



UNIVERSITY
OF
JOHANNESBURG

COPYRIGHT AND CITATION CONSIDERATIONS FOR THIS THESIS/ DISSERTATION



- Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
- NonCommercial — You may not use the material for commercial purposes.
- ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.

How to cite this thesis

Surname, Initial(s). (2012) Title of the thesis or dissertation. PhD. (Chemistry)/ M.Sc. (Physics)/ M.A. (Philosophy)/M.Com. (Finance) etc. [Unpublished]: [University of Johannesburg](https://ujdigispace.uj.ac.za). Retrieved from: <https://ujdigispace.uj.ac.za> (Accessed: Date).

**THE TRAINING NEEDS OF THE OPERATIONS MANAGER: SERVICES
WITH SPECIFIC REFERENCE TO THE BANKING INDUSTRY**

BY

LMM VAN DEN BERG

A thesis submitted in fulfilment of the requirements for the degree of



M Tech Production Management

UNIVERSITY
OF
JOHANNESBURG

**In the Department of Operations Management,
Faculty of Business Management,
Technikon Witwatersrand**

SUPERVISOR: DR R W E VAN DER WAL

December 1998

11080576x

**TECHNIKON WITS LIBRARY
LIBRARY ITEM: 507665**



PREFACE

Achieving a competitive advantage in any business depends upon effective and continuing collaboration between departments and employees.

The modern operations manager must be well trained and must continually develop technical, conceptual and interpersonal skills. This thesis provides some information, techniques and innovations that will equip operations managers in the service industry to develop these skills, and as a result make better operating decisions.

Chapter One, covers the planning of the thesis. Chapter Two examines the development of operations management as a discipline and is an in-depth literature study carried out on the topic. The tasks, skills, techniques and responsibilities according to the literature, have been examined. Chapter Three deals with the collection and analysis of data and examines the results of questionnaires from industry and technikon academic staff. Chapter four is a discussion of the results as found in industry and technikon academic staff. Chapter five evaluates the B – Tech: Production Management programme offered at technikons, and its applicability to the service industry. Chapter six, draws conclusion and makes recommendations, based on the findings in previous chapters.

ACKNOWLEDGEMENTS

Many colleagues and friends have advised me and shared their experiences with me. I sincerely appreciate their help. I acknowledge the assistance given by Standard Bank of South Africa, Amalgamated Banks of South Africa (North West Province) and First National Bank.

My appreciation for the helpful suggestions and moral support is extended to Dr Ruurd van der Wal in the Department of Operations Management, Technikon Witwatersrand. I also thank Mr. Alan Thomson, for his help in proofreading and editorial assistance.

Finally I want to thank my family for putting up with the long hours needed to complete this study. Steyn and Salomie were always supportive of my efforts.

MVDB, 1998

CONTENTS LIST		PAGE
CHAPTER ONE: INTRODUCTION		1
1.1	WHAT IS OPERATIONS MANAGEMENT?	1
1.2	STATEMENT OF THE PROBLEM	2
1.2.1	Hypothesis	2
1.3	RESEARCH OBJECTIVES	2
1.4	LITERATURE STUDY	3
1.5	IMPORTANCE OF THE STUDY	4
1.6	RESEARCH DESIGN	4
1.6.1	Population	4
1.6.2	Sample	5
1.6.3	Research Methodology	5
1.6.4	Qualitative study	5
1.6.5	Quantitative study	6
1.7	DATA ANALYSIS	6
1.8	LAYOUT OF THE DISSERTATION	6
CHAPTER TWO: THE DEVELOPMENT OF OPERATIONS MANAGEMENT AS A DISCIPLINE		10
2.1	INTRODUCTION	10
2.2	A HISTORICAL OVERVIEW	12
2.2.1	The Mill	12
2.2.2	Process Plants	13

2.2.3	The Assembly Line	14
2.2.4	Interchangeability	15
2.2.5	Mass Production	16
2.2.6	The Development Of Project Management	20
2.2.7	Economics Of The Production Process	22
2.2.8	The Development Of Mathematical Models	24
2.2.9	From Production Management To Operations Management	25
2.3	SIMILARITIES AND DIFFERENCES BETWEEN MANUFACTURING AND SERVICES	28
2.4	TRENDS IN OPERATIONS MANAGEMENT	30
2.4.1	International Employment Trends In The Service Industry	31
2.4.2	Employment Trends In South-Africa	31
2.5	OPERATIONS MANAGEMENT AS AN OPEN SYSTEM	33
2.5.1	Open Systems	33
2.6	LINE VERSUS FUNCTIONAL MANAGEMENT	37
2.6.1	Line Management	37
2.6.2	Functional Management	37
2.6.3	Operations Management As A Functional Area	38
2.7	THE OBJECTIVES OF THE OPERATIONS MANAGEMENT FUNCTION	40

2.8.	THE STRATEGIC ROLE OF OPERATIONS MANAGEMENT	41
2.9.	SKILLS, TASKS, TECHNIQUES AND RESPONSIBILITIES OF AN OPERATIONS MANAGER	42
2.9.1	Skills	42
2.9.2	Tasks	44
2.9.3	Responsibilities	49
2.9.4	Techniques	49
2.9.5	Description of techniques	52
2.10	CONCLUSION	56
CHAPTER THREE:	COLLECTION AND ANALYSIS OF DATA	60
3.1	SELECTING THE POPULATION	60
3.2	THE SURVEY AND DATA COLLECTION	61
3.3	RESEARCH PARTICIPANTS – POPULATIONS AND INDIVIDUALS	61
3.4	SAMPLE	62
3.5	INSTRUCTIONS TO PARTICIPANTS	63
3.6	INSTITUTIONAL APPROVAL	63
3.7	DATA ANALYSIS	63
3.7.1	Number Of Questionnaires Returned	63
3.7.2	Questionnaires Returned By The Technikon Academic Population	65

VII

3.7.3	Questionnaire Construction	67
3.8	ANALYSIS OF QUESTIONNAIRES – BANKING INDUSTRY	69
3.8.1	Section A - Background Information – Banking Industry	69
3.8.2	Section B - Current Profile Of An Operations Manager – Banking industry	74
3.8.3	Current Qualifications Of Operations Managers	88
3.9	CONCLUSIONS OF SECTION A AND B	88
3.10	SECTION C – DECISIONS AND ACTIVITIES OF AN OPERATIONS MANAGER	89
3.10.1	Planning	90
3.10.2	Organising	92
3.10.3	Controlling	92
3.10.4	Directing	94
3.10.5	Motivating	94
3.10.6	Co-ordinating	96
3.10.7	Training and Developing Personnel	97
3.11	SECTION D - TECHNIQUES USED IN OPERATIONS MANAGEMENT	98
3.12	SECTION E – CHARACTERISTICS OF AN OPERATIONS MANAGER	99
3.12.1	Be Able To Apply Sound Judgement In Determining The Seriousness Of Problems	101

VIII

3.12.2	Be A Strong Communicator	101
3.12.3	Have Sound Management Skills	101
3.12.4	Have Strong People Skills	101
3.12.5	Be Able To Negotiate At All Levels	102
3.12.6	Be A Firm Decision Maker	102
3.12.7	Be Able To Delegate Effectively	102
3.12.8	Be Able To Handle Authority	102
3.12.9	Be An Innovative Person	103
3.12.10	Have A Knowledge Of Organisation & Methods	103
3.12.11	Have Experience In The Type Of Service Offered	103
3.12.12	Be Able To Adapt To Change	103
3.13	CONCLUSION FOR SECTION E – CHARACTERISTICS OF AN OPERATIONS MANAGER	104
3.14	ANALYSIS OF QUESTIONNAIRES – TECHNIKON ACADEMIC STAFF	105
CHAPTER FOUR: DISCUSSION ON FINDINGS OF QUESTIONNAIRES		107
4.1	TASKS AND RESPONSIBILITIES AS FOUND IN THE BANKING INDUSTRY	107
4.2	DECISIONS AND ACTIVITIES OF OPERATIONS MANAGERS – A COMPARISON BETWEEN BANKING INDUSTRY AND ACADEMIC STAFF	109

4.3	TECHNIQUES USED BY OPERATIONS MANAGERS - A COMPARISON BETWEEN BANKING INDUSTRY AND ACADEMIC STAFF	115
4.4	CHARACTERISTICS OF AN OPERATIONS MANAGER - A COMPARISON BETWEEN BANKING INDUSTRY AND ACADEMIC STAFF	117
4.5	CONCLUSION	119
	CHAPTER FIVE: AN EVALUATION OF THE NATIONAL DIPLOMA AND THE B-TECH: PRODUCTION MANAGEMENT ACCORDING TO THE NEEDS OF SERVICE INDUSTRIES	122
5.1.	CURRENT CURRICULUM OF THE NATIONAL DIPLOMA: PRODUCTION MANAGEMENT	122
5.1.1	Analysis Of Subject Content	128
5.2	AN EVALUATION OF THE B – TECH: PRODUCTION MANAGEMENT	129
5.3	NEEDS OF THE BANKING INDUSTRY	131
5.4	CONCLUSION	131
	CHAPTER SIX: CONCLUSION AND RECOMMENDATION	133
6.1	CONCLUSION	133
6.2	RECOMMENDATIONS	138
6.2.1	Recommendation One	138
6.2.2	Recommendation Two	138

6.2.3 Recommendation Three	140
6.2.4 Recommendation Four	141
REFERENCES	142



ANNEXURES

- A Cover Letter
- B Questionnaire
- C Current Curriculum – National Diploma: Production Management
- D Syllabus Content of National Diploma Currently Offered
- E Current Curriculum of the B – Tech: Production Management
- F Syllabus Content of the B – Tech: Production Management



LIST OF FIGURES

FIGURE:	PAGE	
2.1	Differentiation of production systems over time	11
2.2	Operations Management as an open system	36
2.3	Interfunctional connection with other traditional functional Areas	39
3.1	Comparison between banks – percentage questionnaires returned	65
3.2	Percentage questionnaires returned – technikons	66
3.3	Percentage of respondents answering Section A Qi-iii	70
3.4	Type of environment operations managers are employed in	71
3.5	Responses to Section A Qi	72
3.6	Percentage of males versus females employed – all banks	74
3.7	Gender employed per banking group	75
3.8	Age distribution of the operations manager – all banks	76
3.9	Average age – females – FNB	77
3.10	Average age – females – ABSA (NWP)	78
3.11	Average age – males – SBSA	79
3.12	Average age – males FNB	80
3.13	Average age – males – ABSA (NWP)	80
3.14	Years of experience in the field of operations management	81
3.15	FNB: years of experience in the field of operations management	82
3.16	ABSA (NWP) Years of experience in the field of operations management	83
3.17	Years of experience in the field of operations management – SBSA	84

LIST OF FIGURES (CONTINUED...)

FIGURES	PAGE
3.18	How position of operation manager was attained - all banks 85
3.19	How position of operation manager was attained – ABSA (NWP) 86
3.20	Position obtained of an operations manager – FNB 87
3.21	Position obtained of an operations manager – SBSA 87
3.22	Decisions and activities of an operations manager – Planning – all banks 91
3.23	Decisions and activities of operations manager – Controlling – all banks 93
3.24	Decisions and activities of an operations manager – Motivating – all banks 95
3.25	Decisions and activities of operations manager – Co – ordinating 96
3.26	Decisions and activities of operations manager – Training and developing personnel 98
3.27	Characteristics of an operations manager – all banks 104
3.28	Profile of academic staff – Technikons 105
3.29	Profile of an operations manager: Average age of technikon academic staff 106

LIST OF TABLES

TABLE	PAGE	
2.1	Contrasting problem areas in Postwar Ford Systems (PWFS) with Just In Time (JIT)	19
2.2	Continuum of characteristics of manufacturing and service organisations	28
2.3	South Africa: Standardised employment series for major SIC divisions (1994 – 1996)	32
2.4	Standard management functions operations managers experience most problems with	46
2.5	Decisions and activities of managers in operations (Grouped according to familiar management function)	47
2.6	Techniques used by operations managers	51
3.1	Summary of questionnaires returned – banking industry	64
3.2	Summary of questionnaires – academic staff of technikons	66
3.3	Difference in number of branches reported	73
3.4	Qualifications per banking group	88
3.5	Activities listed – Planning – banks	90
3.6	Decisions and activities of operations manager – Organising – all banks	92
3.7	Decisions and activities of operations manager – Controlling – all banks	93
3.8	Decisions and activities of the operations manager – Directing – all banks	94

TABLES (CONTINUED...)

TABLE		PAGE
3.9	Decisions and activities of an operations manager – Motivating – all banks	95
3.10	Decisions and activities of operations manager – Coordinating – all banks	96
3.11	Decisions and activities of operations manager – Training and developing personnel – all banks	97
3.12	A summary of techniques used in operations management - all banks	99
3.13	Characteristics of an operations manager – all banks	100
4.1	Tasks and responsibilities of an operations manager as found in the banking industry	108
4.2	Decisions and activities of operations managers – a comparison between banking industry and academic staff	110
4.3	Techniques used in operations management as seen by academic staff versus banking industry	116
4.4	Characteristics of an operations manager – a comparison between academic staff and banking industry	118
5.1	Variety of subjects offered at technikons	123

CHAPTER ONE

INTRODUCTION

1.1 WHAT IS OPERATIONS MANAGEMENT?

Harris (1989:4) defines Operations Management as "the management of a system which provides goods and services to or for a customer, and involves the design, planning and control of the system"

Management in itself refers to a process of activities that are carried out to ensure that an organisation can achieve defined objectives by using their human, financial, physical and information resources in an orderly manner (Cronje, Neuland & van Reenen, 1994:280).

The term 'system' indicates an approach used to ensure the optimal utilisation of the resources (Harris, 1989:4).

However, the word "operations" is mainly used to describe the production or manufacture of physical goods. This functional area is referred to as production management. Opinion leaders such as Vollman (1973) have shown an interest in other systems; for example, hospitals, supermarkets and office procedures. They have used the term "operations management" to cover all systems involving men, information, money, equipment used to accomplish some set objectives (Harris, 1989:3).

1.2 STATEMENT OF THE PROBLEM

The term "operations management" acknowledges two branches, namely production and services. Unfortunately, most books and training programmes have not yet addressed the needs of the service branch.

Production management students are currently trained to possess the tools and techniques of manufacturing orientated production managers. However, because of the lack of emphasis on service aspects they are not versatile enough to adapt their knowledge to service related situations.

1.2.1 Hypothesis

B Tech Production Management does not meet the needs of students preparing to enter the service industry as Operations Managers

1.3 RESEARCH OBJECTIVES

The objective of the following research is to enable technicians to train operations managers for the service industry who can identify and solve problems that are "within his/her control. By so doing the service operation can become more efficient and effective. The objectives of this research are therefore:

1. To assess the needs, tasks, techniques and responsibilities of an Operations Manager: Services.

2. To evaluate the existing B Tech: Production Management according to the assessed needs.

1.4 LITERATURE STUDY

For the past fifteen years the National Diploma: Production Management has been offered at various Technikons in South Africa. The training provided concentrated on introducing the world of manufacturing to the student. There has been only one update, in 1992.

In the post-industrial era the focus on both production and consumption in the world economy has shifted towards services (Fitzsimmons & Sullivan, 1982:3). In 1988 the output of these industries in the United Kingdom increased twice as fast as in the rest of the world. In Cape Town, after being selected Businessman of the Year, Dr. Anton Rupert commented, that the same trend is evident in South Africa. "More people are employed in the service sector than in the manufacturing sector" (Cronje, et al, 1994:280).

The term production management became too narrow and in the early 1970s, the term "operations management" was coined to embrace activities linked to production, such as design and distribution. The term "production operations" was used in 1971 to indicate the shift away from strictly manufacturing (Harris, 1989:3).

In the most recent literature, both the manufacturing process and the service industries are covered in the same volume. The result is that

the majority of examples still come from production, which does not enhance understanding of the service sector. Training still concentrates on manufacturing processes.

1.5. IMPORTANCE OF THE STUDY

In the United States of America, service organisations employ 70% of the workforce (Harris, 1989:3). In South Africa, for the past 33-years, the number of people employed in services has been higher than in manufacturing (National Productivity Institute: 1995:5-8). Services are thus an important employer industry. However, in spite of this training in South Africa is still focused on manufacturing processes. To remain relevant to the demand of industry the current training offered by the Technikon Witwatersrand and other technikons in B Tech: Production Management must be refined. It must ensure that students become versatile enough to meet the future demands placed on them by both manufacturing and service industries.

1.6 RESEARCH DESIGN

1.6.1 Population

For the purpose of this research, two populations were surveyed. The first consists of the total academic population in the field of Operations Management at South African Technikons. The second population is defined as persons with the designation 'Operations Manager' or who carries out the tasks of an Operations Manager in the major banking groups namely ABSA, Standard Bank of South

Africa and First National Bank. These banking institutions were approached and agreed to supply the names of personnel members, which may be used as a sampling frame.

1.6.2 Sample

Since the academic population is small, no sample was drawn and all academic staff in Operations Management was surveyed. A haphazard sample was drawn from the banking population.

1.6.3 Research Methodology

The research was conducted in two phases, namely a qualitative study in which the range of variables of operations management was determined. A questionnaire was developed for the quantitative study from this information.

1.6.4 Qualitative Study

Interviews were conducted with operations managers and senior personnel in banking institutions where there was a query. The purpose of these interviews was to explore the range of constructs that comprises operations management in a service management environment.

1.6.5 Quantitative Study

Criteria were developed of the characteristics and skills of an Operations Manager: Services, from the literature and the qualitative study. These characteristics were incorporated in a quantitative questionnaire, which was completed by technician academic staff, and the sample drawn from the banking sector.

1.7 DATA ANALYSIS

A statistical package "NSD STAT" on PC, (Purchased from CSD), was used to analyze the data.

1.8 LAYOUT OF RESEARCH

The research project has been divided into Six Chapters. Chapter 1 is an introduction into the field of Operations Management. Chapter 2 covers the development of Operations Management as a discipline. Chapter 3 is the collection and analysis of data followed by Chapter 4, discussions of findings of questionnaires. Chapter 5 is an evaluation of the National Diploma Production Management and the B – Tech Production Management according to the needs of the service industry. Conclusions and recommendations based on the findings are covered in Chapter 6.

CHAPTER TWO

THE DEVELOPMENT OF OPERATIONS MANAGEMENT AS A DISCIPLINE

2.1 INTRODUCTION

Wilson (1995:65). Maintains that "Operations management as a discipline has a wide range of interests, but our knowledge of this discipline is limited to recent developments. World War II is a watershed for the profession with little knowledge about, or understanding of, anything that occurred before. This lack of an historical dimension is a major failing for any discipline. This is particularly so for operations managers whose common and recurrent problems often entail reinventing wheels. Without a historical perspective, a shallow understanding of current issues and topics, and their further development, is inevitable".

The perspective described in this chapter is a perspective as found in the literature. It provides a framework for viewing the development of operations management. A better understanding of the constraints, objectives, and assumptions that influenced past managers in creating production systems, policies, and practices can provide valuable insights. The historical perspective summarized in Figure 2.1 is adopted from the work of Wilson (1995). The figure provides a useful framework for describing broad developments and influences.

Figure 2.1 Differentiation of production systems over time
(Wilson, 1995:62)

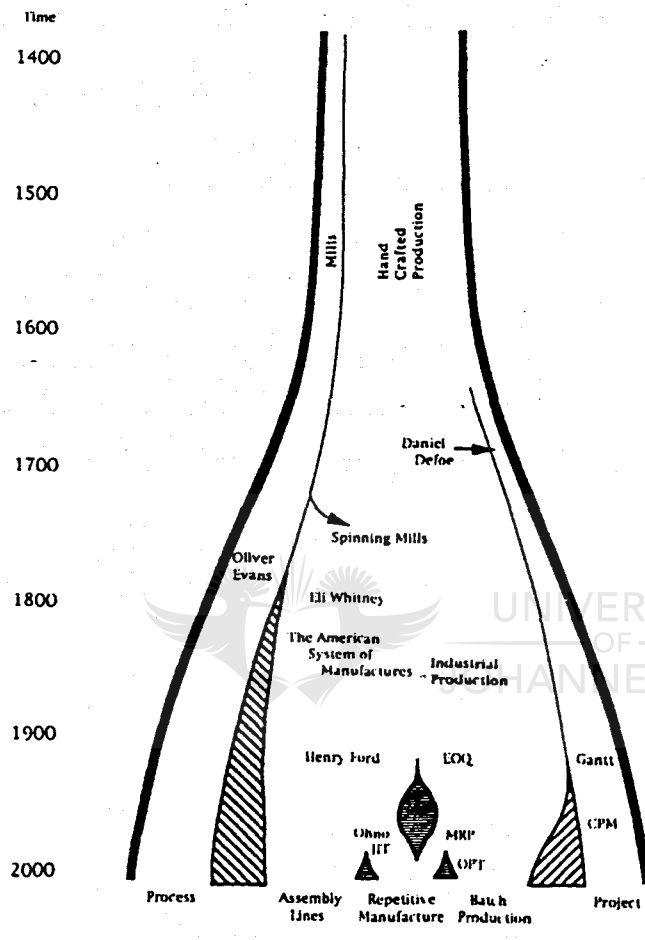


FIGURE 1: Differentiation of production systems over time

Figure 2.1 is in the form of an hourglass and show the interests of operations managers over time. On the horizontal axis current production systems that concern the profession are shown. On the vertical axis a time line is displayed which add a historical dimension.

Specialised techniques (such as MRP, OPT, JIT, CPM, and TQM) for managing assembly lines and projects were not needed or created until a specific production system was recognised. In Figure 2.1 it is shown when each process became differentiated from each other (Wilson, 1995:62).

Figure 2.1 represents associated managerial developments by linking specific production and inventory control techniques to production systems that use them. Distinct categories of processes are recognised: In example projects, batch production, assembly and production lines and processing plants. These distinctions reflect the development of the profession (Wilson, 1995:62).

2.1 A HISTORICAL OVERVIEW

2.2.1 The Mill

A study of the hourglass, reveal that the mill was the first machine ever used. "A mill is a machine that applies power to perform various types of work: grinding, crushing, stamping, and pressing". (Mankin, 1996:1). The term mill also refers to the building that houses such a machine. For many centuries, waterwheels and windmills performed most mechanical work, and so the word mill became a synonym for any workplace where machinery was used. The term milling is now used to describe a large number of processes performed by machine tools (Mankin, 1996:1).

2.2.2 Process Plants

The mill was the forerunner of the modern process plants. The modern processing plant is typically a large, capital-intensive facility producing generic products in high volume. Formally few people are required to monitor or control operations and the emphasis is on planning and maintenance to allow continuous operation (Wilson, 1995:64).

These modern features can be traced to developments early in the industrial revolution. The prototypical processing plant is the spinning mill, which played a significant role early in the industrial revolution. However, the Romans used water mills with vertical mounted, geared wheels as early as the first century BC (Braudel, 1974:260). Although mechanization alone would not distinguish process technology from earlier developments, it facilitated operations and at the same time created management problems on a scale not previously experienced (Wilson, 1995:64).

One characteristic of spinning mills was their need for large numbers of unskilled machine minders. This contrasts with modern processing plants, and is akin to the labour requirements of assembly lines. Oliver Evans provided the distinctly modern feature of processing plants: automatic operation. In 1783 he developed a fully mechanized, water-powered flourmill. While the control systems were crude, this was a singular development, since the mill could be operated entirely without staff (Gies, 1996:1). In the last twenty years of the eighteen-century developments, that would change the

character of mills and mill technology became prominent. The essentials of a modern processing plant can be seen in Evan's developments. The earlier spinning mills exploited the power provided and increased mechanization and they concentrated on productive activity and people. Mechanization was then augmented by automation, with Evan's mills conforming to the modern definition of a processing plant. Figure 2.1 shows this by the processing branch splitting off around 1800, though it had an identity far earlier (Wilson, 1995:64).

2.2.3 The Assembly Line

The concept of a continuous production process was the essential feature of the system of conveyor belts and chutes installed in 1784 by Oliver Evans in his Delaware flourmill. The assembly line is a system of manufacturing in which each worker performs a specialized operation on an unfinished product as it is moved by conveyor past his or her station. The system is designed to achieve an uninterrupted production process by organizing and integrating the various operations that are involved. Although some aspects of the method were used in Europe, the assembly-line technique as such is primarily an American development. The technique gradually came to be used in other major industries (Williamson, 1996:1).

The second major U.S. contribution to the evolution of the assembly line was the utilization of interchangeable parts for use in such varied products as pistols, clocks, and agricultural machinery. By the beginning of the 20th century, the separate features of the assembly

line process (the conveyor and the use of interchangeable parts) were well-established in U.S. industry (Williamson, 1996:1).

2.2.4 Interchangeability

Eli Whitney is acknowledged as the father of interchangeability. Whitney is famous for his invention of the cotton gin. When he agreed to produce muskets in 1798, Whitney suffered numerous setbacks as an arms maker. He lacked a factory, employees, equipment, materials, money, security and access to credit. In addition he had no experience in making guns or interchangeable parts. (Green, 1996:1).

His contract specified delivery over two years, but it took him eleven years to fulfill it. A later contract was refused due to his poor delivery record and quality. Only the War of 1812 stimulated another federal contract. The government's armories and several private contractors were all developing interchangeable parts and mechanized facilities (Hounshell, 1984:23).

Eli Whitney demonstrated that machine tools, manned by workers who did not have the highly specialized skills of gunsmiths, could produce standardized parts to exact specifications, and that any part could be used as a component of any musket. The firearms factory he built, was one of the first to use mass production methods (Green, 1996:1).

Hounshell, D, shows that standardization was a goal pursued throughout the nineteenth century but was not achieved as easily as

is assumed in introductory texts in operations management (Wilson, 1995:62).

At the peak of the industrial revolution the words “factory organisation, specialised machines, precision manufacture, interchangeable parts, carefully coordinated work sequences, material flows and new techniques” were for the first time documented in a report released by the American Systems of Manufacturers in 1854 (Wilson, 1995:63).

British manufacturers feared these concepts and attempted to challenge them. Many local manufacturers in Britain were skeptical of the foreign system's viability. The concepts did not spread widely or quickly in Britain, or in Europe generally. This state of affairs pertained universally in European manufacturing until after World War II (Wilson, 1995:63).

Rosenburg (1969: 23) states that even in the mid-nineteenth century the importance of competitive manufacturing; i.e., being world class, was appreciated.

2.2.5 Mass Production

Williamson (1996:1) defines mass production as “a manufacturing technique used to produce large quantities of commodities at a low cost per unit”. To achieve this objective, a production system requires an uninterrupted flow of materials through various manufacturing processes; highly specialized tools and equipment, and a labour force

trained in the use, maintenance, and repair of such tools and equipment (Williamson 1996:1).

Once the industrial revolution was underway and the factory system had been established, as the major mode of manufacturing, the perfection of mass production techniques was inevitable. Mass production can therefore be seen as the culminating technology in the process of industrialization, made even more efficient today by the arrival of automation (Wild, 1975:12).

It fell to Henry Ford to demonstrate how these features could be combined to yield the full potential of mass production. Initially, the company's assembly process was similar to that of other interchangeable parts manufacturers: it was organised around a series of stations where teams of workers constructed each individual car out of components manufactured and assembled at other stations in the plant (Williamson, 1996:1).

Early in 1913, Ford began using a power-driven conveyor system that carried subassemblies to manufacture magnetos at a correct height and speed past workers, each of which performed a specialized assembly task at a fixed workstation. It had taken one man 18 minutes to assemble a magneto; with the assembly line, the time was cut to 5 minutes (Williamson, 1996:1).

By the end of 1914, Ford had extended this system to the assembly of the entire automobile. He achieved spectacular savings in the

amount of time and labour that had previously been required to transport materials within the plant.

His development of a complete assembly-line process was a major technological breakthrough. It was soon adopted by the manufacturers of an increasing number of products that required accurate and precise assembly. Ford's assembly line became the foundation of modern mass production (Wilson, 1995:63).

Henry Ford's implementation of the assembly line is one of the best-documented industrial developments. This is ironic since the Ford system, so criticised by JIT proponents, bears little resemblance to its initial incarnation in the Model T Production System (MTPS) (Wilson, 1995:63).

Ford had a great impact on automotive design and manufacturing. He had an integrated systems approach founded on a market strategy, which was allied to a focused manufacturing system. The system emphasised quality, efficient production, and an avoidance of waste. It operated within a paternalistic framework intended to make the best use of a generally low grade, but highly varied, work force. Similarities between the JIT approach and Ford's MTPS are striking. Henry Ford was a proponent of JIT ideas (Wilson, 1995:64).

