CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

This research revolves around the impact of Advanced Manufacturing Technologies in Indian Manufacturing industries. Statistics inculcates that a number of industries subsists, which are using different forms of Advanced Manufacturing Technologies. “Advanced Manufacturing Technology” is a generic term, depicting an assembly of manufacturing technologies, which combines both extent and scale capabilities in a manufacturing environment. Advanced manufacturing technology is broadly defined by distinguished authors in their terminologies; Small and Chen, say, it is “An automated production system of people, equipment and utensils for the planning and control of the production process, including the procurement of materials, parts and constituents and the shipment and service of completed products”. In meticulous, Advanced Manufacturing Technology (AMT) can be defined as any new manufacturing technique, which is likely to cause constructive changes in a firm’s manufacturing practices, management systems and its approach for the designing and production of various engineering products. Advanced Manufacturing Technologies are classified into two classes: hardware and software by Small and Yasin (1997).

(I) Pure Technical tools (hardware)
(II) Management tools (manufacturing practice software)

Pure Technical tools or Advanced Technical tools (hardware) can be further classified into the following range of technologies:
(A) Computer aided design (CAD)  
(B) Computer aided manufacturing (CAM)  
(C) Computer numerical control machines (CNC)  
(D) Direct numerical control machines (DNC)  
(E) Robotics  
(F) Computer aided engineering (CAE)  
(G) Group technology (GT)  
(H) Flexible manufacturing system (FMS)  
(I) Automated material handling systems (AMHS)  
(J) Automated guided vehicles (AGV)  
(K) Bar coding (BC)  
(L) Automated storage and retrieval system (AS/RS)  
(M) Rapid prototyping (RP)  

The Manufacturing Practice Software or Production Management tools are additionally classified into the following array of technologies:  
(A) Material requirement planning (MRP)  
(B) Manufacturing resource planning (MRP II)  
(C) Enterprise resource planning (ERP)  
(D) Activity based counting (ABC)  
(E) Office automation (OA)  
(F) Kaizen  
(G) Total quality management (TQM)  
(H) Recycling  
(I) Business process re-engineering (BPR)  
(J) Statistical process control (SPC)  
(K) Just – in – time (JIT)  
(L) Benchmarking (BM)  
(M) Management training (MT)
A manufacturing industry can prefer to compete primarily in one of the two ways – either on cost leadership or on production differentiation, in order to produce similar products at a comparatively lower price, or producing a superior product that differs from its competitors. It is argued that by investing in Advanced Manufacturing Technologies (AMTs), manufacturers would be able to enhance their competitiveness. In other words, AMTs can allow a growth in production of a wide range of varied products, while at the same time, can minimize the overall production cost.

Successful industries have recognized the fact that technology has become a vital competitive tool for success, and the industries are trying to leverage it for their competitive environment. It is a general agreement that the implementation of Advance Manufacturing Technology is a critical component for a firm’s success. The most significant competitive weapon, however, does not comprise in the range of technologies, but their effective deployment, implementation and ultimately their management. Many organizational, management procedures and policies have been developed to decrease the overall uncertainty in the traditional manufacturing systems. These constraints are reduced or have been possibly eradicated with the use of advanced technology. The usage of computer networks and automated machines provides an efficient information and feedback mechanism, not only for the manufacturing system; but also for the tedious and prolonged systems. “Automated processing times” are extremely reliable; the produced data reports from their machines are authentic, unbiased and in the nick of time, thus most of traditional manufacturing management systems, industrial engineering methodology and operational research techniques for increasing the efficiency and effectiveness of manufacturing systems are irrelevant in today’s competitive scenario.

The implementation of AMT affects not only the manufacturing division of a plant, but also the Marketing, Person Resource, Research and Development, and Engineering Design divisions. These technologies transform the design of
a plant as well as the relationship between these various interconnected units. The relationship between the firm and its customers also changes; for example, firms can adjust to frequent changes with respect to the demand, more quickly and would be able to offer superior quality, lesser lead times, and enhanced reliability. For organizations that have successfully implemented AMT, the benefits have been outstanding. The liberalization of the economy has opened new windows of opportunities for the Manufacturing sector. Overall the growth of manufacturing industry is sustained on modernizations, investigate and expansion.

This thesis intends to address the competitive priority, level of investment in the Advanced Manufacturing Technology and effect of the AMT on the manufacturing performance in Manufacturing Industries.

