees	Other third stream income
2001	51,41%	35,08%	13,51%
2002	51,80%	34,77%	13,43%
2003	54,47%	32,08%	13,45%
2004	54,70%	33,11%	12,19%
2005	54,70%	30,50%	14,80%
2006	58,30%	30,94%	10,76%
2007	55,14%	31,37%	13,49%
2008	56,34%	31,18%	12,48%
Average	**54,61%**	**32,38%**	**13,01%**

(CUT, 2001-2008: Financial statements)

The trends in the proportions of income from the three main sources, as outlined in table 7.4, is graphically illustrated in figure 7.1 for the period 2001 to 2008.

Figure 7.1: Trends in the proportions of the three main sources of income for the period 2001 to 2008
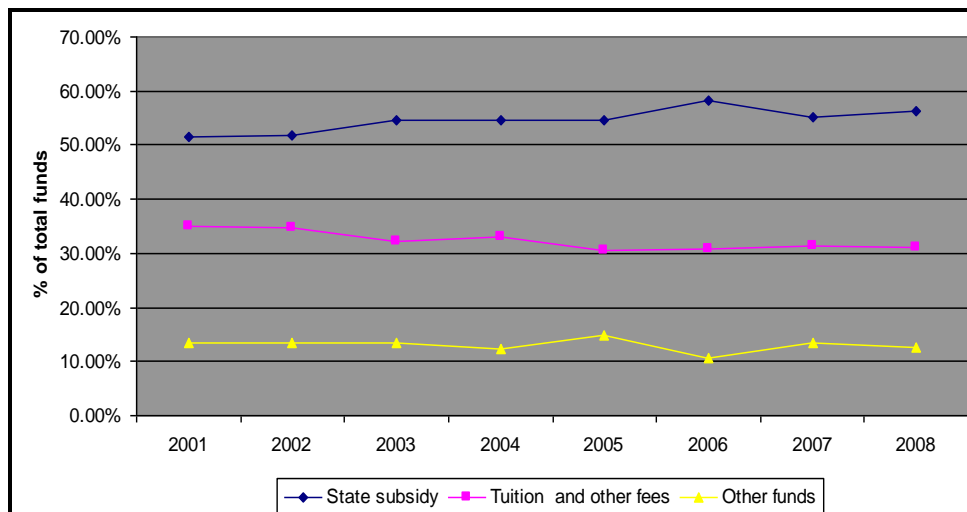
(CUT, 2001-2008: Financial statements)

Deductions that can be made from table 7.4 and figure 7.1:

- There is a trend to increase government funding as a percentage of the total funding of the CUT. The increase in government funding from 51,41% in 2001 to 56,34% in 2008 clearly demonstrates this trend. The average annual growth in government funding was 15,14% during the reporting period.
- Tuition and other fees show a declining trend from 35,08% in 2001 to 31,18% of the total income in 2008. The average annual growth in tuition fees and other fees was 11,75% during the reporting period.
- The funds from other sources remained relatively constant between 13,51% in 2001 and 12,48% in 2008. The average annual growth in third-stream income was 12,38% during the reporting period.

The analysis reflects the changes in the composition of the income of the institution during the reporting period. The most notable changes in the

proportions of the three main sources of income occurred because of the increasing levels in government funding resulting in a decrease in tuition and other fees.

7.3.3.2 State appropriations per FTE student

The number of FTE enrolments is a main consideration in determining state appropriations and tuition fees, as mentioned in the analysis on student enrolments in paragraph 7.2. The state appropriations per FTE student are calculated to determine the trend in government funding per FTE student. Table 7.5 shows the state appropriations per FTE student for the period 2001 to 2008.

Table 7.5: State appropriations per FTE student for the period 2001 to 2008

Year	State appropriations per FTE student
2001	R13 269
2002	R14 824
2003	R16 305
2004	R14 620
2005	R19 180
2006	R22 398
2007	R22 437
2008	R24 224

(CUT, 2001-2008: Financial statements) (CUT, 2001-2008: Stats-at-a-glance)

The following deductions can be made from table 7.5:

- The analysis of the state appropriations per FTE student confirms the increasing trend in government funding as a main source of income for the CUT.

- The state appropriations per FTE student increased from R13 269 in 2001 to R24 224 in 2008, which is an increase of 82,6%.
- The average annual growth in the state appropriations per FTE student during the reporting period was 8,99%.

This analysis confirms the increasing trend in government funding as a source of income for the CUT.

7.3.4 Trends in tuition fees levied

This section of the analysis focuses on the trends in tuition fees levied during the reporting period.

Raising tuition fees is one of the ways that public higher education institutions use to respond to diminishing state funding (paragraphs 1.2.2 and 5.5.3). This trend to increase tuition fees may affect the affordability of tuition fees, and thereby jeopardize the achievement of the equity-in-access goal of the National Plan for Higher Education of 2001 (paragraph 1.2.2). Being aware of the importance of determining trends in the annual tuition fees, as well as the trends in the average tuition fee per FTE student, promotes understanding of the effect of tuition fees on the affordability of higher education at the CUT.

7.3.4.1 Trends in the annual increase in tuition fees levied

Table 7.6 shows the trend in the published annual increase of tuition fees levied for the period 2001 to 2008.

Table 7.6: Published annual increase in tuition fees levied for the period 2001 to 2008

Year	Published annual increase in tuition fees levied
2001	10%
2002	8,6%
2003	9,5%
2004	8,5%
2005	6,5%
2006	6,5%
2007	6,5%
2008	7,5%
Average	**7,95%**

(CUT, 2001 – 2008: Documents from the Student Fees Committee)

The following deductions can be made from table 7.6:

- There was an average annual increase in the published tuition fees at the CUT of 7,95% between the years 2001 to 2008.
- The annual percentage increase in the published tuition fees at the CUT fluctuated during the period 2001 to 2004. During 2005 to 2007 the annual increase in tuition fees remained constant at 6,5% and in 2008 the annual percentage increase in tuition fees increased to 7,5%.

This analysis clearly indicates the trend of increasing tuition fees at the CUT during the reporting period.

7.3.4.2 Trend to increase the tuition fee per FTE student

Table 7.7 outlines the trend to increase the tuition fee per FTE student for the period 2001 to 2008.

Table 7.7: Trend to increase the tuition fee per FTE student for the period 2001 to 2008

Year	Tuition fee per FTE student	Annual increase in the tuition fee per FTE student
2000	R7 349	
2001	R7 807	6,2%
2002	R8 320	6,6%
2003	R8 686	4,4%
2004	R9 021	3,9%
2005	R9 808	8,7%
2006	R11 063	12,8%
2007	R11 948	8,0%
2008	R12 566	5,2%

(CUT, 2001-2008: Financial Statements) (CUT, 2001-2008: Stats-at-a-glance)

From table 7.7 the following deductions can be made:

- There was a trend to increase the tuition fee per FTE student during the reporting period.
- The tuition fee per FTE student increased from R7 807 in 2001 to R12 566 in 2008, which amounted to a total increase of 60,96% between 2001 and 2008.
- The average annual increase in the tuition fee per FTE student during the reporting period was 7,05%.

The analysis illustrates the trend to increase the tuition fee per FTE student during the reporting period.

7.3.5 The annual increase in the tuition fees compared to the changes in the Consumer Price Index (CPIX)

The purpose of this section of the analysis is to compare the annual increases in the tuition fees with the changes in the inflation rate (CPIX).

One of the main concerns of the Ministry of Education, which is discussed in paragraph 1.2.3, is that the increases in tuition fees at public higher education institutions outpaces the inflation rate. Principle six of policy G12.1 on determining student fees, which is discussed in paragraph 6.4.2 of chapter six, also requires that the consumer price index excluding interest rates on mortgage bonds (CPIX) must be considered when determining tuition fees and that tuition fees should, at least, increase annually to keep in step with the CPIX. The annual increase in the tuition fees will therefore be compared to the annual changes in the CPIX to determine whether the annual increase in tuition fees outpaces the CPIX.

7.3.5.1 The annual increase in tuition fees compared to the annual CPIX

Table 7.8 compares the annual increase in tuition fees with the annual CPIX for the period 2001 to 2008.

Table 7.8: A comparison between the published annual increase in tuition fees and the annual CPIX for the period 2001 to 2008

Year	CPIX	Published annual increase in tuition fees
2001	6,6%	10,0%
2002	9,3%	8,6%
2003	6,8%	9,5%
2004	4,3%	8,5%
2005	3,9%	6,5%
2006	4,6%	6,5%
2007	6,5%	6,5%
2008	11,3%	7,5%
Average	**6,66%**	**7,95%**

(Statistics South Africa, Annual inflation) (CUT, 2001 – 2008: Documents from the Student Fees Committee)

Table 7.8 reveals the following findings:

- When the annual increase in tuition fees is compared to the annual CPIX, it is evident that the annual increase in tuition fees outpaced the increases in the CPIX for five of the eight years during the reporting period.
- The average annual increase in tuition fees of 7,95% outpaced the average increase in the CPIX of 6,66% over the reporting period.

This analysis reveals that the average annual increase in tuition fees outpaced the average annual changes in the CPIX over the reporting period.

7.3.6 Total income coverage of total recurrent expenditure

7.3.6.1 Surplus realised

For public higher education institutions to be financially viable and sustainable, the total income of these institutions should be sufficient to cover the total recurrent expenditure. Table 7.9 outlines the surplus realised over the reporting period, and expresses the surplus as a percentage of the total income.

Table 7.9: Surplus realised in Rand value and as a percentage of the total income for the period 2001 to 2008

Year	Surplus ('000)	Surplus as a percentage of the total income
2001	R7 402	4,95%
2002	R8 171	4,52%
2003	R15 629	7,23%
2004	R7 687	2,77%
2005	(R7 327)	(2,57%)
2006	R25 655	8,41%
2007	R34 399	10,42%
2008	R22 832	6,24%

(CUT, 2001-2008: Financial statements)

Table 7.9 reveals the following findings:

- A surplus was realised in seven of the eight years during the reporting period.

- The surplus as a percentage of total income fluctuated during the reporting period and ranged between a deficit of 2,57% in 2005 and a surplus of 10,42% in 2007.

This analysis reveals the financial viability of the CUT, because a surplus was realised in all the financial years during the reporting period, except for 2005.

7.4 RECURRENT EXPENDITURE OF THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

An analysis of the price of a product/service can be regarded as incomplete without an analysis of the costs for providing the product/service because of the relationship between the price and the cost of the product/service, which is discussed in paragraphs 2.2.4 and 3.1. The discussion in chapter three on the importance of costs in pricing emphasizes the price/cost relationship and declares that the costs of a product/service are central considerations in any pricing decision, because the costs set the minimum price for a product/service. The discussion in chapter five also maintains that the costs of providing higher education should be considered when setting tuition fees at public higher education institutions.   According to the investigation on the policies and procedures when determining tuition fees at the CUT, it is evident that costs should also play a role in the pricing of instruction at the CUT (paragraph 6.4.2).

An analysis of the recurrent expenditure data of the CUT is therefore of paramount importance in order to draw conclusions on the pricing of instruction.

7.4.1 The profile of the total recurrent expenditure

The total recurrent expenditure is analysed in this section.

The purpose of the analysis is to determine the composition of the total recurrent expenditure.

7.4.1.1 Total recurrent expenditure

Figure 7.2 illustrates a breakdown of the total recurrent expenditure into the three main components for the year 2008.

Figure 7.2: A breakdown of the total recurrent expenditure for 2008
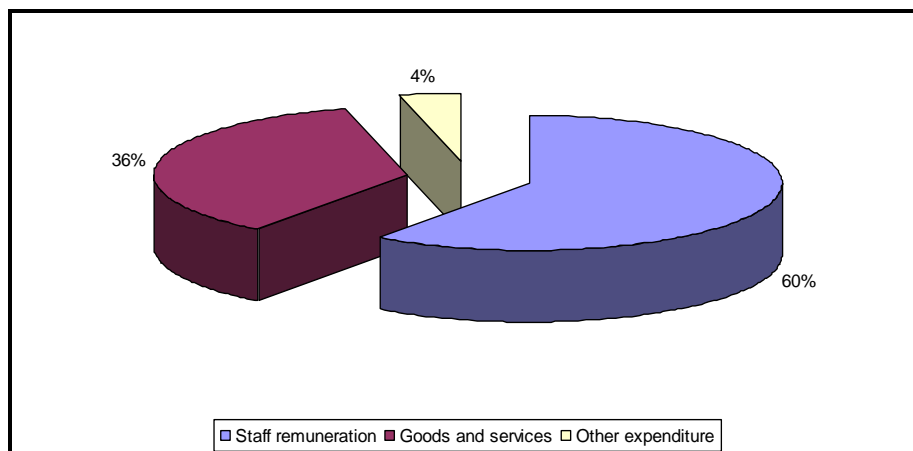
(CUT, 2008: Financial Statements)

The following findings are evident from figure 7.2: A breakdown of the total recurrent expenditure in 2008, as illustrated in figure 7.2, shows that staff remuneration is the largest expenditure component at 60% of the total recurrent expenditure, followed by goods and services at 36% of the total recurrent expenditure. Thus, the two expenditure components, goods and services, as well as staff remuneration make up 96% of the total recurrent expenditure.