The original Ford production system in its years of development, anticipated and resolved many of the concerns that Ohno addressed with his Toyota Production System (Ohno, 1988:15). The essential difference between the two follows from Ford's strictly and purposely limited product line. The MTPS was not a piecemeal effort, it was a

well designed and highly effective manufacturing system (Wilson,1995: 66).

The critical point of departure came in the mid - 1930s when Ford abandoned its single product strategy. This reduced the effectiveness of its manufacturing system without management appreciating that compensatory measures were either necessary or possible. Ford's mimicking of processing plants was successful so long as it produced a generic product, but it was maladapted to making varied products. The key element, the Model T in Ford's Model T production system, changed while the rest remained static. Critics focus on failings of the postwar Ford System (PWFS), and highlight how JIT methods resolve these problems. In Table 2.1 similarities and differences between PWFS and JIT are presented (Wilson, 1995:62-65).

Table 2.1. Contrasting problem areas in Postwar Ford Systems (PWFS) with Just in Time (JIT)

Problems	Postwar Ford System (PWFS)	Just in Time (JIT)
Quality	Large batches Throughput critical Inspector responsible for errors Employees take little interest in quality Single product Rigid standards Poorly educated work force Designed systems to limit operator errors.	Small batches Throughput critical Employees take responsibility for quality Employees take interest in Jobs Multiple products Tolerances allowed Highly educated work force Designed systems to eliminate operator errors

Facility layout and Movement	Recognized that internal movement was a significant Factor in productivity Improvement resulted in eliminating unnecessary movement of men, material and tooling. Achieved this in 1920.	Have suppliers deliver directly to assembly lines. AFROX in South Africa TOYOTA in Japan 1997
Work Force	People were reduced to mindless machine minders with no initiative, and little interest in the product or process. Systems failed to recognized or respond to labour changes Management failed to adapt to a changing work force.	Look for well-educated, technically sophisticated, highly motivated, and loyal people.
Batch Production	Relied on large batches. This increased work in- progress inventories, which reduced incentives to improve efficiency and quality. Emphasis was on processing efficiency and maximising throughput. Adopt a continuous flow philosophy	Small quantities Variety of products Economic order quantity Adopt a continuous flow philosophy

2.2.6 The Development Of Project Management

Many of the essential concepts of operations management must have been familiar to the ancient Egyptians, Chinese, Romans, and Incas. They could not have built such gigantic works as the pyramids, the Great Wall, the aqueducts, or the magnificent public works and

temples of South America without using organizational principles similar to those used in any modern industrial enterprise. Their construction was typically spread over a period of decades, even centuries. In spite of their scale and complexity, project length and cost do not appear to have been managed in a modern sense. A shift from religious and political projects to industrial and commercial ones would heighten awareness of costs and emphasize time (Wilson, 1995:65).

Daniel Defoe's in his *Essay Upon Projects* (1887:32) thought projects were sporadically undertaken in the 1640's which became popular a few years later: "But about the year 1680 began the art and mystery of projecting to creep into the world". His definition of a project "The building of Babel was a right project; for indeed the true definition of a project, according to the modern [circa 1693] acceptance, is, as said before, a vast undertaking, too big to be managed, and therefore likely enough to come to nothing." (Defoe, 1887:30). This is a description that is too often valid even after 300 years. He also applied the term project to various other commercial endeavors, much as it still is today (Wilson, 1995:64).

The modern definition was not dominant and seems to have become significant only recently. Until this century, the term "project" implied highly speculative or shady dealings. Although the special character of projects was known, there do not appear to have been any specialized techniques for handling them until the development of the Gantt chart during World War 1 (Rathe, 1961:54). The network

methods developed in the 1950s further differentiated project management as a subdiscipline (Wilson, 1995:65).

Figure 2.1 represents these developments by showing projects with a distinct identity in the mid1600s and only branching off as distinct types of activity with Gantt in 1917. Simply recognizing a particular type of management problem such as projects does not imply that they can be dealt with effectively. Ford's assembly line represents a different situation. The need to balance the line was immediately apparent and was vigorously addressed (Wilson 1995:65).

2.2.7 Economics Of The Production Process

The first formal discussion of the economics of the production process, however, appeared only in 1776 in Adam Smith's classic work, *Wealth of Nations*. Smith noted the advantages of the division of labour and specialization as a basis for an efficient production system. This concept contrasted sharply with the model of the artisan of the Middle Ages who performed every task required in the manufacturing of a product (Starr, 1996:1).

Another early contributor to the field of operations management was Charles Babbage (Elwood, 1994:13), who published *On the Economy of Machinery and Manufacturers* in 1832. Babbage agreed with Smith that the division of labour would lead to higher productivity. He suggested that the skill levels required for each job should be used to determine the appropriate wage payment and that this practice would result in lower total costs. He discussed the general concepts of Time

and Motion study and advocated the use of scientific methods in the analysis of business problems (Starr, 1996:1).

Smith, Babbage, and others provided the basic concepts of industrial management, but it was Frederick W. Taylor whom must be given credit for their popularization (Elwood, 1994:10). Taylor promoted the idea of scientific management. He maintained that observation, measurement, classification, and the principles derived from these empirical studies should be applied to all managerial problems. He also maintained that the methods by which work was accomplished should be determined by management through the same kind of investigation, and that workers should be "scientifically selected, trained, and developed". Several fields of management evolved from his philosophy, including time and motion study, personnel management, industrial relations, and the managerial functions of planning and control (Starr, 1996:1).

The concept of the division of labour was carried to its logical extreme in 1913 by a technological innovation, the use of a moving Assembly line to manufacture Ford automobiles. Although Henry Ford's innovation has greatly improved productivity, critics argue that the assembly line dehumanizes employees by treating them as parts of a large machine (Starr, 1996:1).

More recently, efforts have been made to enrich factory work by making it more varied, more complex, and more challenging for workers. The objective is to identify jobs that can be done efficiently

by employees yet at the same time provide sufficient challenge and satisfaction to encourage high morale (Starr, 1996:1).

2.2.8 The Development Of Mathematical Models

Virtually every aspect of production management has been affected by the use of mathematical analysis. A mathematical modeling approach known as linear programming has been applied to the problem of scheduling and resource allocation in many production systems. F.W Harris was the first to apply mathematical models to inventory controls (Elwood, 1994:12).

Theories that were developed to explain the statistical behavior of waiting lines (queuing theory) were applied first to problems in the telephone industry. They were later applied to the design of production lines, toll booths, bank service areas, and post offices (Moore, 1996:1).

Shortly after World War II the current rapid development of concepts, theories and techniques in production management began. The need to deploy resources where needed called for research and new mathematical and computational techniques. They created an awareness of how to apply old techniques to war problems. These problems were parallel problems that occurred in production systems. The new approaches developed carried over to industry. The modern era of management science and operations research began (Elwood, 1994:12-13).

2.2.9. From Production Management to Operations Management

Up to 1965 the field concerned with the creation of goods and services was thought of in terms of manufacturing management (Elwood: 1994, 3). It is evident from the previous discussion that the focus was totally on the physical output of production.

The service sector and the manufacturing sector do have many overlaps. "The distinction between manufacturing and service companies is...hazy. Is IBM selling goods or services? Is Volvo a services company, in so far as a good deal of its product is leased out?" (Norman, 1984:32).

Past conditions focused resources and attention on manufacturing systems. Health care, education and financial services grew into huge systems and attracted attention when their cost began to increase rapidly. Expenditure for services has increased at a somewhat faster rate than that of manufactured goods (Elwood, 1994:6).

Other kinds of non-manufacturing systems that were once regarded as simple and insignificant have become worthy of study. The supermarket has replaced the corner grocery store. Problems of forecasting, supply, inventory, layout and material handling can make the difference between profit and loss (Elwood, 1994: 7).

Banks have broadened their range of services and have developed branch banking. In addition, banks have become one of the most important users of computers. They have large-scale office operations

that involve important problems of workflow and information processing. The net result is that service and non-manufacturing systems have taken their place with manufacturing as significant production systems (Elwood, 1994:7).

Society demands that the service sector become efficient at converting its input resources to needed services, whilst maintaining certain quality levels (Elwood, 1994:7).

Every organization has processes that must be designed and managed effectively. Technology, be it manual or computerised, is used in each process. An organisation whether it is a service organisation or manufacturing organisation is concerned with quality, productivity and customer satisfaction. Choices must be made about capacity, location, layout of facilities and dealing with scheduling or outside services (Krajewski & Ritzman, 1996:19).

Service organizations cannot inventory their outputs, but they do inventory their inputs for their products. Banks for example maintain an adequate supply of money. Many operations in a service organization have little customer contact, such as the 'back room' operations of a bank. As organisations sought to improve quality they came to realize that everyone in an organisation has customers, internal and external (Krajewski & Ritzman, 1996:6).

The term 'production operations' was used in 1971 for the first time to move away from the strictly manufacturing problems and to include the service industry (Harris, 1989:3).

Everett (1995:34) makes a statement that most people will be employed in the service industry in future. He takes the position that operations management concepts, skills, and techniques are transferable across industry/services sectors. He also said, however that this view is not widely shared.

There are many definitions of operations management. Here are but a few.

“Operations management is the process of managing production in organisations” (Certo, 1992:555).

“Operations management is the collection of planning and control activities that managers use to produce goods and services” (Bovee, Dovel, Thill & Wood, 1993:638).

“Operations management may be defined as the management of the direct resources required to produce the goods and services provided by an organisation” (Chase & Aquilano, 1991:7).

“Operations management is the field of management that specialize in the physical production of goods or services and uses quantitative techniques for solving manufacturing problems”(Daft, 1995:562).

The definition chosen for the purpose of this research is the one given by Krajewski and Ritzman, which summarises the function of operations management: “Operations management is the direction and control of the processes that transform inputs into finished goods

and services. This function is essential to systems producing goods and services in both profit and non profit organizations” (Krajewski & Ritzman, 1996:3).

2.3 SIMILARITIES AND DIFFERENCES BETWEEN MANUFACTURING AND SERVICES

According to Krajewski and Ritzman (1996:5) the differences between manufacturing and services fall into eight characteristics as shown in Table 2.2

Table 2.2 Continuum of Characteristics of manufacturing and service organisations

<i>More like a manufacturing organisation</i>	<i>More like a service organization</i>
Physical durable output	Intangible, perishable output
Low customer contact	High customer contact
Long response time	Short response time
Regional, national or international markets	Local markets
Large facilities	Small facilities
Capital intensive	Labour intensive
Quality easily measured	Quality not easily measured

Chase and Aquilano (1991:98) further distinguish one service system from another in terms of its production function by it is the extent of customer contact in the creation of the service. “Customer contact refers to the physical presence of the customer in the system, and creation of service refers to the work process that is involved in providing the service itself”

"Why is it so important to know how much customer contact is required to provide a service? "Because it has an effect on every decision that operations managers must make" (Chase and Aquilano, 1991:99).

Chase and Aquilano (1991:94) also recognise this factor as significant, by stating that the task of the operations manager differs depending on the type of customer contact.

Ketcher, A.J. (1992:3) mentioned in his dissertation, " The approach of the operations function in a service environment is quite different from that in a manufacturing or production environment. In service firms, operations consist of two quite different spheres of activity".

"One sphere is the service encounter or cycle of encounters between the customer and the organization... The other sphere encompasses those activities that take place behind the scenes and constitute the 'back office' support system"... These latter activities are analogous to the production processes of the factory – working on things rather on people. The existence of these two spheres of activity and, more important, the emphasis on the customer encounter as the core output function in most service organisations, are what differentiate services from manufacturing".

He goes on to say that in the past the focus of operations management has been on the "back office support system" rather than in the front line. "It is becoming increasingly evident that

traditional production line thinking cannot help service companies" (Ketcher, 1992:4).

Jonathan Day (1990:44) sees things differently "Operations banking businesses typically require superb factory management skills. The problems that their managers confront, the people they require and the fundamental economics of these businesses are far closer to those of a machine factory than of a retail bank. The most successful competitors we interviewed measure and managed their operations businesses using industrial rather than "banking methods".

" Banks are in the service game and as such information is becoming a vital tool for frontline staff. Banks have traditionally developed powerful transaction processing infrastructures but because of this, focus has not been very successful at harnessing the power of the mainframe computers to provide meaningful management information for frontline staff. One of the reasons for this is the traditional focus of the operations function, which is efficiency and maximum throughput for minimum cost " (Ketcher, 1992:28).

2.4 TRENDS IN OPERATIONS MANAGEMENT

In recent times there has been renewed interest in the field of operations management. The first reason is that businesses focus on optimizing business practices, by eliminating waste. The second reason is that to be competitive there is no alternative but to have the best possible product or service quality (Adendorff & de Wit, 1997:3).

Krajewski and Ritzman (1996:7) identified seven trends which had the greatest impact on operations management: "the growth of the service sector; productivity changes; continuous improvement; global competitiveness; quality; time and technological changes."

2.4.1 International Employment Trends In The Service Industry

Between 1955 and 1993 the number of U.S. jobs in service-producing industries rose from 60 to 79 percent of total non-farming jobs. Goods producing and manufacturing industries account for the remaining 21 percent of jobs in the United States. Similar increases in the percentage of the work force in service jobs are taking place in other industrial countries. The share of the work force in service jobs is well above 60 percent in Britain, Canada, France, and Japan (Krajewski & Ritzman, 1996:8).

According to Henkoff the expectation is that by the year 2005 all net job creation in the USA will come from the service industries. (Adendorff & de Wit, 1997:319).

2.4.2 Employment Trends In South Africa

Figures obtained from Productivity Statistics (1995) indicated that in South Africa service industries accounted for almost 61 percent of the gross national product in South Africa in 1994 (Adendorff & de Wit, 1997:319).

Statistics released by the National Productivity Institute (NPI) (1997:13-14) for the period 1994 –1996 is represented in Table 2.3.

According to the NPI definitions the goods producing sector includes mining, agriculture, manufacturing, construction and electricity.

The service sector includes finance, commerce, transport and communications.

Table 2.3 South Africa: Standardised Employment Series for major SIC divisions 1994-1996

SECTOR	1994	1995	1996	TOTAL	%
Goods producing	3 420 700	3398 300	3346 700	10165 700	43,929
Services	4 281 700	4325 000	4368 800	12975 500	56,071
TOTAL	7 702 400	7723 300	7715 500	23141 200	100

Non - government community services, government services and domestic services are not included in the service definition but have been included in the totals above (Productivity Statistics, 1997:71).

Finance makes up 11.18% of the total service industry and government services make up 34.32% of the total service industry.

Manufacturing makes up 42.41% of the goods producing sector.

On the 18th March 1998 Mr. Jan de Jager of the NPI said that one must not forget that South Africa is still a developing country. As such, rely heavily on manufacturing to see to the needs of the people. He also said, that as people's basic needs are looked after the services sector will grow rapidly.

The manufacturing industry is following a path of decline, which is of a great concern for the South Africa. There are many reasons for this. It is not simply a case of blaming on the previous political dispensation. Like South Africa's American, British, Australian and Canadian counterparts, much of the blame must rest squarely on the shoulders of those people who have been the captains of the manufacturing industry. The heroes of the day were not the people who were pioneering new and innovative ways to manufacture products with higher quality standards and lower cost. It was those people who were able, on a year to year basis, to reduce head count and to avoid spending any capital. A breed of managers was developed whose sole purpose in life was to squeeze the last ounce out of the manufacturing stone (Marcus, 1998:16-17).

2.5 OPERATIONS MANAGEMENT AS AN OPEN SYSTEM

2.5.1 Open Systems

Most writers agree on the fact that operations management must be viewed as an open system. Wehrich and Koontz (1993:633) give an overview of operation management as an open system.

A system can be defined as a set of interdependent components that constitute a whole. An organisation as a system comprises three basic

elements: inputs, transformation and outputs. The organisation obtains inputs from its environment in the form of resources or production factors. Within the organisation these inputs are transformed by means of manufacturing and management processes into outputs, in the form of products and services (Smit & de J Cronje, 1992:25).

A system is open if –

- It is dependent on the environment in which it operates
- The environment is dependent on the system
- There is specific interaction between the system and the environment (Smit & de J Cronje, 1992:25).

The operations management systems found in all businesses have certain common characteristics irrespective of the nature of their goods or the services that they provide (Adendorff & de Wit, 1997:4).

Interaction occurs between the operations management system and the market through the service provided. The market accepts or rejects these services. The business must determine the degree of acceptance of its services and must use this information to continually improve its operations management system (Adendorff & de Wit, 1997:6).

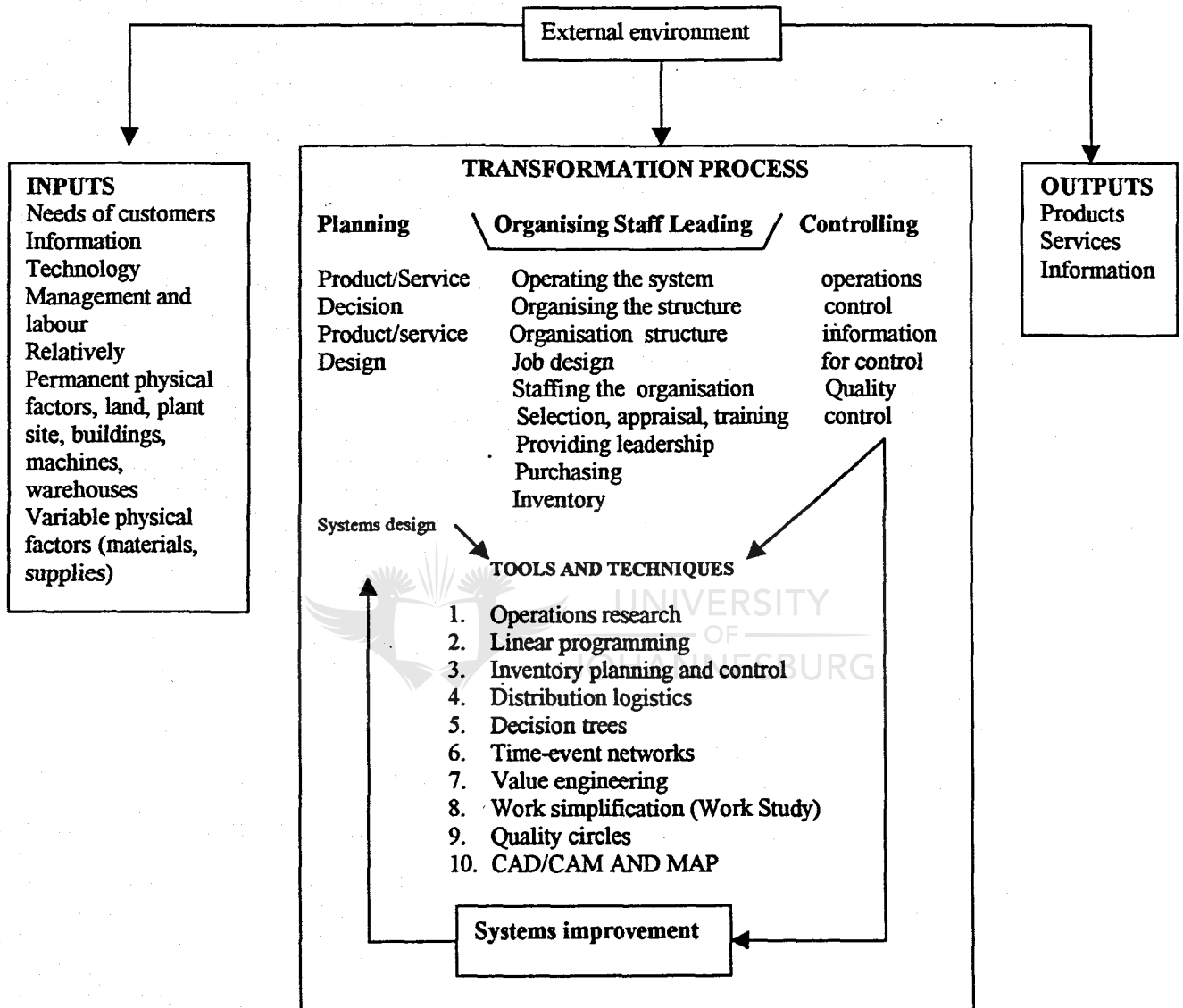
Operations management must be viewed as a system. Figure 2.2 illustrates the operations management function. The inputs include needs of customers, information, technology, management, labour, fixed assets and variable assets that are relevant to the transformation process.

Managers and workers use the information and physical factors to produce outputs. Other physical elements such as materials and supplies are consumed in the process of producing outputs. The transformation process incorporates planning, operating and controlling the system. The tools and techniques listed in Figure 2.2 are available to facilitate the transformation process. A major need to improve the system is illustrated in Figure 2.2. Outputs consist of products and services. Outputs may even be in the format of information, such as is provided by a consulting organisation. Figure 2.2 also illustrates that operations are influenced by external factors such as safety regulations or fair labour practices. Operations management is a sub - system of a total management system.



UNIVERSITY
OF
JOHANNESBURG

Figure 2.2 Operations Management as an open system.



2.6 LINE VERSUS FUNCTIONAL MANAGEMENT

2.6.1 Line Management

Ivancevich and Matteson (1997:58) have the following to say about managers: "These managers coordinate the work of others who are themselves not managers... whatever the case first line managers are responsible for the basic work of the organisation according to plans provided by their supervisors"

Line management refers to those managers who are responsible for the day-to-day supervision and control of staff. Line managers are responsible for setting day-to-day priorities and for guiding and directing staff towards the attainment of set activities, goals, objectives and strategies (Smit & Cronje, 1992:199).

2.6.2 Functional Management

Functional management refers to that management structure which is remote from the day-to-day activities but which supports line personnel through the provision of procedures, systems, work tools and guidance to enable them to accomplish their activities, goals and strategies (Betts, 1993:41).

The topic of operations management refers to the day-to-day management of the technical core. It is that field of management that specializes in the production of goods and services and uses special tools for solving manufacturing problems (Daft 1995: 562). Daft makes it very clear, though, that manufacturing includes services as well.

2.6.3 Operations Management as A Functional Area

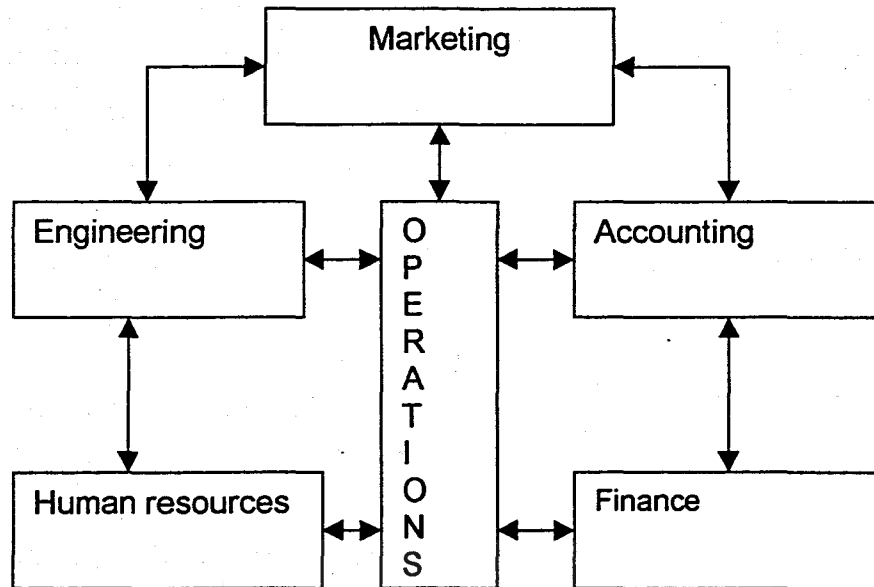
In order for an organisation to be effective and efficient, it must be well organised. To accomplish this, organisations are designed according to the demands of the current situation (Daft, 1998:232). Different functions are created to provide for the needs of the organisation.

In a functional structure, activities are grouped together by common function. All engineers are grouped together or all programmers are grouped together. Functional and divisional grouping are the two most common approaches to structural design. The matrix structure is often the answer when organisations find that neither the functional, divisional nor any other structure will work. The matrix structure optimises functional and divisional structuring (Daft, 1998:225).

The operations function deals with the choice of process by which the goods are manufactured or the service is provided. It also provides the necessary infrastructure to supply or provide the required products or services. It is important to realise that operations strategy should be aimed at establishing a competitive advantage. It should not be seen as merely implementing some form of improvement programme such as total quality management (Adendorff & de Wit, 1997:2).

Figure 2.3 Krajewski and Ritzman (1996:17) illustrates how the operations function intersects with other traditional functional areas.

Figure 2.3 Interfunctional connections with other traditional functional areas



De Wit and Hamersma (1992:2) identified four factors that relate specifically to the operations function: *Quality* (measured in terms of product performance). *Cost effectiveness* (measured in terms of low product cost). *Reliability* (measured in terms of due delivery of orders). *Flexibility* (reacting quickly to changes in output).

Harris (1989:14), who concentrates more on services, sees the factors as *cost*, *quality*, *time* and *quantity* for the operations function. They do not differ from de Wit and Hamersma as mentioned above, for both of them view reliability and time as the same concept.

Krajewski and Ritzman (1996:12) include *technological change* as another important factor in operations management. Technology affects the design of new products and services as well as the

production processes themselves. Many new opportunities arise from advances in computer technology. The internet (part of the telecommunications 'information highway') has emerged as a vital tool, linking firms internally and customers externally. Introducing new technology involves risks, and employee attitudes towards it depends on how the change is managed.

2.7. THE OBJECTIVES OF THE OPERATIONS MANAGEMENT FUNCTION

Adendorff and de Wit (1997:6) clearly outlines the objectives that the operations management function should deal with. These are:

- Product or services characteristics.
- Characteristics of the manufacturing process.
- Quality of the product or service produced.
- Efficiency, through:
 - good employee relations and control of labour cost;
 - control over raw material
 - cost of running and control over production facilities.

- Customer service through:

producing the correct quantities to meet demand and timely delivery of orders.

- Adaptability to ensure future survival

In an article obtained from Standard Bank South Africa (Operations Support Division, 1993:2) the contributions of the Operations Management function to the profitability of a region are clearly listed as: productivity, systems and procedures, security, loss management, cash centres, quality and service, budgetary control and support advice and guidance. Under support advice and guidance they see cooperation with the Human Resource function in respect of recruitment, selection, and placement, training and performance management as key points. The provision of tools and techniques, measurement of standards and the provision of functional support are clearly listed as part of the operations function. The term functional management is differentiated from line management to explain how it should be understood if a strategy of customer services and delivery is to be followed.

2.8 THE STRATEGIC ROLE OF OPERATIONS MANAGEMENT

To understand the tasks and responsibilities of the operations manager it is important to look at the role of strategic planning.

Strategic planning is "the process that involves the review of market conditions; customer needs; competitive strengths and weaknesses...

legal and economic conditions; technological developments; and the availability of resources that lead to the specific opportunities or threats facing the organisation” (Ivancevich & Matteson, 1996:64).

A business strategy is formulated and implemented which will determine the nature of the goods or services produced or provided by the organization. The operations strategy is derived from the business strategy (Adendorff & de Wit, 1997:2). Operations strategy is defined as a vision for the operations function, which determines the general direction for decision- making. The results of an effective operation strategy introduces two factors, how the tasks of the operations management are identified and organised, and how the business competitive base is determined (Heiser & Render, 1992:34).

“More and more companies are recognising the importance of service quality as a strategic through which a competitive advantage can be gained” (Ketcher, 1992:13).

Basic strategic decisions are based on market and competitive opportunities, and should be a guide in establishing operations policy. (Adam & Everett, 1992:30).

2.9 SKILLS, TASKS, RESPONSIBILITIES AND TECHNIQUES OF AN OPERATIONS MANAGER

2.9.1 Skills

Ivancevich and Matteson (1997:58)state that “Regardless of the level of management, managers must possess and seek to further develop

their skills. A skill is an ability or proficiency in performing a particular task. Skills are learned and developed”

Ivancevich and Matteson (1997:59) identified seven types of skills that a manager must possess to perform as a manager.