A structured questionnaire has been developed to qualify the presumptions; the questionnaire which is used in this study has been incorporated with inputs from various sources: most of the questions have been adapted from formerly published works and henceforth, the preliminary draft of the questionnaire was discussed with the academic scholars and practitioners. The questionnaires were administered by post or mail, accompanying a covering letter to a total of 240 industries, out of which 68 industries reverted back with their data. After the compilation and analysis of the received data, investigation has been carried out on the following key points related to the Manufacturing Industries and AMT.

1.) Manufacturing strategy of manufacturing industry
2.) Different types of advanced manufacturing technologies
3.) Level of investment on AMT
4.) Effect on manufacturing performance after accomplishment of AMT
5.) Efficiency enhancement of manufacturing industries by adoption of AMT (Case Study)
The liberalization of the economy has opened new windows of opportunity for the manufacturing sector. An increase in the success of Manufacturing Industries is dependent upon Innovations, Research and Development. It is critical not only to remain competitive but also, a series of other significant advantages could be gained by developing and commercializing of new-age technologies.

1.2 MANUFACTURING SCENARIO IN INDIA

1.2.1 AN OVERVIEW

The manufacturing sector plays a significant role in the economy of almost every country in this world, and certainly in all the developed countries. In 1990, India and China had almost the same Gross domestic product (GDP) per capita. After that, driven by its manufacturing sector, China’s economy has grown faster than India’s and its GDP per capita on a PPP basis is 90% higher than India’s Gross domestic product per capita. To attain more rapidly rates of monetary growth, India immediately needs to make stronger its own manufacturing sector. The Indian economy is going firmly on the path of stable growth, even throughout the last decade when other countries were in the grip of a massive slowdown – India continued to enjoy a comfortable economic position.

The growth in the manufacturing sector is dependent on the investment climate. The structural reforms since the 1990 have made some progress, despite of the current setbacks, it is generally recognized that the reform process in India can’t be reversed, and sooner or later these reforms would be executed. Nevertheless, the long term competitive capability of Indian industries would depend on their manufacture efficiency. Manufacture efficiency, in order, is dependent on the ability to develop, import and adapt for new-age technologies, amongst some other factors. India has made a
significant progress in various spheres of science and technology over the last few years and takes pride in having a strong network of Science and Technology organizations, skilled manpower and an inventive knowledge base. Considering the rapid pace of globalization, fast-depleting material resources, and increasing competitiveness among different nations, a need to protect intellectual property and strengthening of technology base have become an important issue. While India’s technical talent is recognized worldwide, there have been serious institutional gaps in promoting industry-research methodology and interaction with various institutes.

The structural transformation of the Indian economy over the last three decades had been spectacular, mainly due to the growth of its services segment, which now reports for about fifty per cent of the GDP. However, the rapid growth in the service sector which is attaining maturity, before the growth in the manufacturing industry is not a strong indication. An information-based financial system cannot be maintained in the long run unless it is adequately supported by a growing manufacturing financial system. Furthermore, a service financial system cannot persist to thrive on a long-term basis in a country where over eighty per cent of the population is educated below the middle-school level. Some sectors, such as Information Technology and Pharmaceuticals, compete globally, employing perhaps 2% of the population and bringing wealth to various parts of India. At the same time, around 60% of the population remains dependent upon the Agricultural segment, distribution less than one-quarter of India’s GDP. Without reforms, the Agriculture will continue to suffer from prevalent under-employment, low wages and depend on the monsoon. This will result in continued urban immigration, but without the expansion of an industrial segment this will lead to a rise of unemployment in many cities. This recognizes that the growth of this pattern is unsustainable.

It is estimated that India needs to create 8-9 million new jobs every year, besides of Agriculture to stay at its current unemployment level of seven
percent. Manufacturing jobs are ideal for workers, transitioning them out of Agriculture as service jobs require a high level of education and expertise. The revitalization of manufacturing segment can create close to 2.6 Million new jobs every year. With the removal of all quantitative restrictions on imports and the falling import tariffs under the world trade organization regime, it becomes a bigger concern for the Indian industry to improvise its competitive edge.