7.4.2 Trends in the total recurrent expenditure

The analysis focuses on the trends in the total recurrent expenditure, as well as in the recurrent expenditure per FTE student over the reporting period.

The discussion in paragraph 1.2.4 states clearly that public higher education costs have increased faster than the costs of every other sector of the economy with the exception of health care. As a result of the growing costs, public higher education institutions have increased tuition fees to recover these costs. Analysing the cost situation at the CUT, necessitates a review of the trends in the total recurrent expenditure during the reporting period in order to determine the direction, and the rate of change in the recurrent expenditure.

Researchers offer many reasons to explain the rising costs at public higher education institutions. Besides other factors, discussed in paragraphs 1.2.4 and 5.7.4, higher student numbers and the impact of the annual inflation rate are probably the main reasons for the increase in costs. The changes in the total recurrent expenditure will therefore be compared to the annual inflation rate (CPIX), and student headcount enrolments to examine their effect on the total recurrent expenditure.

7.4.2.1 The total recurrent expenditure in comparison with the CPIX

Table 7.10 outlines the total recurrent expenditure in comparison with the CPIX for the period 2001 to 2008.

Table 7.10: Total recurrent expenditure compared to the CPIX for the period 2001 to 2008

Year	Total recurrent expenditure ('000)	Annual increase in total recurrent expenditure	CPIX
2000	R120 954		
2001	R142 056	17,4%	6,6%
2002	R172 802	21,6%	9,3%
2003	R200 583	16,1%	6,8%
2004	R269 351	34,3%	4,3%
2005	R291 958	8,4%	3,9%
2006	R279 268	-4,3%	4,6%
2007	R295 782	5,9%	6,5%
2008	R343 079	16,0%	11,3%

(CUT, 2001-2008: Financial statements) (CUT, 2001-2008: Stats-at-a-glance) (Statistics South Africa, Annual inflation)

Table 7.10 reveals the following findings:

- The total recurrent expenditure grew substantially from R142 056 000 in 2001 to R343 079 000 in 2008, which is an increase of 141,5%.
- The average annual increase in the total recurrent expenditure during the reporting period was 13,42%.
- The annual increase in the recurrent expenditure fluctuated during the reporting period.
- During the reporting period, the average annual percentage increase, of 13,42%, in the total recurrent expenditure was much higher than the average annual increase of the CPIX that was 6,66%.

The analysis reveals the substantial increases in the recurrent expenditure at the CUT, during the reporting period. These annual increases in the recurrent expenditure largely outpaced the CPIX.

7.4.2.2 The recurrent expenditure per FTE student

Table 7.11 illustrates the recurrent expenditure per FTE student, and the annual increase of this expenditure compared to the annual increase in the number of FTE enrolments for the period 2001 to 2008.

Table 7.11: Recurrent expenditure per FTE student, and the annual increase of this expenditure compared to the annual increase in FTE enrolments for the period 2001 to 2008

Year	Recurrent expenditure per FTE student	Annual increase in the recurrent expenditure per FTE student	Annual increase in FTE enrolments
2000	R24 715		
2001	R24 530	-0,7%	18,3%
2002	R27 329	11,4%	9,2%
2003	R27 770	1,6%	14,2%
2004	R28 371	2,2%	31,4%
2005	R35 964	26,8%	-14,5%
2006	R35 186	-2,2%	-2,2%
2007	R36 453	3,6%	2,2%
2008	R40 315	10,6%	4,9%

(CUT, 2001-2008: Financial statements) (CUT, 2001-2008: Stats-at-a-glance)

Table 7.11 reveals the following findings:

- The recurrent expenditure per FTE student has grown substantially from R24 530 in 2001 to R40 315 in 2008, which is an increase of 64,3%.
- The average annual increase in the recurrent expenditure per FTE student is 7,36% during the reporting period.
- The average annual increase in the recurrent expenditure per FTE student of 7,36% outpaced the average increase in the CPIX of 6,66% during the reporting period.
- There is no relationship between the annual increase in recurrent expenditure per FTE student and the annual increase in the number of FTE enrolments.

This analysis reveals that the cost of delivering services to an FTE student increased substantially during the reporting period.

7.4.3 Remuneration and composition of personnel

As the CUT is a labour intensive organisation, the personnel remuneration as the largest expenditure component of the total recurrent expenditure needs to be carefully examined.

The composition of the permanent personnel is analysed according to the three major staff categories which are: instruction and research staff, administrative staff, and service staff. To determine the workload, and efficient use of lecturers and other staff members a comparison is made between the student headcount enrolments to the permanent instructional and research staff ratio, as well as the total permanent staff ratio.

7.4.3.1 Remuneration of personnel

Table 7.12 outlines information on the remuneration of personnel for the reporting period.

Table 7.12: Personnel remuneration for the period 2001 to 2008

Year	Personnel remuneration as a percentage of total recurrent expenditure	Remuneration per FTE staff member	Annual increase in the remuneration per FTE staff member	CPIX
2001	53%	R107 538	6,4%	6,6%
2002	60%	R138 363	28,7%	9,3%
2003	64%	R176 696	27,7%	6,8%
2004	61%	R199 434	12,9%	4,3%
2005	63%	R219 900	10,3%	3,9%
2006	59%	R192 490	-12,5%	4,6%
2007	64%	R224 553	16,7%	6,5%
2008	60%	R243 747	8,5%	11,3%

(CUT, 2001-2008: Financial statements) (CUT, 2001-2008: Stats-at-a-glance)

Table 7.12 reveals the following findings:

- The personnel remuneration as a percentage of the total recurrent expenditure increased from 53% to 60% between 2001 and 2008.
- During the period 2001 and 2008 personnel remuneration as a percentage of the total recurrent expenditure fluctuated and was even as high as 64% in the financial years 2003 and 2007.

- The remuneration per FTE staff member increased substantially from R107 538 in 2001 to R243 747 in 2008, which is an increase of 126,66%.

- The annual increase in the remuneration per FTE staff member fluctuated during the period 2001 to 2008.

- The average annual increase in the remuneration per FTE staff member for the reporting period was 12,40%.

- The average annual increase in the remuneration per FTE staff member of 12,40% largely outpaced the average annual CPIX of 6,66%.

The analysis shows that the remuneration of personnel as a percentage of total recurrent expenditure, as well as the remuneration per FTE staff member increased substantially during the reporting period. The annual increases in the remuneration per FTE staff member were also above the CPIX during the reporting period.

7.4.3.2 Employee profile

Table 7.13 shows the number of permanent staff per main staff category for the period 2001 to 2008.

Table 7.13: Number of permanent staff per main staff category for the period 2001 to 2008

Year	Instruction & research staff	Administrative staff	Service staff	Total permanent staff
2001	142	246	229	617
2002	138	267	213	618
2003	145	272	199	616
2004	202	328	201	731
2005	203	333	181	717
2006	218	320	172	710
2007	224	306	156	686
2008	221	288	145	654

(DoE, 2001 – 2008: Education Statistics in South Africa)

Table 7.13 depicts the following information:

- The number of permanent staff increased from 617 in 2001 to 654 in 2008, which is an increase of 6,0%.
- The instruction/research staff category increased from 142 in 2001 to 221 in 2008, which is an increase of 55,6%.
- The administrative staff category increased from 246 in 2001 to 288 in 2008, which is an increase of 17,1%.
- The service staff category decreased from 229 in 2001 to 145 in 2008, a decrease of 36,7%.
- The instruction/research and service staffs were on average 28% each of the total permanent staff. The administrative staff represented on average 44% of the total permanent staff.

- The ratio of permanent academic staff (instruction/research staff members) to permanent non-academic staff (service and administrative staff) was on average 1:2,58.

The analysis reveals that, although there is a shift in the composition of permanent staff towards an increase in the instruction/research staff category, the majority of staff members are still employed in the non-academic staff category (service and administrative staff).

7.4.3.3 Student headcount enrolments to permanent staff ratios

Table 7.14 indicates the ratios of student headcount enrolments to permanent instruction/research staff and student headcount enrolments to the total permanent staff.

Table 7.14: Ratios of student headcount enrolments to permanent instruction/research staff and student headcount enrolments to the total permanent staff for the period 2001 to 2008

Year	Ratio of student headcount enrolments to permanent instruction/ research staff	Ratio of student headcount enrolments to the total permanent staff
2001	50,1	11,5
2002	56,4	12,6
2003	61,3	14,4
2004	56,2	15,5
2005	50,8	14,4
2006	48,0	14,7
2007	46,8	15,3
2008	49,3	16,7
Average	**52,4**	**14,4**

(DoE, 2001 – 2008: Education statistics in South Africa)

Table 7.14 depicts the following information:

- The average student headcount enrolments to the permanent instruction/research staff ratio was 52,4:1.
- The student headcount enrolments to the permanent instruction/research staff ratio fluctuated during the reporting period.
- The average student headcount enrolments to the total permanent staff was 14,4:1.
- The student headcount enrolments to the total permanent staff ratio fluctuated during the reporting period.

The analysis of the average student headcount enrolments to the permanent instruction/research staff ratio reveals that the availability of academic staff to meet the teaching needs of students fluctuated during the reporting period and there was no significant difference in this ratio between in 2001 and 2008. The average student headcount enrolments to the total permanent staff ratio confirm the shift in the personnel composition as an increase towards academic staff.

7.5 AFFORDABILITY OF HIGHER EDUCATION AT THE CENTRAL UNIVERSITY OF TECHNOLOGY, FREE STATE

The shift in the funding of public higher education towards students and their families, and the increasing costs of public higher education institutions have resulted in higher costs for students who attend public higher education institutions. The higher costs of study may affect the financial ability of students to be able to access public higher education (paragraph 1.2.3). To address the affordability issue, financial aid is made available by public higher education institutions through the NSFAS to ensure that capable students can afford higher education, and are not excluded from participating in public higher education (paragraph 1.2.5).

At the CUT there has been an increasing trend in government funding as a percentage of the total income as well as per FTE student (table 7.4) (table 7.5). Regardless of the increased government funding as a source of income, the average tuition fees per FTE student escalated substantially by 60,96% between the years 2001 and 2008 (table 7.7).

To address the affordability of public higher education at the CUT, the following key indicators of affordability are analysed: financial aid allocations, the average size of financial aid awards granted, and student debt.

7.5.1 Financial aid allocations

Table 7.15 provides financial aid data concerning the number of financial aid awards granted, the number of financial aid awards granted as a percentage of the number of student headcount enrolments, and the financial aid allocations during the reporting period.

Table 7.15: Financial aid allocations for the period 2001 to 2008

Year	Number of financial aid awards granted	Number of financial aid awards granted as a percentage of the number of student headcount enrolments	Financial aid allocations (R'000)
2001	1 380	19,3%	R9 619
2002	1 443	18,4%	R11 628
2003	1 476	16,4%	R15 037
2004	2 446	21,6%	R24 878
2005	2 846	27,6%	R31 868
2006	2 807	26,8%	R28 540
2007	2 933	28,0%	R43 359
2008	3 361	30,8%	R49 072

(CUT, 2001 – 2008: Documents from the Division for Student Accounts, Bursaries and Loans)

Table 7.15 depicts the following information:

- There is a steady increase in the number of financial aid awards granted. During the reporting period the number of financial aid awards granted increased from 1 380 in 2001 to 3 361 in 2008, which is an increase of 143,6%.
- The number of students assisted with financial aid as a percentage of the number of student headcount enrolments increased from 19,3% in 2001 to 30,8% in 2008.

- There was a substantial increase in the amount of financial aid allocations during the reporting period. The financial aid allocations increased from R9 619 000 in 2001 to R49 072 000 in 2008, which is an increase of 410,2%.

The analysis shows that the financial aid allocation in Rand value, and in the number of financial aid awards granted increased substantially during the reporting period.

7.5.2 Average size of financial aid awards granted

Table 7.16 presents the average size of financial aid awards granted for the period 2001 to 2008.