- Technical skills
- Analytical skills
- Decision-making skills
- Computer skills
- Human relation skills
- Communication skills
- Conceptual skills

Dilworth (1992:15) names two major categories of management skills that an operations manager must possess to accomplish the objectives of an operations manager. He does not sub - divide it as well as Ivancevich and Matteson but all the components are there.

a. Technical competence. Managers make decisions about the tasks that other people are to perform. They need a basic understanding of the technology with which the production system works, and they need adequate knowledge of the work they are to manage. Technical competence can be obtained through training and experience or through the use of staff specialists and consultants.

b. Behavioral competence. Group activities exist because people find that they can achieve more, both in work accomplished and in rewards

achieved, by working as a group rather than by working as individuals. Humans generally are gregarious animals and fulfill some of their needs through social interaction. Management must therefore consider the social as well as the physical aspects of work and workers. Since managers work through others, their work necessarily involves a great deal of interpersonal contact. A good manager should have behavioural competence – the ability to work through other people.

A workshop held by the Standard Bank of South Africa (28/03/96) underlines the importance of the above statement, “The function exists within an environment of matrix management, and success depends on the incumbent’s ability to foster team work in a spirit of partnership with all parties”

2.9.2 Tasks

The familiar management functions: planning, organising, controlling and leadership are taken to view the tasks of the Operations Manager (Adendorff & de Wit, 1997:6).

Adam and Ebert (1992:25-28) explains the different tasks that an Operations Manager must perform under the standard management functions. These viewpoints are supported by Adendorff and De Wit (1997:6).

- Planning - The operations manager selects the objectives for the operations subsystem of the organization and the policies, programmes, and procedures for achieving the objectives. This stage includes efforts directed toward product planning, facilities design, and the use of the conversion process.

- **Organising** - The operations manager establishes an intentional structure of roles within the operations sub-system. He or she determines and enumerates the activities required to achieve the operations sub-system's goals and assigns authority and responsibility for carrying them out.
- **Controlling** - To ensure that the plans for the operations sub-system are accomplished, the operations manager must also exercise control. Outputs must be measured to see if they conform to what has been planned. If they do, adjustments aren't needed. If the information feedback indicates substantial differences between planned and actual outputs, then inputs or parts of the conversion process must be adjusted.

Adam and Ebert (1992: 27-28) conducted interviews with operations managers. They have tried to identify in which of the standard management functions operations managers experience most of their problems. The findings of that researched are presented in Table 2.4.

Table 2.4 Standard management functions where Operations Managers experience most problems

PHASE	MAJOR PROBLEM
Planning	Production planning Production scheduling Forecasting Budgeting
Organising	Labour/industrial relations Process design Job design
Controlling	Cost Production Quality Inventory

For further clarity, definitions for the traditional management functions are given:

- Planning includes all those activities that result in developing a course of action. These activities guide future decision-making
- Organising involves all the activities that result in some structure of task and authority
- Commanding is concerned with directing the activities of subordinates
- Coordinating includes those activities that bind all individual efforts and direct them toward a common objective.

- Controlling activities are those that assure that the actual performance in the organisation take place in accordance with planned performance”(Adam & Everett, 1992:8)

According to Cronje, et al (1994:278) the tasks of the operations manager can be divided into long, medium- and short-term tasks. The long-term tasks are also known as the forward planning phase. The medium-term tasks are also known as the tasks of the action-planning phase. The short-term tasks are also referred to as control actions. As the emphasis shifts from long term towards short-term tasks the involvement of the operation manager increases.

Dilworth (1992:18) classifies the decisions and activities of an operation manager in detail using the management functions as a starting point. These decisions and activities are listed in Table 2.5

Table 2.5 Decisions and Activities of Managers in Operations (Grouped according to familiar management functions)

<p>Planning</p> <p>Establish the mix of goods and services to be provided Plan the locations of facilities Plan the capacities of plants and work centres Decide what production methods to use for each item Plan acquisitions of equipment Arrange facilities and equipment Decide on the number of shifts and work hours Set the master schedule of what products to make when Establish improvement projects or other projects Organise changes in new processes or procedures</p> <p>Organising</p> <p>Centralise or decentralise operations Organise by functions, products, or hybrid arrangement Establish work centre assignments Assign responsibility for every activity Arrange supplier and subcontractor networks</p>
--

Table 2.5 (Continued...)

Establish maintenance policies

Controlling

Encourage pride in performing as expected

Compare costs to budgets

Compare actual labour hours to standards

Inspect quality levels

Compare work progress to schedule

Compare inventory level to targets

Directing

Establish provisions of union contracts

Establish personnel policies

Establish employment contracts

Issue job assignments and instructions

Issue routings and move tickets

Issue dispatch lists

Motivating

Challenge through leadership examples, specific objectives, and expectations

Encourage through praise, recognition, and other intangibles

Motivate through tangible reward system

Motivate through enriched jobs and challenging assignments

Coordinating

Coordinate through use of common forecasts and master schedules

Coordinate through common, standardised databases

Observe actual performance and recommend needed performance

Report, inform, and communicate

Coordinate purchases, deliveries, design changes, maintenance activities, tooling

Respond to customer inquiries about status of orders

Training and Developing Personnel

Show a better way

Encourage employees to seek a better way

Give more advanced job assignments

Support employees in training programs

All the decisions and activities as listed in table 2.5 were used in the construction of the questionnaire that was sent out to industry.

A workshop held by Standard Bank of South Africa (28/03/1996) highlighted the following tasks of an operations manager: To foster team work, to provide a secure, cost effective and responsive service delivery infrastructure, to watch over productivity, to ensure that the right people are employed in the right jobs, to check compliance with procedures, to influence sustainable long term profit growth and to enable line focus on service.

2.9.3 Responsibilities

Adam and Ebert (1992:7) define responsibility as "the duty to command"

Jensen recognised that operations managers in bank branches had the talent and energy to turn their operations successfully around but that their sense of power was missing (Ivancevich & Matteson, 1996:389).

Chase and Aquilano (1991:11) allocates the responsibility to ensure good operating procedures for tellers, que clearing procedures, collections and transaction in branches to operations managers.

"Operations is a staff function which has a pivotal role to play in ensuring that line management is empowered to accept the new order and is equipped and supported in every way to execute its role completely" (SBSA, 1996: 1).

2.9.4 Techniques

It seems that operations management relies heavily on the creation and utilisation of optimising techniques. Optimising techniques is any

model, method, technique and or piece of equipment which can assist the operations manager with the decision making process (Churr & Gouws, 1980:27).

Referring to the definitions of operations management (2:30) one will notice that most of the definitions take note of the utilisation of techniques that exists to aid the operation manager in his or her task. It has also already been discussed that some authors do not believe that both services and manufacturing operations managers can use the same techniques.

Referring to Figure 2.2 Operations management as an open system, a list of techniques is provided that the operations manager can use. Churr and Gouws (1980: 27-30) provide a list of techniques that are shown in Table 2.6. In paragraph 2.9.5, a description is provided for most of the techniques. These techniques, as found in the literature, were incorporated into the questionnaires that were sent out to industry.

Harris (1989:62) maintains that many management techniques have been badly applied over the years. This has caused many people to blame the techniques themselves rather than the manner of their application. Harris did not mention any technique specifically but referred to the techniques in general.

Adam and Ebert (1992:34) state that "Modern management needs to transfer manufacturing concept, techniques, and skills to the service sector. With an understanding of operations management, managers

of service operations might well be able to bring about needed improvements in quality, effectiveness and efficiency in their organisations”

Table 2.6 Techniques used by Operations Managers – (Churr &Gouws 1980)

Number	Description
1	Work Study
2	Break – even analysis
3	Networks (PERT and CPM)
4	Decision trees
5	Queuing theory
6	Linear programming
7	Forecasting
8	Regression analysis
9	Quantitative methods
10	Simulation
11	Inventory control
12	Statistical Process Control
13	Job design
14	Performance appraisal systems
15	Incentive schemes
16	Make or buy
17	Productivity indexes
18	Budgeting
19	Financial analysis and control

Harris is the only author who, with practical examples indicates which of the techniques can successfully be used in services. " All these techniques are popularly known as "Management Services techniques" (Harris, 1989:62).

2.9.5 Description of techniques used

A short description of the various techniques and what they aim to teach follows:

- a. **Forecasting:** Decisions as to what will happen in the future need to be made by managers. Investments in new products are made without really knowing what the profits will be. Managers trying to reduce the uncertainty and make better estimates as to what will happen in the future.
- b. **Decision theory.** Success or failure in life depends on the decisions that one makes. One decision may make the difference between a successful career and an unsuccessful one. Decision theory is an analytical and systematic approach to studying decision making. Mathematical models are useful in helping managers to make the best possible decision. A good decision is based on logic. It considers all available data and possible alternatives, and applies quantitative data.
- c. **Statistical Quality Control.** For almost every product or service there is more than one organisation trying to make a sale. Price is an important factor, but quality is often the major

factor. Poor quality can be very expensive. One of the major roles of an organisation is to ensure that the organisation provides quality products at the right place, at the right time, and at the right price. The major dimensions of quality and the evolution of quality as a major management issue need to be understood. The most important statistical methodology for quality management is statistical process control. Operations managers must ensure that statistical tools are used and processes that result in products or services are controlled.

- d. Inventory control as a technique covers aspects related to inventory. Inventory is any stored resource that is used to satisfy a current or a future need. All organisations have some type of inventory planning. A bank has methods to control its inventory of cash. A planning and control system is therefore required. Studying how organisations control their inventories is equivalent to studying how they achieve their objectives by supplying goods and services to their customers.
- e. Linear Programming. Many management decisions are geared towards making the best use of an organisation's resources. Linear programming is a widely used mathematical technique designed to help managers in planning and decision making relative to resource allocation. Computers are normally used to solve real life problems.
- f. Transportation models. The distribution of goods from one point to a number of other points. Transportation models can

be used when a firm is trying to locate a new facility, branch, or warehouse.

- g. **Assignment models.** This refers to the most efficient assignment of people to projects, salespeople/to customers, contracts to bidders and so on. The objectives of assignment models are to minimise costs or total time taken to perform the task at hand.
- h. **Project management.** Most projects that organisations undertake are large and complex. If it is a difficult problem, the risk of failure is high. Project Management makes use of two techniques: PERT (Programme Evaluation and Review Technique) and CPM (Critical Path Method) to help managers plan, schedule, monitor and control large and complex problems.
- i. **Capacity Planning.** An operations manager needs to know the amount of work the unit can cope with. In manufacturing, it is easier to see the link between output and resources. In the service sector, many services are customer driven and there is a tendency for more frequent peaks. In some clerical work the increase and decrease in demand is less obviously noticed. There is also a cost element involved. Where work is being done in any capacity there is a need for the operations manager to have a clear idea of the time scale of operations so that suitable strategies can be adopted to cope with demand change. This brings up the work content of a product that has

to be measured of a product to assist the manager in the planning process.

- j. **Work Study.** This technique consists of two sections. Method Study and Work measurement with the aim of improving productivity, eliminating ineffective time and controlling cost.

Method study records both the physical and the information systems. Charts and diagrams are used to illustrate the present system or proposed system. The most important part of any problem solving or decision-making activity is that of identifying what choices of action are available. Critical examination is applied to present and/ or proposed systems. Method study is a systematic approach. It takes into consideration all resources. It provides a systematic way of developing better methods.

Work measurement provides management with a means of measuring the time taken to perform task. The correct work measurement technique must be used. Method Study and Work Measurement are the major techniques in which a Management Services Practitioner specialises in. Method study could be taught to all employees but Work Measurement should only be conducted by a professional Management Services Practitioner.

- k. **Layout and handling.** Layouts have great potential in enhancing productivity within service facilities. Operations

managers need to know the principles that apply in developing an optimum layout within their current or new facilities.

- l. Simulation. To simulate reality in practical situations. Through role play a suitable solution is found.
- m. Job design. To design a job to suit the individual so that the job synchronises with other jobs in the organisation.

2.10 CONCLUSION

This literature survey in operations management, which examines earlier historical development of operations research, reveals that the focus is almost entirely on current issues. Research articles take an even more narrow view. Operations management is a modern profession but it is hampered by a horizon limited by World War II. The limited focus on postwar developments and current issues gives no insight into the prewar foundations and longer-term forces that have shaped them.

Few books and articles cover operations management in detail; others provided only a page or two. Two publications were found which cover South African issues. One does not even include a chapter on the origin of operations management. From this the assertion that the profession is ignorant of its beginnings is undeniable.

Most books and articles on operations management mentioned its history, and this reveals a wide interest in the subject. However, the negligible content on operations management in a high proportion of these textbooks shows that the authors do not know enough about or do not have much to say about the history of operations management. The examples used were superficial and repetitious. Adam Smith appears repeatedly but with little discussion of his work or its impact. Others like Eli Whitney and Frederick Taylor are also only superficially covered. In these publications, the reader receives only a bare description of facts without any information on how and why these developments are influential. If more were known about the history of operations management these same, superficial examples would not keep reappearing.

Research ignores the prewar past. Articles only frequently and then casually assert that production has always needed to be managed. Dilworth is one of the few authors who devoted a large part of his two works to the history and development of operations management. In his own words, he was trying to keep in mind the several major forces that are helping to reshape the field of operations management. Harris published a book in 1989 covering only services, but gives no reference to the development of operations management.

Prentis and Everette see the origins of operations management dating back to the pyramids but moves swiftly through the 1700 and 1800's in one sentence. Smith and Taylor are mentioned briefly and Monks describe operations management as the foundation for all management disciplines.

Wilson (1995: 62) has the following to say about this: "These beliefs are unsubstantiated: they provide no evidence of historical study, nor do they show systematic thinking about the development of operations management. They do not identify precursors of operations management ideas, thinkers, activities, or systems. Operations management may have always existed, but this is no basis for believing that any theory or consistent practice was identified."

Production systems and thinking did not just happen; they took generations to develop. These developments deserve more discussion and analysis than they have received from the profession.

(Wilson, 1995:63) believes that even operations researchers should examine the origins of their discipline in work undertaken in World War II and that it is an anomaly that operations management professionals have not more actively investigated their own discipline's origins and development.

The fundamental point is that historical developments need specialised analysis to appreciate their significance for the profession. There is no evidence that this is being done, or that historical information is widely known in the profession: ignorance prevails

The role of the operations manager is spelled out in manufacturing where it is seen as a function, mainly the production function. If one looks at the definitions of line versus functional management and reexamined the definitions one would notice that the service industry

see operations management more as a service function than a line function.

Figure 2.2 explained operations management as an open system. In the transformation process three of the traditional management functions, namely Planning, Organising and Controlling were listed as well as the tools and techniques available to assist the operations manager in the transformation process. Operations management as a functional unit was discussed. The objectives of an operations management function and the strategic role it should fulfill were supported by various authors.

There seems to be consensus between various authors regarding the skills, tasks, and responsibilities of the operations manager. Table 2.5 which summarises the decisions and activities of an operations manager as found in the literature has been used in the construction of the questionnaires that were sent out to industry.

As far as the techniques are concerned, all the authors have one thing in common; a statement that says, "the techniques of manufacturing can be applied to the service industry as well". Which of the techniques are applied and how they are applied in services are addressed in only one of the many books available on the topic. A short description of each one of the techniques was given in the chapter. In constructing the questionnaire, all techniques found in the literature were listed and respondents were asked to tick the ones they are currently using.

CHAPTER THREE

COLLECTION AND ANALYSIS OF DATA

3.1 RESEARCH PARTICIPANTS

For the purpose of the research, two populations were surveyed. The first population was defined as persons with the designation "Operations Manager" at three major banking groups. Amalgamated Banks of South Africa (the North West Province), Standard Bank of South Africa and First National Bank. The second consists of the total academic population in the field of Production Management at South African Technikons.

The second population, namely the academic staff at South Africa technikons who offer the course in Production Management, were contacted and questionnaires were forwarded to them.

3.2 THE SURVEY AND DATA COLLECTION

As a descriptive technique, a survey was used. The survey describes the given state of affairs with the use of interviews and questionnaires.

Operations Managers at the various banks accepted the questionnaires and distributed them to the relevant employees to fill out.

As far as the various techniques are concerned, a personal visit, where possible, was made to technicians offering the programme. The questionnaires were handed personally to the heads of departments. The questionnaires were completed by all academic staff who are involved in the training of production management students.

3.3 RESEARCH METHODOLOGY

The research was conducted in two phases. The literature study carried out in Chapter two covers the origin and development of operations management as a discipline. Chapter two also explains the nature of operations management, the strategic role of the operations function, the skills, tasks and responsibilities of the operations manager as revealed in the literature.

A survey was conducted. From the information gathered in the literature study a questionnaire was developed. The questionnaires were sent out to the selected individuals. The analysis of the questionnaires and the interpretation of the answers are covered in this chapter. Telephonic interviews were conducted if certain answers were unclear.

3.4 SAMPLE

Use was made of haphazard sampling for the banking industry. Haphazard sampling is a non-probability sampling technique whereby the sample of participants selected was based on convenience.

As far as the technikons are concerned they were selected using the same haphazard sampling technique. Only technikons who were visited and whose personnel were willing to complete the questionnaires were used.

The following technikons are thus included in the study:

- Technikon SA
- Natal
- Pretoria
- ML Sultan
- Witwatersrand

Technikon Vaal Triangle is not included in the study, due to their lack of experience and knowledge in the field of production management at the time of the research. Technikons Port Elizabeth and Peninsula were not approached to participate in the study, due to a lack of communication between the researcher and the two technikons.

3.5 INSTRUCTIONS TO PARTICIPANTS

A cover letter was drawn up with specific instructions to all research participants. (Annexure A). This cover letter explained the purpose of the study and the task expected from them.

3.6 INSTITUTIONAL APPROVAL

The three major bank groups were approached, the questionnaire (Annexure B) was discussed and approval was given for the questionnaires to be distributed.

The same approach was followed with the relevant faculties at the various technikons.

3.7 DATA ANALYSIS

3.7.1 Number of questionnaires returned

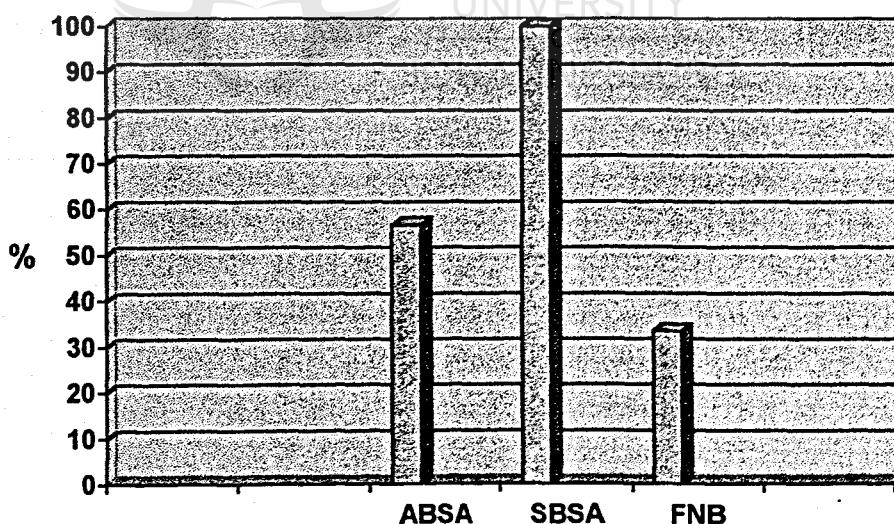
Sixty-two questionnaires were sent out to the various banks. First National Bank returned five completed questionnaires. ABSA (NWP) returned twenty-one and the Standard bank of South Africa returned ten. Hence 58% of the total questionnaires send out to the banking industry were received back. A summary of the results can be seen in Table 3.1.

Table 3.1. Summary of questionnaires returned - banking industry

BANK	Number of questionnaires sent out	Number of questionnaires returned completed	% questionnaires returned
ABSA	37	21	56.57
SBSA	10	10	100
FNB	15	5	33.33
TOTAL	62	36	58

Figure 3.1 shows the results using the actual number of questionnaires sent out. The 100% return figure from SBSA can be misleading because the questionnaires were given to the regions operations managers and not to the operations managers in branches as is the case with ABSA (NWP). FNB gave their questionnaires to various employees bearing the title operations manager. No specific control were exercise in house to ensure the return of the questionnaires. Many questionnaires were misplaced.

Figure 3.1 Comparison between banks - percentage questionnaires returned



3.7.2. Questionnaires returned by the technikon academic population

As table 3.2 illustrates a total of eleven questionnaires were sent out to the selected technikons. All eleven questionnaires were returned

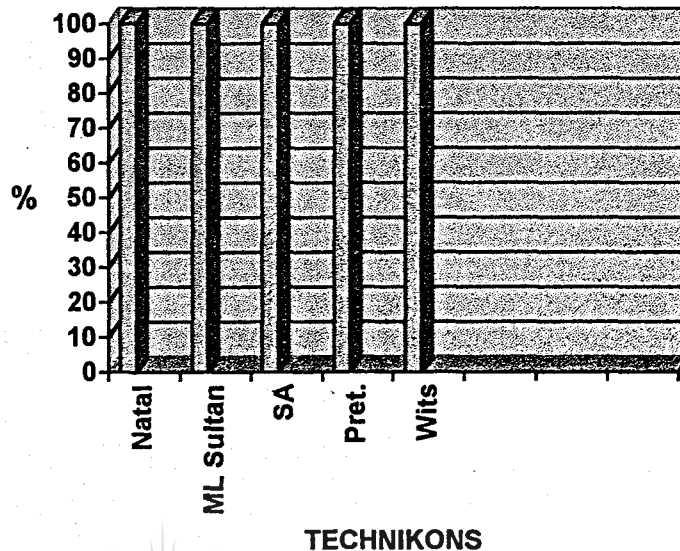
completed. Three technikons were not included in the study but as has been discussed the technikons were haphazardly selected based on convenience.

Figure 3.2 illustrates the return of the questionnaires. The academic population is small and the fact that the questionnaires were given to them and personal contact was established ensured this good response.

Table 3.2. Summary of questionnaires - academic staff of technikons

Technikon	Number of questionnaires send out	Number of questionnaires received back	% of questionnaires returned
Natal	1	1	100
ML Sultan	4	4	100
Pretoria	3	3	100
Southern Africa	2	2	100
Wits	1	1	100
TOTAL	11	11	100

**Figure 3.2. Percentage questionnaires returned -
technikons**



3.7.3 Questionnaire Construction (ANNEXURE B)

When constructing the questionnaire it was important to keep the research question in mind namely:

Does the current B-Tech (this would include the National Diploma) in Production Management meet the needs of students who are preparing to enter the service industry as Operations Managers?

The questionnaire was constructed by using closed questions that required respondents to choose from either a limited number of predetermined responses or just one response.

The questions were at all times kept single barreled. Respondents, for example, could not choose a value between three and four. Ambiguous questions were identified and eliminated before the questionnaires were distributed.

The questionnaire is divided into six sections.

- A: BACKGROUND INFORMATION
- B: CURRENT PROFILE OF THE OPERATIONS MANAGER
- C: DECISIONS AND ACTIVITIES OF THE OPERATIONS MANAGER
- D: TECHNIQUES USED IN OPERATIONS MANAGEMENT
- E: CHARACTERISTICS OF AN OPERATIONS MANAGER
- F: FURTHER CONTACT

Section A covered background information regarding the company, the type of service provided and the number of branches or sales outlets.

Section B covered questions on the current profile of the operations manager. Specific questions regarding age, sex, qualifications and years of involvement in the field of operations management were asked.

Section C of the questionnaire dealt with decisions and activities of an operations manager. The construction of section C relied on what the

theory and the current curriculum suggest an operation manager is or should be concerned with. The questions in section C were grouped according to familiar management functions (Chapter 2, Table 2.5.). The respondents were asked to tick the activities most appropriate to their current situation. Provision was made for the respondent to list any other techniques or skills not covered.

Section D covered the techniques with which an operations manager should be equipped to carry out his or her tasks as suggested by the literature. These techniques were discussed and explained in Chapter 2. The respondents were asked to select the ones most appropriate to their current situation.

Section E covered questions applicable to the characteristics of an operations manager. Weights between one to five were allocated to each statement. The weights were anchored at the ends. The characteristics found in Dilworth and some were added on ad hoc basis.

Section F thanked respondents for their participation and asked if the researcher might make further contact with them, if necessary.

3.8 ANALYSIS OF QUESTIONNAIRES - BANKING INDUSTRY

Percentages computed are based on the questionnaires returned and not on the total number of questionnaires sent out.

The banking industry's response is first analysed and discussed. Thereafter the various technicians views are analysed and discussed. A

comparison will then be made between the response from the banking industry and the response from the technikon's academic staff.

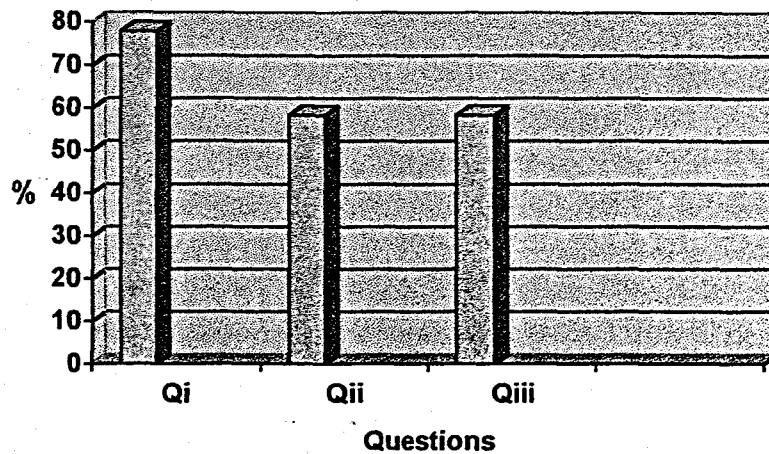
Analysis of the questionnaires is presented in the same order as the questions in the questionnaires. The aim with each section is explained and analysis of each question is then presented.

3.8.1 Section A - Background information - banking industry.

Part A covered background information regarding the company, whether it is a subsidiary of another company or not, specific services provided by the branch and the number of branches currently operated in South Africa.

The overall aim of this section is to determine in which type of environment the operations managers in the banking industry are employed. The percentage of respondents who answered Section A, question i-iii are shown in Figure 3.3.

Figure 3.3. Percentage of respondents answering Section A Qi-iii



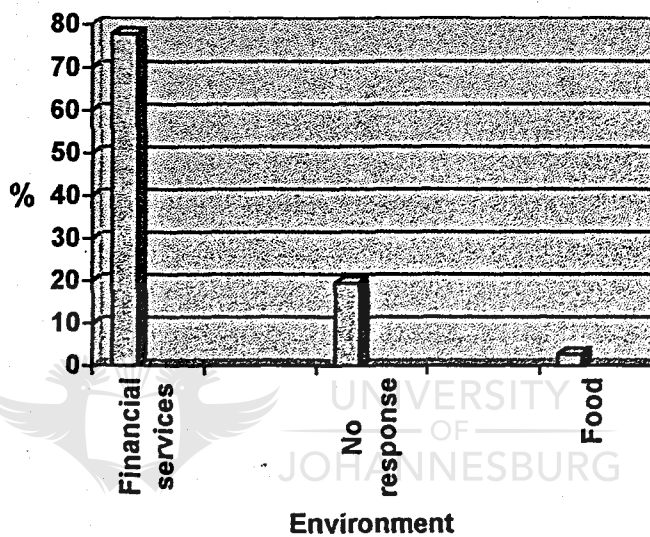
3.8.1.1 Analysis of questions - Section A.

Q i) What are the main products/services covered by your organisation/ business activities?

Figure 3.4 shows the classification of services provided as reported by the respondents. A total of 77.77% responded that the major product, and services of their branches was concerned with finance, services, general banking, administration, maintenance and client services. The provision of meals to management was reported by 2.77% as their main activity.

Question Ai was not answered by 19.46% of the respondents. After a few telephonic interviews it became clear that the respondents thought it was not necessary to be specific, seeing that the questionnaires were

Figure 3.4. Type of environment operations managers are employed in

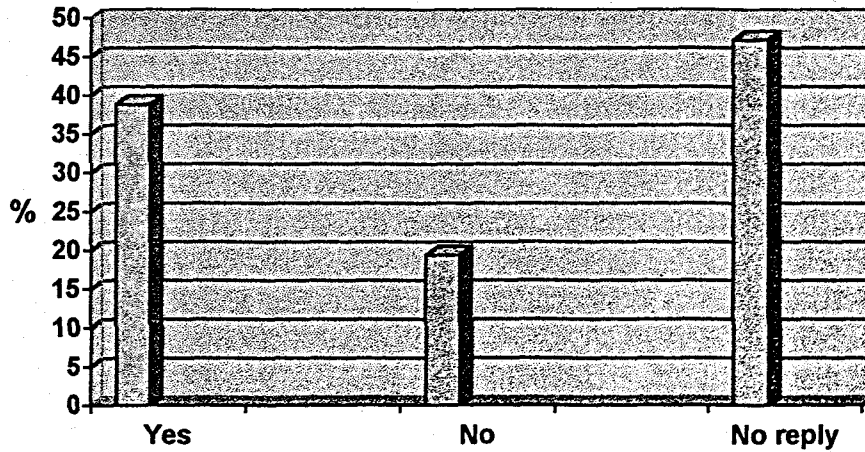


sent to the banking industry.

