

**EVALUATION OF THE STATUS OF THE KENYA
MANUFACTURING SECTOR, THROUGH THE HAYES
WHEELWRIGHT FRAMEWORK //**

By

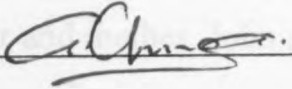
MAINA WILSON GICHINGA

**A Management project submitted in partial fulfillment of the requirements for
the degree of Masters of Business and Administration (MBA), Faculty of
commerce, University of Nairobi.**

OCTOBER 2001

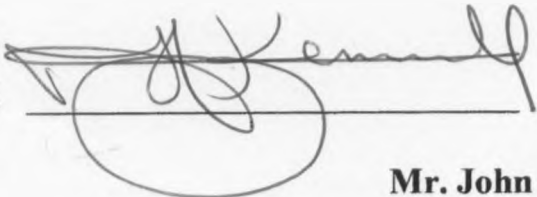
DECLARATION

This management project is my original work and has not been published for a degree in any other university

Signed  Date 29/10/2001

MAINA WILSON GICHINGA

This management project has been submitted for examination with my authority as University Supervisor.

Signed  Date NOV 5, 2001

Mr. John Kenduiwo
Senior Lecturer,
Department of Management Science

DEDICATION

To my Father and mother, John and Mary Gichinga and my brother and sisters Ndegwa, Njoki and Muthoni, for their love, prayers and encouragement in all my academic pursuits, without which this project would have never been a success.

ACKNOWLEDGEMENT

This study has drawn from the talents and sacrifices of very many individuals, some of whom I may not mention by name, nevertheless, their contributions are highly appreciated.

But some individuals deserve special mention. I would like to extend my profound gratitude to my supervisor Mr. John Kenduiwo, whom besides getting me interested in my topic of study went ahead to encourage and support me even when time was clearly not on my side. Despite his demanding schedule as the Dean, Faculty of Commerce, Lecturer in Management science and a PhD researcher, among other roles, he still found time for me when I needed him. I am also grateful to Mr. Julius Kipnegtich especially for his role during the proposal stage.

Particular thanks go to all the organizations and their dedicated staff who spared time out of their extremely busy schedule to fill in my questionnaires that provided data for the completion of the project. The encouragement of the other MBA students and the cooperation from other non academic staff in the various departments of the University of Nairobi, throughout the course is also gratefully acknowledged

I would like to humbly acknowledge my Father and Mother, for the financial and material support, which enabled me to complete this course.

Above all I am grateful to God who makes all things possible, for thus far he has brought me.

TABLE OF CONTENT

CHAPTER 1: INTRODUCTION

1.1 Background.....	1
1.2 Problem statement.....	4
1.3 Objectives of study.....	5
1.4 Significance of the study.....	5

CHAPTER 2: LITERATURE REVIEW

2.1 Manufacturing-missing link in corporate strategy	6
2.2 Stages in the development of manufacturing's strategic role.....	10
2.3 The four stages of development in manufacturing' s strategic role	10
2.3.1 Stage 1 "internally neutral"	11
2.3.2 Stage 2 "externally neutral".....	13
2.3.3 Stage 3 "internally supportive"	14
2.3.4 Stage 4 "externally supportive".....	15
2.4 Contrasting stage 3 and stage 4	17
2.5 The new manufacturing strategy	19

CHAPTER 3: RESEARCH DESIGN

3.1 Population	21
3.2 The sample size and sample design	21
3.3 Data collection.....	22
3.4 Data analysis.....	23

CHAPTER 4: DATA ANALYSIS AND DISCUSSION

4.1 Introduction.....	24
4.2 Overview of the data collected and analyzed	24
4.3 Manufacturing and overall business strategy	25
4.4 Capacity decisions.....	27
4.5 Facility decision	29
4.6 Process technology.....	31
4.7 Vertical integration.....	34
4.8 Workforce and job design.....	35
4.9 Quality.....	38
4.10 Production planning/materials control.....	39
4.11 new product development.....	40
4.12 Performance measurement and reward systems.....	40
4.13 Organization	42

CHAPTER 5: SUMMARY AND CONCLUSION

5.1 Summary and findings	43
5.2 Recommendations	45
5.3 Limitations of study	46
5.4 Suggested areas for further research	47

APPENDIX 1: QUESTIONNAIRE

SELECTED REFERENCES

LIST OF TABLES

TABLE 1.1 Percentage growth and contribution of manufacturing to GDP in Kenya	2
TABLE 4.1 Number of employees.....	24
TABLE 4.2 Attitude of top management:.....	25
TABLE 4.3 Manufacturing Vs. Marketing and Finance	26
Table 4.4 Levels of goal setting.....	26
TABLE 4.5 Maintaining extra capacity.....	28
TABLE 4.6 Objectives for maintaining extra capacity.....	28
TABLE 4.7. Capacity decisions factors.....	29
TABLE 4.8 Facility design.....	30
TABLE 4.9 Degree of equipment specialization.....	30
TABLE 4.10. Age of equipment	31
TABLE 4.11. Source of information.....	32
TABLE 4.12. Objective for adapting new technology.....	32
TABLE 4.13. Developing in-house capabilities.....	33
TABLE 4.14. Perceptions on vertical integration	34
TABLE 4.15. Number of suppliers	35
TABLE 4.16. Workforce involvement in decision-making.....	36
TABLE 4.17. Frequency of job training.....	36
TABLE 4.18. Levels of skills.....	37
TABLE 4.19. Objectives for quality control	38
TABLE 4.20 Quality measurement.....	38
TABLE 4.21. Shop-floor authority	39

TABLE 4.22. New product development	40
TABLE 4.23. Individual vs. organization performance.....	40
TABLE 4.24. Interaction between departments	41
TABLE 4.25. Level of integration	42
Table 5.1 Summary of results for various decision areas	44

ABSTRACT

The study documented the strategic importance of the manufacturing function, of Kenyan firms. The study explored the level of proactiveness of the manufacturing function as a discriminating factor, for manufacturing functions that offered strategic benefits to the firm and those that didn't.

A sample of 45 manufacturing firms in Kenya was studied. The sampling frame was derived from the Kenya association of manufacturers 1998/99 directory, the most current listing of Kenyan manufacturing firms. Efforts were made to ensure representation from all sub-sectors to ensure subsequent generalization.

The study was necessitated by the recognition of the fact that the changing business environment that the country is currently facing necessitated the manufacturers to look for new strategic positioning. The interrelationship between production operations and corporate strategy is not easily grasped, and thus the studies objective to shed more light on this interrelationship. It was also noted that there had been no previous study into the manufacturing sector that focused specifically on manufacturing and its role in corporate strategy.

The findings of the study indicate that, manufacturing accepts a reactive role rather than a proactive role; such a situation was attributed to the state of the economy that seems to encourage marketing and financial control. Additional findings indicated that, the various decision areas in the manufacturing function were at different levels along the Hayes and Wheelwright continuum, but the overall sector had achieved a between stage2 and stage3 level of manufacturing effectiveness, but showed signs of moving towards stage3.

On the findings of this study it was recommended that, there was a need to propagate the concept of stage4 level of effectiveness and to educate and motivate local manufacturing practices to move towards it, since it was noted that, good practices should lead to increased competitiveness.

CHAPTER 1: INTRODUCTION

1.1 Background

In the first two decades following independence, manufacturing output in Kenya increased at the rate of 9-10% per annum on average, with notable expansions in the textile and garments, food, beverages and tobacco production. At the time, public policy targeted import-substituting industries for promotion. The main policy instruments for such promotion included a combination of tariffs and import quotas supported by foreign exchange allocation measures. The exchange rate was also generally overvalued to contain the costs of imported raw material, and credit and interest rates were implicitly subsidized for manufacturing enterprises (economic department, 1994). Manufacturing production was skewed towards consumer goods: beverages, electrical appliances, machinery, paper products, printing, confectionery, and petroleum products.

