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AN INVESTIGATION INTO THE
INFLUENCE OF THE PHYSICAL DISTRIBUTION
CONCEPT ON THE PERFORMANCE OF
CERTAIN SOUTH AFRICAN MANUFACTURERS
OF CONSUMER PRODUCTS

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ABSTRACT

The "Physical Distribution Concept" is being increasingly recognised as a vitally important business philosophy for those firms for which efficient physical distribution is critical to marketing success. Manufacturers of products which are perishable, easily substitutable; and/or quickly obsolescent are some which fall into this category. In a competitive business environment, factors such as the "availability" of the product, and not simply its price or quality, begin to exert a significant influence on the purchasing decision.

The "Physical Distribution Concept" comprises three elements, namely, consumer orientation; organizational integration and profit orientation. "Physical Distribution Orientation" refers to the predisposition of the firm and its employees to these three elements. For the Physical Distribution Concept to serve as an effective guide to management action, a physical distribution orientation on the part of all those concerned with marketing and physical distribution-related activities in a firm, is a pre-requisite. The chief executive, in particular, should adhere to this business philosophy, regardless of the functional route he followed to his position. In his leadership role, theory holds that he exerts considerable influence on his subordinates, and consequently on his firm's way of doing business.

This thesis is concerned with an analysis of the Physical Distribution Concept. It focuses on the chief executives of firms manufacturing consumer convenience goods, as well as consumer shopping goods. As such, it is primarily concerned with determining the extent to which the chief executives are physical distribution oriented and whether there is a statistically significant relationship between their extent of physical distribution orientation and their companies' performance. The thesis is also concerned with the extent

to which any pattern of organizational arrangements for physical distribution exists.

In Chapter I, physical distribution, physical distribution management and the physical distribution concept were defined.

In Chapters II, III and IV, the writer attempted to critically review the literature relating to the three elements of the physical distribution concept, namely, consumer orientation, profit orientation and organizational integration, respectively.

In Chapter V the literature referring to the influence of the chief executive on his firm was briefly explored, as well as the use of Return on Investment as an indicator of company performance.

From the review of the literature in Chapters I to V, a number of propositions were distilled. These formed the basis of the hypotheses which were formulated in Chapter VI and which were to be empirically tested in the research program. Chapter VI was also devoted to a discussion of the research methodology, while a discussion of the empirical results of the research program constituted the major topic of Chapter VII.

Companies listed in certain sectors of the Johannesburg Stock Exchange were chosen as the population of the study. The population numbered 72 companies and an attempt was made to elicit information from all 72 companies.

The survey methodology was designed to obtain reliable data. A mail survey was conducted in which a questionnaire was sent to all the chief executives of the companies in the target population. Part A of the questionnaire, using the semantic differential technique, was designed to extract information with which to measure a chief executive's degree

of "Physical Distribution Orientation"; Part B of the questionnaire, using the rank order technique, was designed to determine whether chief executives regarded any element of the "Physical Distribution Concept" as more important than any other; and Part C was designed to elicit information on the organizational arrangements for physical distribution prevailing in the respondents' companies.

After the pilot study had revealed certain refinements, which were subsequently introduced, and had confirmed the workability of the mail survey, the full scale project was undertaken.

The following represents a brief resumé of the research findings:

(i) The major hypothesis of the study was confirmed, namely, that for the companies in the target population, the relationship between the degree of physical distribution of the chief executive and his company's performance, was statistically significant.

(ii) The empirical results also showed that the relationship between some components of the total philosophy, and company performance was also statistically significant. These correlations, however, were not as high for that of the overall philosophy.

(iii) The research showed that chief executives did regard some of the elements of the physical distribution concept, consumer orientation in particular, as more important than the other two.

(iv) Finally, the research showed that, apart from whether a firm produces to orders or for stock, there did not appear to be any general determining influence on the organizational arrangements for physical distribution.

CHAPTER I

DEFINITION OF THE PHYSICAL DISTRIBUTION CONCEPT

1.1 Physical distribution defined:

Physical distribution has only relatively recently been recognized as a separate, identifiable management function. As with so many management concepts, it emanated from the United States of America where it developed out of the combined work of business school academics and business consultants.¹ Far from it being an esoteric theoretical concept, however, it has been practically oriented from the start. It, in fact, evolved from efforts to find specific solutions to specific problems. The salient feature of physical distribution is the flow or movement of products, together with the flow of the attendant information.

From the proliferation of terminology used to refer to this relatively new management function, it would appear that it defies rigid definition. In order to approach an understanding of the precise nature of physical distribution and the activities which it embraces, and in order to reduce the confusion engendered by the relatively large number of terms apparently used to refer to the same function, and to rectify the incorrect synonomous usage of some terms, it is necessary to analyze the definitions of the more widely used terms. The following is a list of terms frequently used to refer to the flow of products, materials and the attendant information, in a business context:

- . rhocrematics;
- . materials management;
- . physical distribution;
- . business logistics;
- . industrial logistics; and
- . marketing logistics.

The term rhocreematics was coined in the early 1960's and literally means the "flow of things". In the words of Brewer and Rosenzweig:

Rhocrematics is the new science of material and information flow Developed to foster a systematic integrated approach to managing the flow of raw materials, parts, components and finished goods, its chief concept is that of maintaining the flow of the product from raw materials to the ultimate consumer.²

Although the principles it embodies are still relevant, this term has largely fallen into disuse, probably because of its lack of meaning to the English speaker.

The second term, materials management, has been defined as:

that aspect of industrial management concerned with the activities involved in the acquisition and use of all materials employed in the production of the finished product. These activities may include production and inventory control, purchase, traffic, materials handling and receiving.³

Quite clearly, materials management deals with only one element of the science of rhocreematics, namely the acquisition of raw materials and the management of goods-in-process inventory. It cannot therefore be regarded as being synonymous with rhocreematics.

The third term, physical distribution, was defined in 1968 by the National Council of Physical Distribution Management in the United States of America as:

the broad range of activities concerned with the efficient movement of finished products from the end of the production line to the consumer, and in some cases includes the movement of raw materials from the source of supply to the beginning of the production line.⁴

The Centre for Physical Distribution Management set up in 1970 under aegis of the British Institute of Management,

adopted a definition very similar to that of the National Council of Physical Distribution Management:

Physical distribution is the broad range of activities within a company, concerned with the efficient movement of goods and materials both inwards to the point of manufacture and outwards from the₅ end of the production line to the consumer.

The first point to note is that both the British and American definitions specifically include the inward movement of raw materials, the British definition perhaps more directly than the American. The reason for this is not so much a matter of principle as of the synergy which could be usefully achieved if those responsible for the movement of products from the end of the production line to the consumer are mindful that some of their activities are basically similar to those involved in the inward movement of materials to the point of manufacture. The skills required to manage the storage and movement of finished goods, for example, are fundamentally the same as those required to manage the movement and storage of raw materials. In addition, storage or transport facilities may be used more efficiently if raw materials and finished goods are considered jointly than if they are kept distinct from one another. For example, outbound trucks laden with finished goods may be able to bring back raw materials on the return journey. Similarly, there may be times of the year when raw materials need to be stockpiled heavily, and others when finished-goods stocks need to be higher than average with the excesses of each flowing over into a common area. Notwithstanding the need to be mindful of potential synergistic benefits, the primary objectives of the management of raw materials on the one hand, and the management of finished goods on the other, are sufficiently different to demand that materials management and physical distribution be kept distinct from one another.

The fourth term on the list, business logistics, has been defined as follows:

a total systems approach to the management of the distribution process including all of those activities involved in physically moving raw materials, in-process inventory, and finished-goods inventory from point of origin to point of use or consumption.⁶

Rider and Ostrom expand on the meaning of business logistics by identifying the activities of logistics as acquisition, movement and storage:

Acquisition: Providing goods and services which are demanded either for production or consumption. It includes purchasing, leasing, renting or hiring these goods or services as well as decisions to acquire them from within the resources of the organization as well as from without. Though generally considered a supply process, acquisition connotes the acceptance of finished goods from production for subsequent distribution.

Movement: Relocating goods from one point to another on one or more of the various modes of transportation. In general, goods are moved as raw materials from origin to production and as finished goods from production to consumption. It also includes movement within the organization as well as movement between the organization and its suppliers and customers.

Storage: The protective holding of inventories of raw materials and finished goods. It involves determining the size of inventories, and decisions regarding their locations.⁷

In terms of their definitions stated above, business logistics and rhocrematics are clearly synonymous. Far from being synonymous with business logistics, however, both materials management and physical distribution are merely constituent elements of business logistics.

The following is the way in which the fifth term, industrial logistics, has been defined by Slater:

Industrial logistics is specifically concerned with the flow of goods throughout the economic process from the exploitation of raw materials to the final consumption and use of the product by a customer. The boundaries are created by the international economic system, not the parameters of the individual firm or industry.⁸

As defined, industrial logistics takes a macro view of the flow of goods and raw materials, rather than a micro view as from the standpoint of the individual firm. While the definition of industrial logistics approximates the definitions of business logistics and rhocrematics, it embraces far more than that with which physical distribution is primarily concerned. It would thus be a mistake for the terms industrial logistics and physical distribution to be used interchangeably.

Marketing logistics, the final term on the list, is frequently used interchangeably with physical distribution. This, however, is not strictly correct. The reason for this is that while physical distribution management is concerned solely with the physical flow of products, marketing logistics is broader in scope and includes the designing, managing and modifying of the channel of distribution. Kotler defines the distribution channel as "the set of all the firms and individuals that take title, or assist in transferring title, to the particular good or service as it moves from the producer to the consumer."⁹ Thus, marketing logistics may be defined as:

the analysis, planning, organizing and controlling of all movement and storage operations connected with the flow of finished goods from the end of the production line to their satisfactory arrival in the market place, and of the associated channels of distribution required to arrange and complete the transactions between the company and its selected markets.¹⁰

The concept of marketing logistics has focussed attention on the need to treat physical distribution management and channel management jointly rather than separately. Decisions relating to the distribution channel can have repercussions on physical distribution decisions and vice versa, and in order to arrive at the optimum distribution configuration, the two should be treated as an entity.

The relationships between the various concepts defined above, are illustrated in Figure 1.1. As can be seen in Figure 1.1, business logistics takes a total view of the physical flow of materials and products through the organization. This embraces the planning, acquisition, storage and control of not only raw materials, but also sub-assemblies, manufactured parts and packaging materials; the control of goods-in-process inventory; and the planning, co-ordination and execution of all the activities involved in the distribution of the finished products from the end of the production line to the final customers or users. As such, business logistics is comprised of materials management and marketing logistics. Marketing logistics, in turn, is comprised of physical distribution management and management of the channel of distribution. Figure 1.1 also reflects the close relationship between the two components of marketing logistics. The physical distribution arrangements will clearly be different for each alternative institutional route from manufacturer to ultimate consumer whether it be direct to consumer [route (a) in Figure 1.1], whether it be direct to consumer via regional warehouses or depots [route (b)], whether it be direct to some configuration of middlemen [route (c)] or whether it be to some configuration of middlemen via regional warehouses or depots [route (d)].

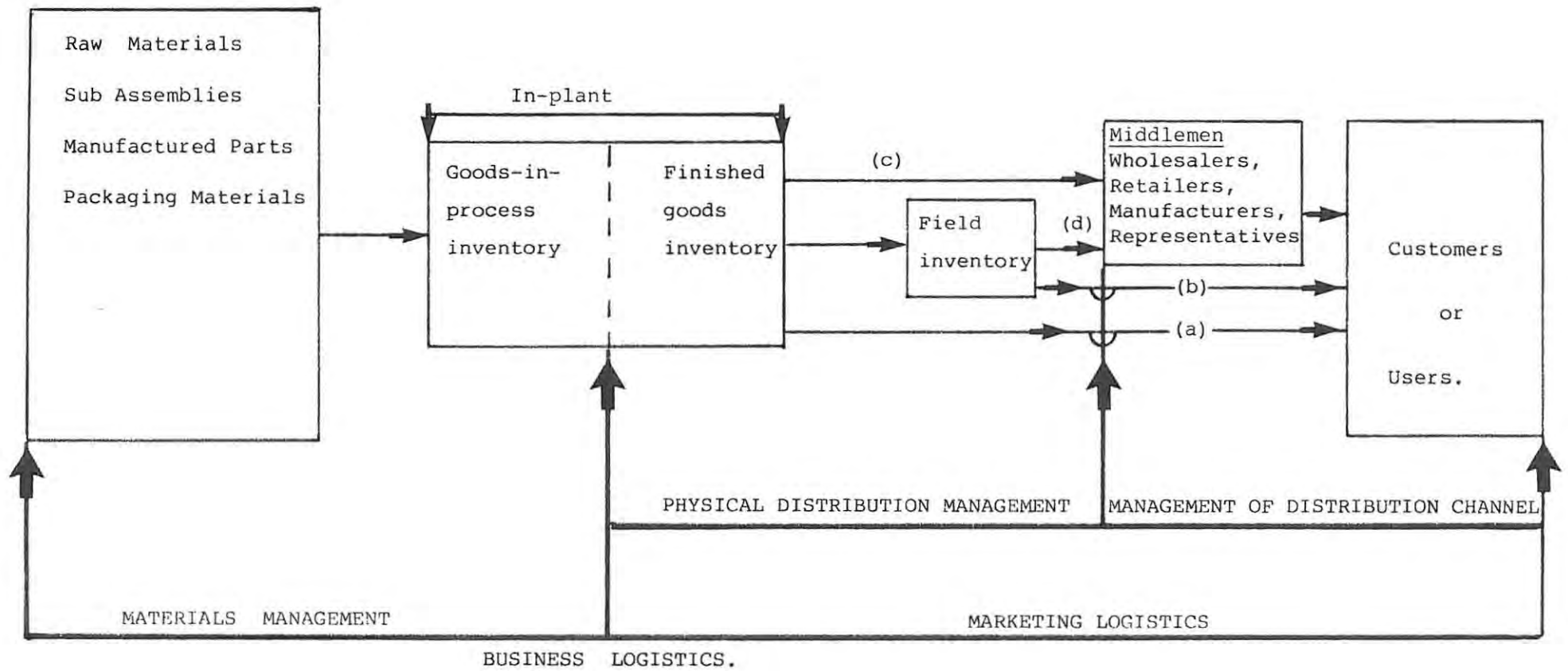


Figure 1.1 THE COMPONENTS OF BUSINESS LOGISTICS.

Having identified the primary responsibility of physical distribution as being the movement of the finished product from the end of the production line to the middleman or final customer or user, and having placed it in the context of the overall flow of goods, materials and attendant information through the firm from the acquisition of raw materials to the delivery of products, it is necessary to identify the constituent activities of physical distribution and to define physical distribution management.

1.2 Identification of the constituent activities of physical distribution and physical distribution management defined:

Physical distribution is clearly not a single activity but rather a combination of activities which have to be co-ordinated if maximum efficiency is to be achieved. There is broad agreement amongst different authors and authorities as to the constituent activities of physical distribution and those listed by Granzin¹¹ and Walters¹² and discussed below, are representative.

By means of a two-stage, descriptive factor analysis, Granzin reduced 182 managers' perceptions of 58 physical distribution activities to five basic, independent areas. Managers furnishing the data were employees of firms located along the Wasatch Front of Utah in the United States of America. The following are the five basic areas identified by Granzin with some of the constituent elements of each:

Internal Materials Movement

Warehouse design and operation
Receiving and shipping operations
Bulk materials handling
Inventory placement
Order assembly
Packaging

Information-system operations

Customer relations
Inventory management
System design

Facilities planning

Traffic Management

Movement scheduling
Traffic management
Shipment documentation

External materials movement

Transport operations
Vehicle operations¹³

Each of these five categories will be briefly discussed.

- (i) Internal materials movement: This describes the throughput operations that occur within a distribution facility such as a warehouse, whether it be in-plant or a regional warehouse. This includes the receiving of incoming bulk shipments and the preparation of outgoing shipments.
- (ii) Information-system operations: This combines the external information flow relating to order-taking and order-filling and the internal information flow relating to inventory management ...
- (iii) Facilities planning: This is concerned with such matters as the selection of sites for facilities location, the determination of the number of facilities locations required and the planning of the expansion of facilities.
- (iv) Traffic Management: This is concerned with the planning, design and maintenance of the optimum transportation system for a firm.
- (v) External Materials Movement: This represents the actual transportation of goods.

Walters similarly assigns the various physical distribution activities to five categories as follows:

Facility locations;
Transportation capability;
Inventory allocations;
Communication networks;
Unitization.¹⁴

Each of Walters' five categories will be briefly discussed.

- (i) Facility locations: Facility here refers to warehouses, depots, sales branches or any other location to which orders and enquiries can be submitted, and from which products can be despatched to customers. An optimum network of facilities in terms of number, size and geographical positioning will result in prompt deliveries to customers at minimum cost.
- (ii) Transport capability: This is one of the most fundamental elements of physical distribution and one which requires careful management.

In selecting modes of transport, three criteria need to be considered. Firstly, there is the cost of the service.

Secondly, there is the speed of the service. The speed factor, of course, is closely associated with the cost factor. The cost of the service refers not only to the actual payment for the movement of products, but also to the expenses associated with inventory while in transit. The cheapness of the slow mode of transport, for example, may well be outweighed by the expenses incurred on inventory tied up for that longer period of time.

Thirdly, there is the consistency of service. This can be of even more importance to a customer than speed of service.

If an order takes two days to arrive on one occasion, for example, and ten days to arrive on another, it could seriously disrupt his inventory system,

Thus in selecting a mode of transport, the cost, speed and consistency of service need to be delicately balanced.

- (iii) Inventory allocation: The main purpose of holding inventory, is to ensure that products are available when customers need them. Holding inventory is not without cost, however, and the major task of inventory management is generally to keep the smallest quantity of stock consistent both with a desired customer service level and total cost.
- (iv) Communication networks: In the past, communications within a logistics context has tended to be neglected, partly because of the lack of data processing systems to handle this high volume but easily calculable type of information, and partly because of the relative ignorance of the impact of rapid and accurate communication on logistical performance.

There are two aspects of communication in a physical distribution context. Firstly, there is customer order processing. This is of the utmost importance because the customer's order is the prime initial input to the logistics system. Secondly, there is order preparation. Not only should a customer's order be dispatched when required, but it should also be correct

with regard to quantity and quality. To achieve this requires the communication of accurate and timely information throughout the system.

- (v) Unitization: Unitization is not the subject of a specific physical distribution department or sub-department as are the other four elements of physical distribution, but rather it occurs throughout the physical distribution system and is closely associated with the physical flow of materials and products. Broadly speaking, unitization involves handling, packaging and containerization. In the words of Bowersox:

It stands to reason that the fewer times a product has to be handled in the total process, the less restricted and the more potentially efficient will be the total physical flow.

To facilitate handling efficiency, individual products are combined into larger cartons, which contain a grouping of cans, bottles, boxes, or whatever For purposes of efficient handling, master cartons are normally grouped together in larger lots. These larger lots may be banded with steel strapping, combined with tape, shrink-wrapped, stocked into a wire cage, or stacked on a wooden pallet the term container is commonly used to describe loadings containing more than one master carton.¹⁵

Thus, unitization is a facilitative component which, if properly planned, can help to make warehouse management, transportation, inventory management and order preparation, more effective.

In the interest of cost-effectiveness and efficiency, it is essential that the various physical distribution activities be managed and controlled, and that physical distribution management be explicitly incorporated into the hierarchical structures of firms in a way similar to marketing, production, personnel and finance. Wentworth has described the aims of physical distribution management as follows:

Physical distribution management's aim is to achieve the highest possible measure of efficiency in the physical distribution activity.... Physical distribution management is essentially a matter of co-ordination - both internally as between its constituent activities, and externally with marketing, production and purchasing so as to ensure the best overall balance in the interests of the company as a whole.¹⁶

As with the management of any other functional area, physical distribution management is carried out at three levels:

(i) strategic; (ii) tactical; and (iii) operational.

Firstly, physical distribution management at a strategic level is concerned with designing the distribution system in broad, general terms; it is concerned with such matters as selecting sites for warehouses, selecting transport modes and designing order-processing systems, for example. The salient strategic question is, "What should our distribution system be?"