Q ii) Is your organisation a subsidiary of another organisation?

The aim of this question is to determine whether operation managers are employed in a subsidiary organisation or at a major organisation. As illustrated in Figure 3.5 when asked if their organisation is a subsidiary of another organisation 38.88% of the respondents reported yes. Of the respondents 19.44% reported no and 47.22% did not respond.

Figure 3.5. Response to Section A Qii



The difference in the “yes and no” resulted from the fact that employees in the ABSA group who worked for other group banks before amalgamation still do not see themselves as part of ABSA, but rather they still see ABSA as their parent company. This fact became clear when the questionnaires were further analysed.

Q iii) How many sales outlets/ branches does your company currently operate in South Africa?

The aim of this question was to determine the number of operations managers employed per number of sales outlets or branches. The difference in answers provided made it impossible to determine this. Table 3.3 shows the difference in the number of branches reported by

the respondents. Averages were calculated, the range indicated and the standard deviation per group was also calculated.

Table 3.3. Difference in number of branches reported.

INSTITUTION	X	RANGE	SAMPLE STANDARD DEVIATION
First National Bank	567,4	10-1600	647,324
Amalgamated Banks of South Africa	817,43	600-30 000	6369,07
Standard Bank of South Africa	269,75	25 – 900	310,131

At first glance, it seems that the respondents did not know how many branches their organisation currently operates in South Africa and that they made guesses. After telephonic interviews to clear the deviation from the mean, it was confirmed that some operations managers interpreted this question to relate to their specific region and some to the total. This is true for all three banks. From this it can be concluded that the question was too open and should have been more specific in order to guide the respondents towards what the researcher was looking for.

3.8.2 Section B - Current Profile of an Operations Manager – Banking Industry

These data was collected to shed some light on the current profile of the operations manager. Aspects such as sex, age, years of experience in the field of operations management and qualifications obtained, if any. The statistics are based on the number of questionnaires returned.

According to the information shown in Figure 3.6 there seems to be equal employment opportunity for males and females as operations managers in the banking industry.

Figure 3.6. Percentage of males versus females employed -
all banks

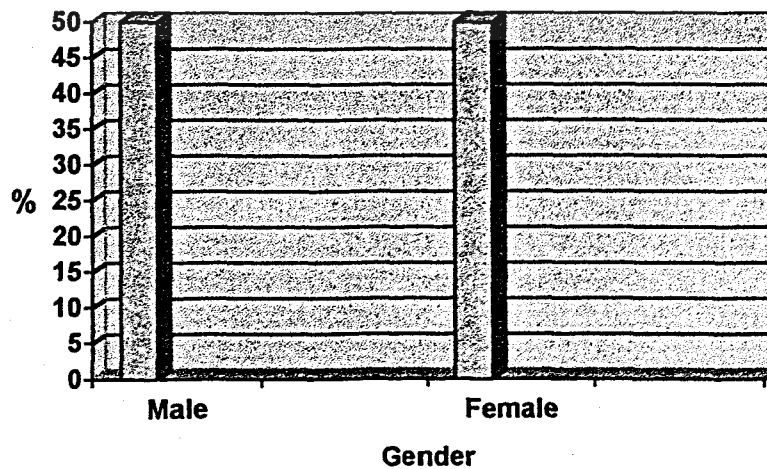
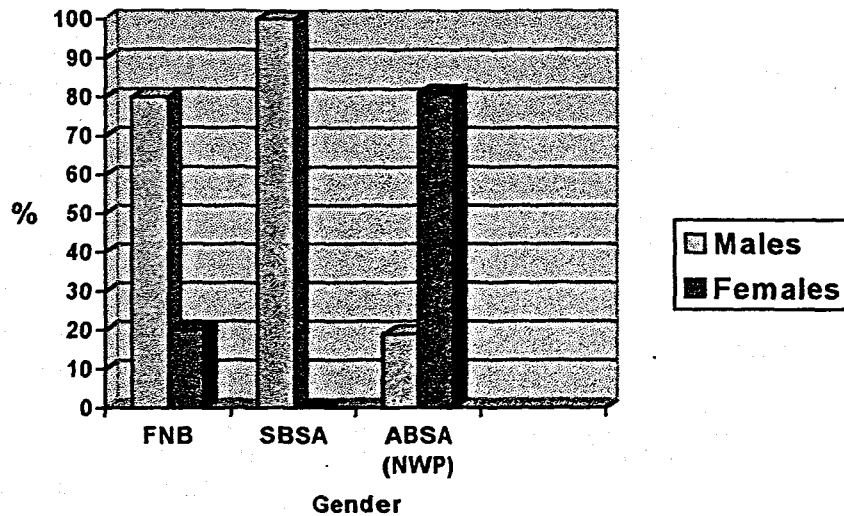


Figure 3.7. Gender employed per banking group



Analysis of Figure 3.7 indicates that 80% of FNB operations managers are males and 20% are females. SBSA has only appointed males in the position of operations manager. ABSA has 80.95% females appointed in the position of operations manager; and 19.05% of operations managers are held by males.

Figure 3.8. Age distribution of the operations manager - all banks

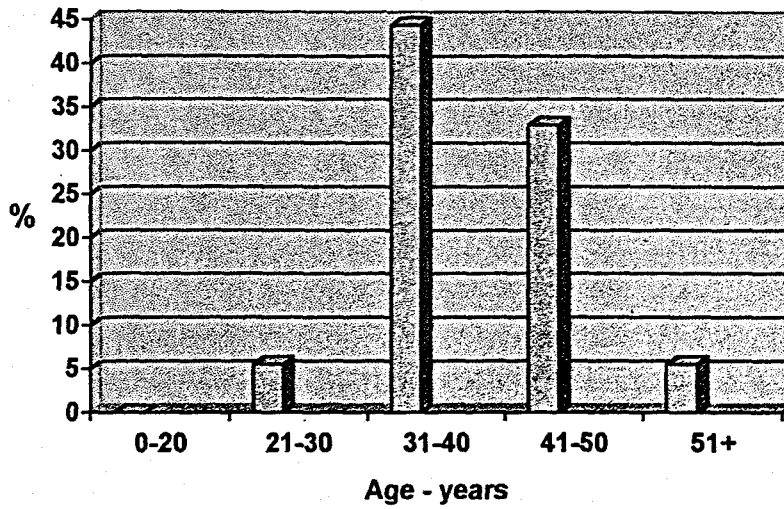


Figure 3.8. shows that of the respondents 5.55% are between the age of 21 to 30 years, 44.445 are between 31 and 40 years of age and 33% is between 41 and 50 years of age. Only 5.55% is older than 51 years.

Figure 3.9. shows the average age of female operations manager at FNB. It is shown that 20% of the respondents from FNB are females and falls within the age group 31-40 years.

Figure 3.9. Average age - females - FNB

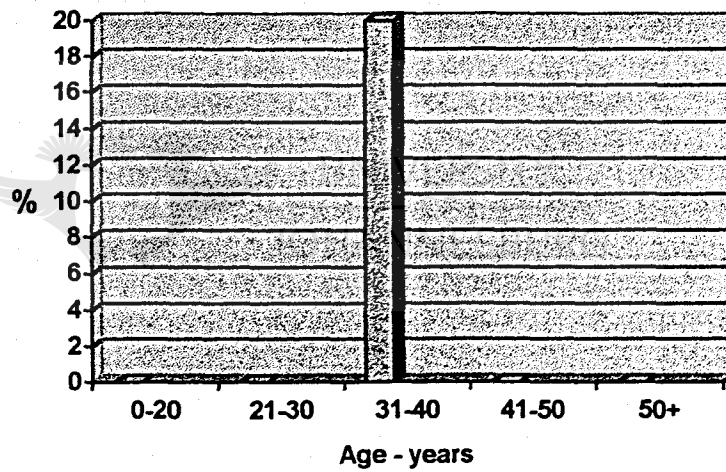
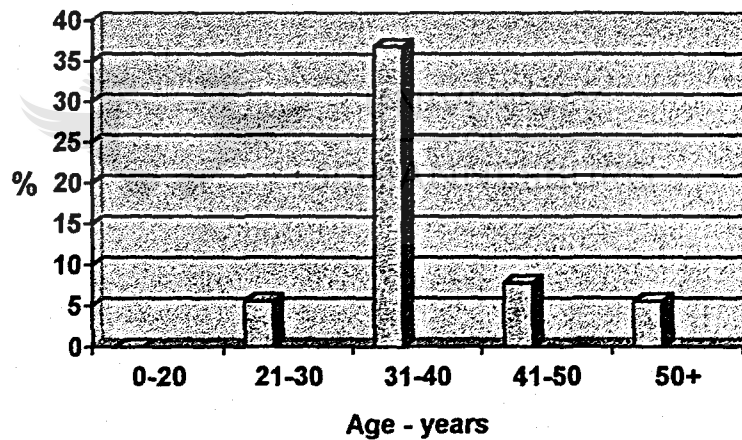


Figure 3.10 shows that there is a normal distribution skewed to the right amongst females in the ABSA (NWP) region. Statistics show that 36.84% of females employed fall within the age group 31-40 years and that 27.77% fall within the age group 41-50 years. It has been calculated that 5.55% of females are between 21-30 years and that 5.55% are older than 50 years. Three female respondents from the ABSA (NWP) group did not reveal their age and were excluded from the graph.

Figure 3.10. Average age - females- ABSA (NWP)



Figures 3.11- 3.13 show the age distribution of males in the various banks. SBSA, who only have males appointed in this position have younger males employed compared to FNB and ABSA (NWP).

Figure 3.11. Average age - males - SBSA

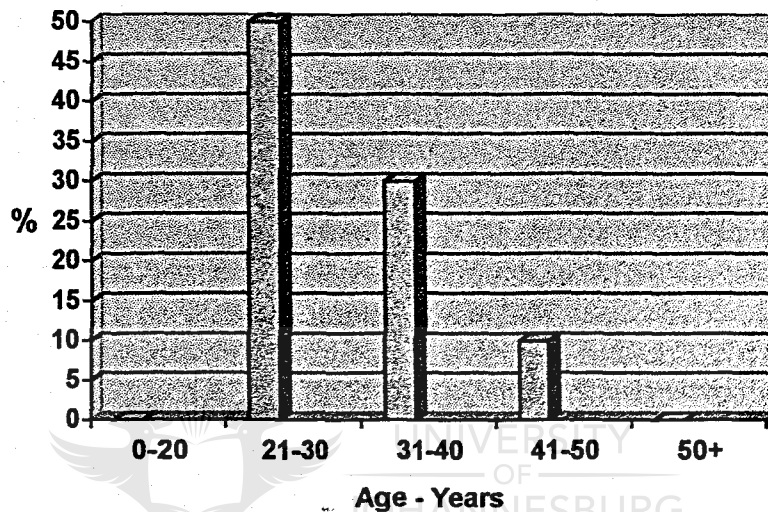


Figure 3.11 shows that 50% of the operations managers employed at SBSA are in the age group 21-30 years, 30% are between 31-40 years and 10% between 41-50 years of age. Only 10% of the respondents did not respond to this question.

If one compares Figure 3.11 with figure 3.12 and 3.13 it can be seen that the average age of the operations managers in FNB and ABSA is 31 years and older for the other two groups. The other two groups sent their questionnaires mainly to branch managers whereas SBSA send

theirs to regional managers. Results might have differ if branch managers from SBSA have been included in the study.

Figure 3.12. Average age - males - FNB

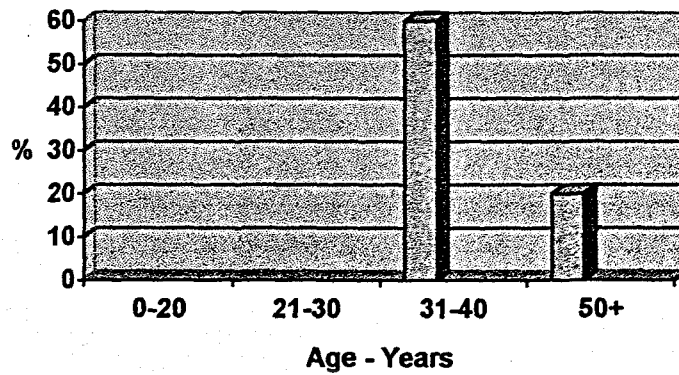
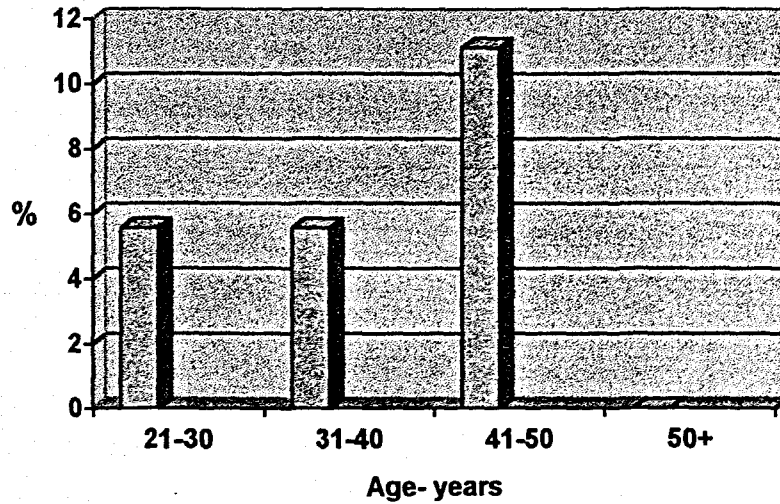


Figure 3.13. Average age - males - ABSA



For the purpose of this research, it was important to determine how many operations managers were appointed or promoted to the position of an operations manager. It was also important to determine the number of year's experience they have.

As figure 3.14 shows 47.22% of the operations managers, have experience of five years and less in the field of operations management.

Figure 3.14. Years of experience in the field of operations management - all banks

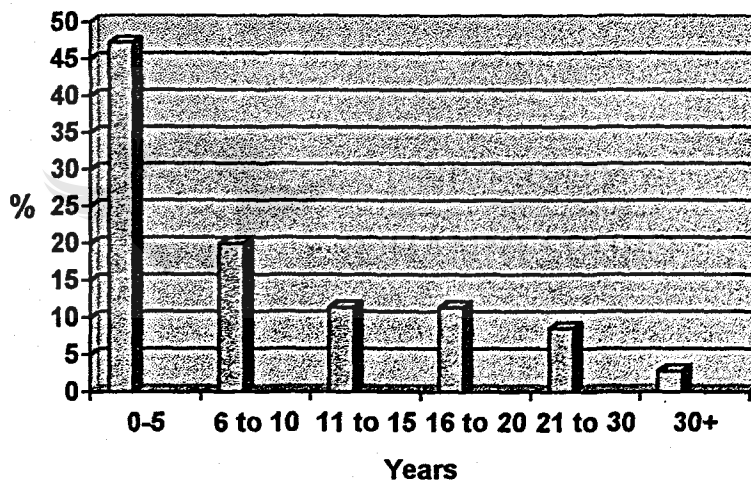


Figure 3.14 also shows that 20% of the operations managers have between six and ten year's experience in the field of operations management. Hence, 67.22% of the operations managers therefore have less than ten years experience.

Figure 3.15 shows that 40% of FNB operations managers have more than five years experience and 40% have more than eleven years experience. Only 20% of FNB respondents have more than sixteen years of experience but less than twenty years experience.

Figure 3.15 FNB: Years of experience in the field of operations management

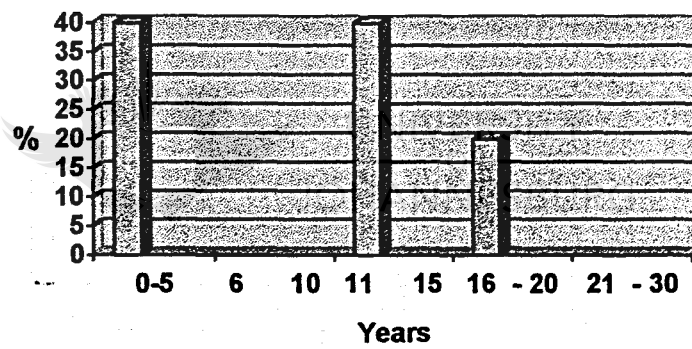


Figure 3.16 illustrates the years of experience at ABSA bank. Of the respondents from ABSA 70% of the operations managers have less than five years experience. The rest of the respondents have more than 5 years but less than 30 years experience in the field of operations management.

Figure 3.16 ABSA (NWP): Years of experience in the field of operations management

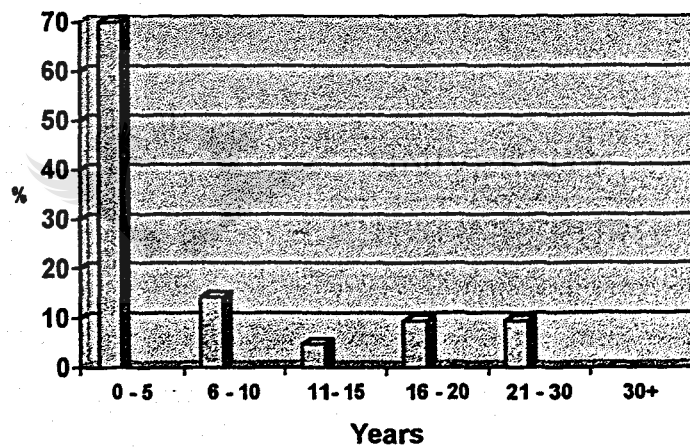
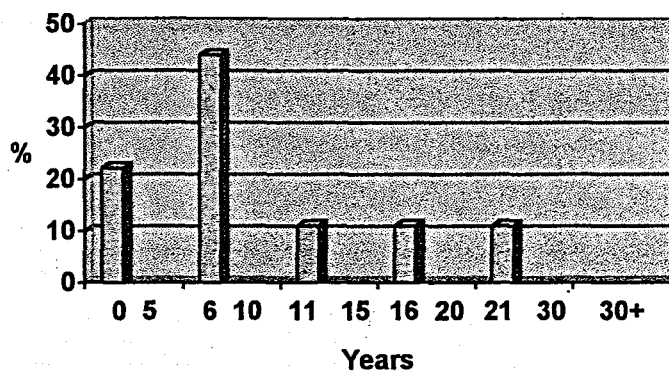


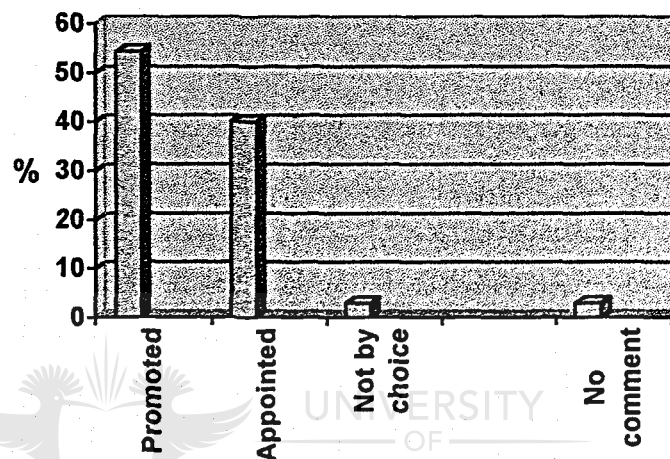
Figure 3.17 Years of experience in the field of operations management - SBSA



In Figure 3.17 above illustrates that 44% of the operations managers employed at SBSA have between six years experience and 10 years experience in the field of operations management. Of the operations managers who responded to the question 20% have less than 5 years experience. The rest of the field has more than eleven years of experience but less than 30 years experience in the field of operations management.

Figure 3.18 shows that 54.28% of operations managers were promoted to the operations management position, 40% of the respondents were appointed, 2.85% indicated that they are not operations manager by choice and 2.85% made no comment.

Figure 3.18. How position of operations manager was attained - all banks



If one studies 3.18 it is clear that internal promotion seems to be the main route to operations manager in the banking industry.

Figure 3.19 shows that 38.09% of operations managers in ABSA (NWP) are operations managers by appointment, 57.14% were promoted into the position and 4.76% indicated that it is not their choice. It also shows that ABSA favours internal promotion to operations manager.

Figure 3.19 How position of operations manager was attained - ABSA(NWP)

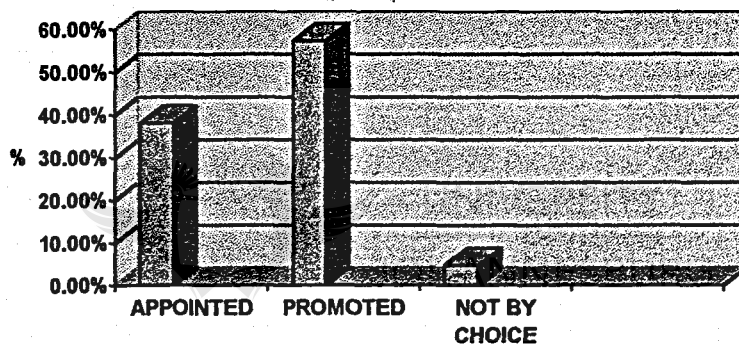


Figure 3.20 shows that all operations managers who responded to this question were promoted into the position of operations manager.

Figure 3.20 Position obtained of an operation manager – FNB

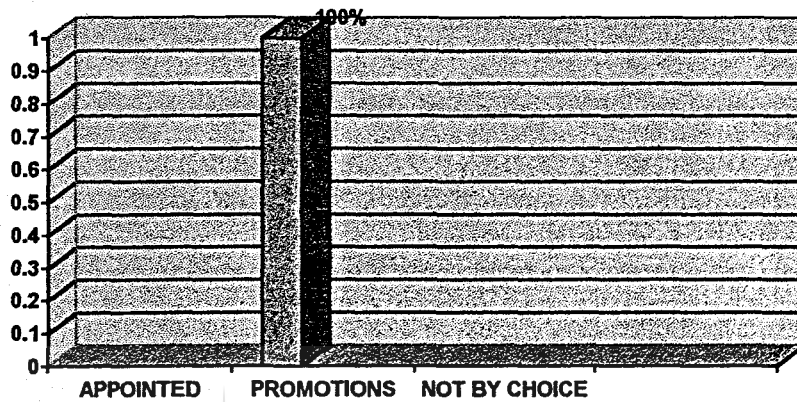


Figure 3.21 Position obtained of an operations manager - SBSA

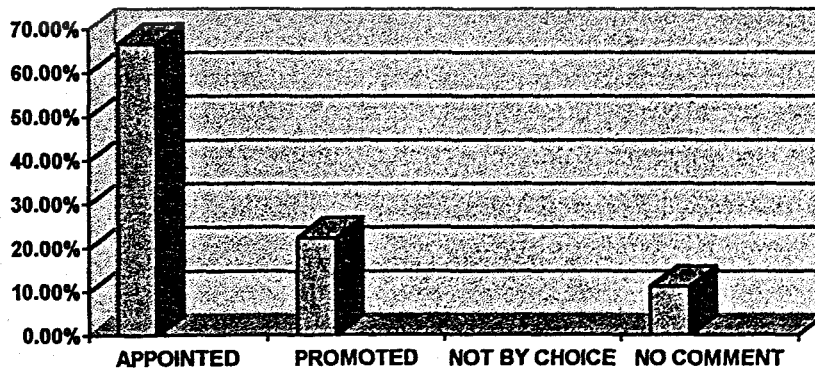


Figure 3.21 above shows SBSA. Of their operations managers 66.66% were appointed into the position of operations manager and 22.22% were promoted internally. Of the respondents 11.02% made no comment.

3.8.3 Current Qualifications Of Operations Managers

Of the respondents 85.58% have matric, 2.85% have grade 9 and 11.57% have a tertiary qualification. Of the respondents 14% felt that a tertiary qualification was not required to do the job. The results per banking group are summarised in Table 3.4.

Table 3.4. Qualifications per banking group

Banks	Std 8 %	Matric %	Tertiary Qualification %	% tertiary qualification no required	% currently studying further
FNB	20	40	40	0	0
ABSA (NWP)	0	100	0	19	4.76
SBSA	0	77.77	22.22	11.11	11.11

None of the respondents indicated that they have obtained any other qualification in example through in - house training courses. It can be concluded therefor that the banking industry feels that banking experience is the only prerequisite for the position of operations manager.

3.9 CONCLUSION OF SECTION A AND B

- The average age of an operations manager, in general is between 31-40 years. The average experience for 47.22% of them is between 0-5 years in the field of operations management.

- SBSA prefers to appoint males in the post of an operation manager. Their average age is 21-30 years and their average experience is between 6-10 years. Of the operations managers 44% have operations management experience of between 6-10 years experience and 66.6% obtained their post by appointment, rather than internal promotion.
- ABSA (NWP) appoints females in the post of operations manager. They have 5 or less years experience in the field. The average age of the operations managers is between 31-40 years and 57.14% attained their post by internal promotion.
- FNB employs 80% males and 20% females. The age range of both genders is 31-50 years. Of these 40% have between 0-5 years experience and 40% have between 11-15 years experience in the field of operations management. All the respondents were internally promoted to their posts.

3.10 SECTION C - DECISIONS AND ACTIVITIES OF AN OPERATIONS MANAGER

This part of the questionnaire was constructed using Table 2.5 in Chapter two as a basis. The activities were grouped according to the familiar management functions as explained in Chapter two. Respondents were asked to tick the appropriate control box most applicable under the function to their current situation.

Percentages are based on the number of questionnaires filled out. The basis for calculations for this section onwards is 35 and not 36 as

in the previous statistics due to the fact that one of the respondents did not return this part of the questionnaire.

This section was divided up into seven categories namely:

Planning, Organising, Controlling, Directing, Motivating, Coordinating and Development and Training of personnel. A list of activities associated with each of these categories was provided. A summary of the findings follows in the form of tables and graphs. A summary per banking group is not given but is available on request.

3.10.1 Planning

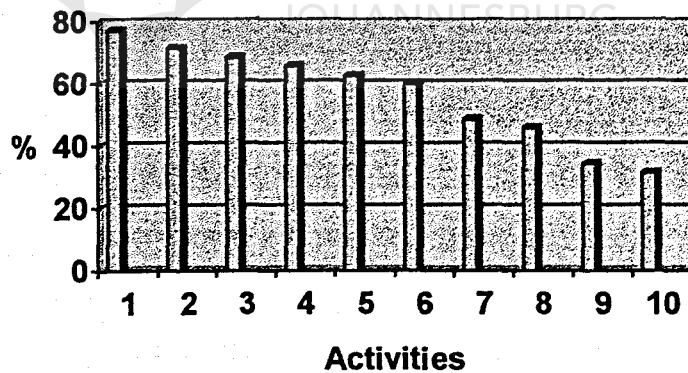
Table 3.5 provides a list of the activities that were listed under planning. The percentages are ranked from the highest to the least.

Table 3.5 Activities listed – Planning – all banks

Number	Activity	%
1	Arrange facilities and equipment	77.14
2	Organise changes in processes and procedures	71.43
3	Plan acquisition of equipment	68.57
4	Decide on the number of shifts and man hours	65.71
5	Establish improvements of projects	62.68
6	Plan the capacity of work centres	60.00
7	Plan the location of facilities	48.57
8	Set the master schedule	45.71
9	Decide what methods and procedures to use for each project	34.29
10	Establish the mix of products and services to be provided	31.43

The activities are also represented Figure 3.22. As can be seen 77.14% indicated that the arrangement of facilities and equipment makes up a large percentage of their overall activities. It was indicated by 71.43% of the respondents that the organisation of procedures and processes takes second priority. Only 34.29% indicated that they are involved in decisions about what procedures and methods to use. Further statistics showed that 68.57 % indicated that they are involved in the acquisition of equipment, and 60% are involved in the capacity planning of the centres. The establishment of the mix of services and products was indicated by 31.43% as part of what they are currently doing.

Figure 3.22 Decisions and activities of the operations manager - Planning - all banks



3.10.2 Organising

The term Organising refers to the task of the operations manager to intentionally structure roles within the operations sub - systems. Authority and responsibility must be assigned to achieve organisational goals. Table 3.6 provides a list of the activities with the corresponding percentages. The statistics indicated that 77.14% of operations managers reported that they have to assign responsibilities for every work centre, whilst work centre assignments are only established by 42.85%. This leaves a question mark as to who plans the assignments. None of the banking groups could be singled out in terms of planning and or assignment of work centre work.