Helped by high import protection, import-substituting manufacturing was initially successful. However, the scope for such substitution was eventually exhausted so that by mid-1980s, there was a slow down in the rate of growth in manufacturing output. Inward looking policies pursued as part of import-substitution made it difficult for Kenyan exports to penetrate and retain their share of international markets. A substantial share of foreign investment, mainly through multinational corporations, which often enjoyed almost virtual monopoly, was heavily involved in this import substitution process. However, multinational interest began to wane in mid-1970s when the growth rates recorded in the 1960s could no longer be realized (Vaitsos, 1991).

By the end of the 1980s it was evident that the sector was facing major difficulties, which were worsened by structural complications. Public policy therefore shifted from import substitution to export promotion and substitution, to reduce dependence on a narrow range of commodity exports and relax the foreign exchange constraint. Liberalization was also promoted as part of the reform process.

The manufacturing sector's share of GDP increased only marginally in the last three decades. Such a share, which was 10%, on average, in the 1960s and 1970s, increased by only three percentage points up to 1989, and another percentage point during the early part of the 1990s.

TABLE 1.1 Percentage growth and contribution of manufacturing to GDP in Kenya

Year	1964-1973	1974-1979	1980-1989	1990-1995
Growth	9.1%	10.0%	4.8%	3.0%
Contribution	10.0%	11.8%	12.8%	13.6%

(Source: Republic of Kenya's National Development Plan 1997-2001).

The import substitution strategy had led to the accumulation of considerable excess capacity so that exporting industries could not take the slack created by adverse effects of import liberalization on domestic industries. Poor weather conditions in 1991-1993 reduced the capacity for power generation and occasioned power shortages that affected production across the industrial sector, reduced agricultural production, negatively affected agro-based industries.

Despite the policy shift from import substitution to promotion of exports, the structure of the manufacturing sector has not changed significantly. Food processing, for example,

which accounted for 23% of the total manufacturing value added in 1975, increased its share to 37% in 1995, thus retaining its domination of manufacturing value added. Other branches whose share of manufacturing output increased were beverages, plastic production, non-metallic minerals, and metal production. These increases were, however, relatively marginal. The share of some products such as transport equipment, petroleum refineries, wood and cork products, and printing and publishing, declined (Republic of Kenya statistical abstracts).

Kenya's industrial base is therefore still very narrow and tilted in favor of agro-activities. From an international comparative perspective, the sector suffers from low value added, low relative employment, and relatively high wages. The capital and intermediate goods component of the sector are nascent, so that manufacturing in Kenya is highly import dependent, the greater part of the country's imports being accounted for by raw materials, capital goods and spare parts. Except for industries based on natural resources and agriculture, local linkages are weak and unable to generate the requisite growth synergy (Macroeconomic & sectoral choices, 1999).

1.2 Problem statement

The Kenyan economy has, for the last decade witnessed major changes, following the implementation of policies leading to economic liberalization. These changes include removal of import controls, price and foreign exchange controls among many other changes. These changes have dictated that firms adjust their structures, designs, manufacturing processes, corporate culture and general posture to remain competitive.

A number of studies have been carried out in Kenya, addressing the strategic response firms have made to the changing business environment. These studies include Owiye (1999) on Government owned sugar firms, Bett (1995) on the dairy industry, Abekah (1996) on the petroleum industry, Kombo (1997) on the motor industry franchise holders, and Chune (1998) on food manufacturing firms in Nairobi.

Available literature indicates that, so far, no study has attempted to address the demands that these strategic responses are placing on the manufacturing functions of companies. According to Skinner, (1969) the purpose of manufacturing is to serve the company to meet its needs for survival, profit and growth. A company's competitive strategy at a given time places particular demands on its manufacturing function, and conversely, that the company's manufacturing posture and operations should be specifically designed to fulfill the task demanded by strategic plans. Manufacturing management's ability to meet that task is the key measure of its success.

The study will undertake to answer the following:

How the manufacturing function of Kenyan firms serve the firm's strategic needs, and conversely evaluate the general positioning of Kenyan manufacturers manufacturing function within the four stages of the Hayes and Wheelwright framework

1.3 Objectives of study

- i. To investigate the strategic importance of the manufacturing function in the overall competitive business strategy formulation.
- ii. To evaluate the general positioning of Kenyan manufacturers manufacturing function within the four stages of the H-W framework.

1.4 Significance of the study

It is hoped that the study will be of the following significance:

- i. The study will provide an insight of the strategic thinking and practices within manufacturing operations;
- ii. The study will provide a benchmark against which specific operations may be compared to world class manufacturers;
- iii. The study is expected to stimulate interest among managers of the competitive value residing in a company's manufacturing function.
- iv. The study is expected to stimulate interest among academicians and encourage further research in manufacturing strategies.

CHAPTER 2: LITERATURE REVIEW

2.1 Manufacturing-missing link in corporate strategy

A company's manufacturing function typically is either a competitive weapon or a corporate millstone (Skinner, 1969). It is seldom neutral. The connection between manufacturing and corporate success is rarely seen as more than the achievement of high efficiency and low costs. In fact, the connection is much more critical and much more sensitive. Few top managers are aware that what appears to be routine manufacturing decisions frequently come to limit the corporation's strategic options, binding it with facilities, equipment, personnel, and basic control policies to a non competitive posture which may take years to turn around.

Skinner's, (1969) work reveals that top management unknowingly delegates a surprisingly large portion of basic policy decisions to lower levels in the manufacturing area. Generally, this abdication of responsibility comes about more through a lack of concern than by intention. And it is partly the reason that many manufacturing policies and procedures developed at lower levels reflect assumptions about corporate strategy, which are incorrect or misconstrued.

When companies fail to recognize the relationship between manufacturing decisions and corporate strategy, they become saddled with seriously non-competitive production systems, which are expensive and time consuming to change. An examination of top management perceptions of manufacturing has led Skinner, (1969) to some notion about basic causes of many production problems. In his work he found top executives delegate excessive amounts of manufacturing policy to subordinates, avoid involvement in most

production matters, and fail to ask the right questions until their companies are in obvious trouble. Skinner (1969) attributed this pattern to a combination of two factors:

- i. A sense of personal inadequacy, on the part of top executives, in managing production. (Often the feeling evolves from a tendency to regard the area as a technical or engineering specialty, or a mundane "nuts and bolts" segment of management.)
- ii. A lack of awareness among top executives that a production system inevitably involves trade-offs and compromises and so must be designed to perform a limited task well, with that task defined by corporate strategic objectives.

The first factor is, off course, dependent in part on the second, for the sense of inadequacy would not be felt if the strategic role of production were clearer. The second factor recognizes that a production system can be designed to do some things well, but at the expense of other abilities. It appears to be the lack of recognition of these trade-offs and their effects on a corporation's ability to compete, that leads top management to delegate often-critical decisions to lower technically oriented staff levels, and to allow policy to be made through apparently unimportant operating decisions.

Frequently the interrelationship between production operations and corporate strategy is not easily grasped. The notion is simple enough namely, that a company's competitive strategy at a given time places particular demands on its manufacturing function, and

conversely, that the company's manufacturing posture and operations should be specifically designed to fulfill the task demanded by strategic plans (Skinner, 1969).

The purpose of manufacturing is to serve the company to meet its needs for survival, profit and growth. Manufacturing is part of the strategic concept that relates a company's strengths and resources to opportunities in the market. Each strategy creates a unique manufacturing task. Manufacturing management's ability to meet that task is the key measure of this success.

Manufacturing policy must stem from corporate strategy, and that the process of determining this policy is the means by which top management can actually manage production. Use of this process can end manufacturing isolation and tie top management and manufacturing together. The sequence is simple but vital (Skinner, 1969):

- i. It begins with an analysis of the competitive situation, of how rival companies are competing in terms of product, markets, policies, and channels of distribution. Management examines the number and kind of competitors and opportunities open to its company.
- ii. Next comes a critical appraisal of the company's skills and resources and of its present facilities and approaches.