Secondly, physical distribution management at a tactical level is involved with resource utilization. The physical distribution configuration having been designed, it is necessary that distribution flows be carefully planned, possibly even on a daily basis, to achieve the highest utilization possible. The salient tactical question is, "How can the distribution system best be utilized?"

Thirdly, physical distribution at an operational level is described by Ballou as being:

the daily tasks that a distribution manager and subordinates perform to assure that the product moves through the distribution channel and on to the ultimate customer. This includes such activities as picking product from warehouse stocks, loading trucks for delivery, packaging the product for shipment, keeping track of inventory levels, preparing stock replenishment orders, etc. The focus of this aspect of distribution management is mainly supervision and task accomplishment.¹⁷

The salient operational concern is, "Let's get the goods out!"

Having identified the constituent activities of physical distribution and having defined physical distribution management, it is necessary to examine the relationship between marketing and physical distribution as a basis for a definition of the physical distribution concept.

1.3 An examination of the relationship between marketing and physical distribution, and the physical distribution concept defined:

It is commonly held that there are four economic utilities which need to be created in relation to a product before it has any value to the ultimate consumer. These are form, time, place and possession utilities. The creation of form utility, or the conversion of raw materials into finished products, is traditionally the responsibility of the production department. The creation of possession utility, on the other hand, is the responsibility of marketing which does this by identifying the needs and wants of consumers and by informing consumers both of the availability of products, as well as of their merits.

Finally, it is left to physical distribution to create the time and place utilities, to ensure that the right product is in the right place at the right time. The creation of time and place utilities forms the operational and facilitative link between form utility on the one hand, and possession utility and consumer satisfaction on the other hand. In other words, physical distribution is the link between production and marketing and as such, it is in a position to make a vital contribution to the effective performance of both activities and to the profitability of the enterprise as a whole. As Pope has stated:

If distribution is to mean anything beyond the convenient agglomeration of clerical and disposable activities, the justification for its survival as a separate function can be found only in the degree of effectiveness it can achieve in relation to the aims and objectives of other functions.¹⁸

The link of physical distribution with production has been easy to identify. They are both concerned with similar issues such as inventory control, vehicle scheduling and routeing, and plant location. In these areas, emphasis has traditionally been placed on quantitative analysis and cost minimisation, within certain limits. The link with marketing, however, has not always been as easy to identify. Marketing is primarily concerned with the sales response to certain company stimuli and as such, focuses on target markets and buyer behaviour. These latter issues tend to be fundamentally of a qualitative nature, which seems to conflict with the deterministic nature of many production and physical distribution activities. The inclusion of the concept of customer service in physical distribution has however, served to establish

the interdependence of marketing and physical distribution. Definitions of customer service abound. As Ballou states:

It is not uncommon to find different forms of customer service actually practised by companies. To some companies it is the time it takes for a delivery of a customer order To other companies, it is stock availability. That is, what proportion of the orders are filled from primary stocks, or what percent of total demand is out of stock? These are common measures for customer service and have the appeal of being easily quantified.¹⁹

With the incorporation in it of customer service, physical distribution has become concerned with and instrumental in securing customer loyalty. In broad terms, the satisfaction of consumer needs and wants is of course a marketing responsibility. Thus in actual fact, physical distribution properly managed, straddles both marketing and production; it is concerned with creating demand and generating sales on the one hand, and servicing demand as efficiently as possible, on the other.

As a point of departure for identifying the three major elements of the physical distribution concept it is necessary to look more closely at the marketing concept.

In a recent marketing textbook, the three fundamental tenets of the marketing concept have been expressed as follows:

First, all company planning, policies and operations should be orientated toward the customer. Second, profitable sales volume should be the goal of a firm. Third, all marketing activities in a firm should be organizationally integrated and co-ordinated.²⁰

Consumer orientation, the first fundamental element of the marketing concept, is one ideal for which every firm operating in a competitive business environment should aim. Consumer orientation has been traditionally interpreted as meaning the identification of consumers' needs and wants and the development of products and services to meet those needs and wants. Particularly as the business environment becomes more competitive, however, consumers seldom if ever simply buy the physical object comprising the product, but rather a conglomeration of benefits and services associated with the physical product. According to Levitt, "the new competition is not between what companies produce in their factories, but between what they add to their factory output in the form of packaging, services, advertising, customer advice, financing, delivery arrangement, warehousing and other things that people value."²¹ Thus consumers may well have physical distribution needs which, if satisfied, may be the key determining factor in whether they buy from a particular firm rather than any other. This contention is supported by Mercer who states that

there is now no doubt that where organizations are providing a service, as is often the case with industrial companies or with chains of retailers, then the actual locations of warehouses and branches and the distribution systems do play a very considerable part in determining the market share which is obtained.²²

Wendell Stewart quotes four major physical distribution areas in which consumers' needs may be met and a competitive advantage created. These are:

- (a) Minimization of out-of-stock occurrences: this reflects the reliability of suppliers.
- (b) Reduction of customer inventory requirements: the shorter and more consistent the lead time between submission of orders and receipt of orders, the smaller the inventories which consumers have to keep and consequently, the lower their costs.
- (c) Forging of supplier-customer relationships: the greater the extent to which a supplier's distribution facilities can be matched with a customer's receiving facilities, the greater will be the consumer loyalty generated.
- (d) Increase of discounts: the development of a more efficient physical distribution system inevitably leads to a reduction in costs, portion of which can be passed on to consumers to their greater satisfaction.²³

The second pillar of the marketing concept is profit. While it may be obvious that the end objective of any marketing effort is profit, it is necessary to explicitly include it in the marketing concept in order to answer the potential question of how far a firm should go in satisfying the needs and wants of consumers. One method of guaranteeing the satisfaction of consumers would be to provide them with good quality goods and services at no cost. This however is untenable in a capitalist, free enterprise system in which the making of profits is the raison d'être of any business undertaking. The simple theoretical answer to the question of how far a firm should go in satisfying the needs and wants of consumers is up to the point where the value derived from so doing, is matched by the cost involved. Beyond this point a firm should refuse to entertain the needs and wants of consumers. While customers, for example, may desire a 24 hour order cycle lead time because this would require them to hold virtually no stock, in many cases it

would be prohibitively expensive for a supplier to oblige. Thus the level of customer service offered would have to be reduced to a point which ensures both sufficient customer patronage and a reasonable profit.

The third element of the marketing concept alludes to organizational integration. This is a plea for the adoption of the systems approach where the objectives of the firm as a whole are seen as paramount and not those of individual departments and activities. Where there is a lack of integration, suboptimization with inevitable conflict between departments and activities tends to be the norm. Thus, physical distribution must be fitted into its rightful place in the firm. The mutual contributions of physical distribution, marketing and production must be recognised and the contributions of all three (as well as of other activities) to the corporate objectives must be of prime consideration. As David Hussey has stated:

Physical distribution is not a relatively passive last link in the chain of production, but a highly important sector of the total business, with its interactions with every other aspect of corporate activity.²⁴

This idea of integration applies also at a micro level within the marketing department. Marketing is not a single activity but rather a combination of activities "designed to plan, price, promote and distribute [of which physical distribution is a major part] want-satisfying goods and services to present and potential customers."²⁵ The planning of the product and its attendant pricing, promotional and distribution strategies constitute what is known as the marketing mix. It is vitally important that the four elements of the marketing mix are internally consistent and complement each other so that the total marketing impact on the target market is maximised.

Having identified how physical distribution plays a role in each of the three elements of the marketing concept, it is possible to formalise what could be known as the physical distribution concept: The physical distribution concept is a customer oriented business philosophy supported by integrated physical distribution activities aimed at generating customer satisfaction as a means of satisfying fundamental organizational goals, of which profit is perhaps the most important. The three basic features of this physical distribution concept are as follows:

- (a) all physical distribution systems and activities should have as their primary objective, the satisfaction of the physical distribution-related needs and wants of the customer;
- (b) all physical distribution activities should be both inter-departmentally and intra-departmentally integrated and co-ordinated; and
- (c) the goal of physical distribution management should be to make a positive contribution to the achievement of organizational objectives, the primary one of which is a satisfactory profit, either by balancing increased physical distribution-related costs against a more than proportionate increase in sales, or decreased sales against a more than proportionate decrease in physical distribution-related costs.

The next section traces in very broad outline, the historical development of physical distribution as a discrete business function in South Africa.

1.4 A broad outline of the historical development of physical distribution in South Africa:

The physical distribution concept did not develop overnight in a revolutionary way, but rather over time in an evolutionary way. As made more explicit in an earlier section of this chapter, the physical distribution concept is a vital complement to the marketing concept in that it is simultaneously concerned with meeting a specific set of consumer needs, as well as enhancing profits. As a result, environmental factors which have necessitated the adoption of the marketing concept have also heralded the need for the adoption of the physical distribution concept.

The need to store and physically move commodities and products has long been recognised in South Africa. The nature and scope of this creation of time and place utilities for products has changed, however, as the South African economy has emerged from one being at a low level of development and purely agriculturally based, to one which is at a higher stage of development and more industrially and urban based.

The evolution of the physical distribution concept, and indeed of the marketing concept, will be examined in the context of W W Rostow's²⁶ five stages of economic growth as it applies to the South African economy.

1.4.1 Stage 1: The Traditional Society:

This is the period in the development of an economy when the level of technological and scientific know-how is very low and when consequently, there is a definite ceiling on what and on how much can be produced. Under these conditions, where demand inevitably

exceeds supply, there is no problem in disposing of or selling what can be produced. The real problems lie in the area of production and all business organizations understandably tend to be product or production oriented. With regard to the performance of physical distribution activities under these conditions, producers would in all probability be able to go so far as to require customers to make their own arrangements without significantly damaging demand.

According to Hobart-Houghton, ²⁷ 1820 with the arrival of the British settlers can be regarded as marking the end of the Traditional Society in South Africa and the beginning of a long transitional period in which the country prepared for the Take-off.

1.4.2 Stage 2: The Pre-conditions for the Take-off:

According to Rostow, there is some weakening of the Traditional Society during this period. This occurs through the spread of education, the widening of trade and commerce and the development of an infrastructure of transport, communications, and banking and financial institutions. The economy is still, nevertheless, mainly characterised by traditional and low productivity methods, and although some advancements will have been made, attention is still legitimately confined to production problems rather than to selling or disposal problems.

In South Africa, Hobart-Houghton regards Stage 2 as stretching from 1820 to 1933. As he states:

British rule made little difference to the basic economic disabilities of the Cape, but

it did introduce new ideas, and the advent of the British Settlers in 1820 is a clear landmark The British government officials were anything but revolutionary, and most of them had spent their lives fighting the ideas and men of the French revolution, but the reforms they introduced as a matter of course had a shattering effect upon the traditional society of the Cape.²⁸

Although production for export and the replenishing of passing ships had taken place since the foundation of the settlement at the Cape, the vast majority of the white population in the 1860's were engaged in subsistence farming. The manufacturing and trade which did exist, was conducted mainly but not exclusively in Cape Town. As Hobart-Houghton points out:

About seventy manufacturing concerns were recorded in 1860 with fifteen brickfields heading the list, followed by nine establishments for curing fish for export, seven steam flour-mills, six soap and candle factories, six snuff mills, five iron and brass foundries, etc ... But manufacture was by no means confined to Cape Town, and nearly all districts of the Colony had some factories, either processing agricultural products, like the distilleries of the vineyard areas, wool-washing in the sheep grazing districts, and milling; or manufacturers to supply a local need, like wagon-building, furniture-making, brick-making and stone-quarrying.²⁹

The ports were the main venues for commerce, and large wholesalers conducted a lucrative two-way trade - importing manufactures of all types and exporting skins, ivory, hides and wool. In South Africa, their commercial travellers sold the imported wares to local shop-keepers.

With this two-way trade, the need for the storage and transportation elements of physical distribution were clearly recognised. The focus of attention, however, was not the requirements of the customer but simply the most efficient use of the existing facilities and infrastructure.

In the mid-nineteenth century, inland transport was very primitive. In 1860 there were only two miles of railway and the ox-wagon was still the main means of conveyance. Inadequate roads, the semi-arid Karoo and the Cape coastal and Drakensberg mountains, however, seriously hampered the carrying of large quantities of goods.

Although characterized by a general slowness of change, the period between 1820 and 1933 did see the establishment of a number of essential requirements for future economic development. In the words of Hobart-Houghton, "trade, banking, transport, education and market-oriented farming were gradually extended into the interior from the ports."³⁰ The discovery of diamonds in 1867 and of gold in 1886 provided the economy with the stimulus it had for so long been lacking. Mining provided an impetus to farming development by not only creating urban concentrations of people and thus markets, but also by stimulating the development of the railway system. The latter, although initially developed for the mining industry, was also available for carrying produce to inland markets and to the ports for export. By 1892 Johannesburg was linked by rail with the Cape ports of Cape Town, Port Elizabeth and East London, while in 1894 the railway service between Johannesburg and Mozambique was opened. The rail link between Johannesburg and Durban was completed at the end of 1898.

Apart from railway development, it was during this preparatory period for economic take-off, that pioneers such as

Andrew Geddes Bain built new roads. It was only during the early 1930's however, that the first serious attempts at road construction for the use of the motor vehicle were made and a system of "national" roads started.

Despite the relatively extensive railway development, there were still vast areas of the country which were clamouring for transport services. Since the building of railway lines to remote and sparsely populated areas was uneconomic, the South African Railways decided to offer them road services, which came into operation in 1912. In time, the road services and the railway services were to become complementary.

Thus it was between 1820 and 1933 that the national transport infrastructure, which is so vital to the efficient practice of physical distribution management by farming and business enterprises, was started.

It was during the middle of World War I that a second revolutionary period in the economic development of South Africa started. It was then that a definite policy of industrialization was adopted with the conversion of available raw materials into manufactured goods carried out on a large scale. Mass production had begun and with it, unwittingly, the seeds were being sown for the need to eventually move to the adherence of the marketing concept, incorporating the physical distribution concept, as a philosophy of business.

1.4.3 Stage 3: The Take-Off:

According to Rostow, the Take-Off is the period during which the hindrances to growth are finally overcome. New industries expand rapidly, profits increase and these tend to be re-invested in additional plant. In the agricultural sector as well, new techniques spread and productivity increases.

As the manufacturing and industrial sector expands, more people are employed at higher wages. As a result, even although a larger range and number of products flow on to the market, there is an expanding wage packet to absorb them. It is under conditions such as these that supply can be perceived to create its own demand. Thus even at this stage in the development of an economy firms can afford to be product and production oriented. As a generalization, whatever they produce they can sell and there is no need for them to be consumer or market oriented.

Another typical phenomenon of the take-off period, as Rostow has noted, is that "the modern sector yields an increase of income in the hands of those who not only save at high rates but place their savings at the disposal of those engaged in modern sector activities."³¹

In South Africa, Hobart-Houghton³² regards the take-off period as being 1933 - 1945. The devaluation of the South African pound in 1933 gave a considerable boost to the gold mining industry which continued to be a major catalyst to economic development. In addition, Iscor was founded during this period and the production of pig-iron and steel served to meet basic infrastructural development needs.

Between 1933 and 1945, the employment of both whites and non-whites in industry increased substantially, as did the total wages going to employees. It was this increased pool of income which provided the basis both for a rise in domestic saving to boost capital formation, and for rising consumption to sustain the new emergent industries.

In accordance with Rostow's thesis regarding the take-off period, the gross value of farming output increased greatly from

R75 million in 1933 to R246 million in 1945 while the value of net manufacturing output rose from R61 million in 1933 to R276 million in 1945. In addition, between 1933 and 1945 the number of private manufacturing establishments increased from 6 543 to 9 316 and employment rose from 133 000 to 361 000.³³

These statistics reflect the fact that between 1933 and 1945 both farming and manufacturing enterprises were rapidly reaching the point where supply of their products would exceed demand for them.

1.4.4. Stage 4: Drive to maturity:

During the "drive to maturity" stage, the economy continues to grow at an even faster pace. Output regularly outstrips the increase in population but the central point about this stage in Rostow's words is:

that it has the technological and entrepreneurial skills to produce not everything, but anything that it chooses to produce. It may lack the raw materials or other supply conditions required to produce a given type of output economically: but its dependence is a matter of economic choice or political priority rather than a technological or institutional necessity.³⁴

It is this state of affairs which requires the phasing out of the production oriented approach by enterprises in commerce, industry and agriculture and the adoption of the more complex market oriented approach if they are to survive under competitive conditions in the long term. The problem now is not how to produce goods, but rather how to dispose of them profitably. Supply is now generally greater than demand and the producer is displaced as king.

South Africa is still in this particular stage of economic development. Rostow contends that historically, approximately 60 years intervenes between the beginning of the take-off period and maturity. If this holds true for South Africa the national

economy should be reaching maturity about the year 1993.

According to Hobart-Houghton, in the period 1933 to 1965 two great structural changes occurred:

Firstly, more and more South Africans of all races have been drawn into the industrial market oriented sectors of the economy. Secondly and closely related with the first, there has been the expansion of manufacturing relative to agriculture and mining. Its position has changed from third place, accounting for less than 13 percent of the national product in the nineteen twenties, to first place, generating a quarter of the greatly increased national income of the sixties.³⁵

With this growth in the manufacturing sector and the proliferation of relatively non-essential goods and services on the market, South African firms have recognised that during this "drive to maturity" stage the adoption of the marketing concept is vital if they are to earn their share of total personal disposable income. Recognition of the need for the adoption of the physical distribution concept has followed closely behind recognition of the need for the marketing concept. The following are some factors which have given rise to the increasing attention being paid to logistics and physical distribution by South African firms:

(a) the important role of distribution in providing customer satisfaction and in attracting customers is being increasingly appreciated. As the business environment has become more competitive, management has finally come to recognize that attracting an order is only half of the total marketing job. Getting the right goods to the customer at the right time and in the right quantities is the other half, and it is becoming an increasingly important half. This is particularly so for those

firms selling relatively undifferentiated products such as chemicals, milk and many types of food and beverages. As the customer begins to adopt data processing technology and becomes aware of the precise costs of holding inventory and the importance of consistent service by suppliers, physical distribution will become even more critical to many firms.

The point is that it has been recognised that in a competitive business environment, physical distribution can be used not solely as a means of servicing demand but also as a means of generating demand and creating a competitive advantage.

(b) As economic conditions have become more difficult, many firms have found themselves in a profit-squeeze situation. As a result they have begun to look around for cost reduction opportunities. It is not always possible, however, to achieve cost reductions without a major restructuring of the cost centres within which they occur. With physical distribution, however, it is possible to achieve these cost savings merely by juggling and manipulating the elements within a cost centre and without restructuring the cost centre itself. For example, it may be possible to reduce the level of stocks held. This will reduce the level of customer service offered and sales will inevitably be adversely affected. Because of the more than proportionate decrease in costs, however, net sales may well have increased.

Cost reductions in the physical distribution area can provide considerable profit leverage. If a company is currently making 2% net from R1 sales, then a reduction in physical distribution costs of 2 cents is equivalent to an increase in sales of R1. Similarly, a reduction in costs of R2 and R20 is equivalent to an increase in sales of R100 and R1 000 respectively.

The point is that in a recessionary economic climate it may well be easier to accomplish the savings in costs rather than the required increase in sales.

The real impact of physical distribution costs on profits is much greater than many managements think. These costs very often increase insiduously because they lie in a managerial no-man's land outside the scope of responsibility of any operating manager. They are not, strictly speaking, the responsibility of the distribution manager because they are incurred in, and as part of, the marketing department, production management or some other functional area of the business. On the other hand, however, these costs cannot be effectively dealt with by these respective operating managers because they are related to distribution policy and strategy which should be the sole preserve of the distribution manager. This state of affairs is directly attributable to the fragmented nature of distribution in many firms. It is for this reason, then, that physical distribution costs in many cases represent a significant untapped profit improvement potential.

(c) A third reason why physical distribution is receiving increasing attention in South Africa is the significant proportion of total costs which physical distribution costs represent. For two dairies in the Pietermaritzburg area, for example, it was established by the writer that total physical distribution costs represent between 30% and 35% of total costs. In 1978, Prinsloo³⁶ calculated very conservatively, that for food products in South Africa, physical distribution costs constituted 21,35% of the wholesale price.