Table 3.6 Decisions and activities of an operations manager – Organising – all banks

Number	Activities	%
1	Assign responsibility for every work centre	77.14
2	Organise services by functions, products	60
3	Establish maintenance policies	48.57
4	Centralising or decentralising operations	42.86
5	Establish work centre assignments	42.85

3.10.3 Controlling

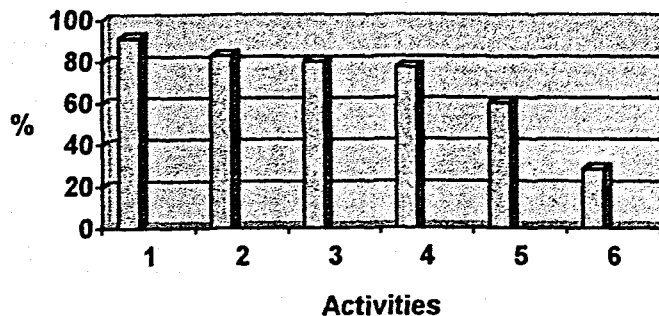
The controlling function ensures that the plans of the operations subsystems are accomplished. The operations manager must exercise control, and outputs must be measured to see if they conform to what has been planned. The list of activities provided to the respondents is summarised in Table 3.7.

Table 3.7 Decisions and activities of operations manager – Controlling – all banks

Number	Activities	%
1	Compare cost to budget	91.43
2	Inspect quality level of service	82.86
3	Compare actual labour hours to standards	80
4	Encourage pride in performing as expected	77.14
5	Compare inventory levels to targets	60
6	Compare work progress to schedule	28

The comparison of cost to budget was indicated by 91.43% of the respondents as one of their current activities. Results showed that 80% indicated that quality levels and the comparison of labour hours worked to standard is a common activity. The comparison of work progress to schedule is only 28% and it might be expected that this would be higher. Figure 3.23 represents the results obtained for the function controlling.

Figure 3.23 Decisions and activities of operations manager - Controlling - all banks



3.10.4 Directing

Table 3.8 Decisions and activities of the operations manager – Directing – all banks

Number	Activities	%
1	Issue job assignments and instructions	97.14
2	Establish employment contracts	40
3	Establish personnel policies	34.29

Table 3.8 lists three activities associated with directing. The issuing of job assignment and instructions were indicated by 97.14% of respondents as one of the activities they spend time on. As indicated the establishment of employment contracts and personnel policies is indicated by 40% of the respondents; and 34.29% indicated that the establishing of personnel policies is part of their job.

3.10.5 Motivating

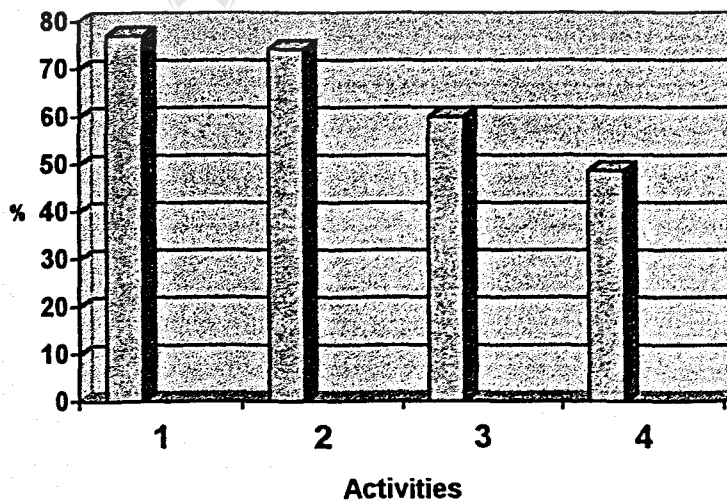
Table 3.9 lists four activities that are associated with motivation. Three of the activities have been indicated by 60% or more as being part of their current job. These activities are; encourage through praise and recognition, challenge sub – ordinates through leadership examples and to motivate through enriched jobs and challenging assignments.

**Table 3.9 Decisions and activities of operations managers –
Motivating – all banks**

Number	Activities	%
1	Encourage through praise, recognition	77.14
2	Challenge through leadership examples	74.28
3	Motivate through enriched jobs and challenging assignments	60
4	Motivating through tangible reward system	48.57

The results can be seen in Figure 2.24. Results indicate that 48.57% of the respondents are currently motivating staff through tangible reward systems. Again, no specific banking group stood out in this analysis.

Figure 3.24 Decisions and activities of operations managers - Motivating



3.10.6 Co-ordinating

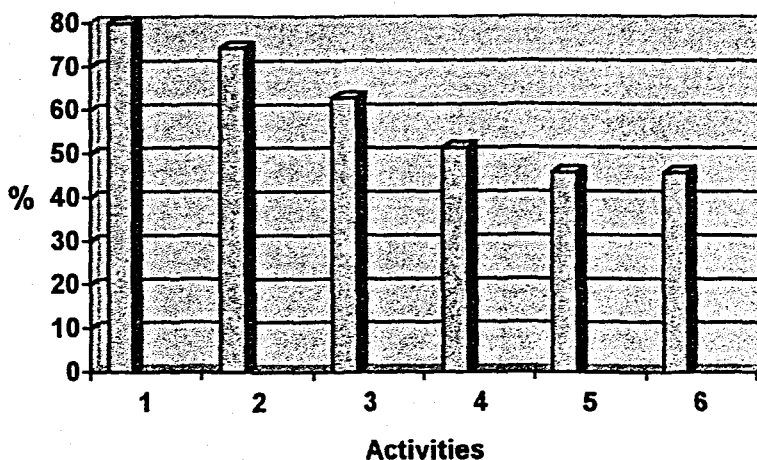
Table 3.10 provides a key with the percentages for the managerial function co-ordinating. To report inform and to communicate has been indicated by 80% as part of their job and 74.29% indicated that the observation of actual performance versus planned performance is part of their job.

**Table 3.10 Decisions and activities of operations managers –
Co-ordinating – all banks**

NUMBER	ACTIVITIES	%
1	Report inform and communicate	80
2	Observed actual performance and recommended needed performance	74.29
3	Co-ordinate purchases, deliveries, design changes and maintenance activities	62.85
4	Respond to customer inquiries about status of orders	51.43
5	Co-ordinating through use of common forecast and master schedules	45.71
6	Co-ordinating through common, standardised data basis	45.71

Figure 3.25 is a graphical representation of the activities as indicated by the respondents.

Figure 3.25 Decisions and activities of operations manager - Co-ordinating



3.10.7 Training and developing personnel.

As shown in Table 3.11 supporting employees in training programmes has been indicated by 91.43% of the respondents as one of their responsibilities. Encouraging employees to seek better ways of doing work has been indicated by 77.14% as one of their responsibilities. Assigning more advanced job assignments has been indicated by 48.57% as a responsibility.

**Table 3.11 Decisions and activities of operations manager –
Training and developing personnel – all banks**

NUMBER	ACTIVITIES	%
1	Support employees in training programmes	91.43
2	Encourage employees to seek a better way	77.14
3	Show sub-ordinates a better way	62.86
4	Give more advanced job assignments	48.57

Figure 3.26 Decisions and activities of operations manager - Training and developing personnel

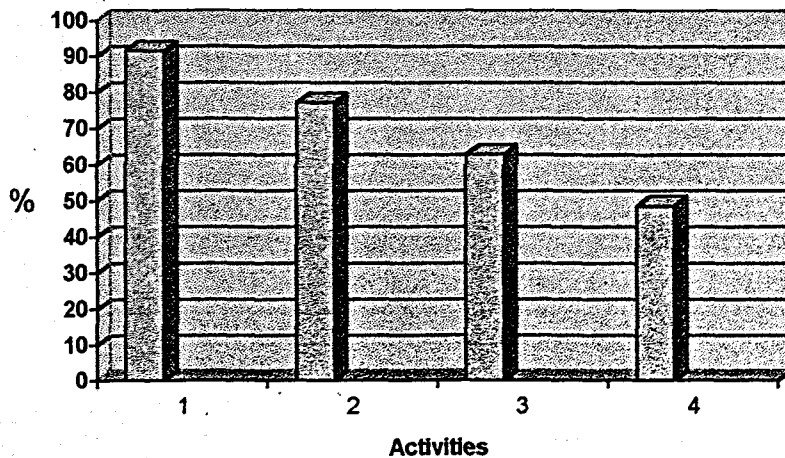


Figure 3.26 summarises the findings of the respondents for training and developing of personnel.

3.11 SECTION D - TECHNIQUES USED IN OPERATIONS MANAGEMENT

The list of techniques presented in Table 3.12 is, according to the literature, the most applicable in the field of operations management. (Refer to figure 2.2).

Respondents were asked to indicate which of the techniques they use in their current environment. Table 3.12 provides a summary of the findings.

Table 3.12 A summary of techniques used in operations Management – all banks

NUMBER	ACTIVITIES	%
1	Statistical Quality Control	75
2	Work Measurement	72.22
3	Job Design	61.11
4	Work Study	55.55
5	Method Study	41.66
6	Layout Facilities	41.66
7	Project Management	38.88
8	Incentive Schemes	36.11
9	Forecasting Demand	36.11
10	Waiting Lines	30.55
11	Capacity Demands	30.55
12	Facility Location	27.77
13	Decision Theory	25
14	Transportation Models	16
15	Linear Programming	8.33

There is little discrepancy between the three banking groups as to which of the techniques are currently used most.

Results indicated that 75% agreed that Statistical and Quality control as a technique is used on a regular basis. Of the respondents 72.22% indicated that work measurement is currently used and 61.11% need to design jobs as part of their daily work. Work-Study as a technique was indicated by 55.55% of respondents as a technique that they currently use. Method Study was indicated by 41.66%.

3.12 SECTION E – CHARACTERISTICS OF AN OPERATIONS MANAGER

The aim of this section was to determine the characteristics of an operations manager. It can be assumed from the age analysis of an operations manager (Figure 3.8), that they would be able to recognise

the characteristics that have assisted them in pursuing the career of an operations manager.

Twelve characteristics were listed, a scale of 1 to 5 was provided. If a participant selected a weight of one he or she would totally disagree with the characteristic. If a respondent selected a weight of two the characteristic is considered a plus point but not a must. A weight of three or four was allocated if the respondent felt in most cases that the characteristic is a requirement. A weight of five was allocated when a participant strongly agreed with the characteristic. All weights are anchored at the end.

Table 3.13 provides a list of the characteristics. The characteristics were listed in order of support as indicated by the respondents. Percentages are based on the actual number of questionnaires returned. No specific order of importance was indicated by the literature.

Table 3.13 Characteristic of an operations manager – all banks

NUMBER	CHARACTERISTICS	%
1	Be able to apply sound judgement in determining the seriousness of problems	85
2	Be a strong communicator	79
3	Have sound management skills	74
4	Have strong people skills	74
5	Be able to negotiate on all levels	71
6	Be a firm decision maker	65
7	Be able to delegate effectively	62
8	Be able to handle authority	59
9	Be an innovative person	59
10	Have a sound knowledge of organisations and methods	56
11	Have experience in the type of service offered	50
12	Be able to adapt to change	50

Results, other than those in Table 3.13 are provided in the discussions. The percentages not shown in the table were calculated based on the weight one to four. Detail results are available in request. A discussion of Table 3.13 follows.

3.12.1 Be able to apply sound judgement in determining the seriousness of problems.

Results indicate that 85% of the respondents consider this to be the most important factor. Figure 3.27 shows clearly that this is considered the most important characteristic.

3.12.2 Be a strong communicator

Of the respondents 79% strongly agree that being a strong communicator helps in making a success of the task on hand.

3.12.3 Have sound management skills

Results indicate that 74% strongly agree that sound management skills are important to the success of the job.

3.12.4 Have strong people skills

Results indicate that 74% strongly agree that to have strong people skills is an important characteristic of an operations manager, Only 20.59% felt it is a must and 5.41% considered this characteristic as a plus point only.

3.12.5 Be able to negotiate on all levels

Results indicate that 71% strongly agree that that an operations manager should be able to negotiate at all levels.

3.12.6 Be a firm decision maker

Of the respondents 65% strongly agree that an operations manager must be a firm decision-maker, yet 85% indicated that the ability to apply sound judgement in determining the serious of problems was an important characteristic to them. Of the respondents, 17.35% did not respond to this question.

3.12.7 Be able to delegate effectively

Results indicate that 62% strongly agree with this characteristic, 65.29% felt that it is necessary and only 2.71% totally disagreed.

3.12.8 Be able to handle authority

The ability to handle authority was indicated by 59% of the respondents that they strongly agree and 38.23% feel that it is a must to be able to handle authority.

3.12.9 Be an innovative person

Of the respondents 59% strongly agreed and 38.23% felt it is necessary to be an innovative person. Of the respondents 2.76% respondents did not answer this question.

3.12.10 Have a sound knowledge of Organisation & Methods

Results indicate that 56% strongly agree that a sound knowledge of organisation and methods is an important characteristic. Only 41.17% felt in most cases it is necessary and 2.95% totally disagree.

3.12.11 Have experience in the type of service offered

Table 3.13 shows that 50% of the respondents strongly agree that experience in the type of service is required.

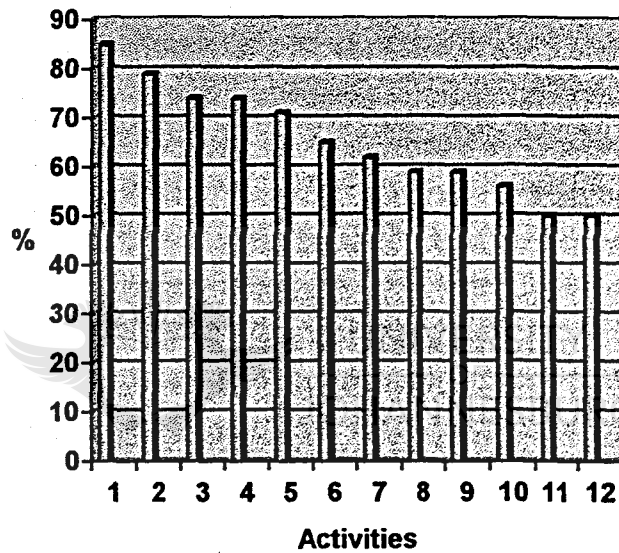
3.12.12 Be able to adapt to change

Results indicated that 50% of the respondents strongly agreed that an operations manager should be able to adapt to change.

3.13 CONCLUSION FOR SECTION E - CHARACTERISTICS OF AN OPERATIONS MANAGER

Figure 3.27 summarises the characteristics in order of importance as listed by the various operations managers. The activities are in the same order as Table 3.13.

Figure 3.27 Characteristics of an operations manager - all banks



The activities were already discussed. Other calculations not shown in tabular form or in the above graph indicate the following results. Of the respondents 66% strongly agree that all the characteristics are necessary. 31.51% felt strongly that they are required by allocating a weight of four and 0.74% allocated a weight of two indicating that the characteristic can be a plus. Only 1.74% strongly disagree with the characteristics listed.

Figure 3.27 graphically portrays the results obtained from the banking industry. The lowest score obtained for a characteristic is the ability to adapt to change and to have experience in the field at 50%. All other characteristics were rated higher. The highest was 85% for the ability to apply sound judgement to the seriousness of problems.

3.14 ANALYSIS OF QUESTIONNAIRES - TECHNIKON ACADEMIC STAFF

A total of eleven questionnaires from the various technikons was analysed.

3.14.1 Profile of lecturing staff at various technikons

Of the technikon respondents 91% are males and 9% are females. The results are shown in Figure 3.28. All respondents have a manufacturing background.

Figure 3.28 Profile of academic staff - Technikons

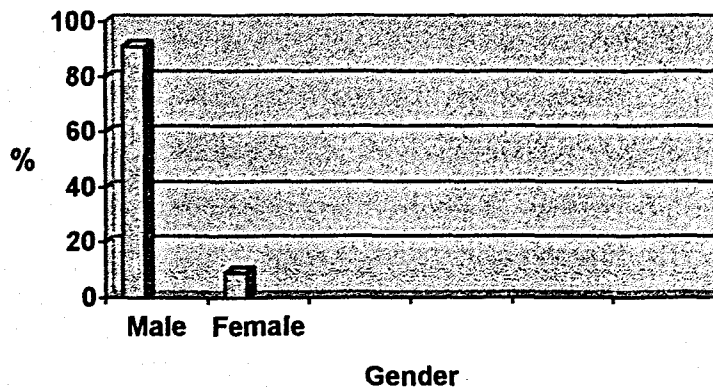
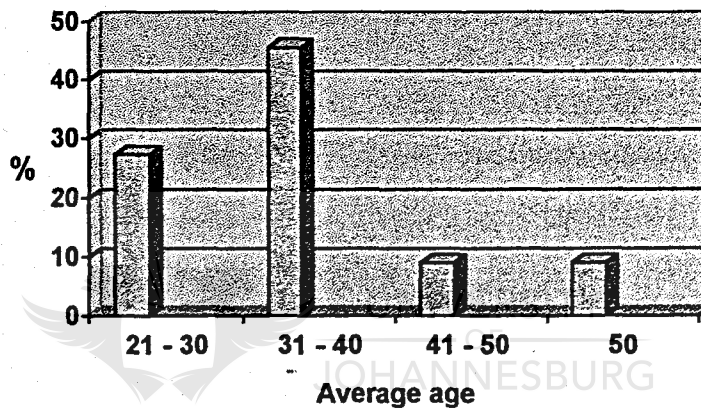


Figure 3.29 shows that 45.45% of academic staff are between the ages of 31-40 years. It was pointed out earlier on in this chapter that 31-40 years is the average age of an operations manager in the banking industry.

Figure 3.29 Profile of an operations manager: Average age of technikon staff



Results indicated that 36.36% of academic staff at technikons have between 11-15 years of experience, which corresponds well with that of industry in general.

Tasks and responsibilities of operations managers as seen by academic staff will be discussed in detail in Chapter 4. It is in Chapter 4 that comparisons are drawn between industry and academic staff.

CHAPTER 4

DISCUSSION OF FINDINGS OF QUESTIONNAIRES

4.1. TASK AND RESPONSIBILITIES AS FOUND IN THE BANKING INDUSTRY.

If the familiar management functions are disregarded and activities are simply listed in order of importance as indicated by the banking industry, the results are presented in Table 4.1.

The results indicate that 97% of the respondents consider the issuing of job assignments and instructions as a major part of their normal activities.

Comparing cost to budget and supporting employees in training programmes has been indicated by 91.43% as the second activity.

It is interesting to note that out of the top ranked six activities, four are controlling activities.

Activities 8 -14 are between 71.14% and 77.43%. These activities include arranging facilities and equipment and encouraging personnel in training. A telephonic interview confirmed that this means in-house technical training and does not refer to other training, such as presentation or industrial relation courses.

Table 4.1 Task and responsibilities of an operation manager as found in the banking industry.

NO	ACTIVITIES	%
1	Issue job assignments and instructions	97.14
2	Compare costs to budget	91.43
3	Support employees in training programmes	91.43
4	Inspect quality level of service	82.86
5	Compare actual labour hours to standard	80
6	Compare work progress to schedule	80
7	Report inform and communicate	80
8	Arrange facilities and equipment	77.14
9	Assign responsibility for every activity	77.14
10	Encourage through praise and recognition	77.14
11	Encourage employees to seek a better way	77.14
12	Challenge through leadership examples	74.29
13	Observe actual performance and recommend needed performance	74.29
14	Organise changes in processes and procedures	71.43
15	Plan acquisition of equipment	68.57
16	Decide on number of shifts and man-hours	65.71
17	Establish improvement projects	62.86
18	Co-ordinate purchases, deliveries, design changes and maintenance activities	62.86
19	Show subordinates a better way	62.86
20	Plan capacity of work centres	60
21	Organise services by function, products	60
22	Compare inventory levels to targets	60
23	Motivate through enriched jobs and challenging assignments	60
24	Plan the location of facilities	48.57
25	Establish maintenance policies	48.57
26	Encourage pride in performing as expected	48.57
27	Motivating through tangible reward system	48.57
28	Give more advanced job assignments	48.57
29	Set master schedule as to what services provided and when	45.71
30	Co-ordinate through use of common forecast & master schedule	45.71
31	Co-ordinate through common, standardised data basis	45.71
32	Centralising or decentralising operations	42.86
33	Establish work centre assignments	42.86
34	Establish employment contracts	40
35	Decide what procedure and method to use for each product	34.29
36	Establish personnel policies	34.29
37	Establish mix of products and services	31.49
38	Respond to customer inquiries about status of orders / services.	22.86

Included in this group of activities are challenge through leadership example, the observation of actual performance and recommended needed performance. To seek a better way to perform a task and the organisation of changes in processes and procedures.

Activities 15-23 vary between 60% - 68.57%. These activities include mainly activities from the planning and organising functions.

The activities listed in this group are: activity 24 - 34 which varies between 40% and 48.57%. Planning the location of facilities, establishment of maintenance policies, encourage performance, motivating through tangible reward systems, to give more advance job assignments and the co-ordination of the master schedule, centralising and decentralising of activities and the establishment of employment contracts.

Activities 35-38 vary between 22.85% and 34.28% and include deciding which procedure and method to use, the establishment of personnel policies, the mix of products and services to use and response to customer inquiries.

4.2. DECISIONS AND ACTIVITIES OF OPERATIONS MANAGERS – A COMPARISON BETWEEN BANKING INDUSTRY AND ACADEMIC STAFF

In analysing the results, it is apparent that lecturing staff with their pure manufacturing backgrounds differs in their opinion of what constitutes an operations manager's tasks and responsibilities. Table 4.2 illustrates this difference.

Table 4.2 Decisions and activities of operations managers – a comparison between banking industry and academic staff

No.	ACTIVITIES	INDUS	TECH.
1	Establish the mix of products and services to be provided	31.43	81.82
2	Plan the location of facilities	48.57	36.36
3	Plan the capacity of work centres	60	81.82
4	Decide what procedures and methods to use for each product	34.29	54.55
5	Plan acquisition of equipment	68.57	27.27
6	Arrange facilities and equipment	77.14	63.64
7	Decide on the number of shifts and man hours	65.71	54.55
8	Set the master schedule on what services to provide	45.71	36.36
9	Establish improvement projects	62.86	72.73
10	Organise changes in processes and procedures	71.43	63.64
11	Centralising or decentralising operation	42.86	36.36
12	Organise services by functions, products	60	100
13	Establish work centre assignments	42.86	36.36
14	Assign responsibility for ever activity	77.14	63.64
15	Establish maintenance policies	48.57	54.55
16	Encourage pride in performing as expected	48.57	90.91
17	Compare cost to budget	91.43	54.55
18	Compare actual labour hours to standards	80	45.45
19	Inspect quality level of service	82.86	63.64
20	Compare work progress to schedule	80	90.91
21	Compare inventory levels to targets	60	45.45
22	Establish personnel policies	34.29	9.09
23	Establish employment contracts	40	9.09
24	Issue job assignments and instructions	97.14	81.82
25	Challenge through leadership examples	74.28	54.55
26	Encourage through praise, recognition	77.14	45.45
27	Motivating through tangible reward system	48.57	36.36
28	Motivate through enriched jobs and challenging assign.	60	63.64
29	Coordinating through use of common forecast and master schedules	45.71	54.55
30	Coordinating through common, standardised data bases	45.71	36.36
31	Observed actual performance and recommended needed performance	74.29	54.55
32	Report inform and communicate	80	45.45
33	Coordinate purchases, deliveries, design changes and maintenance activities	62.86	18.18
34	Respond to customer inquiries about status of orders	22.86	27.27
35	Show subordinates a better way	62.86	36.36
36	Encourage employees to seek a better way	77.14	54.55
37	Give more advanced job assignment	48.57	27.27
38	Support employees in training programs	91.43	45.45

The results in Table 4.2 are in the same order as the questionnaire and are not ranked. These findings will now be discussed in general.

Activity 24, the issuing of job assignments and instructions was 97.14% for the banking industry. Activity 12, the organisation of services by functions and products was the highest for academic staff with a 100%. Activity 34, the response to customer enquiries is the lowest for the banking industry. Activity 22 and 23, the establishment of personnel policies and contracts are the lowest for academic staff with 9.09%.

In determining whether there is a relationship between academic staff and the banking industry as far as the decisions and activities of an operations manager is concerned a correlation and the degree of the strength of this relationship was calculated.

Pearson's product-moment correlation coefficient R , which is the most common correlation coefficient (Howell, DC. 1989), was used to test the relationship. The technique was not used to predict but rather to indicate the relationship of opinions between academic staff and the banking industry.

The correlation coefficient has been calculated but must be interpreted cautiously so as not to attribute a meaning that does not exist.

For the data in Table 4.2 a correlation coefficient of $r = 0.3966$ has been calculated. It must be remembered that this is simply a point

on a scale between – 1.00 and +1.00 and the closer it is to either of those limits, the stronger is the relationship between the two variables. The fact that in this study “r” is closer to 0 does not mean that no relationship exists.

The correlation coefficient of $r = 0.3966$ is not high and does indicate a difference in opinions between academic staff and the banking industry but also that in some areas there is agreement.

If one further analyses Table 4.2 it is clear that 97.14% of the banking industry respondents indicate the issuing of job assignments and instructions as their major task. 81.81% of academic staff indicate that the issuing of job assignments and instructions is an important task that and operations managers should do.

The next tasks listed by the banking industry as being important to their jobs is to compare cost to budget and to support employees in training programmes. In both cases 91.428% of the respondents from the banking industry supported these tasks. Results also show that 54.54% of academic staff respondents indicate that this should be part of an operations manager's task.

45.45% of academic staff respondents indicated that to support employees in training programmes should be part of an operations managers responsibility.

Quality level of services is indicated by 82.85% of industry respondents as part of their task whereas only 63.63% of academic staff indicate that it should be part of their tasks.

The planning of the capacity of work centres is rated very highly by 81.81% of academic staff whereas only 60% of the banking industry indicate that they should be involved in planning.

The decision as to the number of man-hours and shifts to be worked also indicates a difference in opinion. 68.57% of the banking industry respondents indicate this as part of their tasks but only 27.27% of academic staff think that it should be part of their tasks.

Encouraging pride in performance is indicated by 48.57% of the banking industry respondents as part of their responsibility whereas 90.90% of academic staff think it is important.

The comparison of comparing labour cost with actual cost versus standard is considered by 80% of banking industry members as important and only 45.45% of academic staff indicate this as important.

The establishment of employment contracts and personnel policies was indicated by only 9.09% of academic staff as part of their tasks. 34 - 40% of banking industry respondents indicated that this is part of their tasks.

Encourage employees to seek a better way is indicated by 77.14% of banking industry members as important whereas only 54.54% of academic staff think that it should be part of the operations manager task.

The observation of actual performance and to recommend needed performance is considered by 74.28% of the banking industry respondents as part of their tasks whereas 54.54% of lecturing staff mark this activity as a needed task.

To report inform and communicate with employees was fifth on the list of tasks together with activities 18 and 20. Eighty percent of the banking industry respondent's feel that it is their responsibility. Only 45.45% of academic staff saw this as part of an operations manager responsibility.

Activity 33, the co-ordination of purchases, deliveries and the design of changes and maintenance activities is indicated by 62.85% of banking industry respondents as an important part of what they are doing. Only 18.18% of academic staff indicate that it should be part of their task.

The establishment of the mix of products and services to be offered is rated the highest 81.81% by academic staff but only 31.42% of the banking industry indicate that it is part of their tasks.

4.3 TECHNIQUES USED BY OPERATIONS MANAGERS – A COMPARISON BETWEEN BANKING INDUSTRY AND ACADEMIC STAFF

Fifteen techniques are listed in Table 4.3. The techniques are listed in rank order as seen by academic staff.

A correlation coefficient “r” was calculated to determine if there is a relationship between what the banking industry indicates and what academic staff indicate.

The results, which is considered as low are as follows: $R = 0.13307$. The closer $r =$ zero the lower the relationship is between the two. One can concluded from this that there is a difference in what academic staff thinks the industry is using versus what they are using.

Table 4.3 shows the fifteen activities. The activities are rank from highest to lowest as preferred by the banking industry. Academic staff preferences are not rank but listed next to the banking industry.

Of the banking industry respondents 75% express the need for statistical and quality control as the most important technique that would help them with their daily tasks and 100% of academic staff indicated that, that is the technique that could assist an operations manager the most.