1.2.2 SOME REMARKS

Indian manufacturing industries have always been pushed from the protected environment of the license-permit-quota regime to an uncertain environment of liberalization, privatization and globalization, which provides intense Global competition. Indian industries quite often follow an opportunistic approach with respect to growth as opposed to the capability-driven approach and paid very little strategic attention to their shop floors in the last few decades. Now gradually Indian manufacturing industries have started re-organizing themselves, as per driven by their Global competition. In view of the emerging competitive scenario, it is envisioned that Advanced Manufacturing Technologies would be needed for Indian industries to:

- Respond to business policy or corporate objectives
- Correct present weakness or to exploit strengths
- Cope up with the anticipated environmental changes
- Get distinguishing capability which is currently not available
- Make manufacturing function strong
- Achieve performance objectives

In the background it is pertinent to ask:

- How had Indian manufacturing industries responded to the challenges of their competitors?
- What is the role of Advanced Manufacturing Technologies?
Earlier there was a lesser strategic emphasize on manufacturing overpowering focus on structural decisions, such as capacity planning, make v/s buy, and so on. The typical measures of performance were included such as: capacity, planning, utilization of men and machines, labor productivity and manufacturing cost, supply driven environment, manufacturing thrived without much regard to manufacturing excellence, building long term capabilities, benchmarking, global standards improvising on supplier's capabilities and installing quality assurance systems. Following are the characteristics of the Indian manufacturing industry:

- Supplier driven environment
- Lack of customer focus
- Control and command regime of government
- More emphasize on structural decisions such as capacity addition and make v/s buy
- No emphasize on innovation
- Lack of strategic focus
- Manufacturing synonymous with the production
- Reactive role of manufacturing
- Performance measure like utilization of men, machine, material etc.
1.3 INDIAN MANUFACTURING INDUSTRY

Manufacturing is made up of many diverse sectors, each of which is swayed by the overall-manufacturing ambiance. From the Indian perspective, the major manufacturing sectors are Machinery, Automobile, Electronics and Process Industries.

1.3.1 AUTOMOBILE INDUSTRY

Automotive industry comprises of the automobile and auto component sector, which is one of the key segment of Indian economy with extensive forward and backward linkage with other segments of the economy. The Indian auto component industry has grown exponentially in the past some years, as India has evolved into being a preferred destination for sourcing by Original Equipment Manufacturers and because of the growth of its domestic auto industry. The attractiveness of Indian industry can be explained by the fact that presently around 12 global auto giants have set up their international purchasing offices in India and 150 more are expected. India offers original equipment manufacturers a great cost-quality proposition, thus making it a preferred destination for outsourcing. Indian manufacturers enjoy the advantages of cheaper raw materials and availability of educated, qualified and skilled labor as well as engineers and designers at a comparatively lower cost. Technological advancements which have been made by some of these domestic players, have allowed them to become an integrated partner rather than just another outsourcing partner. Indian automobiles and components are gaining an escalating acceptance in the international market due to their cost competitiveness. The industry expects its growth to continue as domestic manufacturers have acquired superior technological skills. The high export growth rate can be attributed with the improvement in the industry’s export capabilities and the increasing Global recognition of their competence.
Automotive components which are manufactured in India are of finer quality and used as the original components for vehicles made by top international companies such as Mercedes, General Motors and others.

Indian industries are no longer restricting themselves with merely component manufacturing. They are also focused on using their expertise in CAD/CAM and in designing and engineering capabilities by entering into designing and development of components for new product. For example, Toyota Kirloskar will be developing the transmission systems for the entire global requirements of a new vehicle platform of the Toyota. India’s automotive component industry manufactures an entire range of parts, which are required for vehicle manufacturing. To meet international quality requirements and for tapping with the international market, the Indian auto ancillary units have entered into joint ventures with various Multi National Companies. India holds a favorable position in order to potentially capture a market in exports. It should do so by primarily targeting on components where it has an advantage over other Low Cost Countries (e.g., in skill-intensive components) or in components where it is comparable with them (e.g., simple labor - intensive components, steel, rubber and aluminium-intensive components). This competitiveness is due to its inherited advantage in Engineering skills and emerging capability for continuous improvement as compared with other Low Cost Countries.