It is widely held that the distribution area is probably one of the last remaining frontiers for significant cost savings.

According to Peter Drucker:

Physical distribution is the only area in which there is still a great deal of room for improvement. In a well-managed plant, it is not really possible to cut costs of the machine work substantially. The problem with sales expenses is not that they are too high, but that salesmen are not productive enough. When it comes to costs, physical distribution is about the only area in which efforts really pay off. A 10 per cent improvement in physical distribution costs is probably worth a 40 per cent improvement in true manufacturing costs.³⁷

The Australian experience, according to Gilmour, has been similar:

The importance of physical distribution to Australian businesses can easily be seen from the fact that between 20% and 50% of gross sales revenue for most firms is spent on physical distribution. Physical distribution is one of the few remaining functional areas where little pressure on costs has been applied; so the potential is great.³⁸

(d) A fourth factor which has resulted in increasing attention being paid to physical distribution, and indeed which has paved the way for the emergence of physical distribution as an important business function, is the use of computers. Distribution data are classified as a high input - low calculation - high output form of processing. The advent of magnetic tape and random access files, for example, has made it possible to handle masses of distribution data in an integrated way. As a result, management probably for the first time, has been fully informed as to the true state of its physical distribution activities.

The fifth of Rostow's five stages of economic growth, is the "Age of High Mass Consumption".

1.4.5. Stage 5: The Age of High Mass-Consumption:

During this stage, the leading sectors of the economy move towards producing durable consumers' goods, as well as selling services. Real income per head of population rises to a point where more and more people can afford commodities other than the basic necessities of food, shelter and clothing. This reflects an economy of abundance, a stage of development in which America has been for some time and which Western Europe and Japan entered in the 1950's.³⁹

It is in this period that the problems of the manufacturer and marketer are really accentuated. There are virtually millions of non-essential products competing for the consumer's discretionary income and the manufacturer somehow has to pander to the needs of the consumer to ensure that demand for his product is maintained at least at some minimum level. Thus, under conditions such as these, unless a firm adopts the marketing concept, it is going to encounter considerable difficulties in the long term. In addition, it is in periods when producers and sellers of goods and services are turning increasingly to what people want, rather than what they need, that developments and improvements in the area of physical distribution may well succeed in creating a competitive advantage for a firm.

1.5 The Physical Distribution Concept As a Philosophy of Management:

A philosophy may be described as an attitude of mind or a way

of thinking. As such, a company philosophy is a set of guiding principles which influences all the actions of the company. To minimize sub-optimization by individual departments and to maximize their contributions to the overall objectives of the total enterprise, it is essential that the company philosophy be made as explicit as possible. Katz writes:

Whichever criteria an enterprise emphasizes most heavily will determine the company's basic orientation and define its range of acceptable action. Unless this emphasis is given explicit attention in making strategic choices, the current relative power and influence of the various departments may be the sole determinant of corporate emphasis and the over-all strategic direction which the enterprise takes.⁴⁰

Such is the physical distribution concept, "an attitude of mind, or philosophy of understanding the business as a whole; combined with a conviction to integrate all the individual elements of the channel into an optimum pattern, which will achieve the company's policies and objectives."⁴¹

De Hayes and Taylor describe the physical distribution concept as a "way of thinking about problems. It involves a systems view of the entire materials flow process in a firm."⁴²

The physical distribution philosophy should not be confused with physical distribution itself, nor does this way of thinking imply that physical distribution is the most important business function. What Lipson and Darling stated about the marketing concept, can also be applied to the physical distribution concept, particularly for those firms for which effective physical distribution and the creation of time and place utilities is critical to the successful marketing of their products: "The concept, and its principles, are merely a basic conceptual foundation for the administration of all

business operations."⁴³ in the firm.

It must be emphasised that the functional aspects of physical distribution such as transportation and the management of customer service levels for example, do not in themselves constitute the philosophy. Thus the physical distribution concept is neither simply nor necessarily reflected in the existence of an aggressive physical distribution department. Increasingly, firms which adopt the physical distribution concept, or the logistics concept in its widest sense, come to view their entire enterprise as a physical distribution or logistics organization.

A combination of the marketing concept philosophy and the physical distribution concept philosophy comes closest to representing an overall management philosophy. The reason for this lies in the fact that they both have at their centre, the purpose for the existence of any business organization, namely the customer. Peter Drucker writes:

There is only one valid definition of business purpose: to create a customer..... It is the customer who determines what a business is what the business thinks it produces is not of first importance - especially not to the future of the business and to its success. What the customer thinks he is buying, what he considers 'value' is decisive - it determines what a business is, what it produces and whether it will prosper .. Because it is its purpose to create a customer, any business enterprise has two - and only these two - basic functions: marketing and innovation.⁴⁴

Physical distribution is of course a part of marketing, and it is becoming an increasingly important part. No longer is it simply viewed as a means of servicing demand; as spelt out before, its capacity to actually create demand is being recognised more and more. Manufacturers of consumer convenience goods and of

consumer shopping goods have come to realise that in a competitive, dynamic business environment, what the consumers may well consider value are attributes such as reliability of supply, consistency of supply, minimum stock-out situations, prompt deliveries etc. Thus many manufacturers have recognised that the creation of form utility is a very necessary but not a sufficient condition for competitive success. What is needed too is greater attention to the creation of optimum time, place and possession utilities which are largely the responsibilities of physical distribution management.

The chapters which follow will examine each of the elements of the physical distribution concept in more detail and indicate that there is a need for this type of philosophy in business today. They will also indicate that the overall company orientation is influenced by the outlook and attitude of the chief executive.

CHAPTER I

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CHAPTER II

THE ROLE OF PHYSICAL DISTRIBUTION IN MARKETING STRATEGY: THE CONSUMER ORIENTATION ELEMENT OF THE PHYSICAL DISTRIBUTION CONCEPT.

2.1 Introduction:

As Schary has pointed out, "the role of physical distribution is becoming recognised as another element in marketing strategy, and distribution service may be used as both substitute or complement for the use of product, price, or promotion variables".¹ In this chapter, the following topics will be covered: the co-ordination and integration of physical distribution with the other elements of the marketing mix; tactical adjustment of physical distribution across the product life cycle; and customer service in a physical distribution context.

2.2 The importance of the co-ordination and integration of physical distribution with the other elements of the marketing mix:

For marketing management to be effective, physical distribution must be viewed as an active element of a firm's overall marketing strategy. As Cannon states, "The process of making goods physically available is a crucial element in the marketing mix with important implications for all other aspects"² The interdependence of physical distribution with the other elements of the marketing mix and the consequent need for co-ordination of these elements, must be recognised. This represents the subject of the following sub-sections.

2.2.1 Promotion:

Should promotional activities be executed without consultation with physical distribution, it is not inconceivable that a stock-out situation could arise with unfavourable consequences. Back orders may have to be issued which adds to a firm's total costs, high speed/high cost transportation may have to be used, the sale may be lost or even worse, the customer may be lost. Physical distribution considerations, particularly the scheduling of inventory locations, should always precede the implementation of promotional programmes.

It could even be held that various elements of physical distribution are themselves promotional tools. Warehouse locations, for example, to the extent that they give confidence to local buyers with regard to product availability and customer service, are in fact performing a promotional function. Another example is in connection with products for which brand loyalty has already been cultivated. With these products, the simple availability on retailers shelves - the culmination of the physical distribution effort - will ensure sales with minimal assistance from formal promotion. On the other hand, however, as Schary and Becker point out, "just as promotional efforts may not succeed without the presence of product at the point of buying decisions, product availability may not create response without inputs from promotion".³

2.2.2 Product:

Many characteristics of a product, such as weight, bulk, fragility and size, have a direct influence on the physical distribution system. Thus mutual co-operation between product development activities and physical distribution is of the utmost importance.

Packaging is another element of the product which requires co-operative effort between physical distribution and marketing, and even between physical distribution and engineering. This is so because the two important dimensions of the product package, namely, its use for promotion and its acceptability to consumers (marketing concerns) and its role in protecting the contents (a physical distribution concern), are not independent.

Another factor to consider is the practice of differentiating products, sometimes spuriously, to meet the increasingly complex needs and wants of consumers in an affluent society. This product differentiation leads to a widening of product lines, which in turn leads to an increase in distribution costs through excessive inventory requirements. Smykay suggests that "a doubling of product line may more than double the inventory necessary to serve market demand".⁴ Thus the potential benefits to be gained from product diversity must be balanced against the costs involved, of which those of physical distribution are a major component.

2.2.3 Price:

In the long run all the firm's costs have to be passed on to the buyer. The instrument used to do this is obviously price. A substantial portion of these costs can be attributed to physical distribution activities. In an integrated physical distribution system, it is possible that these costs will be reduced. These cost reductions can then either be passed on to buyers in the form of price reductions, or simply used to make existing prices more profitable.

A popular incentive pricing scheme is the quantity discount. The purchaser is encouraged to buy in larger quantities than he would normally take, by an incentive system which is linked to the order size. This incentive system usually incorporates reductions in price per unit based on savings achieved in the area of physical distribution. As Ballou points out:

Economies of scale are often difficult to justify in production operations and selling, but the volume discounts established in the transportation rate structure are well known. Because of this, logistics costs are frequently used as a guide in setting discount levels and the quantities at which discounts occur.⁵

Thus it is evident that physical distribution considerations should be represented in pricing decisions.

2.2.4 Distribution:

For the manufacturers of most consumer products, the middleman plays a critically important role in the overall creation of time and place utilities for their products. When shopping, it is virtually impossible for an individual consumer to visit a toothpaste factory for toothpaste, a shirt factory for shirts, and so forth. Davis and Brown summarise the role of the middleman as follows:

Physical supply and demand is heterogeneous and someone must bridge the gap between spatially separated producers and consumers. The middleman, be he wholesaler, retailer, or agent, concentrates goods from these geographically dispersed producers; sorts the merchandise into saleable units; and subsequently dispenses the goods to the ultimate consumer. Even though giant retailers such as Sears, Roebuck and Company and J C Penney have eliminated the middleman, his functions have not been eliminated. Someone, Sears and Penney in this case, concentrates, sorts, and disperses goods.⁶

With this brief description of the traditional functions of the middlemen, the interdependence of physical distribution with the channel of distribution⁷ becomes obvious. John Magee writes:

One traditional role of forward elements in distribution channels, such as retailers or wholesalers, is to serve as elements in the physical distribution system. The performance of physical distribution functions such as warehousing, local demand forecasting, local transportation, order processing, justified, in part the margin that wholesalers have traditionally earned.⁸

Thus in choosing amongst channels of distribution and in making any decision relating to channels of distribution it is vitally important that the physical distribution implications be taken into consideration. As Bowersox puts it:

The distribution or marketing channel is of fundamental importance to physical distribution because the channel is the arena within which marketing and physical distribution culminate into customer transactions One promising way to increase marketing efficiency is to improve physical movement within the distribution channel.⁹

Another related factor which reinforces the interdependence between physical distribution and channels of distribution is that in many product classes consumers are apparently more store-loyal than product-loyal. Thus the retailer very often performs the role of "gatekeeper" and intermediate decision-maker. As such, he must become the focal point of the manufacturer's physical distribution effort, the result of which may encourage him to stock the product in the first place.

From the foregoing discussion, it should be clear that

physical distribution is not just simply a support activity of marketing, but rather an integral part of a firm's marketing mix. As Hussey states:

The least the total physical distribution concept can do is to identify the cost and profits of any change in the system, so that different levels of customer service can be evaluated by the marketing management as an aggressive element of total marketing strategy. This becomes one of the variables to be considered with the other variables - product changes, price movements, promotion, advertising and the like.¹⁰

One of the cardinal principles of product management is that the marketing mix associated with a new product on the day of launch is not a static entity. It is instead a dynamic entity to be altered appropriately whenever the circumstances facing a product change, whether competitive or otherwise. Thus the physical distribution component of the marketing mix must also be regarded as dynamic, and tactics relating thereto must change as the product's environmental situation requires. The product life cycle concept can be used to illustrate the need for dynamic physical distribution performance. Physical distribution strategies must be developed and implemented for each distinctive stage through which the product passes.

2.3 Tactical adjustment of physical distribution across the product life cycle:

The product life cycle concept shows the sales curve and the

different competitive conditions which the typical product is likely to face during its market life. Figure 2.1 shows a product life cycle with four stages, namely: (1) introductory; (2) growth; (3) maturity; and (4) decline.

The important point about the product life cycle is that a different marketing mix is necessary in each stage in order to counteract the activities of competitors. Consequently, expectations regarding the performance of physical distribution over the life cycle will also vary. It must be remembered that both the shape and length of the product life cycle will vary from product to product. The time interval in each stage, for example, can vary widely ranging from a few weeks (women's fashions) to a few decades (motor cars). In addition, some products may take years to pass through the introductory stage, whereas others are accepted in weeks. Knowledge of the life-cycle phenomenon in products allows the physical distribution manager to anticipate distribution needs and to plan well in advance. This will become evident in the following sub-sections.

2.3.1 Introductory stage:

During the introductory period after the product is first launched, a high level of performance will be expected from physical distribution. During this stage availability of the product is of the utmost importance, as is rapid and consistent fulfillment of replacement orders. Middlemen may initially be prepared to take limited quantities of the product but require swift restocking if it gains customer acceptance.

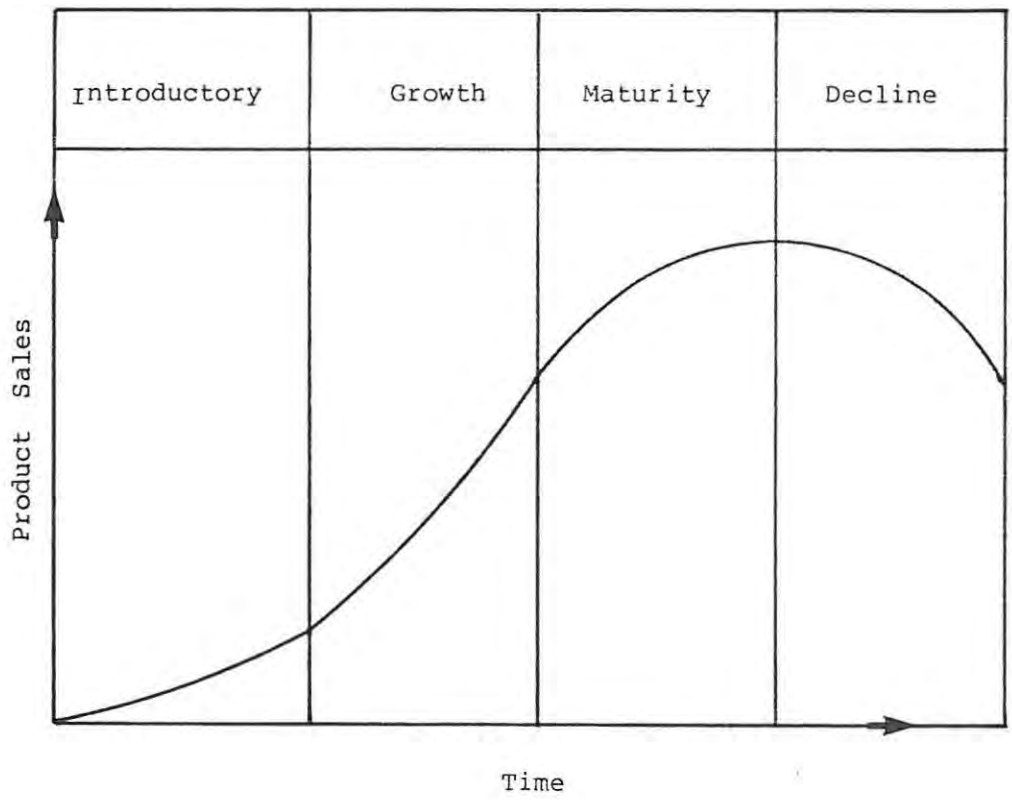


Figure 2,1 The Product Life Cycle Concept.

In addition, promotional expenses are very high in the introductory stage as the firm attempts to educate customers and to move them from a state of unawareness to awareness and to trial of the product. Unavailability of the product due to lack of physical distribution support will certainly dilute the effect of this and other marketing efforts.

Thus the role of physical distribution in the integrated marketing strategy will be significant during the introductory stage. In addition, because sales initially are low, shipments tend to be small and orders erratic and consequently physical distribution costs are high. Firms must thus be prudent in establishing additional distribution centres or warehouses for products in the introductory stage of their life cycle. Public warehousing or direct shipment by airfreight should be used when feasible, to avoid any unnecessary investment in fixed physical distribution facilities.

2.3.2 Growth stage:

By the time the product has entered the growth stage, it will have achieved market acceptance and sales will increase at an increasing rate. The objective of physical distribution strategy in this stage must be to provide the firm with a differential advantage wherever possible in a market which will become increasingly competitive. In order to support marketing plans designed to encourage brand (as opposed to product) awareness and brand loyalty, physical distribution plans must be designed to avoid costly stock-outs. Additional warehouses, for example, could be established during this stage to provide adequate levels of service to customers through the maintenance of high levels of inventory. In addition, least-cost

transportation routes and allocations may be ignored because emphasis is being placed on developing brand and consumer loyalty.

During this stage, the firm must emphasise service, revenue and market share positions and not necessarily careful and detailed cost control. This is consistent with the Boston Consulting Group's approach to product portfolio analysis. The Boston Consulting Group developed a market growth/market share matrix as illustrated in Figure 2.2.

A product in its growth stage would typically be classified as a "star". One of the main characteristics of a "star" product is that it has a high share of a high growth market. It consequently needs to use all, or at least most of the cash which it generates, in order to achieve or maintain market dominance. In fact, a "star" may need more cash than it is generating to achieve market dominance.

2.3.3 Maturity stage:

By the time the product enters the maturity stage of its life cycle, the activities of competitors are a reality and there are many substitute products on the market. Sales still increase during the growth phase of this stage, but at a decreasing rate. If the product was successful in achieving market dominance as a "star", it now becomes a "cash cow" in the Boston Consulting Group's terminology. One of the main characteristics of the "cash cow" is that it has a high share of a market whose growth rate has slowed significantly. (See Figure 2.2). It consequently tends to generate more cash than it needs in order to maintain market dominance. This surplus should be used to support

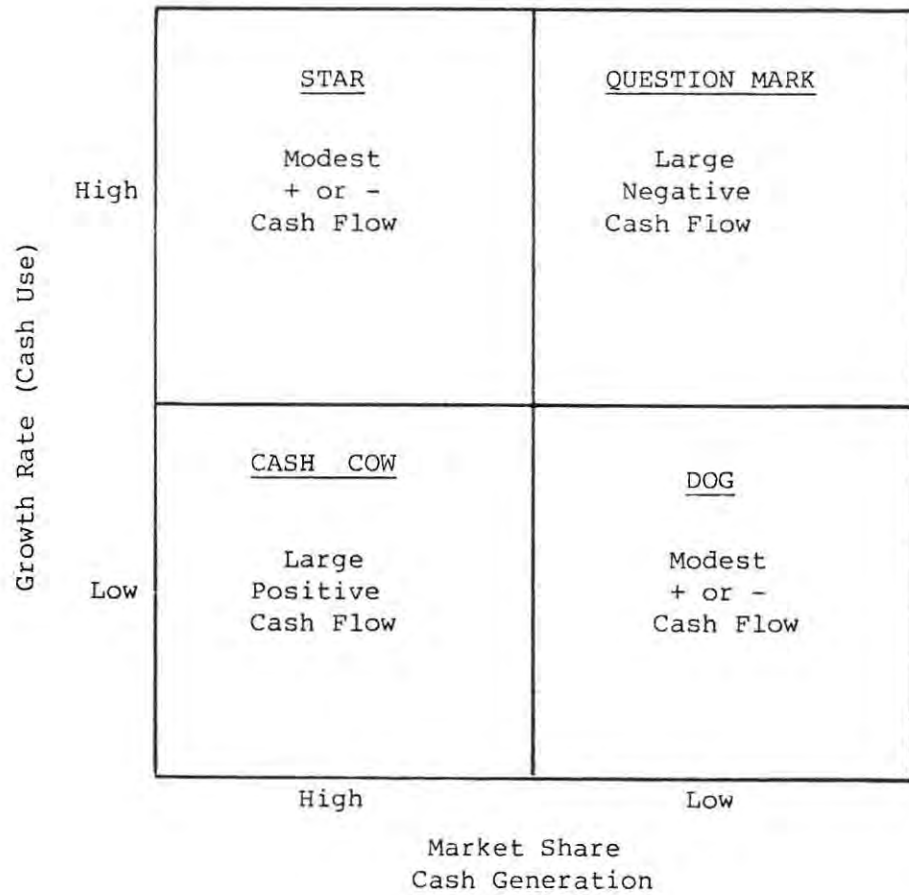


Figure 2.2 Product Categories in the Product Portfolio Chart

Source: Adapted from "The Product Portfolio" (Boston: The Boston Consulting Group, 1970), Perspectives No. 66.

other "stars" or "problem children" (products in the introductory stage of the life cycle) in the firm's portfolio of products.