- iii. The formulation of company strategy: How is the company to compete successfully, combine its strengths with market opportunities, and define niches in the markets where it can gain advantages?
- iv. Define the implications or "so what" effects of company strategy in terms of specific manufacturing tasks. I.e. what will be demanded of manufacturing in terms of costs, deliveries, lead times, quality levels, and reliability? These demands should be precisely defined.
- v. The fifth step is to study the constraints or limitations imposed by the economics and the technology of the industry. These factors are generally common to all competitors. An explicit recognition of them is a prerequisite to a genuine understanding of the manufacturing problems and opportunities.
- vi. This is the key step in integrating and synthesizing all the prior ones into one broad manufacturing policy. The question for management is: "Given the facts of the economics and technology of the industry, how do we set ourselves up to meet the specific manufacturing task posed by our particular competitive strategy?"
- vii. The final step is to work out programs of implementation, controls, performance measures, and review of procedures.

2.2 Stages in the development of manufacturing's strategic role

At the simplest level, one can think of one's manufacturing organization as either making a contribution to one's business strategy or not. Hayes and Wheelwright (1985) indicate that manufacturing can play at least four major roles in a firm's competitive strategy. These four, roles, or stages of development, fall along a continuum and, given the inertia of most large organizations, any enhancement of manufacturing's competitive contribution tends to take place through systematic movements from one stage to an adjacent one. It is seldom possible to skip an entire stage by piling "more resources" on the problem. Given the step-by-step nature of this process a firm should begin by identifying where it is currently along the continuum, and the factors that have led it to be there, before it embarks on the pursuit of the next stage (Hayes & Wheelwright, 1985).

2.3 The four stages of development in manufacturing's strategic role

Stage 1 is the most passive and least progressive view of manufacturing and its competitive role, while stage 4 is the most aggressive and progressive role, i.e. the manufacturing function plays a more proactive role in leading other functional areas in the contribution to the development of the overall corporate strategy. This means that the manufacturing function should not be content with the passive role of merely supporting the corporate level strategy, but rather, it should contribute actively to the initial conception and development of the corporate strategy itself. This thinking is reaffirmed in Hayes et al. (1985) and also alluded to by Schroeder et al. (1986) where their empirical data suggest that there is room for more manufacturing influence over marketing, at least in some cases.

2.3.1 Stage 1 “internally neutral”

Consists essentially of an internally neutral perspective: management regards manufacturing as neutral at best and seeks simply to minimize any negative impact that it might have. Manufacturing is not expected to make any significant positive contribution. Some characteristics of organizations in this stage include the following (Hayes and Wheelwright, 1985):

- i. They tend to call in outside experts when “obvious” strategic issues involving manufacturing occasionally arise. The implication is clear—the manufacturing organization cannot be relied on to handle such important issues by itself.
- ii. They tend to rely on detailed measurements of and controls over operating performance as the primary means for ensuring that manufacturing does not get too far off track before top management’s attention is attracted and corrective action is brought to bear. In essence, this detailed performance measurement/evaluation system works as an early warning system that guard against the potentially negative impact of manufacturing.
- iii. In making structural manufacturing decisions, their goal is generally to keep manufacturing in a flexible and reactive position so that it does not get “locked in” to the wrong set of facilities and processes.

This view of manufacturing according to Hayes and Wheelwright (1985) is particularly prevalent:

- i. In large consumer product firms, as well as companies whose manufacturing function is considered relatively straight forward (and therefore not likely to have much impact on the firm's overall competitive position).
- ii. In companies whose manufacturing process is considered relatively simple and straightforward and not therefore not likely to have much impact on the firm's overall competitive position.
- iii. In companies where the manufacturing technology employed is regarded as relatively standard, and therefore something to be acquired from an outside equipment suppliers rather than developed within the company.
- iv. In firms that tend to view their production process as representing a set of "once and for all" decisions. (I.e. a narrow view of technology).
- v. In firms where changes occur only when new products absolutely require it, or when additional capacity is being added.
- vi. This stage is prevalent in high technology companies that tend to confine their attention to product technology and exclude process technology.

2.3.2 Stage 2 “externally neutral”

The second stage of manufacturing’s strategic role can be characterized in terms of a form of neutrality. Firms in this stage, however, seek competitive neutrality (parity with major competitors) on the manufacturing dimensions, rather than internal neutrality. Therefore this stage is described as externally neutral. Like firms in stage 1, firms in stage 2 see manufacturing’s role as neutral at best, but they define that role in relation to “industry practice”.

Competitive neutrality is sought in the following ways:

- i. “Industry practice” is followed in matters regarding the workforce (for example though industry wide bargaining agreements with national unions), equipment (buying processing equipment from the same suppliers who serve major competitors), and capacity additions (by timing such additions to follow the pattern set by others).
- ii. The operations planning horizon is extended to indicate an entire business cycle (and performance is averaged over that cycle when comparing the competitive success of the major players in the industry).
- iii. Capital investments are the favored means for gaining competitive advantage. The only way that manufacturing competence can contribute to this advantage is through judicious timing in these capital investments.

This view of manufacturing according to Hayes and Wheelwright (1985) is particularly prevalent in:

- i. Firms that do not consider manufacturing to be technically sophisticated to expect their product development people to design a new production process whenever a new product requires it.
- ii. Firms that tend to rely on sources outside manufacturing to provide improvements in their process technology, rather than expecting their manufacturing function to develop them itself.

2.3.3 Stage 3 “internally supportive”

The third stage is one in which the firms expects its manufacturing organization to provide credible and significant support to its overall competitive strategy. This stage is described as internally supportive, in that manufacturing’s contribution is derived from and dictated by a business strategy. In this role manufacturing would:

- i. Screen decisions to be sure that they are consistent with the business strategy.
- ii. Translate the business strategy into implications and terminology that are meaningful to manufacturing.
- iii. Actively seek to identify longer-term developments and trends that may have a significant impact on the success of the manufacturing organization. Management recognizes the values of having a manufacturing strategy and begins to employ such devices as plant charters and mission statements in structuring and guiding manufacturing activities over an extended time horizon.

It is possible to pursue advanced manufacturing practices while in stage 2, but firms that do so tend to regard them as strictly defensive moves-as a means for keeping up with their industry. Stage 3 firms, on the other hand, see technological progress as a natural response to changes in the firm's strategy or competitive position.

The transition from stage 2 to a stage 3 perspective often is precipitous and dramatic: the firm suddenly becomes aware that it is in serious manufacturing trouble. The managers of such companies discover that they have to become "enlightened" quickly regarding the actions required to regain their manufacturing competitiveness. Stage 2 firms may also be driven to move to stage 3 when strong new competitors enter their market.

2.3.4 Stage 4 "externally supportive"

The fourth and final stage of manufacturing's strategic role is when a firm's competitive strategy is based to a significant degree on its manufacturing capabilities. In such firms the role of manufacturing is what Hayes and Wheelwright (1985) call externally supportive. Characteristics of stage four firms include the following:

- i. They anticipate the potential of new manufacturing practices and technologies and seek to acquire expertise in them long before their implications are fully apparent.

- ii. Manufacturing's credibility and influence within the company make it possible to extract the full potential from such manufacturing-based opportunities, because other functions cooperate with complementary efforts.
- iii. They develop long-range business plans in which manufacturing capabilities are expected to play a major part in securing the company's strategic objectives. The manufacturing organization is viewed as a strategic resource that is a source of strength by itself as well as a means for enhancing the contribution of other functions. Manufacturing is "externally supportive" in that it is seen as a means for attaining a significant advantage in the firm's external environment.

Firms that pursue a stage 4 manufacturing strategy are generally of two types:

- i. One comprises those firms whose business strategy places primary emphasis on a manufacturing based competitive advantage. That advantage is usually low cost.
- ii. The other type of stage four firms consists of those that seek a balance of excellence in all of their functions and pursues "externally supportive" roles to play if they are to realize their maximum potential. Manufacturing is regarded as an equal partner in the enterprise, capable of providing input to others as well as managing itself.

2.4 Contrasting stage 3 and stage 4

In stage 3, manufacturing considerations are incorporated in the firm's overall strategy. But the manufacturing function is not viewed as a significant source of potential competitive advantage. As a result, a firm may make a major move that appears to outsiders as being the manifestation of a stage 3 approach (such as building a customized new facility to support a new product), only to find itself back in stage 2 a few years later.