1.3.2 ELECTRICAL & ELECTRONICS INDUSTRY

In India, the electrical engineering industry has a diverse industrial base with significant unorganized market. It is estimated that the light engineering sector contributes to 8-10% of the total exports of country. The exports from the light engineering industry in India mainly consist of structured steel manufactured goods, motorbikes, cycles and auto parts, electronics, electrical, telecommunication and mechanization utensils, hand and appliance apparatus, fans, strains and pumps, and metal appliance tool parts.
The electrical engineering industry is an assorted industry with a number of distinctive sectors and sub sectors. These sectors include low-tech items like forgings, castings and fasteners to the extremely complicated micro-processor based process control equipments and diagnostic medical apparatus. This cluster also comprises industries like bearings, steel tubes and channels etc. The manufactured goods covered under the engineering industry are largely used as an input in the capital goods industry.

1.3.3 MACHINE TOOLS

Machine Tool industry is the backbone of any financial system. It is the mother industry of Capital Goods segment which in turn determines the share of manufacturing in GDP of any country. The Indian machine tools industry’s growth is directly linked to the growth of the Manufacturing /Engineering industry. The Indian engineering industry uses all types of machine tools. Due to India’s rapid modernization, engineering industry has altered its paradigm to work with respect of green field projects as well as the upgrading of existing facilities.

The primary users of machine tools are in the automotive, automotive and ancillaries, railways, agriculture, fertilizers, electronics, electrical, telecommunications, textile machinery, ball and roller bearings, engineering valves, power-driven propels, multi-manufactured goods engineering industries, earth moving equipments, compressors and user products industry sectors. The Indian appliance apparatus industry manufactures a range of both conventional and computer numerically controlled (CNC) products such as metal cutting and metal forming tools. Indian firms also offer many special function machines, robotics and handling arrangements. The Indian Machine Tools Manufacturers Association believes that CNC will be the driving force for the Indian machine tool industry in the future. Approximately seventy five percent of the Indian machine tool producers have received an ISO
Government of India-owned Hindustan Machine Tools Limited (HMT) is the single largest producer of tools. Public Sector Enterprises like Hindustan Machine Tools Limited and Heavy Engineering Corporation Limited besides Mysore Kirloskar Limited have played a significant role in the industrialization of India in the pre-liberalization era. During a period of the past fifty years, India has also established more than thousands companies in the private sector to produce machine tools, both in small sector as well as medium sector to meet the need of the manufacturing sector. However, Liberalization of Indian economy in 1991 sincerely impaired the performance of this sector because of various ailments of protected economy, which involves: high cost, obsolete technologies, sectioned size, low investments, poor Research & Development base etc. Today, the arrangement of the machine tool industry is rather skewed, eighty percent production coming from large industries and balance from other fragmented small size industries. There still remain technological gaps between Indian machinery and machines from Germany or Japan who are world leaders. These gaps broadly comprise in the following categories:

(a) Specifications – Rapid rates, tool change times, maximum spindle speed etc., are higher than those of Indian machines. This becomes clear if one compares the specifications of Indian machines with those of the Japanese.

(b) Appearance – Though Indian machines have improved considerably over the past few years, but they still lag behind with those which are produced by countries such as Japan and Germany, with respect to presentation details and appearance. This is because of the amount of attention that these countries pay to details. The difference in appearance can arise, because of an unfavorable combination of color schemes, curves and contours of the cladding, methods of fastening the covers etc.

(c) Reliability – Reliability is a feature, which is not reflected in appearance or presentation, but is extremely important to a customer. Some Indian manufacturers score higher than imported machines on after sales service and
spare parts supply. However, they are lower on stipulation and uptime. Several imported machines have such negligible downtime that for the customer, Indian advantage is just not relevant. Indian manufacturers need to monitor MTBF (Mean Time between Failures) and MTTR (Mean Time to Repair).

(d) Technology – Although Indian machine tools industry has succeeded to a significant extent in bridging the technological gaps that existed with producers in advanced countries such as Japan, USA, Germany; still a significant gap exists in areas such as Turning Centers, Machining Centers and NC Grinders, and particularly in the area of Gear-Cutting machines.

1.3.4 PROCESS INDUSTRY

Process industry includes industries which manufacture cement, steel, petrochemicals, fertilizers, drugs and medicine. India is the fourth largest producer of cement in the world after China, Germany and USA. India also produces crude steel, which makes it one of the ten largest steel producers in the world. A diversity of grades is manufactured and the quality is at par with producers such as South Korea and the US. Increased demands from China as well as strong domestic demand, particularly by consumer-durables, automotive manufacturers and the construction sector are the key drivers of production growth. Around forty percent of output is produced in integrated steel plants; the remaining comes from various existing mini-plants, among which the maximum number of plants comes from the private sector.