Because of the low probability of increasing market share in a low market growth situation, physical distribution strategies for the mature product should stress caution. Firms must continue with attempts to cultivate brand loyalty where possible, and this could require extensive physical distribution outlays, but generally, physical distribution strategies in this stage should emphasize cost control. Physical distribution performance can be expected to become highly selective with only major, high volume customers being offered their desired levels of customer service.

The stable phase or saturation phase of the maturity stage is generally reached when 90 percent or more of the potential customers possess the product. Thus sales are largely of a replacement nature. As Davis and Brown state:

Economic characteristics of the saturation period center (sic) upon cost, entry barriers and dealer strength Even though specific logistics strategies will vary from firm to firm within the saturation period, in general, emphasis is usually directed toward dealer strength It is essential that production and consumer demand be closely co-ordinated; therefore, order processing should receive a substantial amount of managerial attention. Careful product differentiation and market segmentation is important with respect to levels of service, finished product inventory, and lost sales. Manufacturing plants should be located at least-cost sites and distribution centers placed where the greatest profits can be gained. In this regard, transportation strategy may require locating where carload and less-than-carload costs are minimized.¹¹

2.3.4 Decline stage:

By the time the product has reached the decline stage, it faces severe and aggressive competition on all fronts. It is at this stage that the value of a policy of continuing product development is seen. Once a particular product has reached the decline stage, another new product should already have passed through the introductory stage and be ready to take over from where the dying product has left off. In the Boston Consulting Group's terminology, the declining product is a "dog"; it has a low share of a low growth market. (See Figure 2.2).

Once a product has entered the decline stage, it is usually evident that it is on its way out. While it still exists, however, it has to be managed and a marketing programme developed for it. This could be a continuation strategy, a concentration strategy or a milking strategy. In terms of a continuation strategy, the present market segments continue to be appealed to via the same distribution channels, pricing structures and promotional programmes as before. With this approach, the product simply continues to decline until it is eventually dropped. This point is reached quicker than with any alternative decline strategy because while costs are maintained, volume is declining.

With a concentration strategy, resources are focussed on the strongest market segments, and phased out elsewhere. In these strong areas, physical distribution performance is maintained at a high level and both contributes to, and supports, a satisfactory level of sales.

In terms of a milking strategy, market expenses are sharply reduced to increase the current profits flowing from the product. The marketing strategist pursues this line of action in the full knowledge that it may well accelerate the rate of decline and ultimate demise of the product. Physical distribution is an obvious

area for cutting back; inventories may be substantially reduced and deliveries restricted, for example. The net effect of a milking strategy could conceivably be that with superfluous expenditures eliminated, the profitability of the product is restored. Because the product, even with reduced support, appeals to a certain segment of the market it could be decided to retain it.

It should be clear from the foregoing discussion that physical distribution, as indeed all elements of the marketing mix, must be adjusted to changes in the marketplace and competition. In the words of Bowersox

The product life cycle illustrates a variety of different physical distribution strategies that a firm may select to implement during different points in time The level and response of performance will change over time. Likewise, the firm's willingness and ability to absorb physical distribution cost will also vary across time.¹²

The next section shall be devoted to a discussion of customer service, the key element of consumer orientation in a physical distribution context.

2.4 Customer service in the physical distribution context:

Within the context of physical distribution, customer service is a multi-dimensional phenomenon. Because suppliers provide a variety of services which combine into a customer service package, it is difficult to arrive at a precise definition of physical distribution service. In the past, authors have defined physical distribution service by listing its elements. Table II.1 sets out three such lists.

TABLE II.1
DEFINITIONS OF PHYSICAL DISTRIBUTION SERVICE IN
TERMS OF ITS CONSTITUENT ELEMENTS:

Hutchinson and Stolle ¹³	Stephenson and Willett ¹⁴	Gilmour ¹⁵
(1) order processing time	(1) order cycle length	(1) availability of the item
(2) order assembly time	(2) consistency of order cycle length	(2) after sales service and backup
(3) delivery time	(3) order preparation	(3) efficient telephone handling of orders and queries
(4) inventory reliability	(4) order accuracy	(4) ordering convenience
(5) order size constraints	(5) order condition	(5) competent technical representatives
(6) consolidation allowed	(6) order size	(6) delivery time
(7) consistency	(7) order frequency	(7) reliability of delivery
(8) frequency of salesman's visit	(8) billing accuracy	(8) demonstrations of equipment
(9) ordering convenience	(9) billing efficiency	(9) availability of published material
(10) order progress information	(10) back orders	
(11) inventory backup	(11) claims	
(12) format and organization of the invoice.		

In addition, Heskett lists the following definitions of customer service roughly in order of popularity:

1. The elapsed time between the receipt of an order at the supplier's warehouse and the shipment of the order from the warehouse.
2. The minimum size of order, or limits on the assortment of items in an order which a supplier will accept from its customers.
3. The percentage of items in a supplier's warehouse which might be found to be out-of-stock at any given point of time.
4. The proportion of customer orders billed accurately.
5. The percentage of customers, or volume of customer orders, which describes those who are served (whose orders are delivered) within a certain time period from the receipt of the order at the supplier's warehouse.
6. The percentage of customer orders which can be filled completely upon receipt at a supplier's warehouse.
7. The proportion of goods which arrive at a customer's place of business in saleable condition.
8. The elapsed time between the placement of an order by a customer and the delivery of goods ordered to the customer's place of business.
9. The ease and flexibility with which a customer can place his order.¹⁶

The last four definitions are customer-oriented definitions in contrast with the supplier-oriented ones at the top of the list. The specific definition or definitions adopted by a firm to guide distribution strategy, are likely to reflect the orientation prevailing in that firm, that is, either consumer orientation or product, production, technology or sales orientation. The latter do not always emphasise consumer satisfaction as a goal. Implicit in the various definitions stated above is the fact that customer service policies are inextricably linked with inventory policies and the general issue of product availability. As periods of product and raw material shortages become increasingly prevalent, and as

demarketing becomes a more explicit strategy for more firms, the role of product availability in generating sales is likely to become more pronounced. Gregson puts it as follows:

It can be envisaged that the influence of customer goodwill will be felt to a degree that is going to vary with the ease of product availability. With less capital available in industry generally, there is increasing pressure to reduce inventories of materials at all states of conversion. If a product, or a range of products, is in short supply and frequently unavailable, then the logistics contribution can be absolutely critical. The term 'customer service' is used to describe this contribution as it affects the customer and influences his level of co-operation and goodwill towards the manufacturer.¹⁷

With inventory policies and/or product availability being the main instrument of customer service, it is possible to identify the three major elements of customer service as being (a) order-cycle length, (b) consistency of order cycle length and (c) the meeting of customer requirements. Each of these will be examined in more detail.

2.4.1 Order cycle length:

Order cycle length is the time elapsed between a customer placing an order and his receiving the goods. Over time, a customer builds up an expectation as to the length of this lead time and as to when he should submit an order so that the goods will arrive when required.

The length of a firm's order cycle can exert considerable influence on a customer's readiness to do business with it. The

shorter a supplier's order cycle length, the lower are the inventories which a customer has to maintain. Indeed, if the supplier delivers on a daily basis, the customer will not have to maintain any inventory at all. Thus, a shorter order cycle length appeals to a customer because it means that the supplier absorbs some of his costs of doing business. What is important, however, in so far as gaining consumer patronage and increasing sales is concerned, is not the absolute length of a supplier's order cycle but how it compares with average competitive order cycle lengths. In practice, the range of order cycle lengths amongst competing suppliers tends to be fairly narrow as a result of imitative competition and the concentration of suppliers in the same geographic areas.

Stephenson and Willett present an example, illustrated in Table II.2 showing how profits are affected by changes in the order cycle length relative to competition:

The example assumes a three day average order cycle length among competing suppliers serving this customer. If one supplier (who has previously been giving average service) provides two-day service on an order, his probability of receiving the customer's next order would increase to ,155.¹⁸

In general, and assuming all other things to be equal, a supplier is likely to win an order if his order cycle length is perceptibly better than average.

Table II.2 shows, however, that improvements in customer service above the average meet with relatively small increments in revenue. The average order cycle length in this example is 3 days.

TABLE II.2

SCHEDULE OF PROFIT DIFFERENTIALS AS A FUNCTION OF
VARYING ORDER LENGTHS (ONE CUSTOMER).

Length of order cycle in days.	Probability Supplier will receive customer's order.	Annual Revenue from customer.	Profits before Physical Distribution costs.	Total Physical Distribution costs.	Profits from sales to customer.
1	0,158	\$774	\$271	\$85	\$186
2	0,155	736	258	66	192
3	0,150	675	236	51	185
4	0,140	560	196	36	160
5	0,130	455	159	26	133
6	0,125	406	142	20	122

A reduction from 3 to 2 day results in an increased revenue of \$61 and a reduction from 3 days to 1 day in an increased revenue of \$99. The reason for the relatively small increments in revenue is that customers eventually find it difficult, if not impossible, to discriminate amongst suppliers, all of whom are providing acceptable levels of service. In addition, as shown in research by Ballou and De Hays ¹⁹ buyers may respond to a reduction in order cycle length by reducing their re-order quantities rather than their average inventory levels. This would have little or no effect on the customers' profits and consequently their predispositions towards the supplier would only change marginally.

It is the firms whose order cycle lengths are longer than the average which gain from an improvement in their lead times. This is shown in Table II.2 where if a firm improves its order cycle length from five days to four days, the probability of his getting the customer's order goes up from 0,130 to 0,140.

The order cycle length is made up of three components, namely (a) order transmission, (b) order preparation and (c) transportation.

2.4.1.1 Order transmission refers to the time taken for the order to reach the supplier. The length of this time is influenced by the method of order placement of which there are two main forms, namely, mail and electronic transmission. Electronic transmission includes telephone and telex. Mail is inexpensive but is slow and can make the lead-times less consistent. Telephone and telex, on the other hand, are expensive but are instantaneous and tend to improve lead-time consistency. The observation by Stephenson and Willett ²⁰ in their study that

telephoned orders produced considerably shorter order cycles was not unexpected. The expectation in no way undermines the importance of the observation, however. This is so because most examinations of the ways and means of reducing the order-cycle length revolve around the transportation element. The method of placing the order, however, may well be a low-cost means of reducing the overall order cycle length. In addition, if the supplier specifies and bears the costs of electronic transmission of orders, he can achieve better control over this segment of the lead-time and ensure greater consistency.

Another of Stephenson and Willet's findings was that orders placed via the supplier's salesmen resulted in relatively long lead-times. The salesman either used the mail, telephoned after consolidating the orders of several customers, or carried the orders with him until he returned to his base. Submission of orders via salesmen allows the supplier to exercise control over this activity, but if the salesman is left to his own devices it is likely to result in longer and less consistent lead times.

2.4.1.2 The second segment of the lead-time is order preparation. This refers to the time taken by the supplier to prepare an order for dispatch. This is the one segment of the lead-time over which the supplier has complete control. By implementing computerised, automated and mechanical order-picking systems, he can succeed in reducing this time considerably.

2.4.1.3 The third segment of the order-cycle length is transportation, or the time taken by the goods in-transit from the supplier to the customer.

The second major element of customer service is consistency of order cycle length:-

2.4.2 Consistency of Order Cycle Length:

Over time, a consistency or lack of consistency of the order cycle length of a supplier may emerge. The extent to which consistency does exist may affect the future purchasing decision by the customer. This is so because any variation in the order cycle lead time will have an adverse impact on the buyer's re-order planning and on his costs. The greater the inconsistency, the greater will have to be the customer's investment in safety-stock to avoid stock-outs, and consequently the greater his inventory carrying cost. Indeed if the service lead times are too erratic, stock-outs may still occur notwithstanding the higher safety stock level. This has obvious implications for the buyer's ordering costs and possible lost sales. It is likely that customers will prefer a supplier who minimises these costs even if this minimisation can only be achieved at the expense of service lead times. There is evidence to support this basic contention:

Forbes Research Inc., for example, questioned a sample of industrial buyers as to the relative importance of an exhaustive set of factors that could influence their purchase decision. 'On-time delivery performance' was rated second only to maintenance of product quality within specifications.²¹

In addition, the research done by Ballou and De Hays²² concluded that consistency actually has more impact on the

buyer's profits than speed of delivery.

The reasons for customers placing a premium on consistency are summarised in Figure 2.3. It takes 16 days for this customer to sell his normal operating stock. Over time, he has come to expect that the average order cycle length of his supplier is 8 days. He would thus submit his order at time A in the diagram, expecting the goods to arrive at time B. If, however, the supplier's lead time is inconsistent and on one occasion arrives at time C, this is likely to cause the customer inconvenience. His level of inventory for a period of time is going to be higher than normal causing possible storage and working capital problems. If on another occasion the goods arrive at point D, the customer will be out of stock and will either have incurred the costs of back-orders or have lost sales. To overcome these latter problems, the customer would have to hold higher safety stocks, increase his inventory costs, and yet still operate under conditions of uncertainty.

One measure of the consistency of lead times which can be used to compare the performances of alternative suppliers is the co-efficient of lead-time variation, calculated as follows:-

$$\frac{\text{Standard deviation of order cycle lengths}}{\text{Mean order cycle length}}$$

It is quite possible, of course, for two suppliers to have the same average length of order cycle but to have differences in consistency or standard deviations around the mean. This is shown in Figure 2.4. Both supplier A and

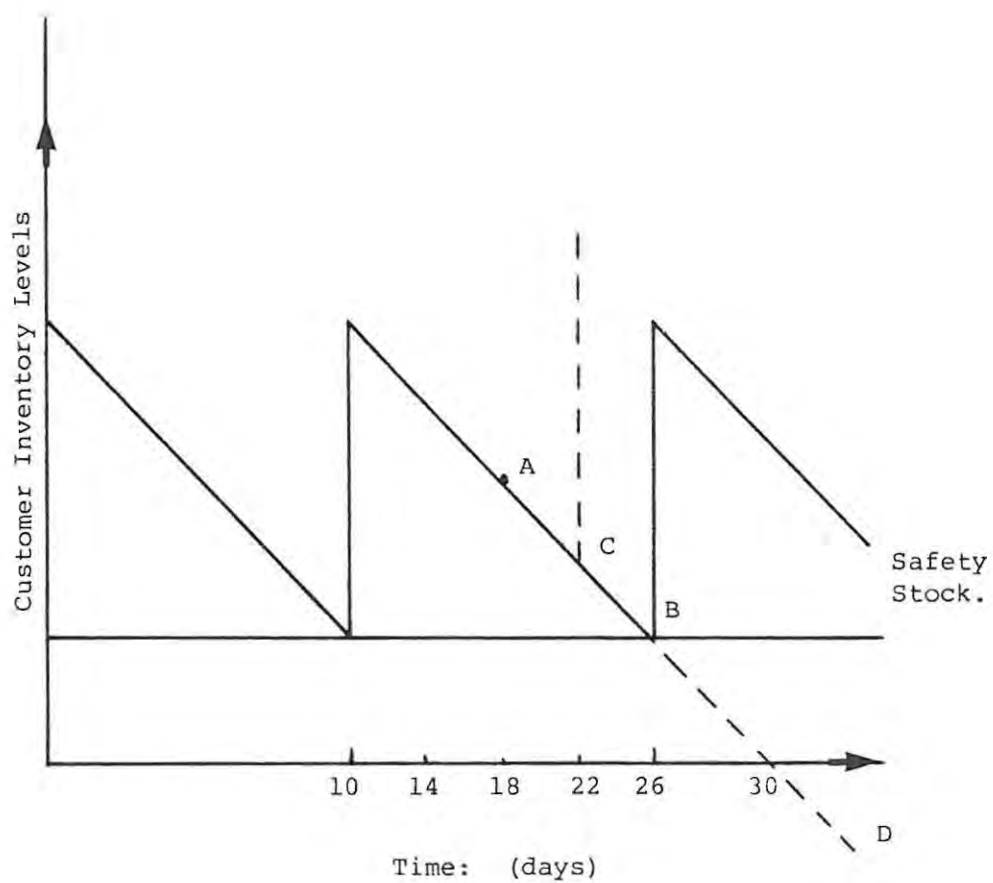


Figure 2.3

Implications of Inconsistent Lead Times:

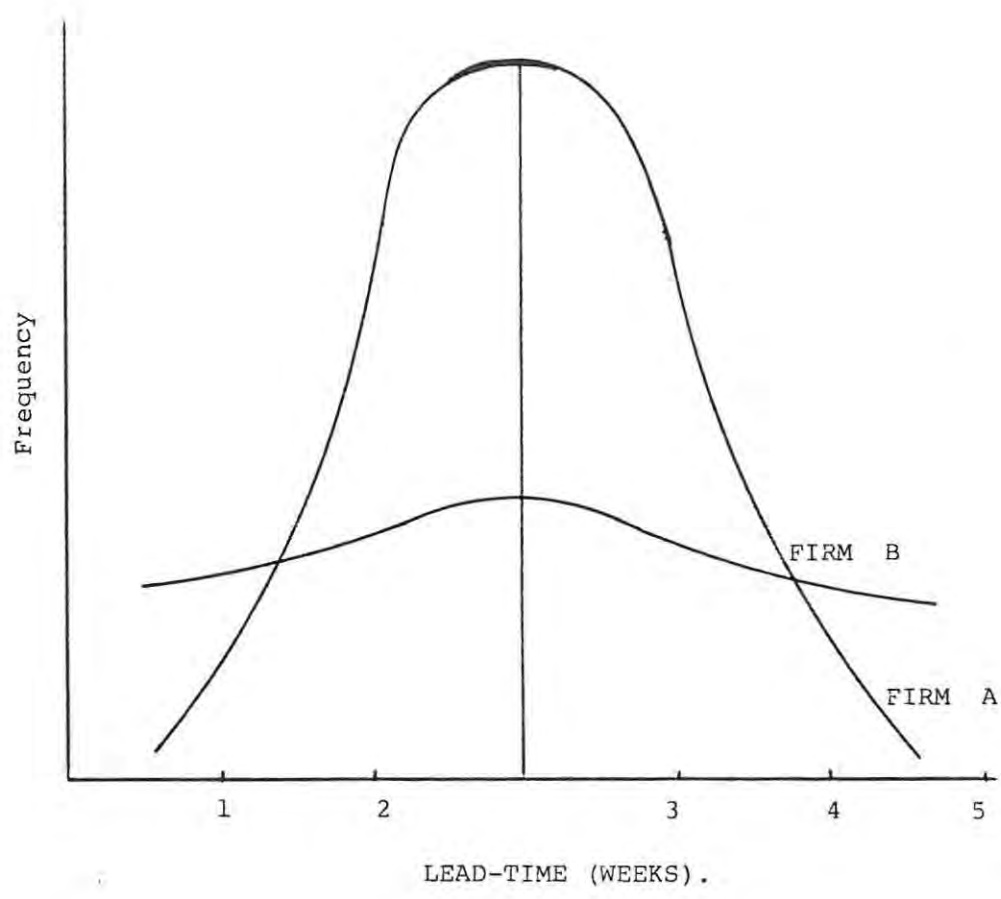


Figure 2.4 Comparative Lead-time Performance of two Suppliers:

supplier B have the same mean lead-time, namely 3 weeks, but different levels of consistency. While supplier A does not provide a lead-time of 1 week nearly as often as supplier B, it seldom goes beyond 4 weeks. Thus, clearly, supplier A's lead-time is far more consistent or reliable. As with the mean lead-time, it is important to think of consistency of lead-times in relative terms. In a competitive situation, even although the consistency of a particular supplier is poor, provided it is superior to those of his competitors it may be a factor operating in his favour.