In contrast stage 4 implies a basic shift in manufacturing's role and self-image. Just as important, it requires a change in the nature of non-manufacturing managers' understanding and view of manufacturing. In this final stage, manufacturing is regarded as an equal partner in the enterprise, capable of providing input to others as well as managing itself. All levels of management are expected to possess a certain level of technical competence so that they can be aware how their actions interact with manufacturing activities.

According to Hayes and Wheelwright (1985) majority of the firms that move into stage 3 do not see a subsequent move to stage 4 as being either essential/natural. Managers in this firms often regard stage 3 as providing 90% of the benefits ('so why spend the extra efforts required to go to stage 4), or they prefer to "play it safe" by remaining in stage 3 for a sustainable period before deciding how and whether to move to stage 4. A sizable number even respond negatively to the prospects of stage 4, viewing it as risky from an organizational point of view, they feel threatened by the kind of initiatives their manufacturing organization might propose, once they are unleashed.

Three variables often discriminate effectively between firms that are in stage 4 and those in stage 3. Each might be thought of as a sort of "litmus test" for a firm's real attitude towards the competitive role its manufacturing organization can play.

- i. The first variable is the amount of in-house process innovation that is done for future generation of products. According to Hayes and Wheelwright firms in stage 4 are continually investing in process improvements, not only because of the resulting benefits for existing products, but because this enhances capabilities that will benefit future generation of products.
- ii. A second discrimination between stage 3 and stage 4 is the extent to which a firm develops its own manufacturing equipment. In stage 3 a firm can continue to rely on outside suppliers for equipment development. However in stage 4 the firm insists that it know more than its suppliers about everything that is critical to its business, while the firm may continue to buy much of its equipment, it also provides a substantial amount in-house so that it is close to "the state of the art" in that equipment technology.
- iii. A final variable to distinguish between stage 3 and stage 4 is that companies at stage 3 often focus their attention primarily on activities such as; business market selection, plant and equipment decisions, capacity, location, specialization, process technology and vertical integration. To be in stage 4, however, a company must also be able to integrate stage 3 activities with; measurement and

control systems, workforce policies, vendor relationships, capital budgeting and organizational structure.

2.5 The new manufacturing strategy

In relatively stable environments of the 1960s and early 1970s, the name of the game in strategy was to find an attractive position (often the lowest cost/the highest quality) and building a competitive fortress around it. A good manufacturing strategy was one that defended a company's position through a narrowly focused set of capabilities. When however the terms of competition shifted from low cost to high quality to flexibility to innovativeness, companies found that both their competitive strategy and manufacturing strategy quickly became outdated (Hayes & Pisano, 1994).

Manufacturing strategy can no longer confine itself to guiding short-term choices between conflicting priorities like cost, quality and flexibility. Nor can managers limit themselves to choosing which faddish improvement technique to Adopt/which Company to emulate. Long-term success requires that a company continually seeks new ways to differentiate itself from its competitors. The companies that are able to transform their manufacturing organizations into sources of competitive advantage are those that can harness various improvement programs to the broader goal of selecting and developing unique operating capabilities (Hayes & Pisano, 1994).

How can a company create such a strategy? Hayes and Pisano (1994) suggest:

i. A company must start with the idea that the primary way manufacturing adds value to an enterprise is by enabling it to do certain things better than its competitors can. Every company occasionally falls behind its competitors in some area, but for the long-term, it must identify one or two areas in which it will try to be in the fore front most of the time. These capabilities should be ones customers value, even better, ones that are hard for competitors to duplicate. Hayes and Pisano (1985) are quick to caution that, great manufacturing strategies are built on unique skills and capabilities, not on investments in buildings, equipment, or specific individuals.

ii. A company must develop a plan for building the capabilities it wants to acquire. Before adapting any program, managers should ask themselves, "What specific capabilities will the program create for my organization, are these capabilities valuable in competitive terms?" Corporate strategy must provide a framework for guiding the selection, development and exploitation of these capabilities. I.e. corporate strategy must become much more explicit about and reliant on manufacturing considerations than in the past.

CHAPTER 3: RESEARCH DESIGN

3.1 Population

The population of the study consisted of all manufacturing firms in the country. It was felt that studying a sample from all manufacturing companies, the findings could be generalized to a countrywide practice. The study focused on both small and large manufacturers regardless of their ownership, it was presumed that pattern of structural and infrastructural decisions that constituted the manufacturing strategy of a business unit, were similar.

3.2 The sample size and sample design

The sampling frame adapted was the listing of firms in the Kenya association of manufacturers 1998/99 directory. This was selected on the basis that it was the most current listing of Kenyan manufacturing firms, since a fair number of firms had closed down during the last decade. After considering the wide distribution of manufacturing firms in Kenya, a sample of 100 companies was selected; this size of sample was considered adequate to provide a general view of manufacturing effectiveness in Kenya. In determination of the sample size, this study adopted the approach suggested by Dixon and Liech, 1984. They proposed that adequacy and resources consideration should determine the sample size. By adequacy, they meant that the sample should be big enough to enable reasonable estimates of variables obtained, be able to capture variability of responses and facilitate quantitative comparative analysis (Dixon & liech, 1984).

In order to get a real feel of the state of manufacturing effectiveness achieved by Kenyan firms, it was presumed necessary to ensure representation from all sub-sectors of

manufacturing. Stratified sampling was done as a first step to ensure representation of all sub sectors within the manufacturing sector. The number of units in each stratum was proportional to the total number of firms within the sub sector. The strata's were according to the various product categories. This approach was similar to that adopted by Aosa, (1992).

There after simple random sampling was done within each stratum to come up with the units to be studied.

3.3 Data collection

This is an exploratory study and relied on primary data, which was collected through the use of a structured questionnaire. The questionnaire was administered through drop and pick latter method for firms in Nairobi and its environs, for firms outside Nairobi environs the questionnaire was mailed to them. The respondents were production mangers, operation mangers, manufacturing managers, or their equivalent. Where questionnaires were not clear clarification was sort by telephone interviews.

The questionnaire was structured to capture both qualitative and quantitative data. Open-ended questions were necessary to obtain qualitative data; closed-ended questions were aimed at obtaining data for statistical analysis. The first section of the questionnaire sought to obtain data pertaining to the characteristics of the firm. These included number of employees and the markets served. The second part of the questionnaire contained questions relating to mission and goals of the firm. The data obtained was to help in

general understanding of the mission statement and goal setting process of the various organizations.

The third part of the questionnaire contained questions relating to the various decision areas in manufacturing as postulated by Hayes and Wheelwright (1985) in their four-stage framework. It sort to identify what stage of effectiveness has been achieved by the various decision areas

3.4 Data analysis

The data collected was analyzed by use of descriptive statistics. The data was first edited for accuracy, consistency, uniformity, completeness and classification. Completed questionnaires were edited and coded. This analysis was carried out using the SPSS-X statistical package.

Data was then summarized and presented in form of tables and proportions. Descriptive statistics were used to analyze all closed ended questions. For open-ended questions data was listed and proportions obtained appropriately.

CHAPTER 4: DATA ANALYSIS AND DISCUSSION

4.1 Introduction

In this chapter the data collected is analyzed in relation to the objectives of the study. The findings of the study are also presented and discussed. It contains mainly 12 sections for each decision area. To assist the researcher in the assessment of manufacturing effectiveness, achieved by Kenyan firms based on the Hayes Wheelwright framework.

4.2 Overview of the data collected and analyzed

Out of the 100 questionnaires that were planned, only 45 companies responded. This represents a response rate of 45%. Table 4.1 (number of employees) bellow shows a summary of the questionnaires responded to as per number of employees. As can be observed 51% (23) of the companies represented small manufacturers with less than 100 employees and 49% (22) of the companies represents large manufacturers with 100 and over employees. To obtain the general guidance as to the classification of number of employees, reference was made to the KIRDI's directory of manufacturing industries of 1993. This directory categorizes manufacturing firms according to the number of persons employed.