Table 4.3 Techniques used in operations management as seen by academic staff versus banking industry

NUMBER	ACTIVITIES	INDUSTRY	TECHNIKONS
5	Statistical and Quality Control	75	100
11	Work Measurement	72.22	63.64
9	Job Design	61.11	45.45
8	Work Study	55.56	72.73
7	Layout Facilities	41.67	90.91
10	Method Study	41.67	81.82
4	Project management	38.89	81.82
1	Forecasting demand	36.11	72.73
12	Incentive Schemes	36.11	9.09
2	Capacity demand	30.56	81.82
3	Waiting lines	30.56	45.45
6	Facility Location	27.78	36.36
13	Decision Theory	25	45.45
14	Transportation Models	16.67	81.82
15	Linear Programming	8.33	81.82

A study of Table 4.3 reveals that layout facilities has been rated by 90.90% of academic staff as the second most useful technique that should be used whereas only 46.17% of the banking industry respondents indicated that they are currently using it.

Work measurement is rated by 72.72% as the second most used technique by the banking industry and Work-Study was indicated by 55.56% as needed to perform their tasks. Job design is indicated by 61.11% as the third technique that would help them with their tasks. Capacity Demand, Project Management, Method Study,

Transportation and Linear Programming are indicated by 81.81% of academic staff as important techniques.

The banking industry indicates that 36.11% of them are currently using incentive schemes, whereas only 9.09% of academic staff indicate this as necessary.

The biggest difference is Linear Programming as a technique. 81.81% of academic staff indicate it as needed but only 8.33% of the banking industry respondents indicate that they are currently using it.

4.4 CHARACTERISTICS OF AN OPERATIONS MANAGER – A COMPARISON BETWEEN THE BANKING INDUSTRY AND ACADEMIC STAFF

Twelve characteristics were listed with a weight of one to five. The weights were anchored at the end. Table 4.4 summarises the outcome. The results are rank in order of highest to lowest for academic staff. The banking industry preference is shown in the next column but are not ranked in order.

Results showed that 90.90% of academic staff respondents and 79% of banking industry respondents strongly agree that an operations manager should be a strong communicator.

Table 4.4 Characteristics of an operations manager – a comparison between academic staff and the banking industry

NUMBER	CHARACTERISTICS	% strongly agree	
		TECH	INDUS.
1	Be a strong communicator	90.90	79
10	Be an innovative person	90.90	59
2	Have sound management skills	81.81	74
3	Have experience in the type of service offered	81.81	50
4	Have a sound knowledge of organisations and methods	72.72	56
9	Be a firm decision maker	72.72	65
6	Be able to apply sound judgement in determining the seriousness of problems	72.72	85
11	Have strong people skills	72.27	74
5	Be able to adopt to change	54.54	50
8	Be able to handle authority	45.45	59
7	Be able to delegate effectively	27.27	62
12	Be able to negotiate on all levels	2.54	71

To be an innovative person is supported by 90.90% of academic staff versus 59% of banking industry respondents.

Only 50% of industry respondents strongly agreed that experience in the field is required versus 81.81% of academic staff.

Results indicated that 54.54% of academic staff and 50% of the banking industry respondents strongly agreed that it is a must to adopt to change.

Of the academic staff 72.72%, strongly agree that an operations manager should be able to apply sound judgement to the urgency and seriousness of problems. This strongly corresponds to what is been indicated by the banking industry at 72.72%.

The handling of authority was strongly agreed by 45.45% of academic staff and 59% of banking industry respondents.

Results showed that 72.72% of academic staff strongly agree that an operations manager should be a firm decision-maker. Only 65% of the banking industry members strongly agreed with this.

Strong people skills were supported by 72.72% of academic staff and 74% of industry members strongly agreed with this.

The ability to negotiate is strongly agreed upon by only 2.45% of the academic staff, but 74% of the banking industry members strongly agreed that this is an important characteristic.

Results that are not shown in Table 4.4 but which were calculated show that overall 57% of academic staff strongly agree with all listed characteristics. 41.54% feel the characteristics can make a difference and 1.4% strongly disagree with all of the listed characteristics. 66.01% of the banking industry respondents strongly agree with all the characteristics.

4.5 CONCLUSION

There are differences of opinions between academic staff and the banking industry regarding the tasks and responsibilities of an operations manager.

The controlling function is indicated by more than 70% of the operations managers in the banking industry as part of their tasks and responsibilities. Controlling indicates the short-term day to day running of the organisation and is a line function. It has been mentioned that the banking industry sees operations management more as a staff function, yet feedback by the banking industry indicates that they are performing more controlling activities.

According to the data available academic staff place more emphasis on the planning function than the controlling function as part of the operations manager's tasks and responsibilities.

Results also indicate that more than 70% of academic staff agree upon 18% of all activities listed and that 57% of these activities are planning activities. Yet only 14% of the activities are controlling activities, 29% of activities are motivating and directing activities.

It has been found that 38% of the activities agree agreed upon by more than 70% of the respondents from the banking industry as being part of their daily tasks and responsibilities. Furthermore 36% of these activities are controlling activities, 21% are training and development activities and 14% are motivational. The other activities fall under organising and directing

Contradictory information is also given by the banking industry. 68.85% indicate that they must show subordinates a better way but they also indicate by 65.72% that they do not decide the method subordinates should be using.

The issue of job assignments and instructions is indicated by 97.14% of the banking industry respondents as what they are currently doing, but 57.143% indicate that they are not responsible for establishing work centre assignments.

Respondents from the banking industry seem to agree on what they are doing currently. Academic staff has different opinions as to what they think the operations manager tasks and responsibilities are.

When it comes to the techniques available it seems that the banking industry member's needs correspond to the tasks and responsibilities they are currently involved in. Few of the banking respondents have any tertiary or any other formal qualifications, which could explain why they do not use some of the techniques listed.

An average of 65.33% of academic staff strongly agree with the characteristics of an operations manager and 66.01% of banking industry respondents strongly agree with the characteristic provided. No additional characteristics are listed by any of the respondents so there seems to be room for further research as to what characteristics an operations manager should possess to be successful in his or her career.

The banking industry expects operations managers to plan, organise and control, but without providing the necessary additional training. Operations managers have only their experience in the banking industry to call on and they must develop these important skills without guidance.

CHAPTER FIVE

AN EVALUATION OF THE NATIONAL DIPLOMA AND THE B- TECH PRODUCTION MANAGEMENT ACCORDING TO THE NEEDS OF THE SERVICE INDUSTRY

5.1 CURRENT CURRICULUM OF THE NATIONAL DIPLOMA PRODUCTION MANAGEMENT (SEE ANNEXURE C & D)

Technikons around South Africa offer a qualification in production management. Twenty-seven subjects are offered in the National Diploma Production Management, of which twelve are compulsory. Production Management I, II and III are compulsory as are Production Management Techniques I, II and III. The other compulsory subjects for all technikons are: Operational Research or Applied statistics and Organisational Effectiveness I and II. (See Table 5.1)

The other four subjects are determined by the various technikons. These will depend on the nature of the industry they are serving.

Each subject is allocated a credit of 0.250. A National certificate is awarded if a student obtains one (1) formal credit. A Higher National certificate is awarded if a student obtains two (2) formal credits. A National Diploma is awarded if a student obtains three (3) formal credits.

Table 5.1 lists the subjects offered at technikons to students who would like to study the field of Production Management. A short description of the contents for each subjects follows.

Table 5.1. Variety of subjects offered at technikons

SUBJECTS	COMPULSORY	
Costing and Estimating	No	
Financial Principles in Production I	No	
Management Principles and Practice	No	
Organisational Effectiveness I, II and III		I and II
Production Management I, II and III		All
Manufacturing Technology I	No	
The Personnel Function	No	
Work Place Dynamics I	No	
End User Computing I	No	
Motor Vehicle Engineering I	No	
Textile Technology I	No	
Food Technology I, II and III	No	
Tyre Technology I, II and III	No	
Labour Law	No	
Microbiology I	No	
Production Management Techniques I, II and III		All
Operational Research III	No	

Costing and Estimating: all aspects of the costing process and looks at aspects such as cost accounting, budgetary control, types of budgets, standard costing, variance analysis and capital expenditure.

Financial Principles in Production I: Covers the elements of cost, methods of costing systems, the financial aspects of the purchasing

and stores procedure, basic concepts of cash flows, elements of overhead cost, financial aspects of budgeting and control and basic concepts of financing projects.

Technikons can decide between Costing and Estimating and Financial Principles in Production I.

Management Principles and Practice I: The evolution of management is studied. The practice of management and the manager's role is also covered. Small business undertakings are explained, to provide an understanding of the external environment and the establishment of undertakings. Also included are producing a product or service, the marketing of a product or service and profit planning and control.

Organisational Effectiveness I: Also known as Work-study this subject covers an introduction to motivational theories, productivity, and method study. The recording of the flow of information, people and products within an organisation and one work measurement technique (stop watch study) for a person engaged on manual work only. The human factor in the work environment and computer applications.

Production Management I: Introduction to the world of production. Also covered are product / service design, the application of forecasting techniques, the planning of facilities and layouts along with capacity management and aggregate planning.

Manufacturing Technology I: In this subject safety and safety legislation, manufacturing techniques and processes, the evaluation of material, parts and processes and the management thereof are studied.

The Personnel Function: Studies industrial psychology, the individual and groups, the staffing function, the development and training of personnel, the nature of work, management and motivation of employees. Human relations and the relationship between management services and line management are also covered.

Work Place Dynamics I: The production environment and the behaviour of humans in production. Group behaviour and the communication skills required in a production environment are discussed. Performance and reward systems and the application and implementation of a production personnel administration procedure also form part of this subject. This subject is production specific.

End User Computing I: In this subject student receive hands on training and they are taught basic word processing skills.

Motor Vehicle Engineering I: Is a subject covering the basics of motor vehicle engineering. Engine systems are studied. It is specific motor vehicles manufacture.

Textile Technology I: General aspects of textile manufacturing are covered. Yarn production, methods of manufacturing, weaving and

knitting and the construction of elementary weaves is covered in this subject.

Food Technology I: The source, composition and properties of various food products are examined. The general principles and application of cooling, dehydration, biological preservation and other factors are studied.

Labour Law: Different legislation (with amendments) is studied, such as Labour Relations Act , the Wage Act, Manpower training, Machinery and Occupational Safety Act and the Workmen Compensation Act.

Microbiology I: Micro organisms are studied in this subject

Applied Statistics I: Descriptive statistics, the presentation of numerical statistics, calculation of probabilities and sampling are covered in this subject.

Organisational Effectiveness II: Is a study of various work measurement techniques available for measuring the work content of any given task. Productivity calculations are dealt with in more depth and the use of standards for the purpose of labour control systems and incentive schemes are covered. Form design is also covered in this subject. All of the above are aimed at improving organisational effectiveness.

Production Management II: Covers Management and Business functions the management of inventory and the master production schedule. Other topics covered are material requirement planning and just in time systems, the scheduling of operations and quality management.

Production Management Techniques II: Formulation of decision problems and the solving thereof using mathematical models. project management and the calculation thereof, complex waiting lines, decision analysis, learning curve theory and the use of the computer to assist with the above are covered in this subject.

Organisational Effectiveness III: The human factor in the work environment, the functioning of groups and individuals in an organisation, motivational theories, job design and the designing of organisational structures to ensure optimal organisational effectiveness are some of the topics covered in this subject. Also covered are Total Quality Management and Productivity Accountancy.

Production Management III: Project management, the application of quality management and maintenance.

Production Management Techniques III: Simulation models, maintenance techniques, quality techniques, dynamic programming, sensitivity analysis and linear programming are the topics covered in this subject.

Operational Research III: Descriptive techniques, Probabilities, sample selection, hypothesis testing, regression analysis and decision theory.

Footwear Technology I and II and Tyre Technology I, II and III syllabi were not available

5.1.1 Analysis of subject content

From a read through the content of the subjects offered currently in the National Diploma Production Management it is very clear, that the emphasis is on manufacturing and not on services.

Subjects such as Costing and Estimating could be replaced with Financial Principles in Production I, which is a less detailed version of costing aspects and which concentrates more on manufacturing production.

Many of the subjects do address management issues; for example, human relations and motivational theories. Work measurement, the improvement of methods and procedures and decision-making tools are included in the current curriculum.

It is the combination of subjects and the emphasis placed within a syllabus that is offered by a technikon that determines the nature of the production diploma.

Students who are currently enrolled for this qualification have strong manufacturing backgrounds or wish to pursue a career in manufacturing within a specific industry.

Once a student has been awarded a national diploma in Production Management he or she is not yet a qualified production manager / operations manager. However he or she is equipped with skills and knowledge of the environment they are about to enter. They have enhanced decision-making abilities. Therefore they can progress much more quickly through the system. They do not have to rely on experience, which often comes with trial and error.

5.2. AN EVALUATION OF THE B-TECH PRODUCTION MANAGEMENT

5.2.1. Current curriculum of the B-Tech Production Management (SEE ANNEXURE E)

Currently five subjects are offered in this programme. All subjects are compulsory.

Research Methodology is a subject that prepares the student to enter the field of research in the field of production. Research at technicians is still a new concept and there many possibilities open for researchers.

Introduction to Marketing Management I covers marketing as a function and its relationship with production. The market, the product

and different distribution structures are studied. Pricing policies and systems, promotional activities, the planning and evaluation of marketing strategies are all part of this subject.

Production Management IV looks at various approaches which are available in the field of production. Strategic management is covered and there is a section on service operations management. Packaging logistics are also covered, as is Total Productivity Maintenance.

Production Management Techniques IV deals with topics such as non-linear programming, simulation, advanced linear programming, goal programming and new technologies.

It is expected of the student to work independently from the lecturers at this level. The lecturers serve more as facilitators on this level.

Financial Planning and Control III: Elements of costs in production, fixed and variable costs, marginal and break even analysis are covered. The concept of contribution and profitability of marginal products is explained. The planning and control of plant and equipment expenditure, sources of funds for financing equipment are studied. Long term investments, budget and budgetary control and lastly the relationship between the production manager and the cost accountant are discussed. Software applications are part of this subject.

5.3 NEEDS OF THE BANKING INDUSTRY

The needs of the banking industry can be summarised as communication skills, people and management skills. Table 4.1 and Table 4.2 clearly show what operations managers are occupied with.

Emphasis for the banking industry must be placed on statistical process control, cost analysis, improvement of work methods, the measurement of work, total quality management, and the management of the human factor in the working environment. Decision making tools and skills must form a large important part of the curriculum.

5.4 CONCLUSION

Curriculum subjects are varied and address many topics. Many of the issues and needs identified are addressed by one or more of the available subjects to serve the banking industry's needs without a doubt.

Technikons focus almost exclusively on the needs of the manufacturing industry. As long as there is such a strong emphasis on manufacturing, the banking industry or a service industry will not identify themselves with this qualification or its content.

Technikon's feel that they have to satisfy the needs of specific manufacturing industries. By doing so they have concentrated on manufacturing and have overlooked the services industries.

Technikon's tend to slavishly follow textbooks and other printed sources, which impose current manufacturing practices onto services. Simply adding the name "operations" to the current qualification is not going to persuade the service industry to buy into this qualification.

Therefor it can be concluded that the current B – Tech Production Management does not serve the needs of the students preparing to enter the service industry.



CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1. CONCLUSION

Chapter one concentrated on the research problem. A problem statement was formulated and a hypothesis was stated. The hypothesis stated that the current B –Tech Production Management (including the National Diploma) does not meet the needs of students preparing to enter the service industry as operations managers. Objectives for this research were formulated to look at the needs of the operations manager in the services industry with emphasis on the banking industry and to evaluate the existing B – Tech Production Management against it. The importance of the study was highlighted and a research design was presented.

Chapter two covered an intensive literature study. The history of operations management was well researched and an attempt was made to show the development of the field as a discipline in its own right. The evolution from production management to operations management was discussed in detail. Various definitions of operations manager were found in the literature and discussed. Differences and similarities between manufacturing and services were listed as found in the literature. Employment trends in South Africa were discussed and compared with international trends. Operation management as an open system was explained. The objectives of the

operations management function and the role it must fulfill in strategic planning were discussed. The skills, tasks and responsibilities of an operations manager as found in the literature were researched and listed.

Based on the findings the following conclusions are drawn for Chapter Two:

- a) Few books and articles cover operations management in detail.
- b) Production systems and thinking did not just happen; it took generations to develop.
- c) The role of the operations manager is spelled out in production.
- d) There seems to be consensus between various authors regarding the skills, tasks and responsibilities of an operations manager.
- e) As far as the techniques are concerned, their application in manufacturing seems clear but vague in services.

Chapter three dealt with the collection and the analysis of data. More detailed explanation was given regarding the population and samples that have been selected. The process that has been followed to distribute and collect the questionnaires was explained. A detailed analysis of the questionnaires received from industry was conducted. Statistics were presented showing the profile of operations managers, their current qualifications, age and experience. A comparison was made between the different banking groups. The characteristics of the

operations manager as seen by the banking industry were analysed and summarised. Decisions and activities of an operations manager were also analysed and summarised.

Based on the findings the following conclusions are drawn for Chapter Three:

- a) The average age of an operations manager in general is between 31 to 40 years. The average experience in the field of operations management for the banking industry is 7.5 years and for academic staff it 13 years.
- b) The banking industry prefers internal promotion rather than outside appointments.
- c) Sixty-six percent of the banking industry respondents strongly agree with the characteristics of an operations manager.
- d) Only two of the respondents from the banking industry have tertiary qualifications, which leads one to believe that the banking industry does not feel it is important to have tertiary qualification for the job as operations manager.

Chapter four covered a discussion of the findings from questionnaires and literature. In this chapter a closer look was taken at the tasks and responsibilities as found in the banking industry. A comparison was drawn between the tasks and the responsibilities as seen by the banking industry versus academic staff. A low correlation existed between the two. Emphasis was clearly placed on different tasks and responsibilities. A comparison was drawn between academic staff and the banking industry as far as the characteristics of an operations

manager are concerned and where differences of opinion exist. The banking industry seems to place more emphasis on controlling and human related activities where as academic staff dwell more on planning activities.

Based on the findings the following conclusions are drawn for Chapter Four:

- a) There are differences of opinions between academic staff and the banking industry regarding the tasks and responsibilities of an operations manager.
- b) The controlling function is indicated by the banking industry as part of their tasks and responsibilities. Whereas academic staff see it as a planning function.
- c) Thirty – eight percent of all activities listed were agreed upon by 70% of the banking industry.
- d) There is consensus between the banking industry on what they are currently doing, whereas the academic population has different opinions.
- e) According to the skills identified that a manager must possess to perform as a manager, the banking industry concentrates on only one of the seven, which is technical skill. Skills such as analytical skills, decision – making skills, computer skills, human relation skills, communications skills and conceptual skills are not attended too.

Chapter five dealt with an evaluation of the National Diploma and the B-Tech Production Management qualifications. An overview was

presented on the various subjects and content as currently offered in the qualifications.

Based on the findings the following conclusions are drawn for Chapter Five:

- a) Current curriculum subjects are varied and address many topics.
- b) Technikons focus almost exclusively on the needs of the manufacturing industry.
- c) Simply adding the name 'operations' to the current qualification is not going to persuade the service industry to buy into this qualification.
- d) The need of the banking industry can be summarised as communication skills, human relation skills, analytical skills, and management skills.
- e) The current National Diploma Production Management does not meet the needs of the banking industry but does meet the needs of the manufacturing industry thus making it a valid qualification. Some of the needs of the service industry are addressed in this qualification, but the emphasis is not where it should be.
- f) Technikons must be careful that by trying to serve both services and manufacturing in one qualification they are not losing perspective and valuable customers. These customers might seek specific training elsewhere.

6.2. RECOMMENDATIONS

Various approaches can be followed as to what technicians should do. If statistics as far as tertiary qualifications are studied for current operations managers, it seems that the banking industry do not have a need to employ operations managers with tertiary education. Industry experience seems to be enough for them. Only 40% of FNB operations managers have tertiary education. Statistics shown that 22.22% of SBSA operations managers have tertiary education and 0% of ABSA operations managers have tertiary education.

It is clear, though, that many of the tasks and responsibilities as highlighted in the literature do form part of the operations manager's tasks and responsibilities in the banking industry. The following alternatives can be suggested to equip current operations managers with the tools, skill, and techniques necessary to perform their task optimally.

6.2.1 Recommendation one

That the banking industry consider engaging in co-operative training with technicians and or private consultants.

6.2.2 Recommendation two

That specific courses to equip current operations managers only with the necessary outstanding skills and techniques are designed.

That the suggested curriculum for such a course is as follows:

MODULE 1 – Costing and Estimating

Costing and Estimating, which will enable them to determine or to understand at least the cost component and how it is made up. This would provide them with an understanding of how to compare actual cost with budgeted cost, budgetary control etc.

MODULE 2 – Organisational effectiveness

Work - study techniques, which will enable them to conduct method studies and to improve procedures, calculate productivity and the scientific measurement of work content by determining valid standard times per service.

MODULE 3 – Total Quality management

Total Quality Management (TQM). Concepts of TQM, TQM systems, techniques and procedures.

MODULE 4 – Organisational Behaviour

Organisational behaviour will help explain to the operations manager to understand the individual and motivational theories, perceptions of the human, organisational structures, job design and the factors influencing organisational effectiveness in general.

MODULE 5 – Statistical Process Control

Statistical Process Control will provide the operations manager with the necessary basic knowledge of statistical procedures and calculations.

MODULE 6 – management Principles and Practice

Management Principles and Practice will equip the operations manager with a basic understanding of the management functions and managerial skills.

6.2.3. Recommendation three

That while the banking industry is engaged with technicians and or private consultants to equip current operations managers with tools and techniques to enhance decision making, the personnel department in collaboration with management can estimate the future number of operations managers required. With the co-operation of the personnel department, the banking industry can be more selective when they recruit for operations managers.

People should be encouraged to further their qualifications when they are employed or promoted into the job of an operations manager. Already qualified operations managers must be allowed to enter the system and should be provided with the necessary practical experience to take on the job as an operations manager. Career planning can be build into this position. It will provide motivation for the employee when he or she enters the system.

6.2.4. Recommendation four

That the current National Diploma Production Management must be retained in its current format and for its current purpose, and that is to serve the manufacturing industry.

It must be said again that by incorporating the term “operations” into the National Diploma Production Management is not going to make it acceptable to the service industry. This approach might work if lecturers at technikons are not selected only from the manufacturing industry but from the service industry as well. The emphasis can then gradually be placed on both services and manufacturing. Students must then be taught basic principles, concepts and skills without emphasis on either manufacturing or services. The question is, is that what technikons want? Is that what industry want?

That a generic diploma in Operations Management must be offered. This means that the current National Diploma Production Management must be phased out and a new curriculum must be designed with all stakeholders present including alumni students from various technikons. There must be no over emphasis of production or services but rather place emphasis on operations and the management thereof as such. At B - Tech level, students can be allowed to specialise in Production or Services

REFERENCES

- Adendorff, S.A., and de Wit. 1997. *Production and Operations Management*. 2nd ed. International Thomson Publishing.
- Adam, F. F., and Ebert, R.J. 1992. *Production and Operations Management. Concepts, Models and Behaviour*. 5th ed. Englewood Cliffs, N J: Prentice Hall Co.
- Amoako-Gyampati, K. 1992. *The Genealogy of Operations Management*. Journal of Operations Management 8, no. 3 : 270-282.
- Babbie E. 1995. *The Practice of Social Research*. 7th Edition. Belmont Watsworth Publishers.
- Betts, P.W. 1993. *Supervisory Management*. Sixth Edition. London. Pitman Publishing.
- Braudel, F. 1974. *Capitalism and Material Life 1600-1800*. New York. Harper Torchbooks.
- Boffa, F. S., and R. K. Sarin. 1987. *Production and Operations Management*. 8th Ed. New York: John Wiley & Sons.
- Central Statistical service. 1995. *Oktober Household Survey 1994 Gauteng (P0 317.7) Pretoria* Government Printing Works.
- Chandler, A. 1977. *The visible hand: The Managerial Revolution in American Business*. Cambridge, Ma: Belknap Press.
- Chase, R. B., and Aquilano, N.J. 1991. *Production and Operations Management. A Life Cycle Approach*. 12th ed. Irwin. United States of America.
- Christensen, L.B. 1997. *Experimental Methodology*. Allyn and Bacon. Boston

- Cronje G.J. de J. & Neuland E.W. & Van Reenen M.J. 1994.
Introduction to Business Management. Pretoria. Southern
 Book Publishers (Pty) Ltd.
- Daft, R.L. 1995. ***Understanding Management.*** The Dryden
 Press.Orlando.
- Defoe, D. A.1887. ***Essay Upon Projects.*** 1887. Reprint of the 1697
 edition. London: Cassell & Company.
- De Wit P.W.C. & Hamersma S.A. 1992. ***Production and
 Operations Management A practical approach.*** First
 Edition, First impression. Southern Book Publishers (Pty) Ltd.
- Dilworth, J. B. 1992. ***Operations Management.*** New York: McGraw-
 Hill Inc.
- Evans, J. R. 1993. ***Applied Production and Operations
 Management.*** 4th ed. Minneapolis/St. Paul, MN: West
 Publishing Co.
- Faurote, F. L., and Arnold, H.L.1972. ***Methods and the Ford
 Shops.*** Reprint of the 1916 edition. New York: Arno Press.
- Fitzsimmons J.A.and Sullivan R.S. 1982. ***Service operations
 management.*** McGraw-Hill.
- Ford, I.I, with Crowther, S. 1926. ***My Life & Work.*** London: William
 Heinemann Ltd.
- Gaither, N. 1993. ***Production and Operations Management.*** 6th ed.
 Chicago, IL: The Dryden Press.
- Green, C.M. 1996. ***Whitney Eli.*** CD – ROM. Crolier Encyclopedia.
 Article number 7654.
- Gies, F. 1996. ***Evans Oliver.*** CD – ROM. Crolier Encyclopedia.
 Article number 7893.

- Gimpel, J. 1988. ***The Medieval Machine. : The industrial Revolution of the Middle Ages.*** London: Pimlico Press.
- Harris D.N. 1989. ***Service operations management*** First Edition. Oxford: Alden Press.
- Hounshell, D. 1984. ***From The American System to Mass Production 1800- 1934.*** Baltimore, MD: The John Hopkins University Press.
- Ivancevich, J.M and Matteson, M.T. 1996. ***Organizational Behaviour and Management.*** Fourth edition. Irwin. United States of America.
- Ketcher, A.J. 1992. ***Customer Service improvement through the application of operations management in service organisations.*** An unpublished thesis.
- Kinney T.C. & Taylor J.R. 1991. ***Marketing Research an Applied Approach.*** New York: Mc Graw Hill.
- Knod. I.E.M. Jr. 1994. ***Operations Management: Continuous Improvement.*** Homewood, IL: Richard D. Irwin Inc.
- Krajewski, L. J., and Ritzman, L.P. 1996. ***Operations Management: Strategy and Analysis.*** Fourth edition. Reading. Addison-Wesley Publishing Co.
- Mankin, C. 1996. ***Mill.*** CD – ROM. Croler Encyclopedia. Article number 20,050.
- Meredith, J.R. 1992. ***The Management of Operations.*** 4th ed. New York: John Wiley & Sons.
- Monks, J. G. 1987. ***Operations Management: Theory and Problems.*** 3rd ed. New York: McGraw-Hill Inc.
- Moore, D.S. 1996. ***Operations research.*** CD – ROM. Croler Encyclopedia. Article number 22,240.

- Mc Cormick E.J. & Ilgen D. 1992. ***Industrial and Organizational Psychology***. Eight Edition, Second impression. Scotprint Ltd, Mosselburg, Great Britain.
- Muhlemann, A, Oakland, J.and Lockyor, J. 1992. ***Production and Operations Management***. 6th ed. London: Pitman Publishing Co.
- National Productivity Institute. 1995. ***Productivity Statistics 1995***. Pretoria, National Productivity Institute.
- Ohno, T. 1988. ***Toyota Production System***. Cambridge, MA: Productivity Press.
- Porter, G. 1984. ***From the American System to Mass Production 1800-1934***. Baltimore, MO: The John Hopkins University Press.
- Prentis, E. L. 1987. ***Operations Management Taxonomy***. Journal of Operations Management 7, no.1, 63-78.
- Rathe, A. W.1961. ***Management***. New York: American Management Association.
- Rosenberg, N. 1969. ***Introduction to the American System of Manufactures***. Edinburgh, Scotland: Edinburgh University Press, 1-86.
- Roy, M. 1998. ***Meeting the needs of a developing manufacturing industry in South Africa***. What's new in Processing. Volume1.1. Margaret Wood.
- Schroeder, R. G. 1989. ***Decision Making in the Operations Function***. 3rd ed. New York: McGraw-Hill Inc.
- Schonberger, R. J.1985. ***Japanese Manufacturing Techniques***. New York:The Free Press.