In the final analysis, it is incumbent on any firm for which physical distribution is relevant, to examine its own situation and to determine the sensitivity of demand relative to these two elements of customer service, namely, order cycle length and consistency of order cycle length. Such an examination may well indicate that too high a consistency of lead-times is being offered in the sense that any reduction would not materially affect demand. The reduction of consistency, however, might well reduce total physical distribution costs significantly.

The major causes of inconsistencies in order-cycle length will be found in one or more of its three components, over which a supplier has greater or lesser control. These three components are order transmission, order preparation and transportation. It is to these areas that a supplier must look for improvements in consistency.

The way in which a customer places an order, and possible delays and bottlenecks in that process, may depend on the

supplier's order transmission system over which he normally has considerable control.

The second component of the lead-time is order preparation over which the supplier has full control.

Most of the variation can often be attributed to the third component of the lead-time over which a supplier has frequently little control, namely, transportation. The inherent characteristics of some modes of transport can cause them to be unreliable at certain times. Air freight, for example, while being able to reduce order cycle length substantially, can also be the cause of inconsistency because of weather conditions, mechanical breakdown and traffic congestion. Because of the impact of transportation on both the order cycle length and the degree of consistency, in choosing between alternative transport modes one returns to a consideration of the sensitivity of demand to each of these factors. As Saleh and Das comment

For too many buyers of transportation services reliability of carrier service is more important than speed Recent comments in the literature seem to have intentionally overlooked the importance of speed of delivery as a performance criterion for carrier service. Both consistency and speed should be weighted in selecting the proper transport carrier.²³

Saleh and Das identify the following situations in which speed rather than consistency should be the main decision criterion in choosing between alternative transport modes or carriers:

(i) Seasonality of demand for a product particularly if it is accompanied by a risk of obsolescence as well as by a difficulty to determine the start or the end of the season.

(ii) For small less-than-truckload shipments. These tend to be the least reliable shipments in terms of transit time performance anyway.

(iii) For slow moving products which are ordered infrequently from a centralised supply depot. Here any gain in average transit time will have a positive effect on total costs through having to maintain lower inventories of slow moving items.

(iv) The greater the proportion of average transit time relative to total lead-time, the greater the justification for faster delivery.

The third major element of customer service within the context of physical distribution, is meeting customer requirements.

2.4.3 Meeting Customer Requirements:

Although the whole of marketing is concerned with satisfying the needs of customers, meeting customer requirements within the context of physical distribution is concerned with specific aspects of customer satisfaction. Some of these are:-

- (a) ensuring that the right product is in the right place at the right time;
- (b) that the correct quantities of the right product are delivered;
- and
- (c) that the method of order preparation be acceptable, whether in pallet loads, containers or cartons of certain sizes.

Having examined the nature, as well as some of the details of

customer service, it will be readily apparent that it is this aspect of physical distribution which gives it the potential to not only service demand, but also to create it. In fact, through its provision of distribution service, physical distribution becomes a key element in the firm's marketing mix. As Hutchinson and Stolle state

Today the trend is for customers to expect service to be as much part of what they buy as are the product's design, quality and price.²⁴

To ensure the effective management of physical distribution, it is incumbent on any firm to determine the nature of the relationship between customer service and demand in its own product-market situation. This is the subject of the next section.

2.5 The relationship between customer service and demand:

As in any other sphere of marketing, it is necessary with regard to customer service to determine the needs of customers; to determine the extent to which service is a factor in influencing overall demand for the firm's products. Walters lists the following factors as some which indicate whether or not a particular industry is sensitive in its response to service:-

Product substitutability: If a customer has no particular brand loyalty and willingly accepts a competitive product offered by a retailer it is clear that minimisation of stock-outs at the retail level is essential.

Product dependability: For some industrial concerns the cost of a stock-out can be enormous ... In such an instance delivery reliability is absolutely essential.

Complementary products: There are some products the absence of which on outlets shelves will restrict the sale of a complementary product. In both cases the combined sales may represent a considerable proportion of the outlet's revenue. In this case service is essential.

The cost of customer enquiries: If these represent an unacceptable proportion of salesmen's and sales administration's time there is a clear indication that service is of concern to the enquiring companies.²⁵

Relevant and accurate yardsticks with which to measure performance in the area of customer service are necessary. To determine the exact relationship between service and demand however, is not easy. This arises from the difficulty in separating out one set of influences, such as physical distribution, from the other elements of the marketing mix, as well as from the difficulty of obtaining objectively quantifiable answers from respondents.

Empirical evidence of physical distribution response functions in any context are severely limited. Nuttall²⁶ tested the proposition that the greater the number of outlets which stock certain lines of confectionery, the greater will be consumer sales of that line. The response function with which he emerged is illustrated in Figure 2.5. As the proportion of retailers which stock the line increases, so do the purchases by final consumers. Eventually, however, a saturation point is reached where increases in the number of stores stocking

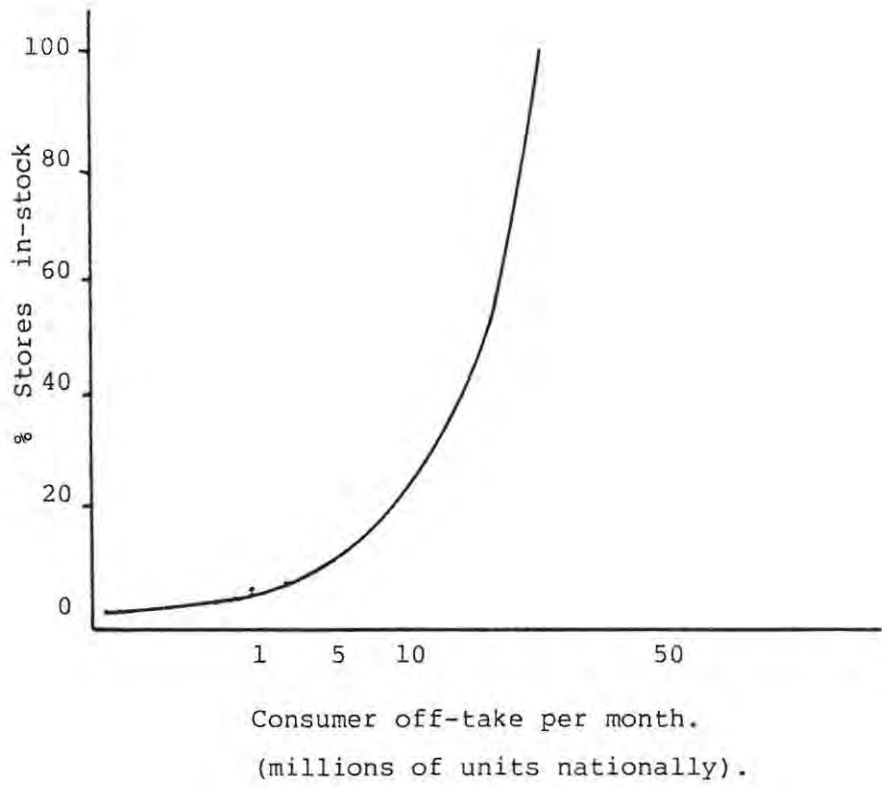


Figure 2.5 Relationship between percentage stores in-stock and consumer off-take per month:

Source: Nuttall, Colin, "The Relationship Between Sales and Distribution of certain Confectionery Lines". Commentary (Vol. 7, October 1965). p. 281.

the line are accompanied by less than proportionate increases in purchases by final consumers.

Christopher²⁷ has suggested that the relationship between customer service and demand can be expressed in the form of an S-shaped curve as shown in Figure 2.6. In terms of this response function there are certain ranges of service in which any improvements in the service level will have a negligible impact on demand. These are at the low levels and the high levels. Customers may well expect a certain minimum level of service such as point A in Figure 2.6 and be unimpressed with any improvements in service until this minimum or threshold level is reached. Similarly, at high levels of service, such as at point B in Figure 2.6, any improvement in customer service may have no impact on demand. The reason for this may be that customers are unable to arrange their own logistics systems to take advantage of an improvement in an already high level of service, or it may be that at that point, the market is saturated. It is in the range between the threshold and saturation points that demand is really responsive to service, and where opportunities may be exploited. While useful in establishing a principle, the generalized S-shaped curve does not provide the physical distribution planner with any practical help in determining the optimal customer service strategy to implement.

In an attempt to develop a response function between demand and customer service, Schary and Becker adapted Vidale and Wolfe's model which described the response of sales to advertising:-

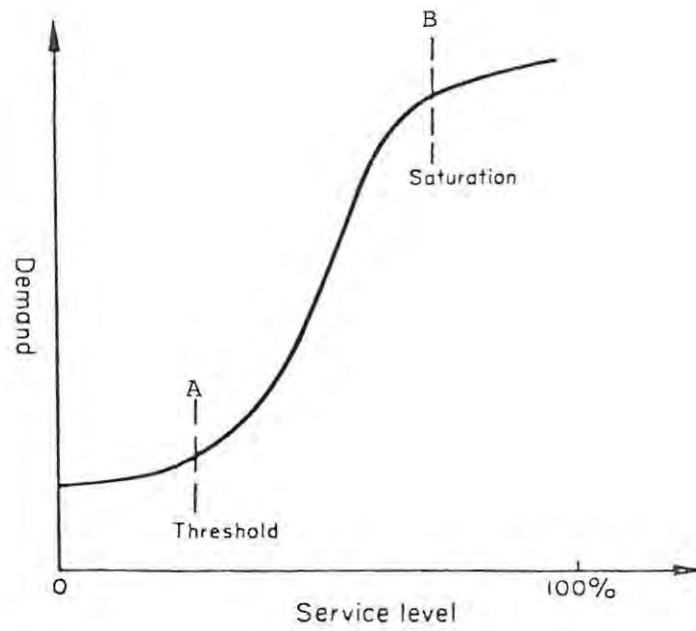


Figure 2.6 Demand as a function of the level of service

Source: Christopher, Martin. Total Distribution, op. cit., p. 89

The basic equation of the Vidale-Wolfe model, transformed into a logistics context, would appear as follows:

$$\frac{ds}{dt} = rL \frac{(M - S)}{M} - \ell S$$

where:

S = sales rate at time t

$\frac{ds}{dt}$ = rate of change in sales rate at time t

L = rate of logistics expenditure at time t

r = sales response constant (defined as the sales generated by logistics activities when S = 0)

M = saturation level of sales

ℓ = sales decay constant.

In descriptive terms, the rate of change in sales (ds/dt) is positively related to logistics expenditures (L) through the response characteristics of the market (r), and the relative saturation of the market. The decay factor describes the declining effect of logistics stimuli as sales increase. The general shape of the function would then posit strong effects in the initial stages, but with declining effect of additional logistics inputs as the level of sales rises.²⁸

With this model too, the physical distribution planner is left with the practical problem of calculating the values for the various variables.

In view of the difficulties inherent in trying to separate out the influence of customer service strategies on the achievement of market performance objectives such as market share,

sales and profit, Schary has suggested that intervening variables be measured and that performance of customer service strategies be evaluated on these. As with the adoption of a new product, customers tend to proceed through a series of "buyer readiness" stages before acting on a change in the level of customer service offered by a supplier. In marketing literature, these "buyer readiness" stages have been referred to as the "hierarchy of effects". Schary adapted the hierarchy of effects process to a customer service situation as illustrated in Table II.3.

TABLE II.3

A FRAMEWORK FOR CUSTOMER SERVICE CONTROL

"Hierarchy of Effects" states	Service Response Stages
Awareness	Organizational Perception
Interest	Recognition of Pay-Offs
Evaluation	Organizational Evaluation
Decision	Changes in Operating Practices
Evaluation	Organizational recognition of advantages of new policy

Source: Schary, P B: "Management Control over Customer Service." International Journal of Physical Distribution and Materials Management (Vol. 10, No.4, 1980) p. 155

Schary describes the practical application of the various customer service response stages as follows:

The first stage is to ensure that service changes are perceived within the customer's organization..... The first stage in a customer service strategy is to create awareness of the change, both as a proposed standard and as performance.... The second stage would establish that all participants are aware of the potential advantages in accepting the new service strategy.... The third stage is evaluation by the customer, where advantages and disadvantages can be compared. Because this is a definite progression toward a point of decision, this may be the most difficult step to achieve and may require substantive active selling assistance at a technical level. The fourth stage, the actual decision, would be manifested in changes in decision rules and other operating practices of the customer's organization which would reflect adopting a new service. The final stage is to ensure favourable post-experience evaluation.... Service must be performed with consistency.... and with visible measures of performance which can be used by the customer.²⁹

Schary sums up as follows:

The hierarchy of effects provides not a set of strategies by itself but a set of measurement points. Management must decide on the level of awareness and the direction and level of diffusion of information to the customer. Coupled with this is the necessity to study the needs of the customer so that both the elements of strategy and the criteria for evaluation represent useful dimensions of service.³⁰

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The customer service response stages suggested by Schary thus provides the physical distribution planner with a framework which he can use to measure customer's responses to different levels of customer service; not in terms of surrogate factors such as market share, sales or profits, but rather in terms of directly relevant intervening variables. This approach, however, is only feasible in intermediate markets where the number of customers, such as wholesalers and retailers, is relatively small.

In an attempt to find practical solutions to the customer service/demand problem and instead of trying to describe the response function of sales to different distribution service levels, a firm may well attempt to elicit customers' preferences to various combinations of the elements of distribution service. There are various methods of doing this, one of which, conjoint scaling, deserves closer examination. This is so because apart from the fact that it has been widely and successfully used in other areas of business, it represents a practical possibility of measuring consumer needs and preferences within the area of physical distribution.

There are three characteristics of marketing problems, including physical distribution, which suggest that conjoint measurement is particularly useful.

As Fenwick explains:-

First, marketing is frequently concerned with ordinal, or ranking, responses. Thus, while consumers can easily place brands in order of preference.... it is unlikely that they can assign meaningful numerical scores to these stimuli ...

Second, marketing involves multi-attribute stimuli Furthermore, many of these attributes cannot be measured on interval scales, they are either subjective ratings (sweetness, creaminess, etc.) or categorical variables (colour, brand name, etc.). This can make conventional analysis methods difficult or clumsy to apply

Finally, marketing decisions involve interdependent variables.... It is insufficient to know merely which product attributes are preferred, rather we need to understand how consumers trade-off between attributes.³¹

Perrault and Russ³² have illustrated the use of conjoint scaling in evaluating alternative service mixes from the customers' point of view. Consider the case of a physical distribution manager who is trying to determine the optimum service mix to implement from the alternatives available to him in Table II. 4.

TABLE II. 4

POSSIBLE SERVICE LEVELS FOR DISTRIBUTION CHARACTERISTICS

<u>SERVICE CHARACTERISTICS</u>				
	Price	Delivery Consistency	Percent out-of-stock	Average Delivery time
Service Level 1	R 95	2 days	23%	30 days
Service Level 2	R100	3 days	27%	36 days

From the characteristics detailed in Table II. 4, 16 different service combinations could be offered. Customers are then required to rank these 16 alternatives in order of preference as illustrated in Table II. 5.

TABLE II.5.

PHYSICAL DISTRIBUTION SERVICE LEVEL MIXES, PREFERENCE RANKINGS
AND ASSOCIATED OVERALL ESTIMATES OF UTILITY

Levels on Four Service Characteristics				Price	Preference Rank*	Estimated Utility
Distribution Mix	Delivery Consistency	Stockout Frequency	Average Delivery Time			
1	2 days	23%	30 days	\$95	16	3.32
2	2 days	23%	30 days	\$100	13	2.74
3	2 days	23%	36 days	\$95	15	3.02
4	2 days	23%	36 days	\$100	11	2.44
5	2 days	27%	30 days	\$95	14	2.63
6	2 days	27%	30 days	\$100	7	2.05
7	2 days	27%	36 days	\$95	12	2.33
8	2 days	27%	36 days	\$100	6	1.75
9	3 days	23%	30 days	\$95	8	2.35
10	3 days	23%	30 days	\$100	10	1.76
11	3 days	23%	36 days	\$95	9	2.05
12	3 days	23%	36 days	\$100	4	1.47
13	3 days	27%	30 days	\$95	5	1.65
14	3 days	27%	30 days	\$100	2	1.07
15	3 days	27%	36 days	\$95	3	1.36
16	3 days	27%	36 days	\$100	1	0.77

*Higher number indicates higher preference.

Through conjoint measurement, answers to the following questions would be sought.

- (1) What is the overall utility (to the customer) of each of these alternative mixes?
- (2) Which characteristics of service are most important to overall utility?
- (3) What is the perceived dollar value to the customer of a "unit" of utility?
- (4) What combinations of characteristics would provide the distribution manager with the best distribution cost/benefit ratio?³³

Answers to question (1) are obtained by applying the following formula:-

$$U_i = \sum_{j=1}^n B_j U_{ji}$$

where:

- U_i = the estimate of overall utility of the i th combination of services;
- U_{ji} = the utility contributed by a particular service level j ;
- B_j = the value 1 or 0, depending on whether or not service level j characterises the j th service combination;
- n = the number of different service levels.³⁴

In order to use this formula, it is necessary to construct customer utility functions for each of the service characteristics in Table II.4 and as illustrated in Figure 2.7. Thus the overall utility of each distribution mix is calculated by summing the relevant readings from each of the utility functions. For example, the overall utility of distribution mix 6 in Table II. 5 will be (1,00 + 0,166 + 0,661 + 0,221) 2, 48.

Answers to question (2) are obtained by carrying out the calculations shown in Table II. 6.

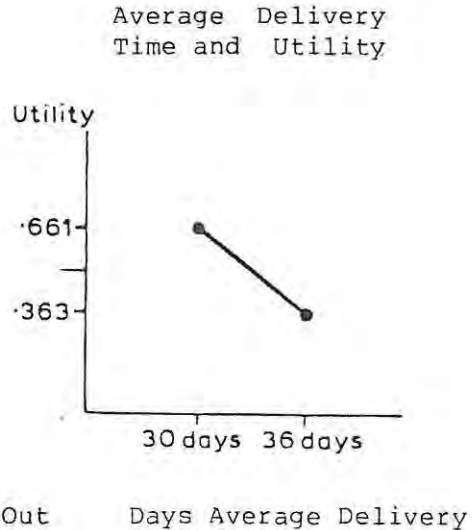
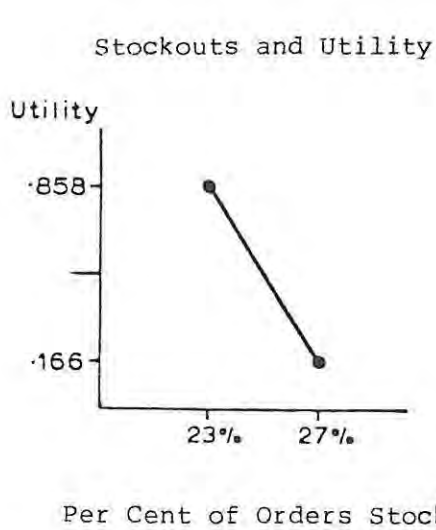
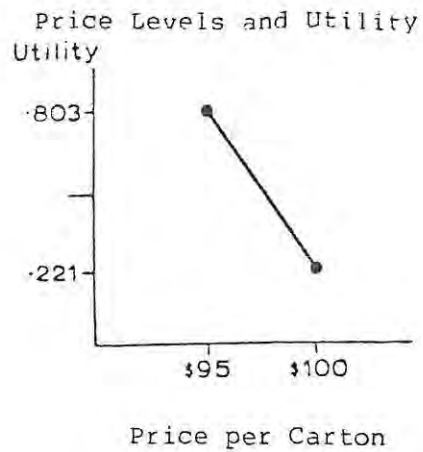
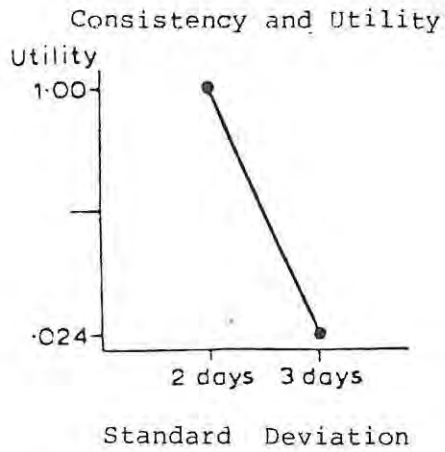


Figure 2.7 Customer Utility Functions

Source: Perrault, W D and Russ, F A. "Improving Physical Distribution Service Decisions with Trade-Off Analysis." I JPD (Vol. 7, No. 3, 1977)

TABLE II.6

RELATIVE IMPORTANCE OF PHYSICAL DISTRIBUTION SERVICE CHARACTERISTICS

Characteristic	Range in Utility Values	Per Cent of Total Range
Delivery consistency	0,976	38%
Price	0,582	23%
Stock outs	0,692	27%
Average delivery time	0,298	12%
	<u>2,548</u>	<u>100%</u>

Source: Perrault, W D and Russ, F A "Improving Physical Distribution Service Decisions with Trade-off Analysis", International Journal of Physical Distribution (Vol. 7, No.3, 1977) p. 125

In this example, then, one would conclude that the customer does not mind slow service as long as it is consistent.