TABLE 4.1 Number of employees

NUMBER OF EMPLOYEES	RESPONDENTS	%
A. 5-19	-	0%
B. 20-49	10	17%
C. 50-99	13	30%
D. 100-199	17	20%
E. OVER 200	5	2%
TOTAL	45	100%

4.3 Manufacturing and overall business strategy

Skinner's landmark article in 1974 is among the first to suggest that management pay more attention to the manufacturing function in formulating the firm's overall corporate strategy. Critics suggest manufacturing has often taken on a subordinate strategic role to the marketing and financial functions. It is then argued that manufacturing must take on a proactive stance if it is to be of strategic importance to the business (Hayes & Wheelwright, 1985)

TABLE 4.2 Attitude of top management:

	RESPONDENTS	%	Cum %
1. Strongly disagree	5	11%	31%
2. Disagree	9	20%	
3. Neutral	21	47%	47%
4. Agree	4	8%	22%
5. Strongly agree	6	14%	
TOTAL	45	100%	100%

- From table 4.2 it was evident that 31% (14) of the respondents indicated 2 and below, suggesting that top management showed some interest in the manufacturing function when formulating the firm's overall business strategy. 47% (21) of the respondents were unsure of their role in corporate strategy development.

TABLE 4.3 Manufacturing Vs. Marketing and Finance

	RESPONDENTS	%	Cum%
1. Strongly disagree	7	16%	51%
2. Disagree	16	35%	
3. Neutral	13	29%	29%
4. Agree	5	11%	20%
5. Strongly agree	4	9%	
TOTAL	45	100%	100%

- From table 4.2, 51% (23) of the respondents indicated that the manufacturing function was perceived to be “inferior” compared to the marketing and financial functions.

Table 4.4 Levels of goal setting

	RESPONDENTS	%
a. Top Management	27	60%
b. Middle management	13	29%
c. Shoopfloor	2	4%
d. All Levels	3	7%
TOTAL	45	100%

- From table 4.4, 60% of the respondents indicated that manufacturing goals were set at the top and middle management levels. This evidence suggests a top down approach to management, an approach that needs to change if stage four of effectiveness is to be achieved, since stage four advocates for a bottom up approach.

This evidence suggests that firms are concentrating more on marketing and finance, and that the manufacturing unit is taking on a reactive role to the demands placed on it from the top management and is offering no strategic advantage to the firm. This evidence does not come as a surprise considering the current economic hardship the country is facing. The year 2000 was the most difficult for the Kenyan economy in recent history.

The rate of economic growth contracted for a fifth consecutive year. Closing with a negative growth rate of 0.3%.

Thus these results suggest that top management has an indifferent attitude towards manufacturing, maybe due to the economic difficulty they have sort to concentrate on marketing and financial control as a survival management technique.

4.4 Capacity decisions

Two major decisions are involved in capacity planning. These decisions are the amount of capacity maintained and the timing of capacity changes in relation to demand. From a long-term strategic perspective, an operation should build and maintain extra capacity; capacity should lead demand. Such a policy not only enables the operation to absorb any unexpected surge in demand, but also provides the firm with competitive advantage. The maintenance of a high level of service by being able to meet demand promptly would attract new customers who are not only satisfied with their present suppliers. In addition, in a growing market, it will be possible for the company to capture a larger market share from competitors who are concerned more with short-term profitability and return on investment than with their long-term market position in terms of capacity (Hum & Leow, 1996).

The results from the sample show the following.

TABLE 4.5 Maintaining extra capacity

	RESPONDENTS	%
Yes	34	75%
No	11	25%
TOTAL	45	100%

- From table 4.5, 34 respondents (75%) indicated they intentionally maintained extra capacity. This suggests that companies maybe plan for extra capacity to cushion for a sudden surge in demand with expectations that the economy might improve.

TABLE 4.6 Objectives for maintaining extra capacity

	RESPONDENTS	%
a. Large orders	17	50%
b. New customers	9	26%
c. Gain market share	8	24%
TOTAL	34	100%

- With respect to the reason for maintaining extra capacity (see table 4.6) 8 respondents (24%) recognize that capacity can be used to gain market share and long-term market position. The rest of the respondents 17 (50%) maintain that capacity decisions are largely demand driven.

TABLE 4.7. Capacity decisions factors

	RESPONDENTS	%
a. Capacity/Demand relationship	12	26%
b. Available resources/Costs	8	8%
c. Available manpower	2	2%
d. Competitors capacity expansion	23	51%
TOTAL	45	100%

- 23 (51%) of the respondents indicated capacity expansion decision to a high extent are dictated by competitor capacity expansion (see table 4.7). The other 12 (26%) of the respondents indicated that capacity/demand relationship was considered when making capacity expansion decisions.

The data above suggests that while strategic considerations are included in evaluating capacity options, and fairly to respond to unexpected large orders and new customers orders. Capacity expansion decisions are dictated to a high extent by demand and competitor actions. Hence, in terms of strategic effectiveness in the area of capacity decisions, the sample companies may be generally assessed as being externally neutral (stage 2).

4.5 Facility decision

In designing the firm's facilities, it is important to ensure that the facilities focus on a narrow product mix for particular market niche. This is because of the use of specialized equipment. Supporting systems and procedures that concentrate on performing a limited manufacturing task for one set of customers is likely to lead to lower cost and lower

overheads compared to a conventional plant, which attempts a broader mission. But more, importantly, such a plant can become a competitive weapon as its entire apparatus is focused to accomplish the particular manufacturing task demanded by the company's overall strategy (Skinner, 1974).

From the data above, the following findings maybe observed.

TABLE 4.8 Facility design

	RESPONDENTS	%
a. Standardized	26	57%
b. Mixed	12	26%
c. Customized	7	17%
TOTAL	45	100%

- 16% (7) of the respondents had customized facility design, while 57% (26) of the companies mainly had standardized facilities

TABLE 4.9 Degree of equipment specialization

	RESPONDENTS	%	Cum %
1. Very weak	5	10%	26%
2. Weak	7	16%	
3. Neutral	26	58%	58%
4. Strong	5	10%	16%
5. Very strong	2	6%	
TOTAL	45	100%	100%

- 17% (7) of the respondents utilized some form of specialized equipment (see table 4.9), and in actual fact 4% (2) of the respondents had very specialized equipment. The results indicate **83%** (38) of the companies have standardized designs, and standard equipment indicating that they may not have focused facilities.

TABLE 4.10. Age of equipment

	RESPONDENTS	%
a. >15 YRS	9	20%
b. 15-10 YRS	31	69%
c. <5 YRS	5	11%
TOTAL	45	100%

- The average age of the equipment for 89% (40) of the companies is 10 years and above (see table 4.10). These findings are not unexpected as small companies usually do not have the resources to invest in new equipment and they usually cannot keep up with the rate of technological changes. This suggests that most companies may be operating with obsolete equipment and may need updating.

The equipment is old, the facilities of the companies do not seem to be focused and hence their operations are assessed as between stages 1 and stage 2 but likely closer to stage 2.

4.6 Process technology

One characteristic of the current operations environment is the rapid pace of technology changes. The ability of a company to stay in the competition would depend on its awareness and speed of adopting new technological innovation. Hence, companies should engage in research and development to provide continual process improvements, which not only benefit existing products but will also benefit future products. In addition, an operation should undertake to develop in house a portion of its own manufacturing equipment that is critical to its business in order to be closer to the state of the art in equipment technology. This means that the adoption of new process technologies can provide the firm with strategic competitive advantages other than cost (Hum & Leow, 1996).

From the data above, we can make the following observations:

TABLE 4.11. Source of information

SOURCE OF INFORMATION	RESPONDENTS	%
a. External	38	84%
b. Internal/External	7	16%
c. Internal	Nil	Nil
TOTAL	45	100%

- 84% (38) of the respondents rely on external sources for information on new technologies and equipment (see table 4.11). These findings are not unexpected as small companies usually do not have the resources to invest in research and development and they usually cannot keep up with the rate of technological changes. This suggests that, the manufacturing technology employed is regarded as relatively standard, and therefore something to be acquired from outside equipment suppliers, rather than developed within the company.