Table 7.16: Average size of financial aid awards granted for the period 2001 to 2008

Year	Average size of financial aid awards granted
2001	R6 970
2002	R8 058
2003	R10 188
2004	R10 171
2005	R11 197
2006	R10 168
2007	R14 783
2008	R14 600

(CUT, 2001 – 2008: Documents from the Division for Student Accounts, Bursaries and Loans)

Table 7.16 depicts the following information:

- There is a fluctuating trend in the average size of financial aid awards granted to students.
- The average size of a financial aid award granted increased substantially from R6 970 in 2001 to R14 600 in 2008, which is an increase of 109,5%.

The analysis reveals that not only did the number of students assisted with financial aid increase, but that the size of financial aid awards also increased substantially during the reporting period in order to cover the higher costs of studying at the CUT.

7.5.3 Student debt

Table 7.17 shows the outstanding student debt, and the outstanding student debt as a percentage of the total student fees levied for the period 2001 to 2008.

Table 7.17: The outstanding student debt in Rand value, and as a percentage of the total student fees levied for the period 2001 to 2008

Year	Outstanding student debt	Outstanding student debt as a percentage of total student fees levied
2001	R819 069	1,52%
2002	R2 065 966	3,07%
2003	R832 471	1,20%
2004	R5 431 461	5,91%
2005	R4 216 477	4,69%
2006	R4 646 534	4,87%
2007	R6 050 173	5,98%
2008	R11 717 404	10,49%

(CUT, 2001 – 2008: Documents from the Division for Student Accounts, Bursaries and Loans)

Table 7.17 depicts the following deductions:

- Student debt increased substantially from R819 069 in 2001 to R11 717 404 in 2008.
- Student debt, as a percentage of the total student fees levied, increased significantly from 1,52% in 2001 to 10,49% in 2008.

This analysis shows that despite the substantial increases in financial aid to students, student debt escalated dramatically over the reporting period.

7.6 SUMMARY

This chapter discusses the information, which was collected and analysed because it is vital to the objectives of the study. The analysis was divided into the following four main categories:

Student enrolment numbers. This section of the analysis depicts the student numbers at the CUT during the reporting period for student headcount enrolments and FTE enrolments. The analysis of student enrolments is of the utmost importance as this impacts on the main sources of income, and recurrent expenditure patterns.

Income. As the focus area of the study is on tuition fees as a source of income, a comprehensive overview of the funding of the CUT was crucial. The purpose of the analysis of the income of the institution was to ascertain the methodology used in determining the tuition fees of the various academic programmes offered by the CUT. The comparison of the composition, and the trends in the income of the institution to that of other public higher education institutions in South Africa, as well as to economic indicators such as the CPIX, is also considered to be important.

Recurrent expenditure. The relationship between the costs and the price of any product/service necessitated the analysis of the recurrent expenditure of the CUT. A number of expenditure indicators including the profile of the total recurrent expenditure, the trend in the total recurrent expenditure, and per FTE student were all investigated.

Affordability of higher education. One of the policy goals of the National Plan for Higher Education of 2001, which has been discussed in paragraph 1.2.1, is the achievement of equity of access in public higher education. The equity principle also implies that no academically-able student, who qualifies for public higher education, should be excluded from participating in public higher education on financial grounds. Because of the higher costs for studying, caused by the continually increasing tuition fees, the affordability of public higher education at the CUT, with specific reference to financial aid allocations and student debt, is discussed.

In chapter eight the analyses are examined, conclusions are discussed, and, finally, recommendations are made concerning the pricing of instruction at the CUT.

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

This chapter endeavours to reach conclusions and makes recommendations to address the problem statement and the objectives of the study as set out in paragraphs 1.3 and 1.4.

8.1.1 Goal of the chapter

Once the problem statement, as manifested in the objectives of the study in paragraphs 1.4.1 and 1.4.2, was thoroughly examined, conclusions had to be drawn, and recommendations made concerning the pricing of instruction at the CUT. For this purpose, the findings of the literature study on the pricing of a product/service, and the national trends at public higher education institutions in South Africa were carefully considered.

The conclusions cover the following five distinctive areas: student enrolment numbers; institutional income; recurrent expenditure; the affordability of public higher education, and the policies and procedures for determining tuition fees.

8.1.2 Layout of the chapter

The following is a visual presentation of the layout of chapter eight. The numbers in the presentation correspond with the paragraph numbers used in the chapter.

8.1	**Introduction**
	8.1.1 Goal of the chapter
	8.1.2 Layout of the chapter
8.2	**Conclusions**
	8.2.1 Student enrolment numbers at the Central University of Technology, Free State
	8.2.1.1 Concluding comments regarding student enrolment numbers
	8.2.2 Institutional income of the Central University of Technology, Free State
	8.2.2.1 Total income

8.2 CONCLUSIONS

8.2.1 Student enrolment numbers at the Central University of Technology, Free State

The literature study, discussed in paragraph 7.2, indicates that student enrolment numbers are valuable determinants of two of the main sources of income of public higher education institutions.

From the analysis of the student enrolment numbers during the study period the following conclusions can be made:

a) The CUT, with the exception of the Mangosuthu University of Technology, had the lowest number of students enrolled at any university of technology in South Africa in 2008 (figure 5.6).

b) Student enrolment numbers were in line with the national requirements for public higher education.   The picture presented in the enrolment data in paragraph 7.2.1 is one of rapid growth from 2001 to 2004.   The number of headcount enrolments increased from 7 133 in 2001 to 11 347 in 2004, which was an increase of 59,08% (table 7.1). In 2005 student enrolment numbers decreased by 9.1% and, thereafter, stabilised with little growth until 2008.

Highlighting the goal of an increased participation rate in public higher education as it appears in the National Plan for Higher Education of 2001 is appropriate in order to understand the increasing trend in student headcount enrolments at the CUT between 2001 and 2004. The National Plan for Higher Education of 2001 (2001:20) states: "To ensure an adequate supply of high level human resources for social and economic development an increased participation rate of 20% of the age group 20-24 in public higher education should be the target over the next 10-

15 years". With this goal in mind, a growth in the number of student enrolments at the CUT was expected during this period.

In 2004 however, the Department of Education proposed that the CUT should stabilise its total student enrolments, and suggestions were made about down-sizing in order to prevent financial pressure occurring as a result of the large number of enrolled students (DoE, 2005: Student enrolment planning in public higher education) (Smit, 2004:155). The annual percentage growth in student headcount enrolments in table 7.1 reflects the down-sizing at the CUT from 2004 to 2005.

c) The increasing trend in student enrolment numbers until 2004, and the stabilisation thereof after 2004, mirrors the national trend in student enrolment numbers at public higher education institutions in South Africa (table 5.5).

d) Student enrolments in SET programmes exceeded the national targets. The National Plan for Higher Education of 2001 (2001:20-21) advocates a change in enrolments according to the fields of specialisation. The Ministry expects student enrolments, according to the fields of specialisation, to be in line with the following percentages: humanities 40%; business and commerce 30%; and science, engineering and technology 30% (National Plan for Higher Education, 2001:30). To fulfil this national requirement on student enrolments according to the fields of specialisation, the CUT also, in its mission statement, unambiguously articulates its intention to make progress in the delivery of high-quality appropriate SET programmes (paragraph 6.2).

At the CUT the ratio between the humanities; business and commerce; and science, engineering and technology was on average 19,83%; 35,05% and 45,12% respectively (table 7.2). This indicates that student enrolment numbers exceeded the national benchmark by 15,12% in the field of SET programmes.

e) Student enrolment numbers exceeded institutional enrolment planning targets, which indicates that the CUT operated at higher than planned capacity (paragraph 7.2.3).

8.2.1.1 Concluding comments regarding student enrolment numbers

Student enrolment numbers determine the income of higher education institutions (CHE, 2006:20). The approved number of FTE enrolments generates government teaching input grants that vary according to the field of specialisation, and the level of study (Education White Paper, 1997: 48-49).

Thus, for public higher education institutions to operate at capacity they should enrol more students in the higher funding groups to optimise institutional income. Student enrolments should however always be in line with the policy goals of the National Plan for Higher Education of 2001.

The findings, concerning student enrolments, clearly illustrate that student enrolment numbers at the CUT were sufficient and in line with national and institutional targets and requirements during this study period.

8.2.2 Institutional income of the Central University of Technology, Free State

The formula, by Reindl (2000:89), for determining tuition fees at public higher education institutions states that tuition fees equal costs minus government grants. This indicates the relationship between government subsidies and the income from tuition fees in the funding of public higher education institutions. Therefore, before concluding the discussion on tuition fees as a source of income of the CUT, reference must be made to government funding and other third stream income as sources of income.

8.2.2.1 Total income

The income of public higher education institutions in South Africa is derived from three main sources namely, state subsidies, student fees, and third-stream income (paragraph 1.2.2) (paragraph 5.3.1). For public higher education institutions to be financially viable the total funds from the three main sources of income should be sufficient to cover the total recurrent expenditure of these institutions.

From the analysis of the institutional income in paragraph 7.3.6.1, the conclusion can be reached that the total funding of the CUT was sufficient to cover the total recurrent expenditure during seven of the eight years considered in this study. Table 7.9 confirms this statement, and indicates that a surplus was realised in all eight years of the study except for 2005. The surplus expressed as a percentage of the total income, during the reporting period, apart from the 2005 financial year, was well above the 1% minimum target suggested as "good practice guidelines" for public higher education institutions (Bunting *et al.* 2010:20).

The surplus, as a percentage of the total income at the CUT, was higher than the average for public higher education institutions in South Africa during the period 2001 to 2004. Since 2007 the surplus, as a percentage of the total income at the CUT was, however, well below that of other public higher education institutions in South Africa where the surplus was 13,9% in 2007 and 15,1% in 2008 (table 7.9) (Bunting *et al.* 2010:20).

8.2.2.2 Government funding as a source of income

The funding for public higher education has changed in South Africa and mirrors a world-wide trend that leans towards the concept of cost sharing. The concept of cost sharing implies the transfer of financial responsibilities for public higher

education from government to students and their families because higher education benefits both society and students (paragraph 5.5.2.2).

The introduction and the reliance on the principle of cost sharing have resulted in a declining trend in government appropriations to public higher education institutions in South Africa (table 5.1). The three national indicators, used to measure government commitment to public higher education, are government allocations to public higher education expressed as a percentage of the total state budget, the education budget, and the Gross Domestic Product (GDP). All three show an abdication of government in the financing of public higher education (paragraph 5.4.1).

In the light of the declining government funding of public higher education in South Africa during the time of this study, the following conclusions can be reached regarding government funding, as one of the sources of income of the CUT:

a) Government funding was the main source of income of the CUT (table 7.4).

b) The proportion of the income from government funding was higher than the 50% per annum suggested for the public higher education system in the New Funding Framework of 2004 (figure 5.1).

c) The dependence on government funding as a source of income was higher compared to the average funding for public higher education institutions in South Africa.

Government funding as a source of income was on average 54,61% of the total income of the CUT (table 7.4). Government funding as a source of income was actually as high as 58,3% of the total income of the CUT in 2006 (table 7.4). Government funding as a source of income for public higher education institutions in South Africa was, however, on average only 42,63% of the total income (table

1.1). One of the reasons for the higher percentage dependence on government funding as a source of income for the CUT can be attributed to the low income from other third-stream funding. The Council on Higher Education maintains that because of the capacity of universities of technology they have more difficulty generating funds from other sources than other institutions of higher educations do (CHE, 2009a:10).

d) There has been an increasing trend in government funding for the CUT as a percentage of the total income (table 7.4) (figure 7.1). This increasing trend in government funding as a percentage of the total income of the CUT was confirmed by the increasing trend in state appropriations per FTE student (table 7.5). Both the increasing trend in government funding as a percentage of the total income, and the state appropriation per FTE student were in sharp contrast to the national declining trend in government financing of public higher education, as discussed in paragraphs 5.4.1 and 1.2.2.

The increasing trend in government funding was as a result of the increasing numbers in FTE enrolments (47,0%), the number of graduates (116,6%), and research outputs in terms of the number of publications (262,5%), Master graduates (85,7%) and Doctoral graduates (400%) between 2001 and 2008 (table 7.1) (CUT, 2001-2008: Stats-at-a-glance). These three figures are determinants of government block grants in the categories of teaching input -, teaching output and research grants respectively (paragraph 5.3.3).