The answer to question (3) is derived from existing information. From Figure 2.7 it is seen that a price difference of \$5 was associated with a utility difference of $0,803 - 0,221$ or $0,582$. Thus it would appear that a unit of utility is valued at $\$5 \div 0,582$ or $\$8,59$.

This information can be used to estimate what the customer would be prepared to pay for differences in levels of the other three characteristics. For an increase in consistency from 3 days to 2 days he would be prepared to pay a premium of $(1,00 - 0,24) \times \$8,59$, or $\$8,39$. A 4% improvement in stockout rates is worth $(0,858 - 0,166) \times \$8,59$ or $\$5,94$ and for an improvement in average delivery time from 36 days to 30 days the customer would be prepared to pay a premium of $(0,661 - 0,363) \times \$8,59$ or $\$2,56$.

With regard to question (4), these money values give the physical distribution manager a way of evaluating the customer's distribution service mix preferences. Profits, however, are a function of both costs and revenues. Thus, before the distribution manager can determine what combinations of characteristics will provide him with the best distribution cost/benefit ratio, he must consider the associated costs.

The reason why so much space has been devoted to a discussion of conjoint scaling is to emphasise the point that the judicious use of marketing research can succeed in pinpointing and quantifying customers' physical distribution needs, thereby providing a rational basis on which to make customer-service policy decisions.

It also illustrates that it is possible to quantify preferences. By asking customers to quantify their utilities of different characteristics of service, they are forced to give these usually conjectural situations deeper consideration, and this deeper consideration in turn results in their being able to assign numbers to their utilities.

2.6 Distribution Complaint Administration:

An aspect of customer service which ought not to be overlooked is the handling of distribution complaints. Prompt and well judged attention to customers' distribution complaints can serve to instil customer confidence in the company. Customers should come to think of the complaint as a realistic means to convey basic attitudes toward the company's product service mix. Wagner says the following about complaints:

they represent opportunities to maintain past accounts and, in certain instances, secure new ones. Customer service personnel can raise profits by improving purchasing behaviour of customers, converting enquiries into sales, introducing new products, upgrading orders and building minor accounts into large ones. Educating customers on how to complain can also represent a major contribution.³⁵

Thus far, customer service has been discussed in isolation from costs. Quite clearly, however, the provision of distribution service incurs costs, the neglect of which would make the determination of optimal customer service policies impossible.

Wagner writes:

In a practical sense, customers represent corporate assets developed over time. As such, costs incurred in improving them can be viewed as capital expenditures. Correspondingly, one approach to customer service management considers each customer an investment capable of providing a given return. This customer investment concept is based on spending designed to create change in the market that will be beneficial to the firm over time. Development and improvement of customer service programmes can in turn, be initiated to the extent that relevant costs are more than offset by increased revenues generated from present customers. Experience has also shown potential bonuses of new accounts arising from such programmes.... This implies need for appropriate procedural and structural changes within the organization. Customer service should be a clearly defined, separate cost centre at which specific service offerings are assigned relevant costs (and are measured in terms of their benefits in increased revenues and/or cost savings.)³⁶

The cost aspects of customer service, and of physical distribution in general, will be considered in Chapter III, and the structural and organizational design aspects in Chapter IV.

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CHAPTER III

THE TOTAL COST CONCEPT IN THE CONTEXT OF PHYSICAL DISTRIBUTION: ONE OF THE MAJOR INFLUENCES ON THE PROFIT ELEMENT OF THE PHYSICAL DISTRIBUTION CONCEPT

3.1 Introduction:

For a firm to successfully apply the physical distribution concept, attention must be devoted to two areas. These are the total cost concept and customer service. As was seen in section 2.4, customer service deserves attention primarily because it serves as the basis of the whole consumer orientation element of the physical distribution concept. In addition, however, because of its potential to actually create demand and generate sales, the impact of customer service on the profit element of the physical distribution concept must also be recognised.

The second issue, the total cost concept, is important because of its potential impact on the profit element of the physical distribution concept. In addition, however, it could well prove to be the instrument for achieving integration not only as required by the physical distribution concept, but also in the firm at large. This is so, because the practical application of the total cost concept in physical distribution demands the co-ordination of physical distribution-related activities such as purchasing, production control, materials management, stock control, warehousing and distribution. In this chapter, the following topics shall be covered: the total cost concept, trade-off analysis and the systems concept as it applies to physical distribution.

3.2 The total cost concept explained:

The essence of this concept is simply that it is the total cost of physical distribution which is important and not the costs of individual physical distribution activities such as warehousing, inventory, transportation or order processing. Firms may well concentrate their distribution cost cutting exercises in the individual areas of warehousing, transportation, inventory and order processing only to find that these savings are not translated into improved profits. This is due to the fact that they have been diluted or outweighed by increases in other costs spread throughout the company. These "other costs" may not appear as distribution costs in financial and operating reports but when they are analysed, they may be found to have one thing in common; they may all result from the way in which the company distributes its products. Thus the real cost of distribution often comprises much more than that which is taken into account by many companies when they set out to deal with distribution costs. The total cost concept in a distribution context recognises that any major distribution decision can affect every cost in the business and that the cost of a distribution decision should be viewed in incremental terms. For example, if an extra warehouse is added, the additional cost to the distribution system should not be calculated simply in terms of the extra investment in capital and stocks in that one warehouse alone, but rather in terms of the incremental change in the total costs of the distribution system. It will be exceptional if the two costs are the same.

Le Kashman and Stolle¹ have identified the following ten cost elements and inter-relationships which should be included in an analysis of the total cost and profit impact of alternative distribution systems:

- (i) Warehousing: apart from affecting costs, a change in the number, type or location of warehouses is likely to exert an influence on the level of customer service offered, and hence sales.
- (ii) Inventory carrying: this bears a cost which is linked to the number of warehouses and level of customer service offered.
- (iii) Inventory obsolescence: Higher levels of inventory to offer better customer service may result in slower turnover of inventory with greater risk of inventory obsolescence. This is particularly true of companies which rely on frequent model or style changes, or whose products are perishable.
- (iv) Production or supply alternatives: Different production plants may have different fixed cost and variable cost structures. Thus, in deciding which plants should serve which customers, consideration should not only be given to transportation and warehousing costs but also to production and supply costs.
- (v) Transportation: Any change in the number or location of warehouses is likely to have its effect on transportation costs. It is possible too, that the effects of a change in the mode of transportation will be felt in the area of inventory carrying costs. A faster mode of transportation, for example, may well mean that lower levels of inventory need to be maintained.
- (vi) Communications and Data Processing: These costs vary directly with the number of distribution points and the customer order cycle lead time as laid down in the customer service policy.
- (vii) Alternative facilities use: A proposed change in a distribution system may result in space previously used for storage being converted to selling space, for example. The impact which this is likely to have on sales, total costs and profits, must be evaluated.

- (viii) Customer service: Stockouts, an unacceptably long time between submission of an order and the receipt of the goods by the customer, as well as excess variability of that lead time, could result in lost sales. The effects which a contemplated change in the distribution system could have on these elements of customer service, and hence on costs, sales and profits, must be evaluated. These effects must be considered part of the true cost of distribution.
- (ix) Cost concessions: A distribution decision may affect the costs incurred by either suppliers or customers. For example, a retailer by establishing his own warehouse may free a supplier from having to maintain a small local warehouse. This retailer may then be able to negotiate to share in the cost savings enjoyed by the supplier.
- (x) Channels of distribution: Apart from many other areas, the choice of distribution channels will exert an influence on the type of physical distribution facilities required. In turn, the choice of physical distribution system may influence the efficiency, cost and profitability of various members in the channel of distribution. These ramifications of any new system, or any change in an existing system must be taken into account.

Le Kashman and Stolle sum up and reveal the importance of the total cost concept within a distribution context, by referring to an example;

This company has shipped directly from its suppliers and its factories to its stores, but wants to determine whether there would be any profit advantage in shifting to a national system of field warehouses.

When this company looked at the combined cost of warehousing and of transportation that would result from introducing various combinations of field warehouses, it appeared that the lowest cost system was one with six warehouses. But this would increase its distribution costs by \$12,9 million.

Thus, on the basis of apparent distribution costs alone, there was no profit advantage in any field warehouse system.

However, when this study investigated how alternative distribution networks would affect other costs in the company, the answer was quite different. the most efficient warehouse system turned out to be one with five, rather than six, field warehouses. And this five-warehouse system would cut the total costs of the company by \$7,7 million; an increase of 1,4 per cent on sales.²

In this example the total cost solution is the sum of all the interacting factors summarised earlier. The total cost solution emphasises the need to treat these factors as dynamic and interrelated, rather than static and independent.

The total cost concept, as discussed, enables a rational choice to be made between alternative physical distribution systems on the basis of minimum cost.

This type of total cost analysis, however, does not go far enough and as such, could be misleading.

3.2.1 Deficiencies in the traditional total cost analysis

The deficiencies of the traditional total cost analysis are apparent in three areas:

(i) It is a static rather than a dynamic analysis.

This is so because it assumes that the volume of units physically passing through the distribution system is constant. This, however, is an oversimplification. In the majority of business situations, volumes of throughput are not stable. Alternative physical distribution systems with different fixed and variable cost structures may be either more or less attractive as the volumes of throughput either increase or decrease.

This is illustrated in Figure 3.1 which shows four different hypothetical physical distribution systems as described by Buxton.³ The respective fixed costs, and variable unit costs per unit of throughput for each system, are as portrayed in Table III.1

TABLE III.1⁴

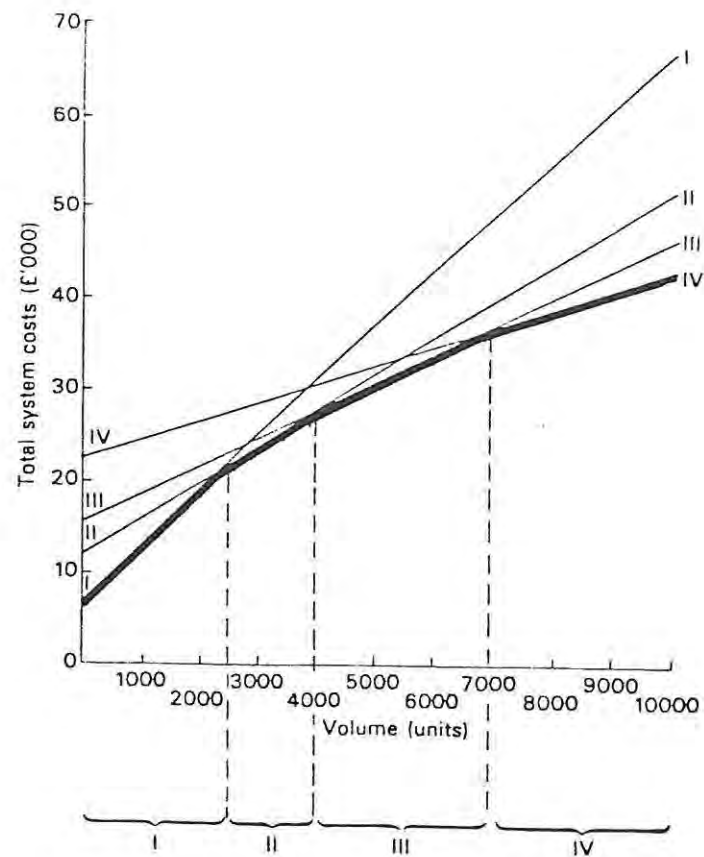
FIXED AND VARIABLE COSTS FOR FOUR HYPOTHETICAL
PHYSICAL DISTRIBUTION SYSTEMS.

<u>SYSTEM.</u>	<u>FIXED COST.</u>	<u>VARIABLE COST PER UNIT OF THROUGHPUT</u>
I	R 7 000	R6
II	R12 000	R4
III	R16 000	R3
IV	R23 000	R2

For ease of explanation, the cost functions are assumed to be linear. Each of the four systems is designed to achieve a certain predetermined level of service so that the choice criterion is minimum cost. With this in mind, it is clear from the diagram that up to a throughput of 2 500 units, System I, with the lowest fixed costs, is to be preferred. Thereafter, as volumes go up from 2 500 to 4 000, from 4 000 to 7 000, and from 7 000 on, Systems II, III and IV respectively, become more appealing in terms of the criterion of minimum cost. In fact, the heavy black line represents the minimum cost curve at any level.

The value of this approach is that it clearly indicates the points at which the firm should change to other systems. In practice, however, the accuracy of the costs of each system may be questioned. Thus what is needed is some form of sensitivity analysis where a range

FIGURE 3. 1.
DYNAMIC TOTAL COST ANALYSIS - GRAPHICAL APPROACH.



Source: Buxton, Graham. Effective Marketing Logistics : The Analysis, Planning and Control of Distribution Operations.
 (London: MacMillan, 1975)

of costs for each system is identified so that the change-over point from one system to another becomes a change-over range. Another practical point which this more dynamic approach to total cost analysis brings out, is the need for flexibility in systems design arising from the difficulty of shifting between different systems.

- (ii) A second deficiency of the conventional total cost analysis as a basis for choosing between alternative distribution systems, is that revenues are ignored. Different systems are likely to have different impacts on the market, and hence different revenue consequences. Relevant here is the fact that different systems are likely to have different impacts on the channel of distribution. This is likely to be reflected in the revenues attributable to each distribution system. In addition, however, a decline in channel efficiency is a real cost of distribution which must also be taken into account.
- (iii) The total cost concept includes only operating costs of each distribution system. What needs to be included as well is the capital investment required to implement each system. This, together with the inclusion of revenues, will lead to a consideration of return on investment as a criterion for evaluating alternative systems. This criterion can be used for both short-term and long-term situations. In a short-term situation, it can be used to determine the feasibility of allocating additional resources to the existing distribution system. If, for example, the cost of an extra delivery van to an

existing fleet is R3 000, the additional sales expected to result in the time period under consideration is R16 000 and the associated direct costs are R9 000, then a relative factor can be calculated by substituting in the following formula:

$$\frac{\text{Additional sales} - \text{additional direct costs}}{\text{additional resources employed}}$$

$$\frac{\text{R16 000} - \text{R9 000}}{\text{R3 000}}$$

$$= 2,33$$

The question is now whether the firm could achieve a better allocation of resources by spending the additional R3 000 in another way, such as on another salesman, for example. The same calculation should be done for this alternative and the one with the highest relative factor will be deemed to be preferable.

For the long-term investment decision an estimate has to be made of the cash inflows and cash outflows over the expected life of the system. This will produce a forecast of net revenues which must be reduced to their present value by a method of discounted cash flow. The purpose of this is to try to take account of the time value of money. The rate of discount usually taken is the one which corresponds to the firm's opportunity cost of capital.

The need to account for the time value of money when evaluating alternative physical distribution systems is shown by Figure 3.2. The net cash flow of each system

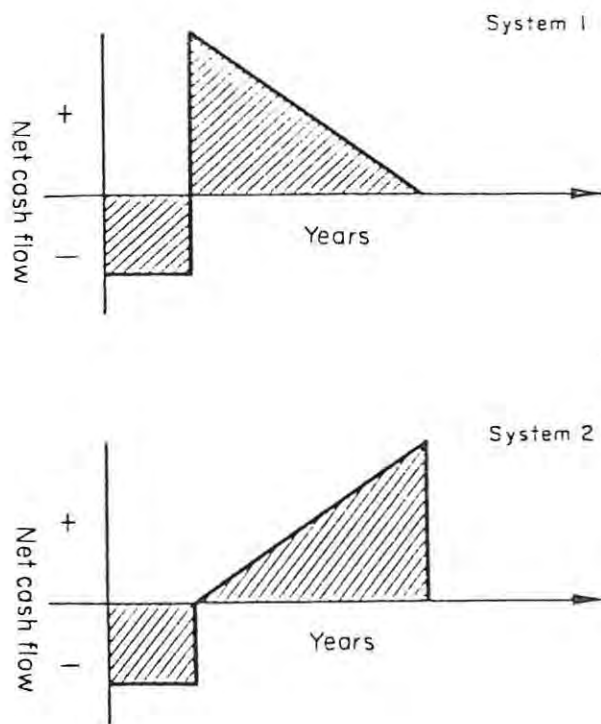


Figure 3. 2: Two Alternative Distribution Systems
with different cash-flows.

is the same and hence the accounting rate of return namely, average net income/total investment, will be the same. Intuitively, however, and this would be proved by a discounted cash flow analysis, system 1 is preferable because it earns the greater portion of its profits earlier rather than later.

Having drawn attention to the nature and importance of the total cost concept, it must be pointed out that in practice it is often extremely difficult to adhere to.

3.2.2 Difficulties in calculating the total cost of physical distribution

There are probably three main areas which cause difficulty in arriving at the total real cost of physical distribution activities:-

- (i) In many companies the logistics function is highly fragmented and the various activities scattered throughout the organization. As a direct result, the costs associated with these activities are similarly scattered which makes their identification and incorporation into a total physical distribution cost figure problematical.

In addition, the absence of an integrated approach to physical distribution management and the consequent fact that physical distribution activities are organizationally ill-defined and haphazardly located, makes the execution of the management function of controlling very difficult. One of the main concerns of accounting is the control of costs within certain periods. This is done by comparing actual costs with budgets, which if flexible, allow for

necessary adjustments to be made should actual volumes of throughput not coincide with expected budgeted volumes. Variances, either favourable or unfavourable, are then extracted and steps taken to rectify an unfavourable state of affairs or to reinforce a favourable situation.

To derive the fullest possible benefit from this type of exercise it is necessary that budgets reflect assigned responsibility such that people held accountable for performance have the commensurate authority to influence it. In the words of Fischer and Mossman:-

To implement the concept of 'responsibility accounting', a firm's accounts must reflect a well-defined organization chart. Very likely the lack of accounting controls applied to physical distribution costs is due in part to the absence of a well-defined organization for these services in the past. Typically the accountant has viewed these costs as being in the category of fixed or committed overhead and as such being unresponsive to cost minimization techniques.⁶

Thus quite clearly, the total cost concept as it applies to physical distribution, cannot be meaningfully implemented until organizational structural issues have been resolved, including channels of communication, authority and co-ordination between the various physical distribution activities. As Pope puts it:-

I do not know of any total distribution costing system that has been introduced easily.

Other managers, apart from the Distribution Manager, have to believe in its usefulness and to want it. It has to be "sold" to Marketing Management in particular - but this can be done and, once it has been done, it becomes part of their armoury, to be developed with their support. They can also help considerably in enlisting the support of top management; so that the accountants, the system analysts, the industrial engineers - and so on - are brought into the fray, to turn estimates and guesstimates into actual figures - and dreams into the reality of a total distribution costing system.⁷

The organizational implications of the physical distribution concept will be discussed in Chapter IV.