TABLE 4.12. Objective for adapting new technology

	RESPONDENTS	%
1. Meet new demand	1	2%
2. Build capabilities	1	2%
3. Develop new products	5	11%
4. Reduce costs	15	33%
5. Improve quality	23	51%
TOTAL	45	100%

- 51% (23) of the respondents, strategic reasons for adopting new technology and equipment is to improve quality, 33% (15) of the respondents focused on cost reduction (see table 4.12). These suggest that low cost and quality are the current competitive dimensions in Kenya.

TABLE 4.13. Developing in-house capabilities

	RESPONDENTS	%
1. Meet new demand	1	2%
2. Build capabilities	1	2%
3. Develop new products	5	11%
4. Reduce costs	15	33%
5. Improve technology	23	51%
TOTAL	45	100%

- 84% (38) of the respondents indicate 4 and above indicating they consider developing in house manufacturing capability as important (see table 4.13). This suggests some inconsistency in the data since developing capabilities involves internal sources of new technologies and equipment, and 84% in table 4.11 had indicated dependence on external sources for information and equipment.

The results indicate either the respondents do not understand the meaning of building in-house capabilities. Hence, since the amount of in-house innovation and the extent to which companies develop its own manufacturing equipment are the two key variables in the litmus test proposed by Hayes and Wheelwright for indicating whether a company has crossed over from stage3 effectiveness to stage4. Since companies from the study are still dependent on external sources for information on new technologies and equipment, suggesting that, the manufacturing processes are considered relatively simple and straight forward (and therefore not likely to have much impact on the firms overall competitive position), a view that is particularly prevalent in companies that have achieved stage2 (externally neutral) of manufacturing effectiveness.

4.7 Vertical integration

Selective vertical integration of parts, components or distribution channels that are critical to the firm's business will enhance its competitive position. Such action will reduce costs, since managers can exploit a wide range of cost reducing activities and improve control, by allowing manufacturers to gain power over suppliers or customers. This is the strategic thinking in terms of manufacturing excellence as inherent in the Hayes Wheelwright framework.

From the data above, we can make the following observations

TABLE 4.14. Perceptions on vertical integration

	RESPONDENTS	%	Cum%
1. Least important	Nil	Nil	11%
2. Important	5	11%	
3. Neutral	8	18%	18%
4.	21	47%	71%
5. Most important	11	24%	
TOTAL	45	100%	100%

- 71% (32) companies in the sample indicated 4 and above indicating they do recognize suppliers as business partners (see table 4.14). With 24% (11) of the above emphasizing strategic competitive considerations. This is an indication that suppliers are considered key in the success of the firm's corporate strategy.

TABLE 4.15. Number of suppliers

NUMBER OF SUPPLIERS	RESPONDENTS	%	Cum%
a. <10	5	11%	58%
b. 5	21	47%	
c. >5	19	42%	42%
TOTAL	45	100%	100%

- 58% (26) of the companies still deal with a fairly large pool of suppliers (see table 4.15).

These is not surprising since the Kenya manufacturing sector is more agriculturally based and the market is liberalized, this can explain the large number of suppliers. These data suggests that the companies are likely to be in-between stage2 and stage3 but closer to stage3.

4.8 Workforce and job design

Workers are directly involved in the production process. Thus, they can serve as a good source of information or ideas for improvement of the production system. Firms should capitalize on these assets by encouraging feedback and suggestions from the workforce and acting on them. In addition, firms should also try to involve workers in decision making, instill some sense of responsibility and hence higher job satisfaction and more commitment to the job. Such is the strategic thinking entrenched in the Hayes Wheelwright framework (Hum & Leow, 1996)

TABLE 4.16. Workforce involvement in decision-making

	RESPONDENTS	%	Cum%
1. Strongly disagree	9	20%	60%
2. Disagree	18	40%	
3. Neutral	3	7%	7%
4. Agree	9	20%	33%
5. Strongly agree	6	13%	
TOTAL	45	100%	100%

- 60% (27) of the companies indicated they do not involve workers in decision-making or improving production systems (see table 4.16).

Thus suggesting that the respondents view workers as a source of production rather than a source of improvement

TABLE 4.17. Frequency of job training

	RESPONDENTS	%
a. Rarely	28	62%
b. Often	14	31%
c. Very often	3	7%
TOTAL	45	100%

- 62% (28) of the respondents seldom conduct training programs (see table 4.17), since they also indicated that the level of skills required of the workers is moderately low (see table 4.18 below), These results are not surprising since only 17% (7) of the respondents used specialized equipment (see table 4.9).

TABLE 4.18. Levels of skills

	RESPONDENTS	%	Cum %
1. Very low	8	18%	62%
2. Low	20	44%	
3. Medium	7	15%	15%
4. High	6	13%	23%
5. Very high	4	10%	
TOTAL	45	100%	100%

The results of the 3 questions relating to workforce and job design suggest that the companies are possibly between stage1 and stage2 but closer to stage2.

4.9 Quality

TABLE 4.19. Objectives for quality control

	RESPONDENTS	%	Cum %
1. Strongly disagree	Nil	Nil	Nil
2. Disagree	Nil	Nil	Nil
3. Neutral	4	9%	9%
4. Agree	26	58%	91%
5. Strongly agree	15	33%	
TOTAL	45	100%	100%

- 91% of the respondents indicated 4 and above indicating they agree that quality control is a means to improve performance of products (see table 4.19).

TABLE 4.20 Quality measurement

	RESPONDENTS		Cum %
1. Strongly disagree	Nil	Nil	Nil
2. Disagree	Nil	Nil	
3. Neutral	5	11%	11%
4. Agree	25	56%	89%
5. Strongly agree	15	33%	
TOTAL	45	100%	100%

- With regard to quality measurements table 4.20, 89% (40) of the respondents indicated that it is to eliminate sources of errors. These results obviously reflect that production managers adopt a serious attitude towards quality and that the concepts involved in quality control are well understood. Possible explanations for this is that most of the firms are either ISO 9000 series certified, or are striving to achieve that status.

Thus, overall, in terms of effectiveness in this quality area of manufacturing, the results indicate that the sample companies are in stage3 (internally supportive). This suggests that quality is viewed as a strategic resource expected to play a major part in securing the companies strategic objectives. This is also supported by data in table 4.12, since 21% (23) of the companies' main reason for adopting new technology was to improve quality.

4.10 Production planning/materials control

TABLE 4.21. Shop-floor authority

	RESPONDENTS	%	Cum %
1. Strongly disagree	Nil	Nil	4%
2. Disagree	2	4%	
3. Neutral	3	7%	7%
4. Agree	28	62%	89%
5. Strongly agree	12	27%	
TOTAL	45	100%	100%

- 89% (40) of the respondents indicated 4 and above in their answers, indicating they agree that shop floor employees do not have the authority to make any changes to the production plans or materials control (see table 4.21), this evidence suggests that the manufacturing function cannot be relied on to handle such important issues by itself.

The results indicate that their production planning/materials control tends to be centralized in their manufacturing function, reducing flexibility at shoopfloor level. These results indicate that companies merely try to accommodate uncertainty in the environment when developing production plans. This is a clear indication that the strategic effectiveness of

the area of production planning/ material control is assessed to be externally neutral (stage2).

4.11 New product development

TABLE 4.22. New product development

	RESPONDENTS	%	Cum %
1. Strongly disagree	Nil	Nil	4%
2. Disagree	2	4%	
3. Neutral	7	16%	16%
4. Agree	26	58%	80%
5. Strongly agree	10	22%	
TOTAL	45	100%	100%

- The data from table 4.22 new product development shows that, companies when developing new products adapted a team approach. 80% (40) of the respondents indicated 4 and above, agreeing that they use a team approach in new product development. This implies that various departments interact or are involved in new product development.

Hence, the new product development is strategic and is possibly into stage3 of manufacturing effectiveness.