In today’s scenario, the Indian Pharmaceutical industry occupies the front rank among various science-based industries of country, with wide ranged capabilities in the complex fields of drug manufacturing and technology. A highly prearranged sector, the Indian Pharmaceutical Industry is estimated to be growing at about 8 to 9 percent annually.

The Indian Pharmaceutical sector is highly fragmented with more than twenty thousand recorded units. It has extended significantly in the last two decades.
India is the third largest producer of fertilizers in the world. The major factor which is responsible for the improved production includes the improvement in the feedstock supply position.

1.4 ADVANCED MANUFACTURING TECHNOLOGY

The definitions of Advanced Manufacturing Technology, which has been adopted by researchers, are often not uniform, and the presence of ambiguity of terms and notations often leads to an unnecessary and unintended controversy in Research. Accordingly this section establishes the position and meaning of the fundamental terms as used in this thesis.

The following classifications have been reviewed and used as background for deriving the definition of Advanced Manufacturing Technology.

- As defined by Small and Yasin (1997), AMT can be described as a group of computer-based technologies, including computer-aided Design (CAD), Robotics, Flexible Manufacturing System (FMS), Automated Material Handling systems (AMHS), and Computer Numerically Control (CNC) or Automated techniques.
- As defined by Y. Park (2000), AMT is “a comprehensive collection of technologies for enhancing the efficiency and flexibility of manufacturing systems”.
- As defined by Seetharaman, A. (2003), AMT involves new manufacturing techniques and machines combined with information knowledge, microelectronics and innovative organizational practices in the manufacturing process.
- As defined by Honggeng Zhou, G. Keong Leong (2009), AMTs provide a variety of operational benefits, which includes better coordination between different departments; greater control of the
processes; reduced product design time; shorter lead time and stable, high-quality outputs.

The AMTs investigated in this study can be grouped into six domains based on the literature of AMT studies. The six domains are:

1. Advanced design and engineering technologies: It concerned with design and engineering technologies such as CAD, CAM, CAE and GT.
2. Advanced machining technologies: It concerned with computer numerical control machines (CNC), numerical control/direct numerical control machines (NC/DNC), flexible manufacturing system (FMS), and robotics.
3. Advanced planning technologies: It concerned with logistic planning such as MRP, MRPII, ERP and ABC analysis.
4. Advanced material handling technologies: It concerned with handling of materials such as AS/RS, AGV, and AMHS etc.
5. Advanced management systems: It concerned with production management tools such as TQM, BPR, SPC, and JIT.
6. Advanced process improvement systems: It concerned with advanced process improvement technologies such as Benchmarking, Kaizen, Training and Recycling.

1.5 MOTIVATION FOR RESEARCH

The way with which manufacturing industries compete in the market has changed drastically. The market is increasingly unpredictable, dynamic and fiercely competitive. One of the foremost behaviors behind the change in the market has occurred because of the rapid expansion of manufacturing capabilities that is partially an effect of the increase in advanced and inexpensive microelectronics-based technologies (cook and cook, 1994) which are often referred to as Advanced Manufacturing Technology (AMT).
Globalization has opened up a new set of challenges to outcome; a shift from “production centric” to “customer-centric’ focus requires that industries should invest in AMT. This should address the question of what to manufacture, for whom and how?

This has to be based on a sound knowledge-base, which anticipates with the change in the environment, not only domestically but also globally. In the past two decades, the concept of Advanced Manufacturing Technologies (AMTs) has received an augmented attention from researchers and the operational managers. As substantiated by the literature, numerous works have been reported on Advanced Manufacturing Technologies in different countries across the globe. The motivation behind the research on Advanced Manufacturing Technology has emerged, because of the occurrence of following gaps, as identified in the literature:

- There are a small number of studies that have been dedicated to the analysis of Advanced Manufacturing Technology, which has been adopted by the Indian Manufacturers.
- A wide spectrum of research in Advanced Manufacturing Technology has focused on specific technologies, with relatively little emphasize on various industrial sectors.
- There does not appear a systematic effort to study cross-sector issues which can investigate the impact of Advanced Manufacturing Technologies.