- Smit, P.J. and de Cronje, G.J. 1992. **Management Principles**. Juta & Co, Ltd.
- Starr, M.K. 1996. **Management Science**. CD – ROM. Crolier Encyclopedia. Article number 18,923.
- Van Staden, L.R. & Van der Wal, R.W.E. 1995. **Implementeringsmoontlikhede vir 'n funksionele Kurrikulumontwikkelingsmodel**. South African journal of higher education, 9(2).
- Vonderembse, M. A., and White, G.P. 1991. **Operations Management Concepts, Methods, and Strategies**. 2nd ed. Minneapolis/St. Paul, MN: West Publishing Co.
- Waters, C. D. J. 1991. **An Introduction to Operations Management** Reading, MA: Addison-Wesley Co.
- Wehrich, H and Koontz, H. 1993. **Management a global perspective**. McGraw – Hill, Inc.
- Williamson, H.F. 1996. **Mass Production**. CD – ROM. Crolier Encyclopedia. Article number 1896 and 19,289.
- Wilson, J. M. 1995. **"Henry Ford's Just in Time System."** International Journal of Operations & Production Management.
- Womack, J. P., Jones, D.T and Roos, D. 1990. **The Machine that Changed the World**. New York: Rawson Associates.
- Wren, D. A. 1994. **The Evolution of Management Thought**. New York: John Wiley & Sons.

ANNEXURE A

COVER LETTER



UNIVERSITY
OF
JOHANNESBURG



SURVEY ON THE TRAINING NEEDS OF THE OPERATIONS MANAGER FOR THE SERVICE INDUSTRY

A major research program for the Technikon Witwatersrand is undertaken to determine the training needs of an Operations Manager for the service industry, with special reference to the banking industry. The critical part of the research will be to draw on employers' and employees experience and their expectations. Your co-operation will therefor be an important part of this research.

I would be most grateful if you would complete the attached questionnaire and return it to the Department of Operations Management in the enclosed pre-paid envelope, or fax it. If you are able to answer only some of the questions this would be most helpful. In most cases the answers involves ticking the appropriate boxes.

All replies will be treated in the strictest confidence. No individual organisation will be identified in our final report which will present the training needs for the Operations Manager. If you have any queries please contact Me. Magda van den Berg (Researcher) at the Department of Operations Management.

Thank you for your consideration

Yours sincerely

Me. Magda van den Berg

(011) 406 - 3541
(011) 406 - 3540

	Direct ☎	Ext		
DOORNFONTEIN CAMPUS	37 Nind St Doornfontein 2094	☎ 17011 Doornfontein 2028	☎ 406-2911	☎ 402-0475
ELOFF STREET CAMPUS	111 Eloff St Johannesburg 2001	☎ 17011 Doornfontein 2028	☎ 406-2911	☎ 406-2033
AUCKLAND PARK CAMPUS	Bunting Rd Cottesloe 2092	☎ 17011 Doornfontein 2028	☎ 406-2911	☎ 406-3505

ANNEXURE B



INDUSTRIAL COVERAGE

This questionnaire applies to organisations principally engaged in service activities.

A. BACKGROUND INFORMATION

- i) What are the main products/services covered by your organisations business activities ?

ABRASIVE MATERIAL E.G. FLOOR SANDING; METAL DRG. SHEETS, FIBRE D.
AND EVEN RIB BANDS

- ii) Is your organisation a subsidiary of another organisation ? (Please tick one box) Yes

No

If 'yes' please give the name and origin of the parent organisation:

3M MINNESOTA, ST PAUL - U.S.A

- iii) How many sales outlets/ branches / establishments does your organisation currently operate in South Africa.
 (Please give the approximate number in the box)

4

B. CURRENT PROFILE OF AN OPERATIONS MANGER

(Please tick the appropriate box)

- i) Male Female Age (y)

- 20	21-30	31-40 <input checked="" type="checkbox"/>	41-50	50 +
------	-------	---	-------	------

- ii) Have you been *appointed* *promoted* *not by choice*
 in the position as an Operations Manger.

- iii) How many years have you been involved in the field of Operations Management.

-5	6 - 10	11 - 15 <input checked="" type="checkbox"/>	16 - 20	21 - 30	30+
----	--------	---	---------	---------	-----

P3...../

iv) What is your highest qualification ?

(Please tick the appropriate box)

Std 8 Matric National Diploma Degree
 National Higher Diploma B - Tech degree Hon. Degree
 Masters Degree Doctorate Other

Please state type of qualification and Institution qualifications obtained from. E.g. B Com Business Management - UNISA

PRODUCTION MANAGEMENT DIPLOMA - WITS TECHNICON

C. DECISIONS AND ACTIVITIES OF OPERATIONS MANAGERS

(The following activities are grouped according to familiar management functions) please tick the activities most appropriate to your current situation.

i) PLANNING

Establish the mix of products and services to be provided.....

Plan the location of facilities.....

Plan the capacity of work centres.....

Decide what procedures and methods to use for each product.....

Plan acquisition of equipment.....

Arrange facilities and equipment.....

Decide on the number of shifts and man hours.....

Set the master schedule on what services to provide and when.....

Establish improvement projects.....

Organise changes in processes and procedures.....

ii) ORGANISING

- Centralising or decentralising operation.....
- Organise services by functions, products.....
- Establish work centres assignments.....
- Assign responsibility for every activity.....
- Establish maintenance policies.....

iii) CONTROLLING

- Encourage pride in performing as expected.....
- Compare cost to budget.....
- Compare actual labour hours to standards.....
- Inspect quality level of service.....
- Compare work progress to schedule.....
- Compare inventory levels to targets.....

iv) DIRECTING



- Establish personnel policies.....
- Establish employment contracts.....
- Issue job assignments and instructions.....

v) MOTIVATING

- Challenge through leadership examples.....
- Encourage through praise, recognition.....
- Motivating through tangible reward system.....
- Motivate through enriched jobs and challenging assignments.....

vi) COORDINATING

Coordinating through use of common forecast and master schedules.....

Coordinating through common, standardised data bases.....

Observed actual performance and recommended needed performance.....

Report inform and communicate.....

Coordinate purchases, deliveries, design changes and maintenance activities.....

Respond to customer inquiries about status of orders.....

vii) TRAINING AND DEVELOPING PERSONNEL

Show sub-ordinates a better way.....

Encourage employees to seek a better way.....

Give more advanced job assignment.....

Support employees in training programs.....

D TECHNIQUES USED IN OPERATIONS MANGEMENT

(Please tick if you are currently using any or all of these techniques in your environment)

Forecasting Demand.....

Capacity Demand.....

Waiting Lines.....

Project Management.....

Statistical and Quality Control.....

Facility Location.....

Layout Facilities.....

Work Study.....

Job Design.....

- Method Study.....
- Work Measurement.....
- Incentive Schemes.....
- Decision Theory.....
- Transportation Models.....
- Linear Programming.....
- Other

(If other please list)



E. CHARACTERISTICS OF AN OPERATIONS MANAGER

(Please tick the appropriate box)

If you strongly agree allocate a weight of 5 points

If you totally disagree allocate a weight of 1 point

A weight between 3 and 4 will be allocated when you feel in most cases it is a must

A weight of 2 when you consider the characteristic a plus point but not a must

An Operations Manager should

	1	2	3	4	5
be a strong communicator					
have sound management skills					✓
have experience in the type of service offered					✓
have a sound knowledge of Organisation and Methods practitioning					✓
demonstrate alertness			✓		
be adaptable to change				✓	
be able to apply sound judgment in determining the urgency and or seriousness of problems					✓
be able to delegate effectively					✓
be able to handle authority expediently		✓			
be a firm decision maker			✓		
be an innovative person					✓
have strong people skills					✓
be able to negotiate			✓		

F. FURTHER CONTACTS

Thank you for completing this questionnaire. I may like to discuss with you certain aspects of your answers. If necessary may I please contact you again ?

Yes

No

If yes, please give the name of contact, position and telephone number:

Name : _____

Position: _____

Telephone : _____

Please return this questionnaire in the reply paid envelope to:

Department of Operations Management
Attention : Me. Magda van den Berg
P O Box 8875
Minnebron
1549

Fax number: (011) 406 3746



UNIVERSITY
OF
JOHANNESBURG

ANNEXURE C

CURRENT CURRICULUM – NATIONAL DIPLOMA PRODUCTION MANAGEMENT

NATIONAL DIPLOMAS

3204008 NATIONAL DIPLOMA: PRODUCTION MANAGEMENT

DATE OF IMPLEMENTATION: JANUARY 1996
 MINIMUM EXPERIENTIAL TIME IN YEARS: 0,0 MINIMUM FORMAL TIME IN YEARS: 3,0

CODE	CREDIT	INSTRUCTIONAL OFFERING
040103812	0,250	COSTING AND ESTIMATING
040113412	0,250	FINANCIAL PRINCIPLES IN PRODUCTION I
040901712	0,250	MANAGEMENT PRINCIPLES AND PRACTICE I
040930712	0,250	ORGANISATIONAL EFFECTIVENESS I
040922212	0,250	PRODUCTION MANAGEMENT I
041008012	0,250	MANUFACTURING TECHNOLOGY I
041101312	0,250	THE PERSONNEL FUNCTION
041105512	0,250	WORKPLACE DYNAMICS I
060501312	0,250	END-USER COMPUTING I
080300512	0,250	MOTOR VEHICLE ENGINEERING I
081812112	0,250	FOOTWEAR TECHNOLOGY I
081812212	0,250	TYRE TECHNOLOGY I
100109312	0,250	TEXTILE TECHNOLOGY I
100311812	0,250	FOOD TECHNOLOGY I
130300112	0,250	LABOUR LAW
150304212	0,250	MICROBIOLOGY I
160801612	0,250	APPLIED STATISTICS I
040930822	0,250	ORGANISATIONAL EFFECTIVENESS II
040922322	0,250	PRODUCTION MANAGEMENT II
040921522	0,250	PRODUCTION MANAGEMENT TECHNIQUES II
081812322	0,250	FOOTWEAR TECHNOLOGY II
081812422	0,250	TYRE TECHNOLOGY II
040930903	0,250	ORGANISATIONAL EFFECTIVENESS III
040921403	0,250	PRODUCTION MANAGEMENT III
040921603	0,250	PRODUCTION MANAGEMENT TECHNIQUES III
060206203	0,250	OPERATIONAL RESEARCH III same as APPLIED STATS
081812503	0,250	TYRE TECHNOLOGY III

REMARKS

(1) COMPULSORY INSTRUCTIONAL OFFERINGS:
 PRODUCTION MANAGEMENT I II III
 PRODUCTION MANAGEMENT TECHNIQUES II III
 OPERATIONAL RESEARCH III OR APPLIED STATISTICS I
 ORGANISATIONAL EFFECTIVENESS I II

(2) OPTIONAL INSTRUCTIONAL OFFERINGS:
 A MINIMUM OF A FURTHER 1.00 FORMAL CREDIT MUST BE OFFERED, WHICH MUST
 INCLUDE 0,25 CREDITS AT LEVEL III IF APPLIED STATISTICS I IS CHOSEN IN (1)

(3) POINTS OF EXIT:
 (3.1) NATIONAL CERTIFICATE : PRODUCTION MANAGEMENT (3104081)
 THIS QUALIFICATION MAY BE AWARDED TO A CANDIDATE ON COMPLETION OF AT LEAST
 ONE (1,0) FORMAL CREDIT OF THIS INSTRUCTIONAL PROGRAMME
 (3.2) NATIONAL HIGHER CERTIFICATE : PRODUCTION MANAGEMENT (3104082)
 THIS QUALIFICATION MAY BE AWARDED TO A CANDIDATE ON COMPLETION OF AT LEAST
 TWO (2,0) FORMAL CREDITS OF THIS INSTRUCTIONAL PROGRAMME

UNIVERSITY
 OF
 JOHANNESBURG

ANNEXURE D

SYLLABUS CONTENT OF NATIONAL DIPLOMA CURRENTLY OFFERED

UNIVERSITY OF
JOHANNESBURG

NATIONAL DIPLOMAS

NASIONALE DIPLOMAS

N: NEW/NUUT R: REVISED H: HERSIEN

R 3204008 NATIONAL DIPLOMA: PRODUCTION MANAGEMENT
H NASIONALE DIPLOMA: PRODUKSIEBESTUUR

DATE OF IMPLEMENTATION: / JANUARY 1996
DATUM VAN INSTELLING: JANUARIE 1996

MINIMUM EXPERIENTIAL TIME IN YEARS: / 0,0
MINIMUM ERVARINGSTYD IN JARE:

MINIMUM FORMAL TIME IN YEARS: / 3,0
MINIMUM FORMELE TYD IN JARE:

K C
R R
E E
D D
I I
E T
T

010301012	FOOD TECHNOLOGY I	0,250
040103812	COSTING AND ESTIMATING	0,250
040113412	FINANCIAL PRINCIPLES IN PRODUCTION I.	0,250
040400812	WORK STUDY I	0,250
040901712	MANAGEMENT PRINCIPLES AND PRACTICE I	0,250
040922212	PRODUCTION MANAGEMENT I	0,250
041008012	MANUFACTURING TECHNOLOGY I	0,250
041101312	THE PERSONNEL FUNCTION	0,250
041105512	WORKPLACE DYNAMICS I	0,250
080300512	MOTOR VEHICLE ENGINEERING I	0,250
081812112	FOOTWEAR TECHNOLOGY I	0,250
081812212	TYRE TECHNOLOGY I	0,250
100109312	TEXTILE TECHNOLOGY I	0,250
130300112	LABOUR LAW	0,250
150304212	MICROBIOLOGY I	0,250
160801612	APPLIED STATISTICS I	0,250
040400922	WORK STUDY II	0,250
040922322	PRODUCTION MANAGEMENT II	0,250
040921522	PRODUCTION MANAGEMENT TECHNIQUES II	0,250
081812322	FOOTWEAR TECHNOLOGY II	0,250
081812422	TYRE TECHNOLOGY II	0,250
040401003	WORK STUDY III	0,250
040921403	PRODUCTION MANAGEMENT III	0,250
040921603	PRODUCTION MANAGEMENT TECHNIQUES III	0,250
060200403	OPERATIONAL RESEARCH III	0,250
081812503	TYRE TECHNOLOGY III	0,250
	END-USER COMPUTING.	

REMARKS

- (1) COMPULSORY INSTRUCTIONAL OFFERINGS:
WORK STUDY I II
PRODUCTION MANAGEMENT I II III
OPERATIONAL RESEARCH III OR
APPLIED STATISTICS I
- (2) OPTIONAL INSTRUCTIONAL OFFERINGS:
A MINIMUM OF A FURTHER 1.00 FORMAL CREDIT
MUST BE OFFERED, WHICH MUST INCLUDE 0,25
CREDITS AT LEVEL III IF APPLIED STATIS-
TICS I IS CHOSEN IN (1)

VOEDSELTEGNOLOGIE I
KOSTEBEREKENING EN -BERAMING
FINANSIELE BEGINSELS IN PRODUKSIE I
WERKSTUDIE I
BESTUURSBEGINSELS EN -PRAKTYK I
PRODUKSIEBESTUUR I
VERVAARDIGINGSTEGNOLOGIE I
DIE PERSONEELFUNKSIE
WERKPLEKDINAMIKA I
MOTORVOERTUIGINGENIEURSWESE I
SKOEISELTEGNOLOGIE I
BUIEBANDTEGNOLOGIE I
TEKSTIELTEGNOLOGIE I
ARBEIDSREG
MIKROBIOLOGIE I
TOEGEPASTE STATISTIEK I
WERKSTUDIE II
PRODUKSIEBESTUUR II
PRODUKSIEBESTUURSTEGNIEKE II
SKOEISELTEGNOLOGIE II
BUIEBANDTEGNOLOGIE II
WERKSTUDIE III
PRODUKSIEBESTUUR III
PRODUKSIEBESTUURSTEGNIEKE III
OPERASIONELE NAVORSING III
BUIEBANDTEGNOLOGIE III

OPMERKINGS

- (1) VERPLIGTE ONDERRIGAANBIEDINGE:
WERKSTUDIE I II
PRODUKSIEBESTUUR I II III
OPERASIONELE NAVORSING III OF
TOEGEPASTE STATISTIEK I
- (2) KEUSE-ONDERRIGAANBIEDINGE
'N MINIMUM VAN 'N VERDERE 1,00 FORMELE
KREDIETE MOET AANGEBIED WORD WAT 0,25
KREDIETE OP VLAK III MOET INSLUIT AS TOE-
GEPASTE STATISTIEK I IN (1) GEKIES IS-

NATIONAL DIPLOMAS

- (3) POINTS OF EXIT:
 (3.1) NATIONAL CERTIFICATE : PRODUCTION
 MANAGEMENT (3104081)
 THIS QUALIFICATION MAY BE AWARDED TO A
 CANDIDATE ON COMPLETION OF AT LEAST ONE
 (1,0) FORMAL CREDIT OF THIS INSTRUCTIONAL
 PROGRAMME
 (3.2) NATIONAL HIGHER CERTIFICATE : PRODUCTION
 MANAGEMENT (3104082)
 THIS QUALIFICATION MAY BE AWARDED TO A
 CANDIDATE ON COMPLETION OF AT LEAST TWO
 (2,0) FORMAL CREDITS OF THIS INSTRUCTIONAL
 PROGRAMME
 (4) THIS INSTRUCTIONAL PROGRAMME REPLACES THE
 NATIONAL DIPLOMA : PRODUCTION MANAGEMENT
 3204072

NASIONALE DIPLOMAS

- (3) UITTREPUNTE:
 (3.1) NASIONALE SERTIFIKAAT : PRODUKSIEBESTUUR
 (3104081)
 HIERDIE KWALIFIKASIE KAN AAN 'N KANDIDAAT
 TOEGEKEN WORD NA VOLTOOIING VAN MINSTENS
 EEN (1,0) FORMELE KREDIET VAN HIERDIE
 ONDERRIGPROGRAM
 (3.2) NASIONALE HOER SERTIFIKAAT : PRODUKSIE-
 BESTUUR (3104082)
 HIERDIE KWALIFIKASIE KAN AAN 'N KANDIDAAT
 TOEGEKEN WORD NA VOLTOOIING VAN MINSTENS
 TWEE (2,0) FORMELE KREDIETE VAN HIERDIE
 ONDERRIGPROGRAM
 (4) HIERDIE ONDERRIGPROGRAM VERVANG DIE
 NASIONALE DIPLOMA : PRODUKSIEBESTUUR
 3204072



UNIVERSITY
 OF
 JOHANNESBURG

INSTRUCTIONAL OFFERING : FINANCIAL PRINCIPLES IN
PRODUCTION I

CODE : 040113412

EXAMINATION : WRITTEN EXAMINATION RECOMMENDED

S Y L L A B U S

1. Elements of cost
2. Methods of costing and costing systems
3. Financial aspects of:
 - 3.1 Purchase procedure
 - 3.2 Stores procedure
4. Basic concepts of cash flow
5. Elements of overhead costs
6. Financial aspects of budgeting
7. Budgetary control
8. Basic concepts of financing projects

INSTRUCTIONAL OFFERING : COSTING AND ESTIMATING

CODE : 040103812

INSTRUCTIONAL PROGRAMME(S) : N Dip : PURCHASING MANAGEMENT 3204095
N Dip : ORGANISATION AND WORK STUDY:
FACTORIES 3204101
N Dip : ORGANISATION AND WORK STUDY:
OFFICES 3204102
N Dip : PRODUCTION MANAGEMENT 3204106
N Dip : MUNICIPAL ADMINISTRATION 3221182

EXAMINATION : 1 x 3 HOURS

S Y L L A B U S

1. Introduction
 - 1.1 An understanding of double-entry bookkeeping
 - 1.2 Debits and credits
 - 1.3 Assets and liabilities
 - 1.4 Income and expenditure
 - 1.5 Simple final accounts and balance sheet
2. Cost accounting.
 - 2.1 Definition - relationship to financial accounting - objectives
 - 2.2 Types of costing, unit, operating, job, batch, multiple etc.
 - 2.3 Elements of cost
 - 2.4 Apportionment allocation and recovery of overheads. Methods used
 - 2.5 Causes of inefficiencies - lost time, idle time, spoilage, wastage of materials, inadequate utilisation of plant and facilities
3. Forecasting and budgetary control
 - 3.1 Short and long term forecasting of demand
 - 3.2 The necessity for production forecasts
 - 3.3 Relation of forecasts and budgets
 - 3.4 Budgetary control: Definition and objectives, budget period
Contents of master budget

- 3.5 Functional budgets: Sales, production, materials, plant and equipment utilisation, labour, manufacturing expenses, maintenance, capital expenditure, purchases, financial
 - 3.6 Flexible budgets and varying levels of production capacity
 - 3.7 Relationship between budgetary control and standard costing
4. Standard costing
- 4.1 Cost control accounts and cost centres
 - 4.2 The establishment of standard costs - direct materials, direct labour, variable and fixed overheads
 - 4.3 Variance analysis
 - 4.3.1 material usage, price, cost, mixture
 - 4.3.2 labour
 - 4.3.3 Idle capacity
 - 4.4 Variable overheads and expenditure
 - 4.5 Other elements of cost - indirect labour and materials; selling, distribution and administration
5. Capital expenditure
- 5.1 Evaluation of projects, method of evaluation, justification of cost
 - 5.2 Capital expenditure control
 - 5.3 Depreciation - rates of depreciation, method of calculating
 - 5.4 Obsolescence, amortisation, depletion

7.

INSTRUCTIONAL OFFERING : FOOD TECHNOLOGY

CODE : 010301012

INSTRUCTIONAL PROGRAMME(S) : N Dip : BREWING TECHNOLOGY: SORGHUM 3201050
N Dip : AGRICULTURE: INSPECTION SERVICES:
ANIMAL PRODUCTS 3201057
N Dip : AGRICULTURE: INSPECTION SERVICES:
PLANT PRODUCTS 3201058
N Dip : FOOD TECHNOLOGY 3215178

EXAMINATION : 1 x 3 HOURS

S.Y.L.L.A.B.U.S

1. Source, composition and properties of:

- 1.1 Cereals and cereal products
- 1.2 Sugar and sugar products
- 1.3 Fats and oils
- 1.4 Fruits and vegetables
- 1.5 Meat and meat products
- 1.6 Dairy products
- 1.7 Fish and fish products
- 1.8 Food additives

2. General principles and application of:

- 2.1 Cooling, freezing, pasteurization, sterilization
- 2.2 Dehydration
- 2.3 Irradiation
- 2.4 Chemical preservation
- 2.5 Concentrating
- 2.6 Biological preservation

INSTRUCTIONAL OFFERING : WORK STUDY I

CODE : 040400812

EXAMINATION : WRITTEN EXAMINATION RECOMMENDED

S Y L L A B U S

1. Introduction to work study
2. Productivity
3. Method study
4. Work measurement (time study)
5. Human factors in work study
6. Ergonomics
7. Computer applications



UNIVERSITY
OF
JOHANNESBURG

INSTRUCTIONAL OFFERING : PRODUCTION MANAGEMENT I
CODE : 040921212
EXAMINATION : WRITTEN EXAMINATION RECOMMENDED

S Y L L A B U S

1. Introduction to PM
2. Product/service design
3. Application of forecasting
4. Facilities planning and layout
5. Capacity management
6. Aggregate planning
7. Introduction to quality management

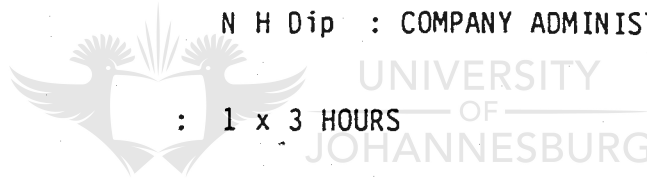


INSTRUCTIONAL OFFERING : MANAGEMENT PRINCIPLES AND PRACTICE I

CODE : 040901712

INSTRUCTIONAL PROGRAMME(S) : N P Cert : BUSINESS EDUCATION 3104007
 N H Cert : PERSONNEL MANAGEMENT 3104037
 N H Cert : SAFETY MANAGEMENT 3104039
 N Dip : MARKETING AND SALES MANAGEMENT
 3204088
 N Dip : MANAGEMENT 3204089
 N Dip : PRINTING MANAGEMENT 3204090
 N Dip : ORGANISATION AND WORK STUDY:
 OFFICES 3204102
 N Dip : PERSONNEL MANAGEMENT 3204104
 N Dip : PRODUCTION MANAGEMENT 3204106
 N Dip : SAFETY MANAGEMENT 3204112
 N Dip : MANAGEMENT OF TRAINING 3204300
 N Dip : CREDIT CONTROL 3204301
 N H Dip : COMPANY ADMINISTRATION 3504216

EXAMINATION : 1 x 3 HOURS



S Y L L A B U S

1. Evolution of management

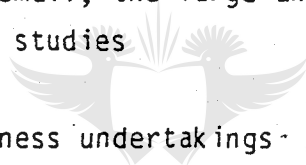
- 1.1 A short history of the development of industry from the industrial revolution - the work of Adam Smith
- 1.2 What is management?
- 1.3 The importance of management
- 1.4 Schools of management
- 1.5 Scientific management (1890 - 1916)
- 1.6 Administrative management (1930 - 1950)
- 1.7 Behavioural science 1950
- 1.8 Management science - 1950
- 1.9 Management - a quantitative perspective
- 1.10 Case studies

2. The practice of management

- 2.1 The role of management
- 2.2 The jobs of management
- 2.3 The challenge to management
- 2.4 What is a business?
- 2.5 What is our business and why should it be?
- 2.6 The objectives of a business
- 2.7 Today's decisions for tomorrow's results
- 2.8 The principles of production
- 2.9 Managing managers
- 2.10 Management by objectives and by self-control
- 2.11 The manager's job - individual tasks and team tasks
- 2.12 The span of managerial responsibility - the manager's authority
- 2.13 The manager and his superior
- 2.14 The spirit of an organisation
- 2.15 What kind of structure?
- 2.16 Building the structure
- 2.17 The small, the large and growing business
- 2.18 Case studies

3. Small business undertakings

- 3.1 Entrepreneurship: Personal characteristics and outlook on work and life
- 3.2 Managing a section or department in a large organisation compared to managing your own small business undertaking
- 3.3 Goal setting and the entrepreneur
- 3.4 The new venture idea
- 3.5 Analysing the new venture's feasibility
- 3.6 Forms of business ownership
- 3.7 How to establish a new business
- 3.8 Planning and organising a new business
 - 3.8.1 studying the economic environment of the business
 - 3.8.2 how to establish a new business
 - 3.8.3 planning for the new business
 - 3.8.4 planning the legal, financial and administrative structure of the new business



- 3.9 How to enter an existing business
 - 3.9.1 what you are paying for when buying a business
 - 3.9.2 steps in investigating a business for purchasing
- 3.10 Producing the product or service
 - 3.10.1 operations - converting inputs to outputs
 - 3.10.2 designing and controlling work
 - 3.10.3 purchasing and controlling materials
- 3.11 Marketing the product or service
 - 3.11.1 developing marketing strategies
 - 3.11.2 sales forecasting, pricing and promoting
 - 3.11.3 selling the product or service
- 3.12 Profit planning and control
 - 3.12.1 evaluating the financial position and operations
 - 3.12.2 maintaining adequate and accurate records
 - 3.12.3 planning for a profit
 - 3.12.4 short-term vs long-term funds
 - 3.12.5 accounts receivable
 - 3.12.6 inventory management and control
 - 3.12.7 liquidity
 - 3.12.8 turnover
- 3.13 Case studies

4. Planning

- 4.1 The purpose and nature of planning
- 4.2 Steps in planning
- 4.3 Long-, medium- and short-term planning
- 4.4 The hierarchical nature of objectives and hence of planning: corporate strategic and operational planning
- 4.5 Planning, execution and control as an iterative process
- 4.6 Planning tools: the computer, production schedules, systems analysis, PERT, CPM, the budget
- 4.7 Benefits of effective managerial planning
- 4.8 Case studies