The increases in government block-grant categories at public higher education institutions in South Africa for the period 2000 to 2008 were as follows: FTE enrolments (39,4%), the number of graduates (50,9%), and research outputs in terms of publications (48,2%), Master's graduates (37%) and Doctoral graduates (20%) (Bunting *et al.* 2010:13-19).

The significantly higher increases in the block-grant categories at the CUT, in comparison to that of public higher education in South Africa in general, explain the contrasting trend in the composition of institutional income at the CUT opposed to that of public higher education in South Africa during the reporting period.

8.2.2.3 Tuition fees as a source of income

The Higher Education Act 101 of 1997, and the Education White Paper 3 of 1997, discussed in paragraph 5.5.1, provide the legal framework for tuition fees, and allow the levying of tuition fees for instruction provided by a public higher education institution.

The increasing levels of tuition fees charged by public higher education institutions are however a concern for the Minister of Education (HESA, 2008:3). Public higher education institutions justified the increasing levels of tuition fees because of the declining trend in government funding, and the increasing trend in the costs of delivering public higher education (paragraphs 5.5.3 and 5.7.4).

The following conclusions can be deduced by examining the analysis of tuition fees as a source of income of the CUT, during the reporting period:

(i) Levels of tuition fees as a source of income

From the analysis of the composition of the income of the CUT in paragraph 7.3.3, one can reach the conclusion that the levels of tuition fees, as a source of income at the CUT, were high based on the following findings:

a) Tuition fees as the main non-government source of income of the CUT were on average 32,38% of the total income (table 7.4).

b) The income from tuition fees as a percentage of the total income was higher than the suggestions of the New Funding Framework of 2004 for the public higher education system. The New Funding Framework of 2004 suggests that tuition fees should be 25% per annum of the total income of public higher education institutions (figure 5.1).

c) The income from tuition fees, as a percentage of the total income the CUT, was higher compared to the average levied by other public higher education institutions in South Africa.

Tuition fees amounted to an average of 27,37% of the total income of public higher education institutions in South Africa (table 1.1), while the income from tuition fees as a percentage of the total income of the CUT amounted to an average of 32,38% (table 7.4).

d) The average tuition fee per student at the CUT was, for all but one, the highest of any of the universities of technology in South Africa in 2008 (table 5.3). The CUT can therefore be regarded as one of the most expensive universities of technology in South Africa.

(ii) Trends in tuition fees

One of the major concerns of the Minister of Education is the rate of the annual increases in tuition fees at public higher education institutions in South Africa (paragraph 1.2.3).

From the analysis of the trends in tuition fees at the CUT, in paragraph 7.3.4, one can conclude that the concerns of the Minister of Education, regarding the rate of the annual increases in tuition fees at public higher education institutions were justified with regards to the CUT, by the following findings:

a) The tuition fee per FTE student increased from R7 807 in 2001 to R12 566 in 2008, an increase of 60,96% (table 7.7).

b) The average annual increase in the tuition fee per FTE student of 7,05% outpaced the average increase in the CPIX of 6,66% (table 7.7) (table 7.8).

c) The average annual increase in the published tuition fees of 7,95% outpaced the average increase in the CPIX of 6,66% (table 7.6) (table 7.8).

d) The annual percentage increase in the published tuition fees at the CUT was relatively in line with that of other universities of technology in South Africa (table 5.3) (table 7.6).

8.2.2.4 Third-stream income as a source of income

The declining trend in government funding of public higher education in South Africa has forced public higher education institutions to not only increase income from tuition fees, but also to increase income from third-stream sources to fund their operations (CHE, 2006:72) (CHE, 2009a:69). Third-stream income includes philanthropic funding in the form of donations and endowments, funding from entrepreneurial or commercial activities, income from contract or sponsored research, and income from investments and borrowings (CHE, 2009a:69).

Based on the analysis of the composition of the income of the CUT, in paragraph 7.3.3, the following conclusions can be reached about the third-stream income as a source of income for the CUT during the reporting period:

a) The income from other sources, at an average of 13,01% of the total income of the CUT, was low compared to the 25% per annum of the total income of public higher education institutions that the New Funding Framework of 2004 for the public higher education system suggested (figure 5.1) (table 7.4).

b) Third-stream income, as a percentage of the total income of the CUT, was lower than the average of third-stream income of the other public higher education institutions in South Africa. Third-stream income amounted to an average of 30% of the total income of public higher education institutions in South Africa (table 1.1), whereas third-stream income, as a percentage of the total income of the CUT, amounted to only 13,01% (table 7.4).

8.2.2.5 Concluding comments regarding institutional income

The Council on Higher Education maintains that for higher education to succeed the right *level* and *mix* between the three main sources of funding need to be in place (CHE, 2009a:65).

The following points summarise the findings and conclusions on the income of the CUT during the time of this study:

- The levels of total funding were sufficient as the total income generated exceeded the total recurrent expenditure in seven of the eight years during the period of this study.
- The ratio between the three main sources of income was not in line with the suggestions in the New Funding Framework of 2004, and that of the averages of other public higher education institutions in South Africa.
- The levels of tuition fees income at the CUT were much higher compared to that of public higher education institutions in general, and increased at a rate that outpaced the CPIX. If this trend continuous it should be a matter of concern as it may affect the increased participation and equity policy goals of the National Plan for Higher Education of 2001.
- The levels of third-stream income were lower than the average of other public higher education institutions during the time of the study. Improved levels of third-stream funding would help to limit the annual above-inflation increases of tuition fees now and in the future.

8.2.3 Recurrent expenditure of the Central University of Technology, Free State

The discussion on the literature study in chapter two emphasises that the cost of a product/service is one of the main considerations when pricing a product/service, because the cost sets the floor, or the lower level of the price of a product/service (figure 2.2) (paragraph 2.2.4). The formula for determining tuition fees at public higher education institutions: costs equal government grants plus tuition fees, is discussed in paragraph 5.1, and also indicates the direct relationship between the costs of a public higher education institution, and the amount of income from tuition fees.

From the discussion of the literature study in chapter three on the role played by costs when pricing a product/service, the investigation of the cost accounting system in use at the CUT in chapter six, and the analyses of the recurrent expenditure of the CUT in paragraph 7.4, the following conclusions can be made regarding the recurrent expenditure of the CUT during the reporting period:

8.2.3.1 Cost accounting system

The literature study in chapter three emphasises the importance of cost information for effective decision-making concerning the pricing of any product/service. A sound cost accounting system will provide accurate and reliable cost information that can be used by management in decision-making aspects such as pricing decisions (paragraph 3.3.1).

The following exposition describes the major shortcomings of the existing costing system in use at the CUT compared to the sound cost accounting system that is discussed in chapter three:

a) *Cost accounting system.* An integrated cost accounting system for effective cost determination, cost recording, cost analysis, cost management and cost control did not exist, at the time when this research study was conducted at the CUT (paragraph 6.6). Since 2004 a management information tool, the PSP Icon: Affordability Model has been developed to address the costing issues, and to identify revenue and margins per academic programme (paragraph 6.6). The PSP Icon: Affordability Model is an information tool that may assist managers to improve decision-making but which is, however, not part of an integrated cost accounting system in use at the CUT (paragraph 6.6).

b) *Timeous cost information.* One of the virtues of a proper cost accounting system is to provide relevant and current cost information timeously to the decision-makers in an organisation (paragraph 3.3.1). Cost accounting systems, as financial accounting systems, make use of historic data, and provide information for future decision-making, such as pricing decisions. The PSP Icon: Affordability Model does not comply with this criterion as the information provided by this Model is outdated because of the time-lapse between an academic/financial year and the completion of the cost data by this Model (paragraph 6.6.2).

c) *Cost allocation methods.* The literature describing cost allocation methods distinguishes between traditional costing methods, which includes absorption and variable costing methods, and activity-based costing (paragraph 3.3.1). The PSP Icon: Affordability Model uses the absorption cost allocation method when determining the cost of an academic programme (paragraph 6.6.1). In the literature study many criticisms against, and arguments in support of both the traditional cost allocation methods are identified (paragraph 3.3.1.1). However, researchers in the literature on cost allocations, paragraph 3.3.1.2, argue that the use of activity-based accounting for cost allocations is better because it was specifically developed to bridge the shortcomings of the traditional cost allocation

methods. Some of the main difference between the traditional costing systems and the ABC system of cost allocations are discussed in paragraph 3.3.1.2.

d) *Cost management and control*. A sound cost accounting system provides information to managers of an organisation for the effective management and control of the costs of the organisation (paragraph 3.3.1). The deduction that can be made from the conclusion based on the trends in the recurrent expenditure of the CUT, discussed in paragraph 8.2.3.3, is that the CUT is not effective in the management and control of recurrent expenditure. As mentioned before, the CUT does not use a cost accounting system as part of the accounting system, but uses policies and procedures as outlined in paragraph 6.6.2, as well as the PSP Icon: Affordability Model to compare the actual results with the budgeted results. The ineffectiveness of the PSP Icon: Affordability Model, because of the time-lapse between an academic/financial year and the completion of the cost data by this Model has already been mentioned (paragraph 6.6.2).

8.2.3.2 The profile of the recurrent expenditure

The profile of the recurrent expenditure of the CUT corresponded with that of the national trend during the years 2001 to 2008 (figure 5.4) (figure 7.2). The recurrent expenditure of the CUT has two main components viz. staff remuneration as well as goods and services at 60% and 36% respectively of the total recurrent expenditure of the CUT (figure 7.2). The price/cost relationship makes the effective management and control of these two expenditure components essential, because if these two expenditure components are managed well this will have a positive effect on the levels of tuition fees needed at the CUT.

8.2.3.3 Trends in the recurrent expenditure

Research findings, discussed in chapter five, concerning the trend in higher education costs, stress that the dramatic rate of increase in the costs of public higher education institutions is a disturbing trend and, if it is allowed to continue, it may have profound implications for the higher education equity policy (paragraph 5.7.4).

One may conclude from the analysis of the trend in public higher education costs described in paragraph 5.7.4, and the trend in the recurrent expenditure of the CUT that is discussed in paragraph 7.4.2, that it is fair to conclude, based on the findings below, that the increases in the recurrent expenditure of the CUT, during the reporting period, exceeded the national trend of cost explosions at public higher education institutions (paragraph 5.7.4).

a) The total recurrent expenditure of the CUT has increased by 141,5% in comparison to the 94,4% for public higher education institutions in South Africa (table 5.4) (table 7.10).

b) The recurrent expenditure per FTE student has grown substantially by 64,3% (table 7.11) in comparison to the 51,9% for public higher education institutions in South Africa (figure 5.5).

c) The average annual increase in the recurrent expenditure per FTE student amounted to 7,36% (table 7.11) in comparison to the 5,3% for public higher education institutions in South Africa (figure 5.5).

d) The average annual increases in the total recurrent expenditure of 13,42% outpaced the average increase in the CPIX of 6,66% (table 7.10).

8.2.3.4 Remuneration and composition of personnel

a) The following findings support the view that one of the main causes for the increases in recurrent expenditure occurred as a result of increases in staff remuneration, during the reporting period:

- Staff remuneration as the largest expenditure component increased from 53% to 60% of the total recurrent expenditure at the CUT (table 7.12).
- The remuneration per FTE staff member increased by 126,66% (table 7.12).

The following reasons explain the increases in the remuneration of personnel during the time of the study:

- The number of permanent staff members increased by 6,0% (table 7.13) (CUT, 2001 - 2008: Stats-at-a-glance).
- The increases in personnel remuneration were above the rate of inflation. The average annual increases in the remuneration per FTE staff member of 12,4% were above the average changes in the CPIX of 6,66% (table 7.12).
- Changes in the composition of staff, which included, for instance, the increase from 42 employees in 2001 to 49 employees in 2004, and the subsequent decrease to 30 employees in 2008 in the executive administration/managing professionals' personnel category, which is the most expensive personnel category at the CUT (CUT, 2001 -2008: Stats-at-a-glance).

b) One of the core business areas of public higher education institutions is instruction. Because tuition fees are levied for instruction, the shift in the composition of the personnel towards the employment of further instruction/research staff is, certainly, a step in the right direction. This increase

can be seen by the growth of 55,6% in the number of instruction/research staff members at the CUT from 2001 to 2008 (table 7.13). This increase was much higher than the 7,6% average for public higher education in South Africa (paragraph 5.8).