4.12 Performance measurement and reward systems

TABLE 4.23. Individual vs. organization performance

	RESPONDENTS	%	Cum %
1. Strongly disagree	2	4%	13%
2. Disagree	4	9%	
3. Neutral	30	67%	67%
4. Agree	7	16%	20%
5. Strongly agree	2	4%	
TOTAL	45	100%	100%

- The performance measurement and reward system table 4.23 indicates that, 67% (30) of the respondents placed equally emphasis on organization performance and individual contribution.
- Though 20% (9) of the companies tended to emphasize organizational performance as a whole. This suggests a possible team approach in the manufacturing function; this is supported by table 4.24 that indicates that 82% (37) of the companies departments assist each other in developing plans and control measures.

TABLE 4.24. Interaction between departments

	RESPONDENTS	%	Cum %
1. Strongly disagree	31	69%	82%
2. Disagree	6	13%	
3. Neutral	8	18%	18%
4. Agree	Nil	Nil	Nil
5. Strongly agree	Nil	Nil	
TOTAL	45	100%	100%

Overall, then, the design of the performance measures and reward systems is possibly in stage3 (externally supportive) of manufacturing effectiveness.

4.13 Organization

TABLE 4.25. Level of integration

	RESPONDENTS	%	Cum %
1. Strongly disagree	Nil	Nil	Nil
2. Disagree	Nil	Nil	
3. Neutral	4	9%	9%
4. Agree	26	58%	91%
5. Strongly agree	15	33%	
TOTAL	45	100%	100%

- From the data in table 4.24 interaction between departments, the level of departments assisting each other in development of plans and control measures is moderate to high.
- As 82% (37) of the companies indicate that departments often assist each other. 91% (41) of the respondents (see table 4.25) indicated that there is a high level of integration among departments, suggesting that activities and plans of these departments are well coordinated.

This indicates that the organization of manufacturing departments is likely to be externally supportive (stage3).

CHAPTER 5: SUMMARY AND CONCLUSION

This chapter mainly summarizes the findings of the study in relation to the objectives put forward in chapter one. It also discusses the recommendations of the study, its limitations and suggested areas for further research.

The objectives sought in this study were two, namely;

- i. To document the role of the manufacturing function in the overall competitive business strategy formulation of Kenyan manufacturing firms.
- ii. To document the general position of the manufacturing function of Kenyan manufacturers within the four stages of the Hayes and Wheelwright framework.

In addition the study also addressed the strategic thinking and practices for each of manufacturing decision areas. This was important in operationalizing the Hayes and Wheelwright framework.

5.1 Summary and findings

A total of 45 questionnaires were returned duly filled for analysis. The returned questionnaires were mostly from small manufacturers with less than 100 employees.

Most of the respondents indicated they were unsure of their role in corporate strategy development (see table 4.1). Manufacturing as a function in most firms was considered “inferior” to marketing and finance (see table 4.2). 4% of the firms (table 4.3) indicated some involvement of the manufacturing function in corporate strategy formulation.

Concerning the first objective it can be generally concluded that, manufacturing accepts a reactive role rather than a proactive role. Suggesting that, manufacturing reacts to the demands placed on it from the top and often is of no strategic advantage to the firm.

The second objective dealt with the general positioning of the manufacturing function of Kenyan firms within the four stages of the H-W framework. Quite expectedly, the results showed that the various decision areas in the manufacturing function were at different levels along the H-W continuum as summarized bellow:

Table 5.1 Summary of results for various decision areas

	Stage of manufacturing effectiveness
Capacity	Stage 2 "Externally neutral"
Facility	Stage 2 "Externally neutral"
Process technology	Stage 2 "Externally neutral"
Vertical integration	Stage 3 "Externally supportive"
Workforce and job design	Stage 2 "Externally neutral"
Quality	Stage 3 "Externally supportive"
Production planning/material control	Stage 3 "Externally supportive"
New product development	Stage 3 "Externally supportive"
Performance measurement	Stage3 "Externally supportive"
Organization	Stage 3 "Externally supportive"

From the above findings, the following conclusion can be drawn.

The results suggest that Kenyan manufacturing firms are generally between stage 2 and stage 3 of manufacturing effectiveness. But moving towards stage 3. Majority of the decision areas have already achieved or are headed for stage3 status (see table 5.1).

The various decision areas have revealed a between stage 2 and stage 3 level of manufacturing effectiveness, while the same data has revealed that manufacturing is playing a reactive rather than proactive role in overall business strategy formulation. This reveals some inconsistency in the data, that can be explained by the current economic decline the country is facing. Naturally when faced with economic declines most firms in order to survive concentrate on marketing and financial control thus the reactive role of manufacturing in business strategy formulation, but this does not affect the fact that the processes of the same firm have achieved a between stage 2 and stage 3 level of manufacturing effectiveness. The manufacturers can achieve stage 3 status by purposefully pursuing a manufacturing strategy; seeking to ensure that all thier decisions are coherent and consistent, in support of the business strategy.

5.2 Recommendations

Arising from the findings of the study, there is a clear indicator that Kenyan companies are not at stage 4 of manufacturing effectiveness, thereby indicating the need to propagate the concept of stage 4 level of effectiveness and to educate and motivate local manufacturing practices to move towards it.

By adopting the stage4 level of effectiveness business performance will improve correspondingly. As Voss and Blackmon, (1993) commented "...it has been argued that operating performance is a key contribution to competitiveness and business performance; and that operating best practice should improve operating performance, by implication good practice should lead to increased competitiveness"

5.3 Limitations of study

The following have been identified as limitations of the study:

- i. Majority of the companies, procedures and regulations demanded clearance from directors or human resources managers. This necessitated the need for several calls on each one of them and some of them could not be found.
- ii. Time and other resources were limited. This restricted the area of study to Nairobi and its environs. Mailed questionnaires to companies outside Nairobi were not responded to on time, contributing to the low response rate.
- iii. The number of questions in the questionnaire was limited to ensure that the audit instrument was not too tedious for respondents to complete. A better picture would have been portrayed if a more comprehensive audit too were used.
- iv. The study was limited to measuring proactiveness one of the six "ps" of manufacturing strategy (Leong & Ward, 1990), which describes the content of manufacturing strategy. A clearer portrait would have been discerned if all six "p's" were pieced together.

5.4 Suggested areas for further research

This study was the first of its kind in Kenya; therefore it is a pioneer study for interested researchers who wish to carry out research in the area. However the researcher recommends the following areas for scholars to pursue.

- i. A similar study should be conducted for firms in the service sector in Kenya, to establish their perceptions of operations strategy, and to evaluate their status using the Hayes and Wheelwright framework.
- ii. A similar study should be conducted on the other "P's" of manufacturing strategy, in order to portray a more accurate picture of the process and content of manufacturing strategy in Kenya.
- iii. There is need for a similar study few years down the road to establish, the status of Kenya manufacturers using the H-W framework, to establish if Kenya manufacturers moved on to stage4 status and if not why.

APPENDIX 1: QUESTIONNAIRE:

A. GENERAL INFORMATION.

1. Company Name.....
2. Title of Interviewee.....
3. How long have you been with the company?..... years.
4. Number of employees.....
5. What industry does your company belong?.....
6. What is the nature of your production facility? (Tick one)
 - a. Single plant [] b. Multi-plant []
7. What markets do you serve? (Tick one)
 - a. Domestic market []
 - b. Foreign markets []
 - c. Both domestic and foreign []

B. MISSION AND GOALS.

8. (a) Do you have a mission statement for your company?
 - a. Yes [] b. No []

(b) If "yes" please state it.....

.....

.....
9. (a) Does your company set goals?
 - a. Yes [] b. No []

(b) If yes, at what level are these goals set?

 - a. Top management [] b. Middle management [] c. Shoopfloor []
 - d. All levels []

(c) Who participates in setting goals in your company? Please be specific.

.....

C. STRATEGIC THINKING AND PRACTICES:

10. Do you have a manufacturing strategy for your company?

Yes [] or No []

11. If yes please specify

.....