5. Organising

- 5.1 The concept of organisation
- 5.2 The organisation and its environment
- 5.3 Five important functions that organisations may provide: An efficient work system; a system of communication; a meaningful job content for each job; organisational and individual identities; introduction of meaningful innovations and the rapid adaptation to change
- 5.4 The formal organisation
- 5.5 Common basic organisation units
- 5.6 Additional organisation units
- 5.7 Organisation structure and co-ordination
- 5.8 Means of departmentation, centralisation and decentralisation
- 5.9 Evaluating centralisation and decentralisation
- 5.10 Concepts of authority
- 5.11 Psychological and social influences upon authority
- 5.12 Limits of authority
- 5.13 Responsibility defined
- 5.14 Co-equality of responsibility and authority
- 5.15 Source of responsibility
- 5.16 Types of authority and organisational relationships, line authority. Staff authority
- 5.17 Line and staff organisation
- 5.18 Line and staff relations
- 5.19 Advisory staff authority
- 5.20 Service staff authority
- 5.21 Control staff authority
- 5.22 Functional staff authority
- 5.23 The "assistant to" manager
- 5.24 Organisation charts titles
- 5.25 Case studies

6. Leading

- 6.1 The leader and manager; self-knowledge, self-control, self-discipline and self-development. Setting priorities, creative thinking and management of time
- 6.2 The concept of management leading

6.3 The activities of management leading: Initiating, decision-making, communicating, motivating, appraising people, selecting people, developing people, building teamwork

6.4 Case studies

7. Controlling

7.1 Importance and purposes of controls

7.2 Over-controlling and under-controlling

7.3 The essence of control systems

7.4 Criteria effective control systems

7.5 Cost-benefit analysis

7.6 Control over money

7.7 Control over physical resources

7.8 Control over administrative systems

7.9 Control over production systems

7.10 Control over organisation

7.11 Control over manpower

7.12 Performance appraisals and evaluation of results

7.13 Management corrective action

7.14 Case studies

8. The nature of managerial work

8.1 What do managers do?

8.2 Contemporary views of the manager's job

8.3 Some distinguishing characteristics of managerial work

8.4 The manager's working roles

8.5 Variations in manager's work

8.6 Science and the manager's job

8.7 The future of managerial work

8.8 Questions on case studies will not be set in the examination

ONDERRIGAANBIEDING : DIE PERSONEELFUNKSIE

KODE : 041101312

ONDERRIGPROGRAM(ME) : N Dip : DRUKKERYBESTUUR 3204090
 N Dip : INKOOPBESTUUR 3204095
 N Dip : ORGANISASIE EN WERKSTUDIE:
 FABRIEKE 3204101
 N Dip : PRODUKSIEBESTUUR 3204106
 N Dip : VEILIGHEIDSBESTUUR 3204302

EKSAMEN : 1 x 3 UUR

S I L L A B U S

1. Inleiding - die aard en omvang van industriële sielkunde en sy verband met personeelbestuur
2. Individuele en groepverskille
 - 2.1 Liggaamlike en verstandelike vermoëns
 - 2.2 Persoonlikheid
 - 2.3 Temperament
 - 2.4 Emosies
 - 2.5 Intelligensie
 - 2.6 Die behoeftes van die mens
3. Voorsiening in arbeidsbehoefte
 - 3.1 Beplanning van mannekragbehoefte
 - 3.2 Taakontleding
 - 3.3 Taakbeskrywing
 - 3.4 Taakspesifikasie
 - 3.5 Arbeidsomset
 - 3.6 Werwing
 - 3.7 Arbeidsbronne
 - 3.8 Keuring en plasing van personeel

- 3.9 Onderhoudtegnieke
- 3.10 Opneming en oriëntering van nuwe werknemers
- 4. Opleiding en ontwikkeling van personeel
 - 4.1 Opleidingsbehoefte in 'n organisasie
 - 4.2 Die leerproses
 - 4.3 Vaardighedsopleiding
 - 4.4 Opleidingsmetodes en -tegnieke
 - 4.5 Opleidingsprogramme
 - 4.6 Ontwikkeling van werknemers se potensiële vermoëns
 - 4.7 Evaluering van opleiding
 - 4.8 Prestasiewaardering - die doel, omvang en basiese prosedures daarvan
- 5. Die werksituasie
 - 5.1 Die aard van die werk
 - 5.2 Die invloed van omgewingsfaktore op die produktiwiteit van werkers
 - 5.3 Ongelukke en veiligheid
 - 5.4 Welsyn en gesondheid
 - 5.5 Nywerheidswetgewing en diensvoorwaardes
- 6. Besoldiging van arbeid
 - 6.1 Loonbeleid en -beginsels
 - 6.2 Taakevaluering en die vasstelling van lone en salarisse
 - 6.3 Bevorderingsbeleid en -praktyk
 - 6.4 Vakansiebonusse, pensioen- en mediese hulpskemas
 - 6.5 Loonaftrekkings en betaalrekords
 - 6.6 Tydopneming en klokkaarte
 - 6.7 Werkmeting
 - 6.8 Finansiële aansporingskemas gebaseer op individuele en groepsprestasie
- 7. Bestuur van mense en werkmotivering

- 7.1 Die studie van groepsgedrag
 - 7.2 Formele en informele organisasie
 - 7.3 Die rol van kommunikasie
 - 7.4 Die rol van toesighouer in personeelbestuur
 - 7.5 Dissipline en raadgewing
 - 7.6 Leierskap en menseverhoudings
 - 7.7 Moreel
 - 7.8 Werkmotivering en taakbevrediging
 - 7.9 McGregor se teorie x en teorie y
 - 7.10 Maslow se teorie
 - 7.11 Herzberg se motivering - higiëneteorie
 - 7.12 Bestuur en motivering
 - 7.13 Taakverryking
 - 7.14 Patrone van doeltreffende toesig
8. Menslike verhoudings
- 8.1 Die verskillende groepe onder die werkers in die Suid-Afrikaanse nywerheid (wat tans in die proses van industrialisasie is)
 - 8.2 Hul kultuur en omgewing
 - 8.3 Plattelandse invloed en gebruike
 - 8.4 Probleme wat uit die verstedeliking van plattelandse mense voortspruit
 - 8.5 Hul behoeftes, begeertes en doelwitte
 - 8.6 Sensiwiteitsgebiede
9. Die verwantskap tussen werkstudiepersoneel en lynpersoneel
- 9.1 Verantwoordelikheid en gesag van werkstudiebeamptes
 - 9.2 Behoefte om te motiveer en samewerking te verkry
 - 9.3 Moets en moenies

INSTRUCTIONAL OFFERING : MANUFACTURING TECHNOLOGY I

CODE : 041008012

EXAMINATION : WRITTEN EXAMINATION RECOMMENDED

S Y L L A B U S

1. Safety and safety legislation
2. Manufacturing methods, techniques and processes
3. Identification and application of materials
4. Evaluation of materials/parts/methods and equipment
5. Management of materials, in process
6. Computer



UNIVERSITY
OF
JOHANNESBURG

INSTRUCTIONAL OFFERING : WORKPLACE DYNAMICS I
CODE : 041105512
EXAMINATION : WRITTEN EXAMINATION RECOMMENDED

S Y L L A B U S

1. Production environment
2. Human behaviour in the production environment
3. Group behaviour in the production environment
4. Communication skills required for the production environment
5. Legal aspects in the production environment
6. Negotiating skills required in the production environment and the application of these skills
7. Performance expectations in the production environment
8. Reward systems applicable to the production environment
9. Evaluate and implement production personnel administrative procedures

<u>INSTRUCTIONAL OFFERING</u>	:	END-USER COMPUTING I
<u>CODE</u>	:	060501312
<u>EXAMINATION</u>	:	PRACTICAL: THE PRACTICAL ABILITIES OF CANDIDATES MUST BE ASSESSED THROUGHOUT THE STUDY PERIOD AND MUST BE TAKEN INTO ACCOUNT WHEN DETERMINING THE FINAL MARK
	:	FORMAL EXAMINATION - 1 X 3 HOURS

S Y L L A B U S

1. COMPUTER BACKGROUND THEORY

- 1.1 Historical background
- 1.2 Concept definitions
- 1.3 Operating system concepts
- 1.4 Information organization
- 1.5 Telecommunications
- 1.6 Application programmes: Background knowledge on various application packages
- 1.7 PC hardware and software acquisition
- 1.8 Security

2. PRACTICAL

Experience of a package in each of the following fields:

- 2.1 MS DOS commands and file management
- 2.2 Word processing
- 2.3 Spreadsheets and graphics
- 2.4 Record, file and database management programs
- 2.5 Use of a specific application package in the study field of the student

INSTRUCTIONAL OFFERING : TEXTILE TECHNOLOGY WI
CODE : 110204612
INSTRUCTIONAL PROGRAMME(S) : N Dip : STANDARDIZATION: TEXTILE
PRODUCTS 3210158
EXAMINATION : 1 x 3 HOURS

S Y L L A B U S

1. General aspects

- 1.1 Organization of the textile industry in South Africa
- 1.2 Sources of information for the textile industry
- 1.3 Sequence of manufacturing procedures and principles involved

2. Yarns

2.1 Yarn production

- 2.1.1 Basic principles of spinning yarn from staple fibres
- 2.1.2 Production of yarns on the cotton spinning system and their characteristics
- 2.1.3 Production of yarns on the worsted spinning system and their characteristics
- 2.1.4 Production of yarns on the woollen spinning system and their characteristics
- 2.1.5 Conversion of flax fibres into yarns; yarn characteristics
- 2.1.6 Conversion of jute fibres into yarns; yarn characteristics
- 2.1.7 Modifications of above systems, e.g. semi-worsted system

2.2 Unconventional methods of yarn production

- 2.2.1 Principle of open-end spinning
- 2.2.2 Principle of self-twist spinning
- 2.2.3 Principle of twistless spinning
- 2.2.4 Principle of integrated composite spinning
- 2.2.5 Comparison of yarn properties with those of yarns spun on conventional systems
- 2.3 Principle of texturizing
 - 2.3.1 By the false-twist method
 - 2.3.2 By the knit-deknit method
 - 2.3.3 By edge crimping
 - 2.3.4 By the stuffer-box method
 - 2.3.5 Properties of texturized yarns and of fabrics made from them
- 2.4 Principle of tow conversion
 - 2.4.1 Tow to top system
 - 2.4.2 Tow to yarn spinning system
- 2.5 Doubling and cabling
 - 2.5.1 Principles of doubling and cabling
 - 2.5.2 The effect on the properties and uses of the yarns produced
- 2.6 Expression of yarn linear density
- 3. Preparatory processes for doubling, weaving, and knitting
 - 3.1 Winding for doubling
 - 3.2 Winding for knitting
 - 3.2.1 Weft knitting
 - 3.2.2 Warp knitting
 - 3.3 Warp and weft preparation for weaving

- 3.3.1 Winding for warping with reference to Barber-Colman spooler, 'Baromatic' cone winder, Schlafhorst 'Auto-coner', etc.
- 3.3.2 Warp beam preparation (sectional and direct warping) with reference to Barber-Colman warper, Schlafhorst warper, etc.
- 3.3.3 Sizing: processes, preparation of size (without chemical details), sizing machines
- 3.3.4 Weft preparation: different methods of pirn winding, including loom winding systems

4. Weaving and woven fabrics

4.1 Principles of weaving

- 4.1.1 Basic mechanisms (shedding, picking, beating-up, letting-off, taking-up)
- 4.1.2 Classification of weaving machinery
- 4.1.3 Description of shedding mechanisms (tappet, dobby, jacquard)
- 4.1.4 Types of picking mechanisms (shuttle, rapier jet, etc.)
- 4.1.5 Let-off and take-up mechanisms

4.2 Construction of elementary weaves

- 4.2.1 Plain
- 4.2.2 Twill
- 4.2.3 Satin (sateen)

4.3 Developments of weaves from elementary bases

- 4.3.1 Ribs, hopsack, huckaback, honeycomb, etc
- 4.3.2 Barathea, pointed twill, broken twill, herringbone, etc.
- 4.3.3 Cords, pile weaves (warp and weft)
- 4.3.4 Basic structures of carpeting

4.4 Properties of fabrics

- 4.4.1 Basic mechanical properties

- 4.4.2 Properties due to weave structure
- 4.4.3 Properties and end-uses of cotton fabrics
- 4.4.4 Properties and end-uses of woollen and worsted fabrics
- 4.4.5 Properties and end-uses of synthetic and blended fabrics

5. Knitting machines and knitted fabrics

- 5.1 General aspects (main parts of knitting machines, machine gauge, housing and movement of the needles, supply and feeding of the yarn, take-down devices)
- 5.2 Loop formation (with latch, bearded, and compound needles, with or without sinkers)
- 5.3 Basics of knitting machines and influence on fabric properties
 - 5.3.1 V-bed flat knitting and flat-bed purl knitting machines
 - 5.3.2 Open-top and cylinder-and-dial knitting machines
 - 5.3.3 Straight bar and sinker wheel machines
 - 5.3.4 Hosiery and speciality machines
 - 5.3.5 Tricot and raschel warp knitting machines
- 5.4 Basics of knitted structures and influence on fabric properties
 - 5.4.1 Jersey fabrics (fabrics containing floats, tuck loops, and transferred loops; plated fabrics; pile fabrics, laid-in fabrics, Fair Isle fabrics, warp-stitch fabrics)
 - 5.4.2 Rib and interlock fabrics (welt-stitch formations, double piqué, tuck fabrics, rib jacquard and blister fabrics, principles of racking, rib transfer, plain and patterned purl fabrics)
 - 5.4.3 Warp-knitted fabrics made with two or more guide bars on one or two sets of needles (including locknit, shark-skin, Queen's cord, laid-in fabrics, mesh and piqué fabrics, plush, shell-stitch, and fall-plate fabrics)

6. Finishing of textiles

- 6.1 General principles
 - 6.1.1 Improvement of appearance
 - 6.1.2 Improvement of serviceability

6.2 Finishing of wool fabrics

- 6.2.1 Perching
- 6.2.2 Knotting and mending
- 6.2.3 Crabbing
- 6.2.4 Scouring
- 6.2.5 Milling
- 6.2.6 Drying
- 6.2.7 Raising
- 6.2.8 Cropping
- 6.2.9 Decatizing
- 6.2.10 Pressing

6.3 Finishing of cotton and other fibres

- 6.3.1 Perching
- 6.3.2 Singeing
- 6.3.3 Desizing
- 6.3.4 Scouring
- 6.3.5 Bleaching
- 6.3.6 Calendering
- 6.3.7 Raising
- 6.3.8 Comprehensive shrinkage and stenter overfeed
- 6.3.9 Mercerizing
- 6.3.10 Application of resins and special finishes
- 6.3.11 Coating

INSTRUCTIONAL OFFERING: LABOUR LAW

CODE: 130300112

INSTRUCTIONAL PROGRAMMES: ND PRINTING MANAGEMENT
ND HUMAN RESOURCES MANAGEMENT
ND PRODUCTION MANAGEMENT
ND ORGANISATION AND WORKSTUDY

EXAMINATION PAPERS: 1

LENGTH OF EACH PAPER: 3 HOURS

CORE SYLLABUS

1. *The common law contract of service*

2. *A study of the following legislation (with amendments)*

2.1 *Manpower Training Act 56 of 1981*

2.2 *Guidance and Placement Act 62 of 1981*

2.3 *Labour Relations Act 28 of 1956*

2.4 *Wage Act 5 of 1957*

2.5 *Basic conditions of Employment Act 3 of 1983*

2.6 *Machinery and Occupational Safety Act 6 of 1983*

(This Act has been replaced by the Occupational Health and Safety Act 85 of 1993)

2.7 *Workmen's Compensation Act 30 of 1941*

(This Act has been replaced by the Compensation for Occupational Injuries and Diseases Act 130 of 1993)

2.8 *Unemployment Insurance Act 30 of 1966.*

INSTRUCTIONAL OFFERING : MICROBIOLOGY I

CODE : 150304212

INSTRUCTIONAL PROGRAMME(S) : N Dip : BREWING TECHNOLOGY: SORGHUM 3201050
 N Dip : PLANT PROTECTION 3201065
 N Dip : VETERINARY TECHNOLOGY 3209154
 N Dip : MEAT HYGIENE 3209155
 N Dip : MICROBIOLOGY 3215173
 N Dip : FOOD TECHNOLOGY 3215178
 N Dip : WATER CARE 3215179

EXAMINATION : 1 x 3 HOURS (INTERNAL)

S Y L L A B U S

1. Introduction
2. Microscopy
3. General properties and differences of the protista, myceta and monera
4. General properties and differences of the eucariots, procariots and virusses
5. General principles of microbial nutrition, growth and culture media
6. Sterilisation and control of micro-organisms
7. Aseptic techniques and pure culture techniques
8. Basic terminology and principles of microbial metabolism
9. Practicals

NAME OF OFFERING: OPERATIONAL RESEARCH
LEVEL: 2 CODE: 060206203
NO OF EXAMINATION PAPERS: Internal evaluation by Technikon
DURATION OF EACH PAPER: N/A

1. Introduction
2. Descriptive techniques
3. Probability and probability distributions
4. Sample selection and sampling theory
5. Operational sample design
6. Hypothesis testing
7. Nonparametric methods
8. Regression analysis
9. Decision theory and "Bayesian" probability
10. Using the computer



UNIVERSITY
OF
JOHANNESBURG

INSTRUCTIONAL OFFERING : APPLIED STATISTICS

CODE : 160801612

INSTRUCTIONAL PROGRAMME(S) : N Cert : COMPUTER DATA PROCESSING 3106028
 N Dip : ORGANISATION AND WORK STUDY:
 FACTORIES 3204101
 N Dip : PRODUCTION MANAGEMENT 3204106
 N Dip : COMPUTER DATA PROCESSING 3206116

EXAMINATION : 1 x 3 HOURS

SYLLABUS

1. Presentation of numerical data

Tabulation - collection and presentation
 Diagrams and graphs; frequency distributions

2. Descriptive statistics

Norms of localisation, distribution and form: averages, median and mode, standard and mean deviations, quartiles and range

Correlation coefficients and grade correlations as criteria of association

Introduction to statistical noting (down). Standardised deviates

3. Elementary calculations of probabilities

Addition and multiplication of probabilities

Statistical independence. Binomial and Poisson distributions. The use of χ^2 as a test for goodness of fit

4. Sampling

Probability distribution as the limit of a frequency distribution. The use of expected values. The estimation of probability distribution parameters from samples. Standard errors

INSTRUCTIONAL OFFERING : WORK STUDY II

CODE : 040400922

EXAMINATION : WRITTEN EXAMINATION RECOMMENDED

S Y L L A B U S

1. Revision of work study techniques
2. Compiling of operations procedures
3. Further work measurement (techniques)
4. Application of ergonomics
5. Indices of production factors
6. Presentation techniques
7. Computer applications
8. Value analysis

INSTRUCTIONAL OFFERING : PRODUCTION MANAGEMENT II

CODE : 040921322

EXAMINATION : WRITTEN EXAMINATION RECOMMENDED

S Y L L A B U S

1. Management functions
2. Business functions
3. Inventory management
4. Master production schedule
5. Material requirements planning
6. Just-in-time systems
7. Scheduling of operations
8. Quality management

INSTRUCTIONAL OFFERING : PRODUCTION MANAGEMENT
TECHNIQUES II

CODE : 040921522

EXAMINATION : WRITTEN EXAMINATION RECOMMENDED

S Y L L A B U S

1. Involved formulation of decision problems, more than two variables
2. The simplex method of solving LP problems and sensitivity analysis
3. Involved transportation and assignment models
4. Pert/CPM, including making time-cost trade offs
5. Complex waiting line models
6. Inventory control
7. Decision analysis
8. Game theory
9. Decision analysis
10. Learning curve theory
11. Use of computer in solving of problems
12. Case studies and practical projects on all the above techniques

INSTRUCTIONAL OFFERING : WORK STUDY III
CODE : 040401003
EXAMINATION : WRITTEN EXAMINATION RECOMMENDED

S Y L L A B U S

1. Introduction
2. Systems analysis and design
3. Performance improvement programmes (project work)
4. Computer applications



UNIVERSITY
OF
JOHANNESBURG

INSTRUCTIONAL OFFERING : PRODUCTION MANAGEMENT
TECHNIQUES III

CODE : 040921603

EXAMINATION : WRITTEN EXAMINATION RECOMMENDED

S Y L L A B U S

1. Multi-dimentional LP problems
2. Matrix algebra
3. Involved LP problems, sensitivity analysis and dual simplex algorithm
4. Making changes to the LP problem, adding of constraints and all types of variables, changes to the RHS
5. Duality theory, sensitivity analysis
6. Solving of transportation and assignment models using LP
7. Integer programming, graphical and simplex
8. Dual simplex algorithm
9. Case studies of LP problems and practical projects
10. Dynamic programming, case studies
11. Simulation modelling, Monte Carlo method, inventory control, waiting line, practical case studies, design of simulation experimants, projects
12. Maintenance techniques
13. Quality techniques
14. Computer applications of operations management techniques

INSTRUCTIONAL OFFERING : OPERATIONAL RESEARCH

CODE : 060200403

INSTRUCTIONAL PROGRAMME(S) : N Dip : COMPUTER DATA PROCESSING 3206116

EXAMINATION : 1 x 3 HOURS

S Y L L A B U S

1. Review of statistics and probability
2. Replacement models
3. Inventory models and systems
4. Monte Carlo simulation.
5. Queuing or waiting line theory
6. Linear programming
7. Transportation and assignment problems
8. Sensitivity analysis for linear programming
9. Network analysis
10. Computer packages for the above topics

INSTRUCTIONAL OFFERING : PRODUCTION MANAGEMENT III

CODE : 040921403

EXAMINATION : WRITTEN AND PRACTICAL EVALUATION
THE PRACTICAL ABILITIES OF CANDI-
DATES MUST BE ASSESSED THROUGHOUT
THE STUDY PERIOD AND MUST BE
TAKEN INTO ACCOUNT WHEN DETER-
MINING THE FINAL MARK

S Y L L A B U S

1. Project management
2. Application of quality management
3. Maintenance management
4. Case studies/projects and assignments in all topics covered in PM I, PM II and PM III. This will enable students to practice decision making and analysis involving situations as found in industry and commerce

ANNEXURE E

CURRENT CURRICULUM OF THE B – TECH:PRODUCTION MANAGEMENT

UNIVERSITY OF
JOHANNESBURG

BACCALAUREI TECHNOLOGIAE

3304006 BACCALAUREUS TECHNOLOGIAE: PRODUCTION MANAGEMENT

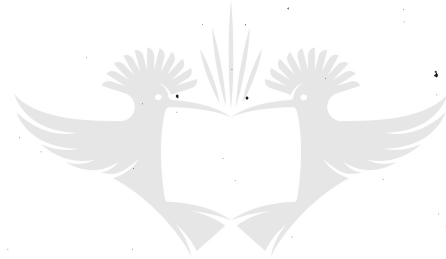
DATE OF IMPLEMENTATION: JANUARY 1996

MINIMUM EXPERIENTIAL TIME IN YEARS: 0,0 MINIMUM FORMAL TIME IN YEARS: 1,0

CODE	CREDIT	INSTRUCTIONAL OFFERING
040918212	0,050	RESEARCH METHODOLOGY
041001612	0,200	INTRODUCTION TO MARKETING MANAGEMENT I
040300103	0,250	FINANCIAL PLANNING AND CONTROL III
040907706	0,250	PRODUCTION MANAGEMENT IV
040908106	0,250	PRODUCTION MANAGEMENT TECHNIQUES IV

REMARKS

(1) COMPULSORY INSTRUCTIONAL OFFERINGS:
ALL THE INSTRUCTIONAL OFFERINGS



UNIVERSITY
OF
JOHANNESBURG

479
BACCALAUREI TECHNOLOGIAE

N: NEW/NUUT R: REVISED H: HERSIEN

N-3304006 BACCALAUREUS TECHNOLOGIAE: PRODUCTION MANAGEMENT
BACCALAUREUS TECHNOLOGIAE: PRODUKSIEBESTUUR

DATE OF IMPLEMENTATION:/JANUARY 1996
DATUM VAN INSTELLING: JANUARIE 1996

K C
R R
E E
D D
I I
E T
T

MINIMUM EXPERIENTIAL TIME IN YEARS:/ 0,0
MINIMUM ERVARINGSTYD IN JARE:

MINIMUM FORMAL TIME IN YEARS:/ 1,0
MINIMUM FORMELE TYD IN JARE:

040918212 RESEARCH METHODOLOGY
041001612 INTRODUCTION TO MARKETING MANAGEMENT I
040300103 FINANCIAL PLANNING AND CONTROL III
040907706 PRODUCTION MANAGEMENT IV
040908106 PRODUCTION MANAGEMENT TECHNIQUES IV
Adv. Rec

0,050
0,200
0,250
0,250
0,250

NAVORSINGSMETODOLOGIE
INLEIDING TOT BEMARKINGSBESTUUR I
FINANSIËLE BEPLANNING EN BEHEER III
PRODUKSIEBESTUUR IV
PRODUKSIEBESTUURSTEGNIEKE IV

REMARKS
(1) COMPULSORY INSTRUCTIONAL OFFERINGS:
ALL THE INSTRUCTIONAL OFFERINGS

OPMERKINGS
(1) VERPLIGTE ONDERRIGAANBIEDINGE:
AL DIE ONDERRIGAANBIEDINGE

UNIVERSITY
OF
JOHANNESBURG

ANNEXURE F

SYLLABUS CONTENT OF THE B- TECH PRODUCTION MANAGEMENT

**UNIVERSITY OF
JOHANNESBURG**

AM VAN AANBIEDING: INLEIDING TOT BEMARKINGBESTUUR I
 NAME OF OFFERING: INTRODUCTION TO MARKETING
 MANAGEMENT I

AK: 4 KODE: 041001612
 LEVEL: CODE:

TOTAL VRAESTELLE: Internal evaluation by Technikon
 OF EXAMINATION PAPERS:

DURATION OF EACH PAPER: N/A

Modern marketing

The market

The product

Distribution Structure

Pricing policy and pricing systems

Promotional activities

Planning and evaluation of marketing strategies

Case studies on all the topics mentioned above



UNIVERSITY
 OF
 JOHANNESBURG

AANBIEDING: NAVORSINGSMETOLOGIE
OFFERING: RESEARCH METHODOLOGY

4 KODE: 0409....06
CODE:

VRAESTELLE: Internal evaluation by Technikon
EXAMINATION PAPERS:

WELKE VRAESTEL: N/A
NUMBER OF EACH PAPER:

aim and importance of research
focus in research
development of the techniques required to conduct a research project.
Introduction to Design of Experiments



NAM VAN AANBIEDING: FINANSIELE BEPLANNING EN BEHEER III
 NAME OF OFFERING: FINANCIAL PLANNING AND CONTROL III

SAK: 3 KODE: 040300103
 WEL: CODE:

WAT VRAESTELLE: Internal evaluation by Technikon
 AANTAL VAN EXAMINATIEPAPERS:

DUUR VAN ELKE VRAESTELLE: N/A
 DUUR VAN ELKE PAPIER:

Elements of costs in production

Fixed and variable costs

Marginal costs and break-even analysis

The concept of contribution and profitability of marginal products

Planning and controlling plant and equipment expenditure

Sources of funds for financing plant and equipment

Long term investment decisions

Budgeting and budgetary control

The relationship between the production manager and the cost accountant

Computer software application

NAAM VAN AANBIEDING:
 NAME OF OFFERING:

PRODUKSIEBESTUUR IV
 PRODUCTION MANAGEMENT IV

WYK 4
 VRAESTEL:

KODE: 0409....06
 CODE:

WYK VAN VRAESTELLE:
 NAME OF EXAMINATION PAPERS:

Internal evaluation by Technikon

WYK VAN ELKE VRAESTEL: N/A
 DESCRIPTION OF EACH PAPER:

- Product planning and competitive priorities
- Process design
- New technologies
- Production Management Systems
- Materials requirement planning (MRP)
- Total Quality Management (TQM)
- World Class Manufacture (WCM)
- Project management
- Strategic management
- Service operations management
- Total Productivity Maintenance (TPM)
- Packaging logistics
- Computer software application



UNIVERSITY
 OF
 JOHANNESBURG

NAM VAN AANBIEDING: PRODUKSIEBESTUURSTEGNIEKE IV
NAME OF OFFERING: PRODUCTION MANAGEMENT TECHNIQUES IV

NO. OF PAPER: 4
KODE: 0409....06

WATERSKRAEFT: Internal evaluation by Technikon
OF EXAMINATION PAPERS:

NO. OF EACH PAPER: N/A
DESCRIPTION OF EACH PAPER:

Expert Systems

Non-linear Programming

Simulation

Advanced Linear Programming

Goal Programming

Markovian Models

New Technologies

Computer software Applications



UNIVERSITY
OF
JOHANNESBURG