Although the shift in the composition of the permanent personnel was towards the instruction/research staff category, the number for this personnel category was still not in line with that of other public higher education institutions in South Africa. This can be seen in the staff composition for the CUT during the period of 2001 to 2008. The ratio between instruction/research staff: service staff: administrative staff at 28%:28%:44% respectively at the CUT did not correspond with the 36,5%:15,6%:47,9% at the other universities of technology in South Africa for the same staff categories (table 7.13) (paragraph 5.8). The instruction/research staff category, which was an average of 28% of the total permanent staff of the CUT, was well below the average of 35,4% for public higher education institutions in South Africa, and the average of 36,5% for the universities of technology (paragraph 5.8) (table 7.13).

The ratio of student headcount enrolments to the permanent instruction/research staff also confirms this trend. The ratio of the average student headcount enrolments to the permanent instruction/research staff was an average of 52,4:1, which was higher than the average for public higher education in South Africa of 47,8:1 (table 7.14) (paragraph 5.8). The ratio of the average student headcount enrolments to total permanent staff at 14,4:1 was lower than the average for public higher education in South Africa of 16,8:1, which, therefore, confirms the higher number of permanent staff in the administrative and service staff categories at the CUT as mentioned in the previous paragraph (table 7.14) (paragraph 5.8).

8.2.3.5 Concluding comments regarding recurrent expenditure

The rising costs of higher education institutions is one of the main contributors to the trend of increasing tuition fees (paragraph 1.2.4). Because of rising tuition fees, and the impact thereof on the policy goals of the National Plan for Higher Education of 2001, institutions of higher education should maximise all cost-efficiency opportunities to provide instruction at a price that is affordable to students and their parents. Unless there is a reduction in cost increases by public higher education institutions, tuition prices are going to continue increasing and, thereby, undermine equity in accessing public higher education institutions.

Effective cost management and cost control rely on the use of a proper cost accounting system to guide current and future operations towards the achievement of the objectives set by an institution.

The following points summarise the findings and conclusions on the recurrent expenditure of the CUT during the years 2001 to 2008:

- An integrated cost accounting system did not exist for effectively determining cost, recording cost, analysing cost, managing cost and controlling cost. The PSP Icon Affordability Model proved to be ineffective in providing timeous cost information about the various academic programmes offered at the CUT. Cost information was, therefore, not used in the pricing of academic programmes.
- The trend in the recurrent expenditure at the CUT corresponded with the national trend of cost explosions at public higher education institutions in South Africa. Cost explosions are, together with the decrease in government funding, the main reasons for the high tuition fees of public higher education institutions (paragraph 5.5.3). Researchers are of the opinion that the high costs of higher education institutions, including the CUT, with the accompanying high tuition fees, is a trend that may have

profound implications for the higher education equity policy of the National Plan for Higher Education of 2001 (paragraph 1.2.3).

- Personnel remuneration, was the main expenditure component, and at an average of 60%, of the total recurrent expenditure of the CUT, which was in line with national trends (paragraph 5.7.3) (figure 7.2).

- The category of the instruction/research staff in the personnel composition, was not in line with that of other public higher education institutions in South Africa, and other universities of technology (table 7.13) (paragraph 5.8).

8.2.4 Affordability of higher education at the Central University of Technology, Free State

The following higher education policy documents call for the affordability of public higher education, namely: a) The National Plan for Higher Education of 2001 states that the cost of higher education should be affordable and should not exclude students who qualify for higher education (paragraph 5.11.1). b) The Education White Paper 3 of 1997 emphasises that the financial needs of students should not be a barrier when they wish to access higher education (paragraph 5.11.1). c) Policy documents in use at the CUT also address the affordability issue. Principle one of policy G12.1 on determining tuition fees at the CUT advocates that students should make a fair and reasonable contribution towards the running costs of the institution. Principle three of this policy, however, stresses that the CUT is committed to providing affordable and sustainable levels of financial aid to advance student access to public higher education.

The higher study costs for students caused by the substantial increases in the tuition fee per FTE student (table 7.7), and the above-inflation increases in tuition fees (table 7.8) during the reporting period at the CUT, may affect the affordability of public higher education at this institution if sufficient financial aid is not available to assist financially needy students (paragraph 5.11.1).

The following findings that have emerged from the analysis in paragraph 7.5 on financial aid allocation and student debt at the CUT during the years 2001 to 2008, justifiably leads to the conclusion that higher education at the CUT has become less affordable to students over the reporting period:

a) More students enrolled at the CUT were in need of financial aid because of the high cost of study. The number of financial aid awards granted were increased by 143,6%, and the number of financial aid awards granted as a percentage of the number of student headcount enrolments increased from 19,3% in 2001 to 30,8% in 2008 (table 7.15). This increasing trend in financial aid assistance was not limited to the CUT but also corresponded with the increasing national trends in financial allocations to needy students, as discussed in paragraph 5.11.2 and table 5.7.

b) During the period of this study, the amount of financial aid allocations and the average size of a financial aid award increased substantially by 410,2% and 109,5% respectively (table 7.15) (table 7.16). These trends indicate that not only did the number of students assisted with financial aid increase, but the amount of financial aid allocation per award and in total also increased substantially to cover the higher cost of study.

c) Despite the substantial increases in the financial aid allocations the amount of student debt also increased dramatically from R819 069 in 2001 to R11 717 404 in 2008, an increase of 1330,58% (table 7.17). This alarming trend indicates that the amount of financial allocations was not enough to cover the costs of study at the CUT.

d) Outstanding student fees, as a percentage of total student fees levied, increased from 1,52% in 2001 to 10,49% in 2008 (table 7.17).

8.2.4.1 Concluding comments regarding the affordability of higher education

The high costs of providing public higher education at the CUT during the reporting period, caused substantial increases in the tuition fee per FTE student as well as above-inflation annual increases in the tuition fees.

In the light of the above comment, the logical conclusion is that higher education at the CUT has become less affordable, which is based on the increasing number of students in need of financial aid, and the high student debt despite substantial increases in financial aid.

8.2.5 Policies and procedures for determining tuition fees at the Central University of Technology, Free State

The following conclusions have been deduced from the investigation of the pricing policies and procedures in use at the CUT during the time of this study:

8.2.5.1 The pricing plan: A framework for pricing

According to the literature study in chapter two, the pricing of a product/service clearly explains that to successfully set, manage and control the price of a product/service, an organisation needs a comprehensive pricing plan, a framework for effective pricing decisions. The pricing plan, as discussed in paragraph 2.3, is a process consisting of the following six major steps:

- develop pricing objectives;
- estimate demand;
- determine costs;
- evaluate the pricing environment;
- choose a pricing strategy; and
- develop pricing tactics.

On investigation it was found that no comprehensive pricing plan exists at the CUT. Policy G12.1, that guides the determining of student fees, is discussed in paragraph 6.4.2, which outlines ten principles that should be upheld when determining student fees at the CUT. Only two of these principles are included as elements of the comprehensive pricing plan suggested in the literature study (paragraph 2.3). The investigation of the policies and procedures for determining tuition fees, which are discussed in paragraph 6.4.2, revealed that, at the time of this study, no procedure manual or methodology existed for determining tuition fees at the CUT.

8.2.5.2 The pricing process in use at the Central University of Technology, Free State compared to the pricing plan suggested in the literature

In the analysis of the methodology used for setting tuition fees which is discussed in paragraph 7.3.2, no standard pattern or criteria was found for determining tuition fees at the CUT.

In the comparison of the policy G12.1 about determining student fees at the CUT, with the literature study on the nature of pricing, and the comprehensive pricing plan discussed in chapter two, the pricing of instruction at the CUT appears to have been inadequate during the time of this study. The following exposition considers the shortcomings of the existing pricing process at the CUT compared to the comprehensive pricing plan included in the literature study, discussed in paragraph 2.3:

a) *Responsibility area of the pricing function in an organisation*. Paragraph 2.2.2 clearly states that pricing management is one of the four elements of the marketing mix that form part of the marketing strategies of an organisation. According to this finding, therefore, pricing is primarily the responsibility of the marketing team. The finance department is co-responsible for the pricing function because it provides the applicable cost data, and sets financial targets for the

organisation (paragraph 2.7.1). At the CUT the annual review of student fees is the responsibility of the Student Fees Committee, which consists mainly of representatives from the financial departments, the academia, and student affairs (paragraph 6.4.2). The actual setting of the price of an academic programme at the CUT is currently the responsibility of the relevant programme heads, who have little, or no knowledge, or experience of pricing (paragraph 6.4.2). This confirms the argument by Pratt (2007:1), mentioned in paragraph 2.2.3, that prices in an organisation are generally set by guesswork and not by a scientific approach.

b) *Pricing objectives.* The pricing plan emphasises the necessity of developing pricing objectives so as to give direction to the pricing plan, and to finally achieve the goals, vision and mission of the organisation (paragraph 2.4). Investigation revealed that clear pricing objectives did not exist at the CUT during the years 2001 to 2008. However, the CUT corporate strategic plan for the academic years 2007 to 2009, which is discussed in paragraph 6.5, pointed out that the optimisation of tuition fees is one of the strategies used to accomplish financial sustainability. An investigation revealed that the CUT had no operational plan to address the issue of the optimisation of tuition fees.

c) *Demand and prices.* A comprehensive pricing plan will require an estimation of the demand for a product/service as one of the most important pillars for determining prices (paragraph 2.3). The demand for an academic programme is one of the strategic measures used by the CUT in determining the viability of an academic programme. The analysis in paragraph 7.3.2.1 clearly reveals that there was no relationship between student-demand and tuition fees levied for a specific academic programme during the time of this study. The demand for an academic programme, therefore, played no role in the pricing of an academic programme at the CUT during this period.

d) *Costs and pricing.* A comprehensive pricing plan emphasises the role of the cost of a product/service when pricing a particular product/service (paragraph

2.3). The analysis of the cost of an academic programme, discussed in paragraph 7.3.2.4, shows that the cost was not considered when determining the tuition fees for an academic programme as there was no relationship between the cost of an academic programme and the tuition fees charged for such an academic programme during the reporting period.

e) *The pricing environment.* The pricing plan recommends an evaluation of the pricing environment (paragraph 2.3). The pricing environment includes both the internal and the external factors that affect the pricing decision (paragraph 2.7). In paragraph 7.3.2.3, the comparison is made between the strategic value of an academic programme, which is determined by examining the relevant internal and external factors, and the tuition fees charged for an academic programme. The deduction that can be made from this analysis is that the strategic value of an academic programme was not used when determining tuition fees during the years 2001 to 2008, because there was no relationship between the strategic value of the academic programme and the tuition fees charged for the academic programme.

Tuition fees according to the G12.1 policy should be regulated at the CUT by focusing on the following principles: the cost sharing approach; national and regional trends; the cost/price relationship, and the inflation rate for general economic activity (paragraph 6.4.2). However, the findings revealed that only the following two factors from the G12.1 policy were considered when determining the tuition fees of academic programmes during the reporting period: the inflation rate for general economic activity, and national and regional trends in tuition fees.

f) *Pricing methods.* The pricing plan refers to the pricing methods, discussed in chapter four, which an organisation can use to determine the price of a product/service. These pricing methods include the following three general pricing approaches: cost-based pricing, demand-based pricing and competition-based pricing (paragraph 4.2). The investigation on pricing procedures at the CUT

revealed that, at present, there is no pricing procedure manual describing pricing methods, which should be used when determining tuition fees (paragraph 6.4.2). The second principle in the G12.1 policy, about determining tuition fees, states that the CUT will determine tuition fees by taking into account the national and regional trends in public higher education fee pricing. According to this principle the CUT appears to lean towards competition-based price setting where prices are based on what competitors are charging, while ignoring the cost structure of the institution, and the customers in the market (paragraph 4.2.2.2).

g) *Pricing tactics.* The pricing plan describes pricing tactics, such as discounts, which an organisation might use to adjust the final price, for reasons that are discussed in paragraph 2.3. At the CUT, as discussed in paragraph 6.4.3, discounts were allowed during the time of this study for the full payment of tuition fees for an academic year on enrolment. Discounts were also allowed for a second, third and fourth family member, where members of the same family, who are not financially independent, are enrolled simultaneously at the CUT.

8.2.5.3 Concluding comments concerning policies and procedures when determining tuition fees

Effective pricing management in any organisation, including public higher education institutions, is based on the implementation of a comprehensive pricing plan that consists of clear pricing objectives and strategies, and integrates a range of internal and external factors from the pricing environment that will have an effect on the pricing decision.

A comprehensive pricing plan will enable the management of the CUT to explain to all stakeholders exactly how the tuition fees of an academic programme are calculated, and will also serve as guidelines for the annual increase in tuition fees.