In view of the above, the research has been aimed to examine the Advanced Manufacturing Technologies practices in Indian manufacturing industries through questionnaire survey and case studies.
1.6 RESEARCH OBJECTIVES & RESEARCH STRATEGY

The purpose of this study is to identify the competitive priorities in organizational structures, to assist in the explanation of the implementation of AMT; and observe the level of investment in advanced manufacturing technologies and manufacturing performance. Recently, due to the poor economic outlook on international markets, the importance of flexibility and efficiency has increased in the manufacturing sector. It is widely recognized that AMTs assist industries in decreasing materials costs, increasing flexibility, and improving productivity. The improvements of efficiency and productivity, as well as the decrement in cost, have resulted in an increased number of implementations of AMTs.

Milgrom and Roberts (1995) proposed that the implementation of AMT must be accompanied by a shift in the supporting aspects of the organization including marketing, human resources, engineering design and management policies. The amount of cooperation and integration required to obtain a successful implementation is extremely higher, in comparison with respect to several traditional forms of production machinery. The Indian manufacturing industry is made up of many diverse sectors, each of which is swayed by the overall manufacturing climate. The major manufacturing sectors are Automobile, Electronics, Machinery and Process Sector. Therefore these sectors have been considered in this research.

The purpose of this research is to assess the status of advanced manufacturing technologies in different sector industries, to identify advanced manufacturing technologies relevant to Indian manufacturing industries, to assess the degree of investment in advanced manufacturing technologies, and to identify AMT implementation steps. The strategies that are of interest to this study are surveyed through a multiple case study. It feels that an individual survey or case study will not reveal a comprehensive and honest picture. So in this study, both parameters have been used.
1.7 OUTLINE OF THE THESIS

The thesis has been organized into eight chapters. As an overview of the whole thesis a brief outline of each chapter has been provided below:

Chapter 1: Introduction:

This chapter has provided a brief background to the topic of the AMT and the motivation behind the study, including an initial identification of the gap in the existing literature and justification for the study. A brief study of a research objective, strategy and methodology, and chapter outlines have also been included to provide a description of the steps and procedures involved in conducting this study.

Chapter 2: Literature Review:

This chapter explores in elucidating with the terminologies to be used within the thesis, i.e. AMT (Advanced Manufacturing Technology). Terms used by the researcher have been carefully defined, in order to establish a clear and an operational definition of variables used in the thesis. Thus this chapter builds a foundation of variables used in the thesis in order to set the boundaries of the study. This chapter examines existing seminal works within the range of multiple literatures that are relevant to this thesis, which mainly includes AMT implementation, strategic management, technology, and production operation management.

Chapter 3: Research Methodology:

This chapter discusses the research approach that has been taken, i.e. the research method and the foundation behind selecting the method, as opposed
to other possible modes of study that could have been followed. Broadly it deals with the survey, the development of the questionnaire, administration of questionnaires, responses received, profile of respondents and reliability and validity of the questionnaire, hypotheses testing and case study.

Chapter 4: Descriptive Analysis:

This chapter presents the descriptive statistics of the industries who participated in this study. This provides essential information of various industries, such as their characteristics, extent of AMT adoption, their manufacturing technology and manufacturing performance in regards to their manufacturing capabilities. These variables have been analyzed with the type of their associated industry.

Chapter 5: Hypotheses testing:

This chapter further explores the survey data and analyses the competitive priority, competitive strength, level of investment in advanced manufacturing technologies and the performances of manufacturing industries. It also provides a detailed result of statistical procedures involved in conducting hypotheses testing, and result based on other multiple approaches.

Chapter 6: Case Studies:

This chapter describes the case studies developed after the observational study of different sectors. In this chapter, the observations have been made of the existing processes, methods in the industry and lastly, the reason behind the implementation of Advanced Manufacturing Technology, with various innovative processes and proposed methods.
Chapter 7: Results and Discussion:

The penultimate chapter begins with a brief recap of profiles of various companies that have been included in this survey. It then discusses the critical success factors and a framework for implementation of Advanced Manufacturing Technology, based upon the observations learned from the survey and case studies.

Chapter 8: Conclusions:

This final chapter highlights the conclusions and implications of the research. It reviews the objective of the research and provides a summary of the findings of the research. It also discusses the implications for research, policy and practices, which also includes suggestions. The chapter concludes with a discussion regarding the limitations of the study and provides several suggestions for future research, contemplating with some final thoughts on the contribution of the thesis entirely.