- (ii) Another potential difficulty in calculating the total costs of physical distribution and exercising control, lies in the area of allocating physical distribution costs to relevant cost centres. Traditional costing methods, particularly in distribution, very often allocate costs solely to natural cost centres, such as salaries, wages, rent, insurance etc., and not to functional cost centres such as transportation, warehousing and order processing. This practice has the effect of obscuring the total cost of distribution. Allocating costs to functional cost centres, however, may not even go far enough. What is needed as well, is the allocation of distribution costs by product and market to permit the determination of the profitability of distributing particular products to particular market segments.

On this point of physical distribution cost allocation,

Slater has made the following observations:-

- Some costs are incurred by third parties in the logistics channel which are not 'directly' under the control of the company, and are only reported as overheads consolidated into one figure (e.g. contract transport costs).
- Similarly, certain logistics cost centres are small and again the costs are consolidated into one overhead figure, because they are considered as either indirect production or marketing costs (e.g. material handling costs).
- Certain costs may be accepted by management without question (e.g. customs duties), and again consolidated into one overhead figure.
- Some costs are difficult to determine by normal historic cost accounting methods (e.g. stockholding costs which may occur only as interest on overdraft or loans providing working capital).⁸

(iii) The third area in which difficulties may lie in using total cost analysis as a basis for evaluating alternative physical distribution systems, is in estimating future costs.

Quite clearly, it is not acceptable to base the costs of future operations on current costs.

The present operation may be less than efficient and there may well be changes in the way in which certain activities will be performed in the future. Where a new or different distribution system is being contemplated, then of course it is likely that new types of costs will have to be incorporated.

There are two broad categories of cost estimation methods. Firstly, there are engineering estimates. These are standard times for performing certain activities derived from work sampling procedures and time and motion studies. Secondly, there are

estimates based on an analysis of past cost data. The usual method for projecting past cost relationships into the future is regression analysis.

In the course of discussing the total cost concept, it will have been apparent that cost trade-off analyses are an integral part of the total cost concept and total cost analyses. Because the concept of the cost trade-off is fundamental to physical distribution management, it warrants further examination and the following section is devoted to it.

3.3. The Cost Trade-off

As defined by Christopher, "trading off involves maintaining a sub-optimal position in one or more sub-systems so that the system as a whole can operate at optimum efficiency".⁹

The trade-off concept can be applied at a number of different levels within the overall logistics system:

- (a) The first level of trade-off is the inter-functional trade-off. This is where costs in one major business function, such as production, are traded-off against costs in another business function such as distribution, so that the firm as a whole benefits. As reflected in Figure 3.3, a decision to expand marketing activities into more distant geographic territories may result in an increase in the distribution costs per unit of product from point A to point B. These increased distribution costs, however, may be more than offset by decreased production costs per unit from point C to point B in Figure 3.3, resulting from economies of scale flowing from an increase

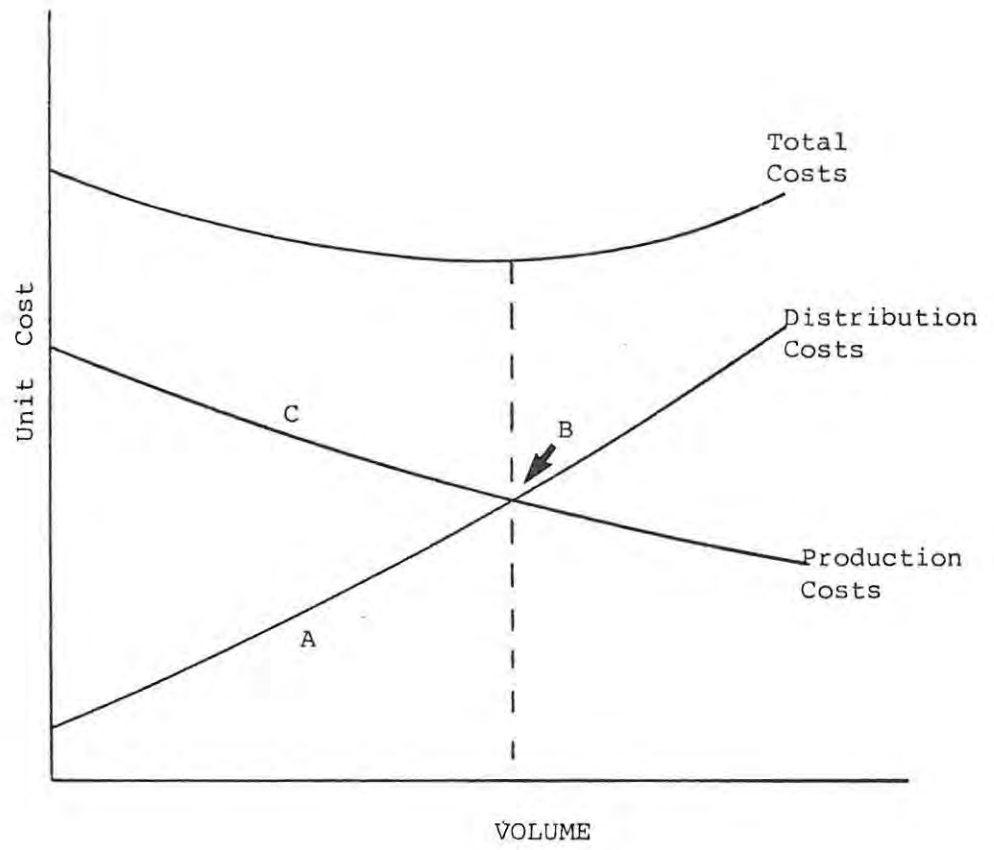


Figure 3.3 : Inter-functional Trade-Off

in volume.

- (b) The second level of trade-off is the inter-activity trade-off. This is seen in the situation where increases in one area of physical distribution activity are traded off against decreases in other areas of physical distribution activity such that the total costs of physical distribution are lower than before. This situation is reflected in Figure 3.4. As a result of increasing the number of depots, depot costs and stockholding costs have increased. These, however, have been more than offset by decreases in trunk haulage and local transport costs, stock-out costs and communication and order-processing costs, such that total logistics costs are now lower than they were before.
- (c) The third level of trade-off is what may be termed vertical trade-offs. These are cost trade-offs within activity centres of physical distribution - for example the trade-off between public warehousing or private warehousing, or the trade-off between using rail transport or one's own fleet of road vehicles. With this type of trade-off, one of the alternatives is normally dependent on the availability of either capital for investment or skilled manpower resources. The main factor influencing the choice is whether the expected level of throughput at least equals or exceeds that which is required for the minimum optimal operation of the alternative involving investment of capital.

Under the heading of vertical trade-offs, there are two variations. Firstly, there is the inter-modal trade-off which is encountered particularly in the area of transportation, and secondly, the inter-type trade-off

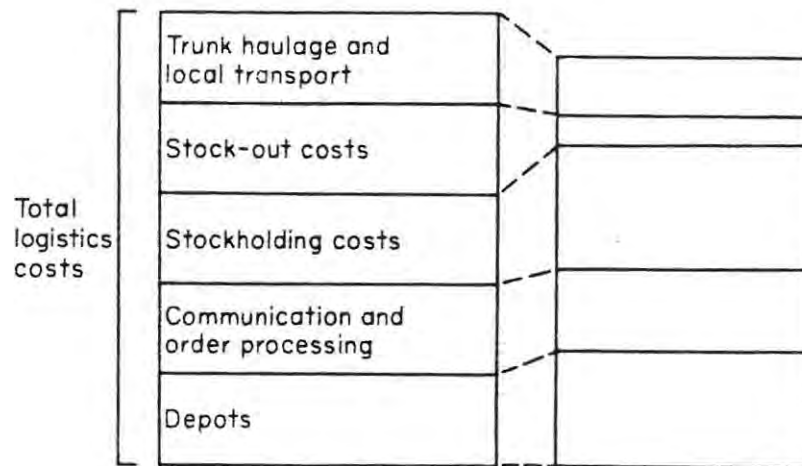


Figure 3.4 Inter-activity Trade-Off: Trading-Off Depot Costs Against Transport and Stock-Out Costs.

Source: Christopher, Martin Total Distribution (London: Gower Press, 1971) p. 21.

which considers the attractiveness of public (or leased) versus private operations such as in the area of warehousing, for example.

With regard to inter-modal trade-offs, when a firm is in a position to choose between alternative modes of transportation then the fixed and operating costs of each must be traded-off against one another. In Figure 3.5, this firm has the choice between transporting goods by rail, or by road using its own fleet. Using rail, costs are entirely variable, and with an increase in volume, they rise relatively slowly. Using its own fleet, it incurs certain fixed costs. With an increase in volume, the total costs (fixed and variable) of the road fleet increase relatively quickly such that a point of indifference between road or rail is eventually reached at point A in Figure 3.5. Up to this level of volume the company's own vehicle fleet is preferable, but beyond it transport by rail is deemed to be preferable in terms of costs.

With regard to inter-type trade-offs, the example of public warehousing versus privately owned warehouses may be used. As shown in Figure 3.6, the costs associated with public warehousing are all variable, whereas with private warehousing there is a fixed cost component. With the latter, therefore, as the level of throughput increases, costs increase in a step-wise fashion. The net effect of the inter-type trade-off is that at different volumes or levels of throughput, either private warehousing or public warehousing is preferable in terms of minimum cost.

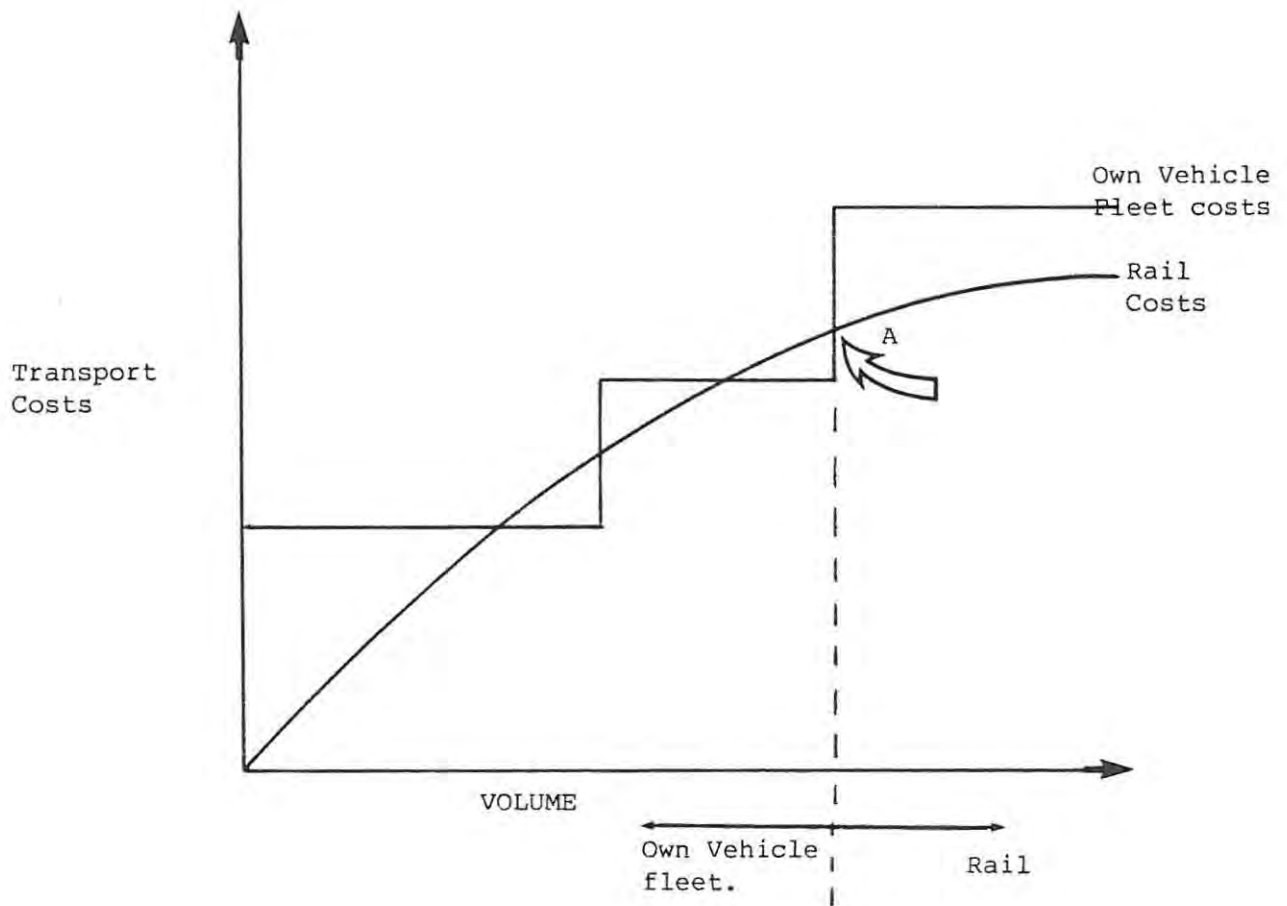


Figure 3.5: Inter-modal Trade-Off.

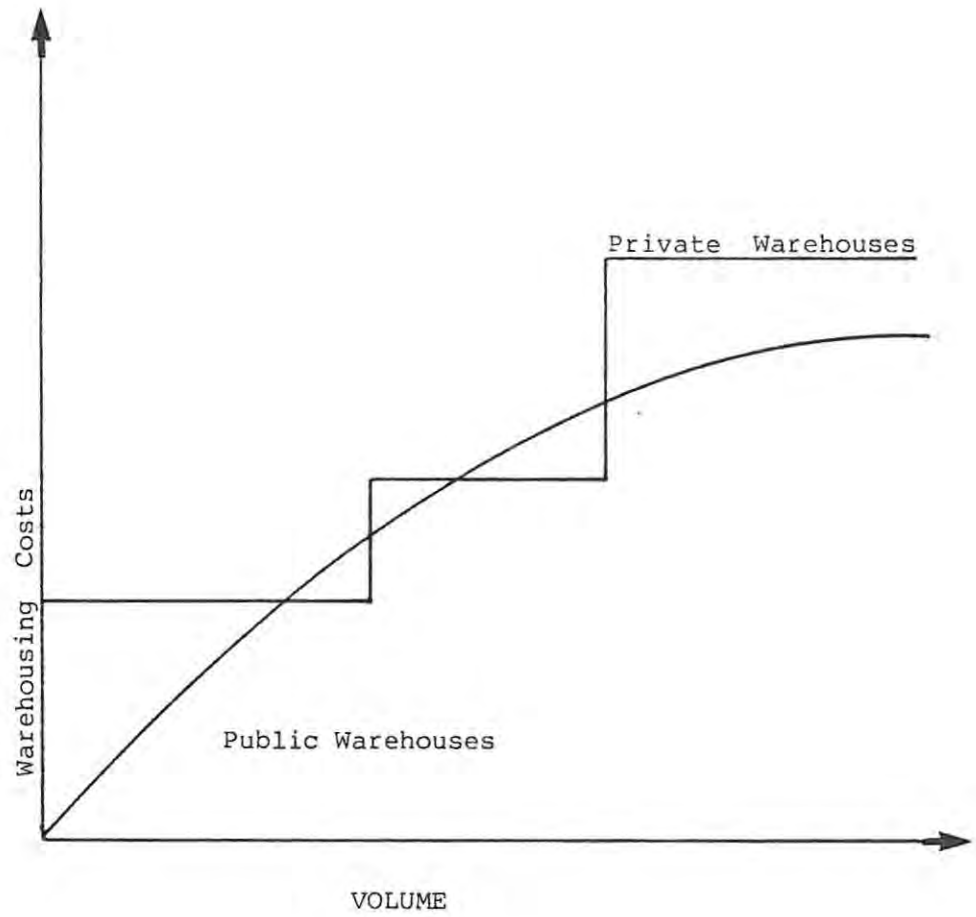


Figure 3.6: Inter-Type Trade-Off.

With vertical trade-offs involving the investment of capital, care must be taken not to introduce trade-offs to the point where over-capacity could exist. To preclude this, it may be necessary to have two operating systems in a company to perform the same function. For example, a company which manufactures a product with seasonal demand, may have its own warehousing system. When this is fully stocked during the peak of season, instead of expanding the warehousing system, additional space may be hired in a public warehouse.

Another example of where two operating systems may be used to perform the same function is in the area of transportation. Herron draws attention to the fact that "the lowest total cost of transportation, warehousing, and carrying inventory at a given customer service level for a product is often achieved by a combination of both air and surface transport."¹⁰ Because safety-stock has the economically unfavourable characteristic of zero turn-over, it is argued that it should be kept to the absolute minimum. This could be done by supplying the predictable demand by surface transport, by warehousing the normal cycle stock plus a limited amount of safety stock, and by supplying the unpredictable spurts in demand by air transport from current production.

In another transportation context, a trade-off analysis may find it profitable to service large customers with private transport and to use public transport to service small customers, particularly if they are dispersed over a wide geographic area.

- (d) Apart from the types of trade-offs outlined above, Slater draws attention to a fourth possible trade-off, namely, a lateral trade-off. As he explains it:

this is a trade-off where one independent third party will incur additional costs so that successive independent companies may reduce their costs, which will again result in reducing (or optimising) the total logistics channel costs.... It is extremely difficult to obtain lateral trade-offs because each independent firm wishes to minimise its cost and maximise its profits, and it is extremely difficult to identify trade-off opportunities without co-operation created by the leadership of one of the channel members.¹¹

- (e) Up until this point, trade-offs have been assessed from a cost point of view only. They must also be assessed, however, from a revenue point of view. This brings the subject of customer service back into focus because customer service exerts a significant influence on both costs and revenues.

The typical situation is the not unexpected one that higher levels of customer service cost more. In fact, Christopher¹² demonstrates that once the level of service reflecting the percentage of orders that can be met from stock within a given period, increases beyond 70% to 80%, the associated costs increase exponentially. The reason for this is the obvious one that opportunities that offer the greatest improvement in service at the least cost are selected first. Improvements in service are therefore more costly when service is already at high levels than when at low levels.

If the exponentially increasing cost function is superimposed

on the S-shaped sales response function as in Figure 3.7, it can be seen that neither a policy of customer service maximization (and hence revenue maximization) as at point B, nor a policy of cost minimization as at point C, will result in the maximization of the profit contribution. This is only achieved at point A. In so far as cost minimization is concerned, Christopher suggests: "We can minimize distribution costs by going out of business."¹³

What in fact is needed is a trade-off between the level of service offered and total costs, in order to arrive at an optimal profit situation. It may be necessary for total costs to increase but because of the better service now offered, sales increase more than proportionately, with a resultant increase in profits. Alternatively, it may be possible to significantly reduce total costs with a minimal reduction in level of service and a resultant less than proportionate reduction in sales. This latter situation is likely to apply where a firm is offering an excessively high level of service around the 97% mark.