The findings and conclusions, concerning the policies and procedures on determining tuition fees during the years 2001 to 2008, are summarised below:

a) The CUT lacked a comprehensive pricing plan at the time of this study. When pricing procedure manuals to guide the pricing of instruction for the various academic programmes that are offered at the institution were requested, there were none available.

b) No clear pricing objectives did exist to guide and provide direction for the pricing process.

c) The following were the effects of the internal and external factors of the pricing environment on the pricing of the various academic programmes at the CUT:

- Strategic value of an academic programme: Not considered when pricing academic programmes.
- Demand for an academic programme: Not considered when pricing academic programmes.
- Cost of an academic programme: Not considered when pricing academic programmes.
- Number of FTE enrolments per academic programme: Not considered when pricing academic programmes
- Prices of the competitors for similar academic programmes: Not considered when pricing academic programmes.
- Consumer price index: Considered in the annual review of tuition fees.

8.3 RECOMMENDATIONS

In line with the problem statement (paragraph 1.3), and in accordance with the conclusions deduced from the literature review and the empirical research, various recommendations are suggested in this section.

These recommendations are cascaded down from the objectives of the study (paragraph 1.4) into the following categories, namely:

- Student enrolment numbers
- Institutional income
- Recurrent expenditure
- Financial aid
- Student debt
- The affordability of higher education
- Institutional plans, policies and procedures

8.3.1 Student enrolment numbers

As student enrolment numbers are one of the main determinants of the income of the CUT, the institution needs to maintain student enrolment numbers, and enrolments by field of specialisation to optimise institutional income and to comply with national requirements.

8.3.2 Institutional income

No recommendations regarding institutional income will be made as this will be addressed in the formulation of a comprehensive pricing plan for the CUT in paragraph 8.3.7.2.

8.3.3 Recurrent expenditure

The relationship between the costs of providing a service, and the price charged for services rendered, necessitates the following recommendations concerning the recurrent expenditure of the CUT:

a) The CUT needs to develop and implement an integrated cost accounting system for the effective determining of costs, cost recording, cost analysis, cost management and cost reporting.

b) The CUT should attempt to evaluate cost efficiency through the use of Stochastic Frontier Analysis (SFA) or Data Envelopment Analysis (DEA), as discussed in paragraph 5.7.2.

c) Once the minimum costs for a given amount of output are determined the CUT should explore cost-savings measures and introduce cost-reduction programmes to strengthen institutional cost control on an ongoing basis.

d) A comprehensive investigation into staff remuneration, which is the largest expenditure component of the CUT, is necessary. The investigation should closely examine, in particular, the composition of the CUT staff, the remuneration packages of the various categories, and student/staff ratios to optimise the utilisation of the personnel.

e) The rate of the annual increases in the recurrent expenditure should not exceed the average annual CPIX.

8.3.4 Financial aid

The provision of financial aid, as a means of addressing the issue of the affordability of public higher education at the CUT, necessitates the following recommendations:

a) There should be an increase in the amount of financial aid assistance, and the number of grants provided by the CUT should increase to address the growing demand for financial aid. Sufficient financial aid will address the affordability of

public higher education and, therefore, this aid is critical for achieving policy goals, such as the equity principle, of the National Plan for Higher Education of 2001.

b) The CUT should explore indirect forms of financial support, such as giving needy students a discount on tuition fees.

c) The CUT should increase the present efforts to gain the support of the private sector and, thereby, ensure sustainable long term contributions to the student financial aid scheme of the CUT.

8.3.5 Student debt

The development and implementation of a comprehensive student debt management programme should become a priority in order to address the increasing problem of outstanding student debts, and to improve the revenue collection at the CUT.

8.3.6 The affordability of higher education

The CUT should generate a set of principles to guide the development of an affordability policy that will address the high cost of providing higher education and the lack of sufficient financial aid, which are obstacles for some students who wish to enrol in public higher education institutions.

8.3.7 Institutional plans, policies and procedures

8.3.7.1 Strategic financial plan

The CUT needs to develop and implement a long-term strategic financial plan with clear measurable financial objectives. The strategic financial plan must be renewed annually before the budget is compiled for a specific year.

The income from tuition fees in the strategic financial plan should be of particular importance, and should include:

- The amount received from tuition fees.
- The basis for the estimation of the income from tuition fees.

8.3.7.2 The pricing plan: A framework for pricing

The CUT should develop and implement a comprehensive pricing plan to guide institutional practices paying particular attention to the setting, implementation, management and the control of tuition fees.

A pricing plan for the pricing of academic programmes will benefit the CUT in the following ways:

- Assist management in obtaining institutional goals and objectives as these goals and objectives will form the foundation of the pricing plan.
- Provide a clear, consistent, standardised, and structured methodology for the pricing of instruction.
- Enable the leaders of the institution to explain to all relevant stakeholders how the tuition fees for the various academic programmes are calculated.
- Define the role of the price of instruction in the institution and give direction to the pricing of the various academic programmes.
- Integrate all the components of the pricing process.

The pricing plan has to be descriptive in nature, and should use the analytical pricing approach with the focus on managerial applications. The pricing plan should also attempt to blend pricing theory and practice. The focus of the pricing plan illustrates how the CUT can identify the best suitable pricing strategy, or combination of pricing strategies, to be used when determining the price of an academic programme.

Annexure F provides a diagrammatic presentation of the pricing plan for the CUT. The pricing plan consists of three sections viz. the pricing authority, the foundation of the pricing plan, and the pricing process.

Section one: The pricing authority

The CUT needs to appoint a pricing committee that should be responsible for the pricing function at the institution.

When the CUT pricing authority is established, regulations determining the functions of the pricing committee, and the identification of the members of the pricing committee should be decided upon as well.

The functions of the pricing committee should include the following activities:

- The development and implementation of a comprehensive pricing plan.
- The coordination, facilitation and administration of the pricing process on an ongoing basis.
- Price communication with all role players involved.

Members of the pricing committee should be drawn from several departments of the CUT that include the following:

Representatives from:	*Number of representatives*
- Finance department - Accounting department - Marketing department - Senior line management (Ex official) - Academics	The total number of representatives should be limited to avoid an awkwardly operating pricing committee

| • Student accounts and administration department | |
| • Student Representative Council | |

Section two: The foundation of the pricing plan

The pricing committee selected for the CUT needs to determine the legal and institutional foundation for the pricing plan.

The pricing plan for the CUT ought to be based on and within the framework of the following external and internal parameters:

External parameters	• The Higher Education Act of 1997 • The 1997 White Paper on Higher Education • The policy goals of the National Plan for Higher Education of 2001 • The funding suggestions of the New Funding Framework of 2004
Internal parameters	• The mission statement of the institution • The objectives, goals and core values of the institution • The financial objectives of the institution • The marketing objectives of the institution

Section three: The pricing process

The pricing process ought to be divided into three stages that include price setting, implementation, and management and control.

(i) Price setting

Price setting entails the development of pricing objectives, the determining and assessment of pricing determinants, the selecting of a pricing strategy, or a combination of pricing strategies, the setting of the price, and the development of pricing tactics.

a) The development of pricing objectives

As a first step in the price setting process for academic programmes at the CUT, the institution needs to develop clear, attainable and measurable pricing objectives, expressed in terms of value for a specific period. The purpose of pricing objectives is to give direction to the pricing plan, and to outline the goals the CUT plans to achieve with the pricing of instruction.

The process for the development of effective pricing objectives includes the identification of possible pricing objectives; the evaluation of the identified pricing objectives; the prioritisation of the identified pricing objectives, and the compilation of a final statement of the pricing objectives.

➤ **The identification of possible pricing objectives**

The pricing committee has to identify multiple short-term and long-term pricing objectives that comply with the criteria of effective pricing objectives.

➤ **The evaluation of the identified pricing objectives**

The pricing committee has to evaluate each valid, identified, pricing objective. The evaluation of the identified pricing objectives can be done by making use of a Likert scale. A Likert scale is a psychometric scale commonly used in questionnaires and, which measures respondents' attitudes by asking how

strongly they agree or disagree with a set of questions or statements. Likert scales usually have the following five potential choices, namely strongly agree, agree, neutral, disagree, strongly disagree (Bryman & Bell, 2007:729).

In the evaluation of each of the valid, identified pricing objectives the pricing committee can use a five-point Likert scale with the following response values:

Score	Response statement
5	Extremely favourable as a pricing objective
4	Somewhat favourable as a pricing objective
3	Neutral as a pricing objective
2	Somewhat unfavourable as a pricing objective
1	Extremely unfavourable as a pricing objective

➢ The prioritisation of identified pricing objectives

The pricing committee needs to prioritise the identified pricing objectives by making use of the mean opinion score.

The mean opinion score represents the average score that each pricing objective obtained when the Likert scale was used to evaluate the pricing objectives.

The mean opinion score of each identified pricing objective is computed by making use of the following formula:

$$M = \frac{\sum X}{N}$$

(Steinberg, 2008:73)

Where:

M   =   The mean score

X   =   The total score obtained by an identified pricing objective during the evaluation of the identified pricing objectives

N   =   The number of respondents from the pricing committee

➢ The compilation of a final statement for pricing objectives

The pricing committee finally needs to compile a list of pricing objectives in accordance to the importance attached to each pricing objective. The pricing objective with the highest mean score is ranked first, and the pricing objective with the lowest mean score is ranked last.

Table 8.1 is an example of the format for the final statement for pricing objectives.

Table 8.1: Final statement for pricing objectives

Pricing objective	Mean score	Rank according to the mean score
Pricing objective A	X	X
Pricing objective B	X	X
Pricing objective C	X	X

The CUT as a public higher education institution can consider the following types of pricing objectives as set out in table 8.2:

Table 8.2: Types of pricing objectives

Types of pricing objectives	Example
Surplus	Maintain surplus margins
Tuition fees	Appropriate proportions between the level of tuition fees income and other main sources of income

Types of pricing objectives	Example
Cost	Partial cost recovery
Third stream income	Increase third stream income by creating third-stream income activities
Liquidity	Maintain levels of liquidity
Customers	Avoid protest actions owing to tuition fees increases that do not meet students' expectations
Competitors	Match competitors' prices
Social responsibility	Recognise obligation to society by setting affordable tuition fees
Economic indicators	Annual increase in tuition fees should not exceed the average annual inflation rate

b) Determining and assessing pricing determinants

The choice of a pricing strategy for any institution is influenced by a whole set of complex factors, called pricing determinants. In developing pricing strategies for the CUT the pricing committee needs to determine and assess the internal and external pricing determinants related to the institution's operations.

In order to be in a position to determine and assess pricing determinants there must be an analysis of the pricing environment, a list of pricing determinants, an evaluation of the identified pricing determinants, and the prioritisation of the identified pricing determinants.

➤ **The analysis of the pricing environment**

The pricing committee needs to analyse the pricing environment to identify a broad set of internal and external pricing determinants that may affect the choice of a pricing strategy, or combination of pricing strategies, for the CUT.

➢ Listing pricing determinants

The internal and external pricing determinants affecting the choice of a pricing strategy, or combination of pricing strategies for the CUT, can be listed according to the categories set out in table 8.3.

Table 8.3: Categories of pricing determinants

Pricing determinant	Example
Institution characteristics	Geographic area and size of institution
Customers (student) considerations	Value and price perceptions
Competitive considerations	Number of competitors and competitors' prices
Product (academic programme) considerations	Strategic value of the academic programme
Demand considerations	The demand value for an academic programme
Cost considerations	Cost per academic programme and per FTE student
Government subsidy	Government subsidy per FTE student, per academic programme
Market conditions	Market growth rate, and the rate of inflation

➢ The evaluation of the identified pricing determinants

The pricing committee will have to evaluate each identified pricing determinant by making use of a five-point Likert scale with the following response values:

Score	Response statement
5	Extremely important in determining price
4	Somewhat important in determining price
3	Neutral in determining price
2	Somewhat unimportant in determining price
1	Not at all important in determining price

➤ The prioritising of identified pricing determinants

The list of pricing determinants affecting the choice of a pricing strategy, or combination of pricing strategies for the CUT, needs to be ranked from the most influential pricing determinant to the least influential pricing determinant by calculating the mean opinion score for each of the identified pricing determinants.

c) The selection of a pricing strategy, or combination of pricing strategies

In this section of the pricing plan, the pricing committee's aim is to achieve the pricing objectives of the institution by identifying a suitable pricing strategy or combination of pricing strategies to determine the tuition fees of the various academic programmes.

The process for selecting the most suitable pricing strategy, or a combination of pricing strategies, entails the identification of suitable pricing strategies, the evaluation of the identified pricing strategies, the matching of the most important pricing objectives and the most influential pricing determinants with the most suitable identified pricing strategies, and the selection of the most suitable pricing strategy or combination of pricing strategies for determining the tuition fees of the various academic programmes.