12. What improvement techniques has your company implemented in last ten years?

- a. Just in time (JIT) []
- b. Total quality management []
- c. Computer integrated manufacturing []
- d. Group technology []
- e. Employee involvement []
- f. Other (specify).....

13. What capability have you been able to develop in the last ten years?

- a. Low cost []
- b. High quality []
- c. Delivery performance []
- d. Flexibility []
- e. Innovativeness []

14. What do you foresee as the future competitive dimension in-terms of capabilities?

.....

15. How many competing firms already possess particular valuable resources and capabilities?.....
16. Does your company build and maintain extra capacity?
a. Yes [] b. No []
17. If "yes" Why?
a. To respond to unexpected large orders []
b. To respond to new customers orders []
c. To gain market share/ long-term market position []
18. What factors do you consider important when making capacity expansion
Decisions?
a. The general relationship between capacity and demand []
b. Available resources/cost of capacity expansion []
c. Available manpower skills []
d. Competitors capacity expansion []
19. How can you describe you facility's design?
a. Standardized []
b. Mixed []
c. Customized []
20. What is the degree of your equipment specialization?
a. Very weak []
b. Weak []
c. Neutral []
d. Strong []
e. Very strong []

21. What is the age of your equipment?
- a. More than 15yrs []
 - b. 15-10yrs []
 - c. Less than 10yrs []
22. Who are your sources and suppliers for both information on new technology
 And manufacturing equipment?.....

23. What are the reasons for your company to adapt new technology and Equipment?
- a. To meet new demand []
 - b. To build new capabilities []
 - c. To develop new products []
 - d. To reduce cost []
 - e. To improve quality []
24. How does your company view developing its own manufacturing capability? On a scale of 1 to 5 (Where 5 is most important and 1 least important)
1. [] 2. [] 3. [] 4. [] 5. []
25. How does your company view vertical integration and supplier relationships? On a scale of 1 to 5 (Where 5 is most important and 1 least important)
1. [] 2. [] 3. [] 4. [] 5. []

26. How many suppliers serve your company?
- a. More than 10 []
 - b. 10-5 suppliers []
 - c. Less than 5 []
27. How does your company consider workers involvement in improving production systems and decision making? On a scale of 1 to 5 (Where 5 is most important and 1 least important)
1. [] 2. [] 3. [] 4. [] 5. []
28. How often are training programs carried out?
- a. Rarely []
 - b. Often []
 - c. Very often []
29. How can you described the skills required of the worker/
- a. Very low []
 - b. Low []
 - c. Medium []
 - d. High []
 - e. Very high []
30. What is the level of integration among departments?
- a. Very low []
 - b. Low []
 - c. Medium []
 - d. High []
 - e. Very high []

31. Listed bellow are different opinions about your manufacturing function. Please indicate how strongly you agree or disagree with each by putting an X next to your choice on the following scale

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

A. Top management does not pay enough attention to the manufacturing function when formulating the firm's overall corporate strategy. 1 2 3 4 5

B. Manufacturing often takes on a subordinate strategic role to the marketing and Financial function. 1 2 3 4 5

C. The production manager should not be involved in corporate strategy development. 1 2 3 4 5

D. Your organization emphasizes quality control as a means to improve performance of product rather than just for controlling the number of defects. 1 2 3 4 5

E. Your organization emphasizes quality measurements to eliminate sources of errors. 1 2 3 4 5

F. Employees at the shop floor level do not have authority to make any changes to the production plans/materials control. 1 2 3 4 5

G. Your organization emphasizes team approach to new product development. 1 2 3 4 5

H. Your organization emphasizes more organizational performance than individual contribution. 1 2 3 4 5

I. Departments rarely assist each other in the development of plans and control measures. 1 2 3 4 5

SELECTED REFERENCES

A. Books

1. Buffa, E. S., 1984, Meeting The Competitive Challenge, Dow Jones-Irwin, Illinois.
2. Chase, Richard B., & Aquilano, Nicholas J., 1991, Fundamentals of Operations Management, Richard D. Irwin Inc.
3. Dilworth, J. B., 1992, Operations Management: Design, planning & Control for Manufacturing and Service, Mc Graw Hill Inc.
4. Dixon & Leach, 1984, Survey Research in Undeveloped Countries, Geo Books, Norwich.
5. Hayes, R. H. & Wheelwright, S. C., 1984, Restoring our competitive edge: Competing Through Manufacturing, John Wiley & Sons, New York.
6. Hayes, R. H., Pisano, G. P., Upton, D., 1996, Strategic Operations, The Free Press, New York.
7. Hayes, R. H., Wheelwright, S. C. & Clark, K., 1988, Dynamic Manufacturing, The Free Press, New York.
8. Macroeconomic & sectoral choices, 1999, Kenya's strategic policies for the 21st century, institute of policy analysis & research (IPAR), Kenya.
9. Porter, M. E., 1980, Competitive Strategy, Free Press, New York.
10. Sekeran, U., 1984, Research Methods for Business, John Weley and Sons Inc, USA.
11. Vaitos, C., 1991, "The state and foreign business interests" in Coughlin. P. & G. K. Ikiara eds. Kenya's industrialization dilemma, Heinemann Nairobi, Kenya.

B. Journal articles and reports

1. Gilgeous, Vic & Maria, 1999, **A Framework for Manufacturing Excellence**, Integrated Manufacturing Systems, Vol. 10, Issue 1.
2. Government of Kenya, 1997, **The national development plan (1997-2001)**, Government printers.
3. Hayes, R, H., 1985, "**Strategic Planning-Forward in Reverse?**" Harvard Business Review, November-December.
4. Hayes, R, H., & Pisano, G, P., 1994, "**Beyond World-class: The New Manufacturing Strategy**", Harvard Business Review, January-February.
5. Hum, S, H., Leow, L, H., 1996, "**Strategic Manufacturing Effectiveness: An Empirical Study Based on the Hayes-Wheelwright Framework**", International Journal of Operations & production management, Vol. 16, Issue 4.
6. KAM, Kenya Association of Manufacturers Members Directory, 1998/99.
7. KIRDI, Kenya Industrial Directory, 1993.
8. Schroeder, R. G., Anderson, J. C., & Cleveland, G., 1987, "**The content of manufacturing strategy: an empirical study**". Journal of operations management, vol. 6 No. 4, April.
9. Skinner, W., 1969, "**Manufacturing-missing link in corporate strategy**". Harvard Business review, May-June.
10. Skinner, W., 1974, "**The Focused Factory**". Harvard Business Review.
11. Voss, C. A., & Blackmon, K., 1993, **Practice performance relationships in UK manufacturing industry**, London Business school.

12. Wheelwright, S. C., Hayes, R. H., 1985, **“Competing through manufacturing.”** Harvard business review, Jan-Feb.

C. Unpublished works

1. Abekah, J., 1996, **“strategic responses to business environment –The Kenya petroleum industry after liberalization”**, Unpublished MBA project, United States International University (USIU) Nairobi.
2. Aosa, Evans., 1992, **“An Empirical Investigation of Aspects of Formulation and Implementation of Strategic Planning Within Large private Manufacturing Companies in Kenya”**, Unpublished PhD Dissertation, University of Strathclyde, Glasgow, Scotland.
3. Bett, S. K., 1995, **“Strategic marketing of dairy products in Kenya”**. Unpublished MBA project, University of Nairobi.
4. Chune, F. M. N., 1998, **“Changes in the Kenyan business environment: their influence on the corporate behavior of food manufacturing firms in Nairobi”**, Unpublished, MBA project, University of Nairobi.
5. Economics department, 1994, **Limitations and rewards in Kenyan manufacturing: a study of enterprise development.** Gothenburg University Sweden & University of Nairobi, Kenya.
6. Kiruthu, Z. N., 1996, **Total Quality Management: Status in Kenya’s Manufacturing Sector.** Unpublished MBA Project, University Of Nairobi.
7. Owiye, P. O., 1998, **“Why Kenyan sugar firms are failing to compete effectively within the liberalized trading environment in Kenya: The case**

of Government owned-sugar firms”, Unpublished MBA project, University
of Nairobi.