➢ The identification of suitable pricing strategies

The pricing committee needs to identify multiple pricing strategies suitable for the pricing of an academic programme at the CUT.

The following pricing strategies can be used:

- Cost-based pricing strategies.
- Demand-based pricing strategies.
- Competition-based pricing strategies.
- Break-even pricing strategies.
- Profit (Surplus)-based pricing strategies.
- Value-based pricing strategies.
- Prestige pricing strategies.

➢The evaluation of the identified pricing strategies

The pricing committee has to evaluate each identified pricing strategy by using a five-point Likert scale with the following response values:

Score	Response statement
5	Extremely suitable when determining prices
4	Somewhat suitable when determining prices
3	Neutral when determining prices
2	Somewhat unsuitable when determining prices
1	Not at all suitable when determining prices

➤ **The matching of identified pricing objectives and identified pricing determinants with suitable identified pricing strategies**

In a questionnaire format, members of the pricing committee should be asked to match the most important pricing objectives and the most influential pricing determinants with the most suitable identified pricing strategies.

The questionnaire format illustrated in table 8.4 can be used by the pricing committee to match the most important pricing objectives and the most influential pricing determinants with the most suitable identified pricing strategies:

Table 8.4: The matching of identified pricing objectives and identified pricing determinants with suitable identified pricing strategies

Pricing objectives	Pricing strategies		
	Pricing strategy A	**Pricing strategy B**	**Pricing strategy C**
Pricing objective X			
Pricing objective Y			
Pricing objective Z			
Pricing determinants			
Pricing determinant X			
Pricing determinant Y			
Pricing determinant Z			

➢ **The selection of the most suitable pricing strategy, or combination of pricing strategies, to be used when determining the price of an academic programme**

When selecting the most suitable pricing strategy, or combination of pricing strategies, to be used in the pricing of the various academic programmes, the three key elements of price setting viz. the pricing objectives and the pricing determinants are linked to the pricing strategies to determine their association with one another. To emphasise, pricing strategies are the means by which an institution achieves the identified pricing objectives. The pricing determinants may affect the pricing committee's choice of a pricing strategy, or combination of pricing strategies.

Determining the association of the three key elements in price setting can be done through the use of a number of nonparametric statistical tests such as the chi-square and the Kruskal-Wallis test. In this study the chi-square test of independence is used to determine the association of the identified pricing strategies, the most important pricing objectives, and the most influential pricing determinants. The chi-square test of independence is extremely suitable in this type of analysis as it can be used to analyse the frequencies of two variables with multiple categories, and can also be used to determine whether the two variables are independent of each other (Black, 2011:656).

Determining the value of the chi-square of independence consists of the following seven steps: the construction of a contingency table and the entering of the frequencies in the appropriate cells, the establishment of the hypotheses, the computation of the test statistic, the establishment of the significance level, the evaluation of the test statistic, the interpretation of the results and finally the selection of the most suitable pricing strategy or combination of pricing strategies for determining the price of the various academic programmes (Black, 2011:656-663).

- *Step 1: The construction of a contingency table and the entering of the frequencies in the appropriate cells*

A contingency table is a two-way table, consisting of rows and columns which display the frequency distribution of two variables. One variable determines the row categories; the other variable determines the column categories. The combinations of row and column categories are called cells. The frequency distribution of the two variables in the contingency table represents the number of observations at a specific intersection of categories of each of the two variables. The frequencies for the appropriate cells of the contingency table will be obtained from the questionnaires, which the pricing committee complete. The questionnaires require the most suitable identified pricing strategies to be matched with the most important pricing objectives, and the most influential pricing determinants.

Table 8.5 illustrates the format of a contingency table.

Table 8.5: Contingency table

Pricing objectives (Pricing determinants)	Pricing strategies				
	Pricing strategy 1	Pricing strategy 2	Pricing strategy 3	Pricing strategy 4	Row marginal
Pricing objective 1	$n_{1,1}$	$n_{1,2}$	$n_{1,3}$	$n_{1,4}$	
Pricing objective 2	$n_{2,1}$	$n_{2,2}$	$n_{2,3}$	$n_{2,4}$	
Pricing objective 3	$n_{3,1}$	$n_{3,2}$	$n_{3,3}$	$n_{3,4}$	
Column marginal					

Where:

n = The total of all frequencies for a cell.

- *Step 2: The establishment of the hypotheses*

A hypotheses, which has to be tested needs to be established. The hypothesis represents a statement of expected results on the possible association between two variables. All hypotheses consist of a null hypothesis and an alternative hypothesis. The null hypothesis, symbolised by H_0, indicates that there is no relationship between two variables and the alternative hypothesis, symbolised by H_1, assumes that there is a relationship between two variables (Black, 2011:292).

The following hypotheses need to be tested:

The null hypothesis (H_0): Pricing objectives/pricing determinants and pricing strategies are independent.

The alternative hypothesis (H_1): Pricing objectives/pricing determinants and pricing strategies are not independent.

- *Step 3: The computation of the test statistic, the chi-square-test of independence (X^2)*

Testing the independence hypothesis stated above, requires the computation of the chi-square statistic.

The chi-square statistic is calculated by the formula:

$$X^2 = \sum \left[\frac{(F_O - F_e)^2}{F_e} \right]$$

Where:

Fo= Observed frequency for each cell

Fe= Expected frequency for each cell

Fe= (frequency for the column)(frequency for the row)/n

(Steinberg, 2008:355)

- *Step 4: The establishment of the significance level*

The significance level, or relative standard that can serve as a basis for accepting or rejecting the hypotheses, needs to be stated. The significance level illustrates the level of confidence that exits in the relationship between the two variables.

- *Step 5: The evaluation of the test statistic*

To evaluate the chi-square statistic (X^2) it must be compared to the critical value of the chi-square statistic (X^2_{crit}) for the appropriate degrees of freedom. The critical value is a term used in statistics that represents the number that must be achieved in order to demonstrate statistical significance. If the critical value is achieved the null hypothesis is rejected (Pagano, 2010:302).

Degrees of freedom describe the number of values in the final calculation of the test statistic that are free to vary and are calculated as (r – 1) x (c – 1),

Where:

r = The number of rows in the contingency table
c = The number of columns in the contingency table
(Steinberg, 2008:185) (Black, 2011:658)

To determine the critical value of the chi-square (X^2_{crit}) for the appropriate degrees of freedom, the statistical table for the chi-square distribution can be used.

- *Step 6: The interpretation of the results*

This step entails the rejection of the null hypothesis or the acceptance of the alternative hypothesis.

The rejection of the null hypothesis applies when the value of the chi-square (X^2) is greater than the critical value of the chi-square (X^2_{crit}) thus indicating that pricing objectives/pricing determinants, and pricing strategies are independent.

The acceptance of the alternative hypothesis applies when the value of the chi-square (X^2) is less than the critical value of the chi-square (X^2_{crit}) thus indicating that pricing objectives/pricing determinants and pricing strategies are not independent.

- *Step 7: The selection of the most suitable pricing strategy, or combination of pricing strategies*

The rejection of the null hypothesis (H_0) and the acceptance of the alternative hypothesis (H_1), indicates that there is an association between the suitable identified pricing strategies, the most important pricing objectives, and the most influential pricing determinants. If there is an association between the most suitable pricing strategies, the most important pricing objectives, and the most influential pricing determinants, additional analysis called the post hoc analysis of the chi-square, can be conducted to identify the most suitable pricing strategy, or combination of pricing strategies for determining the tuition fees of the various academic programmes at the CUT.

A post hoc analysis of a significant chi-square test, as described by (Markowski & Markowski, 2009:59-65) entails the following:

- The analysis of the components of the chi-square statistic, and the identification of the row or column in the contingency table with the highest average contribution to the chi-square total.

- The interpretation of the discrepancy between the observed and expected frequencies for the cell in that row or column, which has the highest chi-square component.

- The elimination of the identified row or column from the contingency table.

- Repeating the chi-square test on the reduced contingency table.

- If the new chi-square statistic is not significant, no further post hoc analysis is required. If the chi-square is significant, again identify and interpret the row or column of the reduced contingency table for which the average contribution to the chi-square total is the highest.

- Repeat these steps until the chi-square statistic is no longer significant.

d) The setting of the price

After the post hoc analysis has been conducted the remaining pricing strategies can be considered and applied in the pricing of academic programmes at the CUT. The various pricing strategies are discussed in chapter four.

e) The development of pricing tactics

The chosen pricing strategy, or combination of pricing strategies, are used to set the base or general price of an academic programme at the CUT. Once the base price of the various academic programmes has been determined, as described in the price setting procedure above, the CUT may consider the adjustment of the base prices for example for:

- Discounts allowed for early payments
- Discounts allowed for multiple family member enrolments
- International student charges

- Personnel discounts

(ii) The implementation of the pricing plan

Once the pricing objectives, pricing strategies, and pricing tactics have been established, a clear explanation is very important about how to implement the most suitable pricing strategy, or combination of pricing strategies, and pricing tactics in order to accomplish the pricing objectives of the CUT.

When the pricing committee members of the CUT plan to implement the most suitable pricing strategy, or a combination of pricing strategies, for the various academic programmes, they will need to include the following actions:

➢ **The justification of the pricing plan**

The pricing committee must submit the pricing plan to management for approval.

➢ **The development of pricing policies**

The pricing committee needs to develop pricing policies with the purpose of explaining the 'what' and the 'why' of the pricing plan, to validate pricing decisions, and to achieve consistency in the pricing process.

➢ **The development of procedure manuals**

The pricing committee needs to develop procedure manuals for the execution of the pricing plan, and they will need to include operating guidelines explaining the 'what', 'how', 'where', and 'when' of the pricing plan.

➤ **Price communication**

The price of the academic programmes must be communicated to all relevant parties through the publication of the final price of the various subjects and academic programmes in the fees calendar of the CUT.

(iii) Pricing management and control

The last stage in the pricing plan entails a comprehensive assessment of the pricing process at the CUT. The pricing committee, therefore, needs to annually conduct a comprehensive pricing audit to look at the way pricing is planned and managed at the institution, to ask what has been done, and what else should be done.

The pricing audit entails a pricing SWOT analysis, and a pricing GAP analysis.

➤ **The pricing SWOT (Strengths/Weaknesses/Opportunities/Threats) analysis**

The pricing SWOT analysis is a method that the pricing committee can use to evaluate the strengths, weaknesses, opportunities and threats of the current pricing situation at the CUT. The execution of a SWOT analysis entails the following actions by the pricing committee:

- The identification of the pricing areas to be subjected to the SWOT analysis.
- The identification, ranking and analysis of the strengths and weaknesses in the current price planning process.
- The identification and the ranking of opportunities and threats in the pricing environment.

- The plotting of the outcomes of the SWOT analysis on a SWOT Analysis Grid.

- The addressing of the pricing issues identified by the SWOT analysis, and of finding ways to convert weaknesses into strengths, and threats into opportunities.

➢ **The pricing GAP analysis**

The GAP analysis is an assessment tool that the pricing committee can use to compare the actual pricing results with the planned pricing performance of the CUT, and which involves the following actions by the pricing committee:

- The identification of the difference between the pricing objectives and the current pricing performance.

- The development of strategies to bridge the gaps between the pricing objectives and the pricing performance.

8.4 SUMMARY

To conclude the study one can accept unequivocally that the problem statement/ hypothesis has been answered. The analysis that was conducted proved that a comprehensive pricing plan does not exist at the CUT for the pricing of the various academic programmes, and that higher education has, despite the increasing trend in government funding, become less affordable for students at the institution. The affordability issue at the CUT can be partly attributed to the lack of a comprehensive pricing plan with clear attainable pricing objectives, and a pricing strategy to accomplish the stated pricing objectives. Another contributing factor to the affordability issue is the lack of an integrated cost accounting system and costing policies that outline measures to address the cost efficiency of the institution.

Implementation of the recommended pricing plan should assist management in determining tuition fees on a scientific basis, and will also enable the management of the CUT to explain to all relevant stakeholders how the tuition fees of the various academic programmes are calculated.

8.5 FURTHER RESEARCH

Further research could explore the development of a mathematical pricing model for the pricing of the multi-products of a higher education institution. This research could also investigate the possibility of applying this mathematical pricing model not only on institutional level, but also on a national level for a uniform and consistent pricing process.

ANNEXURES

ANNEXURE A

Average tuition fee per subject per academic programme in 2008

Academic programme	Average tuition fee per subject
Accounting	R1 035
Accounting (Welkom)	R960
Administration (Welkom)	R510
Agricultural Management	R1 747
Arts (Welkom)	R800
Biomedical Technology	R1 548
Built Environment	R2 552
Business Administration	R1 185
Clinical Technology	R2 301
Clothing/Fashion	R2 036
Commerce (Welkom)	R472
Cost & Management Accounting	R1 026
Cost & Management Accounting (Welkom)	R956
Dental Assisting	R3 626
Education	R1 528
Education (Welkom)	R1 586
Emergency Medical Care	R1 313
Engineering Civil	R1 331
Engineering Computer Systems	R1 466
Engineering Electric	R1 427
Engineering Mechanical	R1 378
Environmental Health	R2 675
Financial Information Systems	R1 206
Fine Arts	R2 697
Fire Technology	R1 339

Academic programme	Average tuition fee per subject
Graphic Design	R2 270
Hospitality Management	R1 973
Human Resource Management	R1 667
Human Resource Management (Welkom)	R1 994
Import/Export Management	R1 898
Information Technology	R1 810
Information Technology (Welkom)	R1 740
Internal Auditing	R1 044
Internal Auditing (Welkom)	R967
Jewellery Design (Welkom)	R3 854
Language Practice	R1 367
Language Practice (Welkom)	R1 244
Management	R1 538
Marketing	R1 905
Marketing (Welkom)	R1 830
Office Management & Technology	R2 306
Photography	R2 627
Project Management	R1 637
Public Management	R1 728
Public Management (Welkom)	R1 830
Radiography	R1 767
Somatology	R2 113
Sport Management	R969
Tourism Management	R2 036

(CUT, 2008: PSP Icon Affordability Model)

ANNEXURE B

Tuition fee per FTE student per academic programme in 2008

Academic programme	Tuition fee per FTE student
Accounting	R9 261
Accounting (Welkom)	R9 818
Administration (Welkom)	R0
Agricultural Management	R12 959
Arts (Welkom)	R7 143
Biomedical Technology	R11 289
Built Environment	R15 345
Business Administration	R10 573
Clinical Technology	R9 695
Clothing/Fashion	R14 643
Commerce (Welkom)	R5 687
Cost & Management Accounting	R10 044
Cost & Management Accounting (Welkom)	R9 366
Dental Assisting	R25 990
Education	R9 421
Education (Welkom)	R10 227
Emergency Medical Care	R17 511
Engineering Civil	R15 728
Engineering Computer Systems	R15 953
Engineering Electric	R15 217
Engineering Mechanical	R15 440
Environmental Health	R12 675
Financial Information Systems	R12 477
Fine Arts	R11 023
Fire Technology	R10 078

Academic programme	Tuition fee per FTE student
Graphic Design	R12 695
Hospitality Management	R20 470
Human Resource Management	R9 557
Human Resource Management (Welkom)	R10 012
Import/Export Management	R8 198
Information Technology	R11 850
Information Technology (Welkom)	R10 556
Internal Auditing	R10 267
Internal Auditing (Welkom)	R9 131
Jewellery Design (Welkom)	R15 087
Language Practice	R13 375
Language Practice (Welkom)	R9 250
Management	R17 120
Marketing	R8 804
Marketing (Welkom)	R9 014
Office Management & Technology	R14 157
Photography	R8 897
Project Management	R11 952
Public Management	R10 172
Public Management (Welkom)	R9 150
Radiography	R9 645
Somatology	R18 134
Sport Management	R10 561
Tourism Management	R12 297

(CUT, 2008: PSP Icon Affordability Model)

Some academic programmes indicated a tuition fee per FTE student of R0, because these academic programmes had a very low number of headcount enrolments, which resulted in an insignificant number of FTE enrolments.

ANNEXURE C

Tuition fee per FTE student compared to the strategic and demand values of an academic programme for 2008

Academic programme	Strategic value	Student demand	Tuition fee per FTE student
Accounting	-0.188	0.5	R9 261
Accounting (Welkom)	-1.185	-1.2	R9 818
Administration (Welkom)	-0.768	-1.7	R0
Agricultural Management	0.644	-0.3	R12 959
Arts (Welkom)	-0.559	-0.9	R7 143
Biomedical Technology	0.311	0.1	R11 289
Built Environment	0.163	-0.6	R15 345
Business Administration	-0.471	-1.4	R10 573
Clinical Technology	0.908	-1.1	R9 695
Clothing/Fashion	0.666	-1.4	R14 643
Commerce (Welkom)	-0.381	0.4	R5 687
Cost & Management Accounting	-0.915	-0.2	R10 044
Cost & Management Accounting (Welkom)	-0.958	-1.9	R9 366
Dental Assisting	0.237	-1.6	R25 990
Education	-0.032	0.7	R9 421
Education (Welkom)	0.087	0.0	R10 227
Emergency Medical Care	0.159	-1.3	R17 511
Engineering Civil	0.302	1.1	R15 728
Engineering Computer Systems	0.980	0.0	R15 953
Engineering Electric	1.115	2.0	R15 217

Academic programme	Strategic value	Student demand	Tuition fee per FTE student
Engineering Mechanical	0.916	0.6	R15 440
Environmental Health	1.003	-0.6	R12 675
Financial Information Systems	0.480	-0.3	R12 477
Fine Arts	-0.383	-1.5	R11 023
Fire Technology	-1.246	-1.8	R10 078
Graphic Design	-0.556	-0.9	R12 695
Hospitality Management	0.200	0.0	R20 470
Human Resource Management	-0.387	0.4	R9 557
Human Resource Management (Welkom)	-1.499	-0.6	R10 012
Import/Export Management	-0.967	-1.2	R8 198
Information Technology	0.998	0.7	R11 850
Information Technology (Welkom)	0.554	-1.0	R10 556
Internal Auditing	-1.184	-0.2	R10 267
Internal Auditing (Welkom)	-1.218	-1.9	R9 131
Jewellery Design (Welkom)	-1.108	-1.7	R15 087
Language Practice	-0.665	-1.1	R13 375
Language Practice (Welkom)	-0.692	-1.8	R9 250
Management	-0.869	-1.7	R17 120
Marketing	-0.628	0.2	R8 804
Marketing (Welkom)	-0.800	-1.2	R9 014
Office Management & Technology	-0.601	0.4	R14 157
Photography	-0.365	-1.7	R8 897
Project Management	-0.587	-0.8	R11 952
Public Management	-0.041	0.3	R10 172
Public Management (Welkom)	-1.395	-2.0	R9 150

Academic programme	Strategic value	Student demand	Tuition fee per FTE student
Radiography	0.559	-0.1	R9 645
Somatology	0.684	-1.0	R18 134
Sport Management	-0.474	-1.1	R10 561
Tourism Management	0.316	0.0	R12 297

(CUT, 2008: PSP Icon Academic and Affordability Model)

ANNEXURE D

A comparison between the number of FTE students enrolled per academic programme and the tuition fee per FTE student per academic programme for 2008

Academic programme	Number of FTE enrolments	Tuition fee per FTE student
Accounting	398	R9 261
Accounting (Welkom)	124	R9 818
Administration (Welkom)	0	R0
Agricultural Management	122	R12 959
Arts (Welkom)	83	R7 143
Biomedical Technology	85	R11 289
Built Environment	143	R15 345
Business Administration	53	R10 573
Clinical Technology	94	R9 695
Clothing/Fashion	57	R14 643
Commerce (Welkom)	392	R 5 687
Cost & Management Accounting	142	R10 044
Cost & Management Accounting (Welkom)	25	R9 366
Dental Assisting	18	R25 990
Education	704	R9 421
Education (Welkom)	254	R10 227
Emergency Medical Care	42	R17 511
Engineering Civil	356	R15 728
Engineering Computer Systems	85	R15 953
Engineering Electric	551	R15 217
Engineering Mechanical	299	R15 440
Environmental Health	115	R12 675

Academic programme	Number of FTE enrolments	Tuition fee per FTE student
Financial Information Systems	69	R12 477
Fine Arts	39	R11 023
Fire Technology	57	R10 078
Graphic Design	86	R12 695
Hospitality Management	138	R20 470
Human Resource Management	446	R9 557
Human Resource Management (Welkom)	376	R10 012
Import/Export Management	50	R8 198
Information Technology	813	R11 850
Information Technology (Welkom)	175	R10 556
Internal Auditing	154	R10 267
Internal Auditing (Welkom)	9	R9 131
Jewellery Design (Welkom)	35	R15 087
Language Practice	243	R13 375
Language Practice (Welkom)	89	R9 250
Management	15	R17 120
Marketing	195	R8 804
Marketing (Welkom)	135	R9 014
Office Management & Technology	186	R14 157
Photography	31	R8 897
Project Management	90	R11 952
Public Management	466	R10 172
Public Management (Welkom)	6	R9 150
Radiography	107	R9 645
Somatology	79	R18 134

Academic programme	Number of FTE enrolments	Tuition fee per FTE student
Sport Management	97	R10 561
Tourism Management	122	R12 297

(CUT, 2008: PSP Icon Affordability Model)

ANNEXURE E

Cost and tuition fee per academic programme per FTE student for 2008

Academic programme	Cost per FTE student	Tuition fee per FTE student
Accounting	R21 987	R9 261
Accounting (Welkom)	R18 983	R9 818
Administration (Welkom)	R24 946	R0
Agricultural Management	R33 304	R12 959
Arts (Welkom)	R40 330	R7 143
Biomedical Technology	R43 243	R11 289
Built Environment	R28 011	R15 345
Business Administration	R31 474	R10 573
Clinical Technology	R39 442	R9 695
Clothing/Fashion	R49 353	R14 643
Commerce (Welkom)	R19 367	R 5 687
Cost & Management Accounting	R20 861	R10 044
Cost & Management Accounting (Welkom)	R12 131	R9 366
Dental Assisting	R79 259	R25 990
Education	R25 286	R9 421
Education (Welkom)	R22 755	R10 227
Emergency Medical Care	R78 802	R17 511
Engineering Civil	R26 304	R15 728
Engineering Computer Systems	R32 459	R15 953
Engineering Electric	R29 874	R15 217
Engineering Mechanical	R31 608	R15 440
Environmental Health	R41 116	R12 675
Financial Information Systems	R36 184	R12 477
Fine Arts	R72 328	R11 023

Academic programme	Cost per FTE student	Tuition fee per FTE student
Fire Technology	R26 717	R10 078
Graphic Design	R34 873	R12 695
Hospitality Management	R44 554	R20 470
Human Resource Management	R21 430	R9 557
Human Resource Management (Welkom)	R16 166	R10 012
Import/Export Management	R24 375	R8 198
Information Technology	R25 529	R11 850
Information Technology (Welkom)	R15 364	R10 556
Internal Auditing	R22 725	R10 267
Internal Auditing (Welkom)	R12 750	R9 131
Jewellery Design (Welkom)	R19 018	R15 087
Language Practice	R27 595	R13 375
Language Practice (Welkom)	R11 624	R9 250
Management	R39 583	R17 120
Marketing	R25 021	R8 804
Marketing (Welkom)	R12 647	R9 014
Office Management & Technology	R31 685	R14 157
Photography	R52 397	R8 897
Project Management	R26 345	R11 952
Public Management	R22 860	R10 172
Public Management (Welkom)	R26 978	R9 150
Radiography	R39 716	R9 645
Somatology	R35 075	R18 134
Sport Management	R27 517	R10 561
Tourism Management	R41 532	R12 297

(CUT, 2008: PSP Icon Affordability Model)

ANNEXURE F

Annexure F provides a diagrammatic presentation of the recommended pricing plan.

THE PRICING PROCESS	Price manage-ment and control	**Conducting a pricing audit** **SWOT and GAP analyses**
	Pricing plan Implemen-tation	**Implementing the pricing plan** **Developing pricing policies and procedure manuals**
	Price Setting	**Developing pricing tactics**
		Selecting pricing strategies and setting the price **Linking pricing strategies, pricing objectives and pricing determinants**
		Determining and assessing pricing determinants
		Customer Considerations / Competitive Considerations / Product Considerations / Demand Considerations / Cost Considerations
		Developing pricing objectives

THE FOUNDATION OF THE PRICING PLAN	Internal Parameters	**Central University of Technology, Free State**
		Mission / **Core Values** / **Objectives and Goals**
	External Parameters	**The Higher Education Act of 1997** / **The 1997 White Paper on Higher Education** / **The National Plan for Higher Education of 2001** / **The New Funding Framework of 2004**

THE PRICING AUTHORITY	**Selecting the pricing committee**

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