To illustrate the importance of trading-off the level of service against total costs, and to demonstrate the relationships between the various factors affecting the contribution of the physical distribution function towards corporate profitability, Christopher¹⁴ postulated a model as described in Figure 3.8. Quadrant 1 shows total costs as a function of service level while Quadrant 2 shows the familiar S-shaped response function of sales to level of service. Quadrant 3 is an aggregation of several sets of cost data which suggests that as sales increase, net sales revenue increases more than proportionately, that is, economies of scale operate. Quadrant 4 consists of a 45° angle

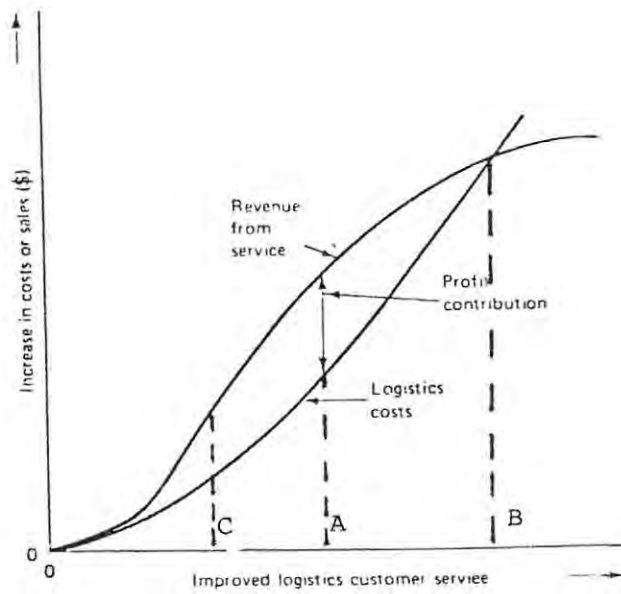
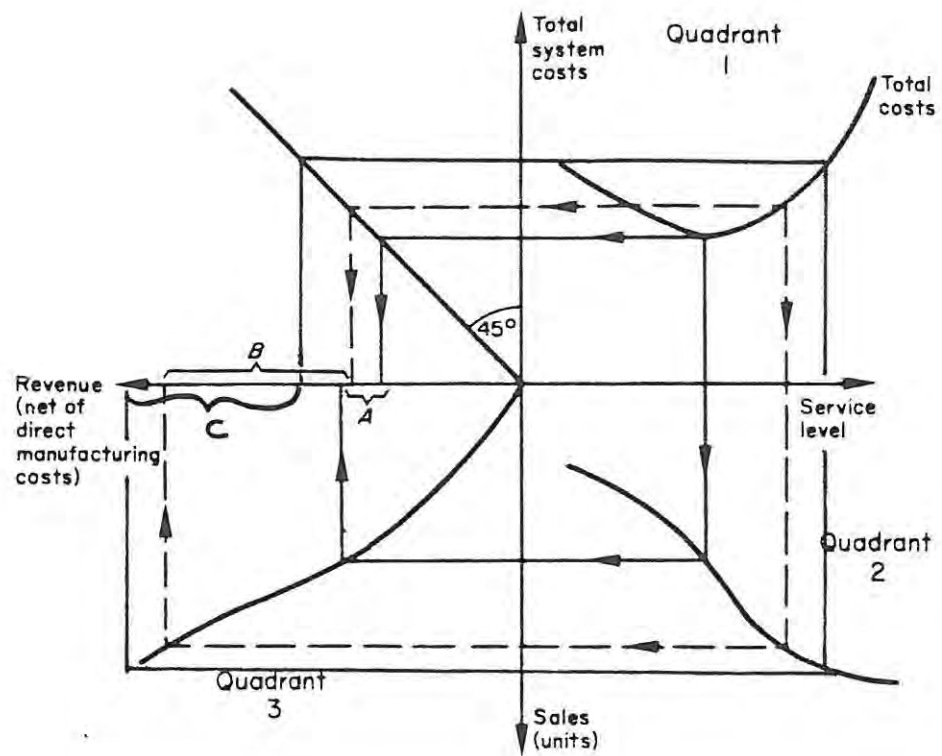


Figure 3.7: A generalized cost-sales trade-off at varying levels of logistics customer service.



A = Logistics contribution through a cost-minimisation solution

B = Improved logistics contribution through improved customer service

Figure 3.8: Quadrant model showing cost/service trade-off for a distribution system.

Source: Adapted from: Christopher, Martin.
Total Distribution, op. cit. p. 101.

which merely serves to project total costs onto the net revenue axis and to permit the calculation of the physical distribution contribution to the fixed costs and profits of the whole organization.

The model shows quite clearly that neither cost minimization (see bracket A) nor service maximization (see bracket C) optimises the physical distribution contribution to fixed costs and profits. This is only achieved when total costs are traded-off against service level as evidenced by bracket B.

Trade-off analysis can be a complex and time consuming exercise. It involves detailing all the activity centres in the physical distribution system and listing all the alternative methods of performing their functions. As a first step, Christopher ¹⁵ suggests that this can most usefully be done in terms of a trade-off impact matrix as illustrated in Figure 3.9. Using this matrix, the impact within any activity centre of changes in its row and column co-ordinates can be methodically studied. As a rule of thumb, trade-offs within activity centres should be exhausted before moving on to trade-offs between activity centres. Once this qualitative type of trade-off analysis has been done, it needs to be quantified in terms of a total cost analysis.

Having explored the total cost concept and the trade-off concept, it must be recognised that their application will be difficult in the absence of an appreciation and awareness of the system concept and hence in an absence of the integrated approach to physical distribution management. The systems concept will be briefly examined in the next section.

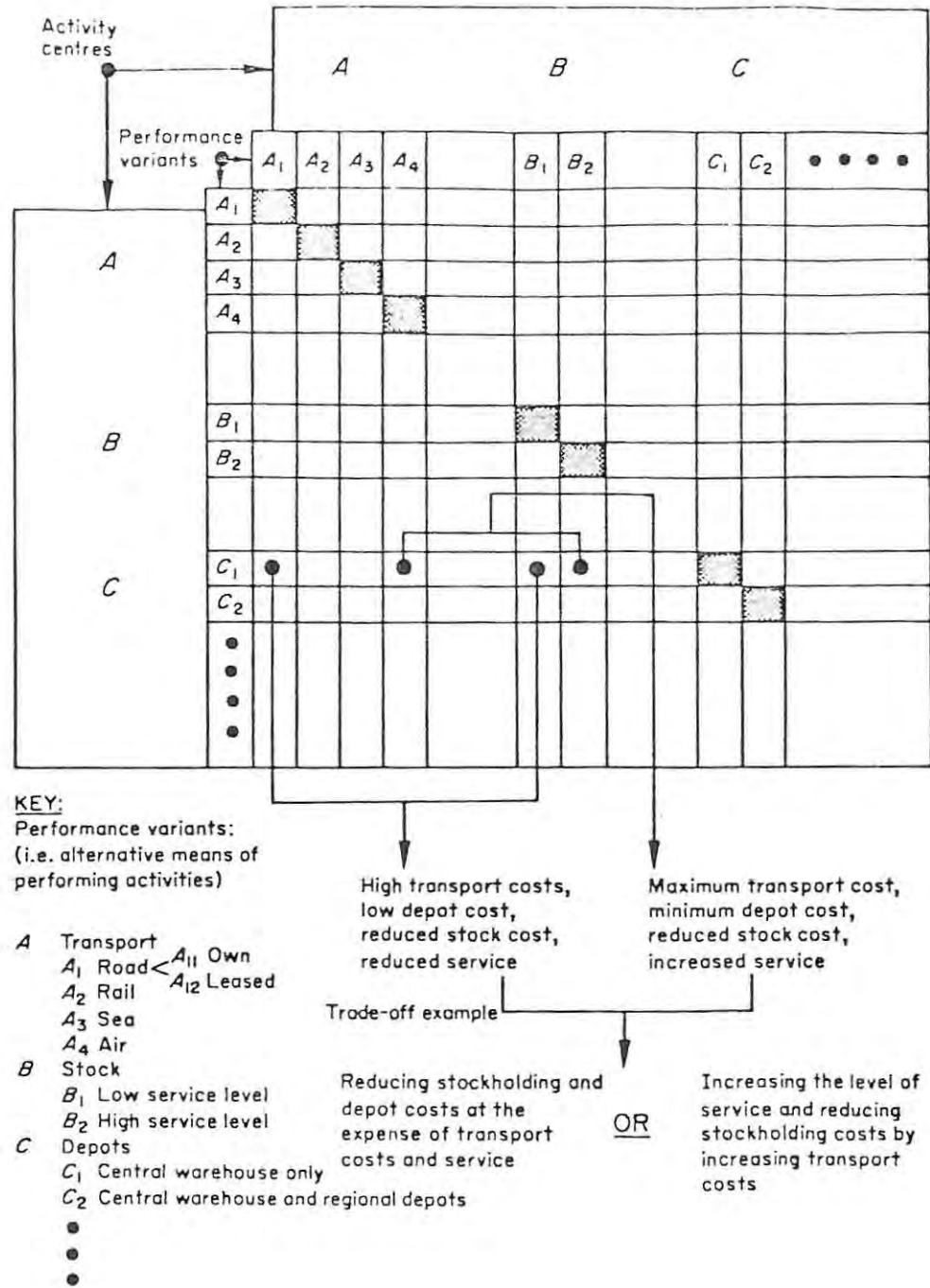


Figure 3.9: Trade-off Impact Matrix.

Source: Christopher, Martin. *Total Distribution*, op. cit. p. 23.

3.4 The Systems Concept:

In describing it, Bowersox states that:

The systems concept is one of total integrated effort toward the accomplishment of a pre-determined objective ... Basic acknowledgement is given to the importance of all elements included in the system. These are normally considered components of the system.¹⁶

Physical distribution is both a sub-system and a system in its own right. The former holds true because it is part of the total business organization while the latter holds because physical distribution is composed of a number of sub-systems such as transport, warehousing, inventory, all of which are part of the total flow process of products through the firm.

The nature of the systems concept and its role as an indispensable pre-requisite for the application of the total cost and trade-off concepts, will become clear from an identification of general systems principles:

- (a) It is the performance of the total system which is of paramount importance. The existence of sub-systems or components are only justified in so far as they make a contribution to total system performance.
- (b) The performance of individual sub-systems need not be optimised because emphasis is placed upon their integrated relationship in the total system.
- (c) Individual activity centres integrated within a total system can produce better results than attainable by a series of individual efforts. Indeed, the desired results may not be attainable at all without such synergistic performance.

To help make the systems concept operational, it is useful to think in terms of distribution missions and to undertake a distribution missions analysis. Missions are nothing more than goals to be achieved by the distribution system in particular product/market

contexts. The following are some hypothetical distribution missions which a company might have:

Mission A: To serve the company's export markets with a 95% delivery within 8 weeks at lowest cost.

Mission B: To serve the company's domestic consumer market with a 95% delivery within 10 days at lowest total cost.

Mission C: To serve the institutional buyers of the company's products and to meet their needs in terms of shipment sizes and frequency of delivery, at minimum total cost.

To achieve these missions, inputs are required from various functional areas, such as production, purchasing, sales, as well as from the various physical distribution activity centres. Traditional internal accounting approaches have tended to be structured on functional or activity centre lines, with budgets and targets set up for each. As a result, the contributions of each to the different missions of the company were not clearly identified, thus making the application of the total cost and trade-off concepts difficult, if not impossible.

In recent years a method of budgeting has been developed, termed Planning, Programming, Budgeting System (or output budgeting), which cuts across functional lines and which enables both functional budgets and mission budgets to be determined almost simultaneously. The way in which this is done can be seen in Figure 3.10. The primary analysis is horizontal wherein the required

	Activity centre 1	Activity centre 2	Activity centre 3	Activity centre 4	Total mission cost
Mission A	100	90	20	80	290
Mission B	50	70	200	20	340
Mission C	70	30	50	70	220
Activity centre inputs	220	190	270	170	850

Figure 3.10: The Programme Budget (or Output Budget).

Source: Christopher, Martin. Total Distribution. op. cit. p. 63

inputs by each activity centre for each mission are determined. The total cost for each mission is then calculated simply by summing horizontally. Almost as a by-product, the budgets for each activity centre can be arrived at by summing vertically. Thus the role of missions analysis and output budgeting as an instrument for the application of the systems concept is seen in the fact that it is the goals or missions of the total company which are of overriding importance, and not those of individual sub-systems. The latter are still obviously relevant, but of secondary concern.

To conclude this section on the total systems concept, implicit in which is the total cost concept and the trade-off concept, it is useful to quote from a study conducted by McKinsey and Company, and quoted by Neuschel, on distribution economics and distribution management in 26 large and profitable companies covering a wide range of industries in the United States of America:

Of the 26 companies studied, 5 stand head and shoulders above the rest by virtue of both their sophistication and their success in managing the distribution function. The common feature of their approach - consistent regard for the total economics of getting products to the customer - is manifested in three principal ways.

First, the executives heading up major functions in each of these 5 companies are clearly both willing and able to deal with distribution activities from a corporate rather than a functional viewpoint - even when it means giving up service or product features, or incurring extra costs, for the sake of greater benefits elsewhere in the company.

Secondly, each of these 5 companies boasts a nucleus of transportation personnel who are free from the functional parochialism... they also show a keen awareness of the impacts of their activities on marketing and manufacturing costs.....

Thirdly, these companies stress adequate and timely cost information. With the help of such data, they are able to identify and price-out alternatives as a basis for making trade-offs.¹⁷

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Harvard Business Review
(March - April, 1967)
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CHAPTER IV

THE ORGANIZATIONAL IMPLICATIONS OF THE INTEGRATED APPROACH TO PHYSICAL DISTRIBUTION: THE INTEGRATION ELEMENT OF THE PHYSICAL DISTRIBUTION CONCEPT.

4.1. Introduction:

As has already been pointed out in earlier chapters, physical distribution is not a single activity but rather a combination of activities; it is not only concerned with transporting products, but also with matters relating to levels of inventory to be held, where they are to be held, how they are to be ordered and how they are to be assembled for transport. It is essential that these various elements of the physical distribution-mix be well integrated and consistent so that the physical distribution-related needs of customers are met as effectively as possible. This is the first requirement of the integration element of the physical distribution concept.

The second requirement of the integration element of the physical distribution concept is that for the physical distribution concept to be successful, it must permeate through and be accepted by, the whole organization, from the managing director at the top, to the drivers of delivery vehicles, at the bottom. It is unlikely that a firm can become physical distribution oriented simply by appointing a physical distribution manager or by changing the title of the traffic manager to physical distribution manager. The physical distribution concept is a business philosophy or as De Hayes and Taylor argue, "a way of thinking",¹ and to be effective, must be adopted by the whole organization.

In addition, of course, the practical application of the total cost concept in physical distribution demands the co-ordination of physical distribution-related activities. In the achievement of both the inter-departmental and intra-departmental integration required by the physical distribution concept, organizational structural design can play a vital facilitating role.

4.2 The consequences of a fragmented view of physical distribution:

Where physical distribution is not viewed as an integrated task, no one executive has responsibility for managing all distribution activities and it frequently takes place in a series of fragmented and unco-ordinated movement and storage sub-functions. This is reflected in Figure 4.1. In the firm, for which Figure 4.1 is a partial organization chart, customer service and the issues relating to inventory obsolescence, are the responsibility of marketing; communications, data processing and deciding how much inventory to carry are the responsibility of finance; and warehousing and transportation are the responsibility of manufacturing.

This fragmented approach to physical distribution has at least three adverse consequences:

- (a) each physical distribution management function tends to be relegated to a role of secondary importance in the major mission and responsibility of its parent department. The net effect of this is that the full potential of physical distribution as a means of creating demand, as well as simply servicing demand, is overlooked;
- (b) because physical distribution activities are spread throughout the organization, it is very difficult, if not impossible, to calculate the total cost of physical distribution; and
- (c) because of the difficulty of co-ordinating the movement of goods through an unintegrated physical distribution system, sub-optimization often tends to be the norm. This sub-optimization or potential conflict of objectives is also seen in Figure 4.1.

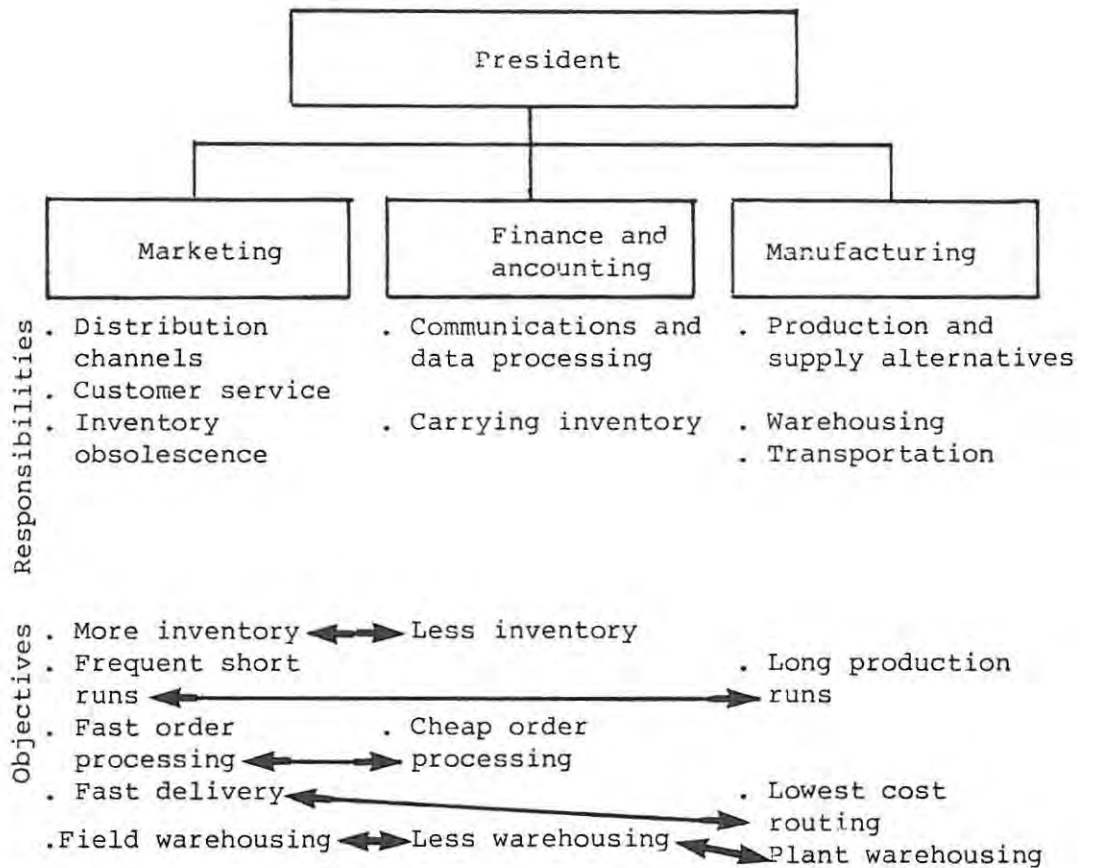


Figure 4. 1.: Organization in a Typical Manufacturing Company

Source: Stolle, John F; "How to Manage Physical Distribution". in: Readings in Physical Distribution Management. (eds. Bowersox, D J; La Londe, B J and Smykay, E W) (London: MacMillan; 1969) p. 285.

Firstly because he tends to be judged on total sales, the salesman would like high levels of inventory so that customers' orders can be met at any time. Finance, on the other hand, because their objectives tend to be expressed in cost terms, would prefer low levels of inventory so that less working capital is tied up. Secondly, whereas the salesman would like frequent, short production runs so that there is a wide range of products on hand at all times, the production manager would prefer long production runs of only one product so that his costs are minimized. Thirdly, to satisfy the needs of customers, the salesmen would like fast order processing, whereas to achieve his cost objectives, the accountant would prefer the cheapest mode of order processing, notwithstanding what the needs of the customers are. Similarly, the salesman would like fast delivery, whereas the production manager would focus on the lowest cost vehicle schedule. Finally, whereas the salesman would like warehouses to be located as close to customers as possible, the production manager would prefer warehouses to be located as close to himself as possible, and the accountant would prefer less warehousing altogether.

In a fragmented approach to physical distribution which is fraught with potential conflicts of objective as above, the department whose objectives will hold sway will depend upon a variety of factors, least of which very often is what is in the best interests of both the customer and the total organization. As summed up by Stolle:

Only the president really seeks maximum total company return on investment, and the individual objectives of executives in marketing, finance and accounting and manufacturing often conflict with this overall objective - and with each other.²

La Londe, Grabner and Robeson conclude:

Suboptimization leads to not only poor distribution performance from the customers' viewpoint, but in some cases inefficiency, waste and morale problems from a management point of view.³

To overcome these problems, it is necessary for a firm to adopt a total or integrated approach to physical distribution. In terms of this integrated approach, the physical distribution operation is seen as a total system rather than as a number of fragmented parts. The adoption of the integrated approach to physical distribution by a firm inevitably requires some adjustments in the firm's organizational structure in order to promote and facilitate the co-ordination and communication demanded.

The need to consciously organize for physical distribution becomes clear upon consideration of the nature and purpose of organization structure in a business context. This is the subject of the next section.

4.3 The Nature and purpose of the organization structure:

Allen has defined organization as:

the process of identifying and grouping the work to be performed, defining and delegating responsibility and authority, and establishing relationships for the purpose of enabling people to work most effectively together in accomplishing objectives.⁴

An important point to note about this definition is that organization is not an end in itself but merely a means to an end, namely, a means of achieving the company's objectives. A statement of the company's or business function's objectives should come first and

organization follow as a consequence of those objectives. Thus, once the objectives of a physical distribution function have been carefully spelt out, and they will usually contain reference to levels of customer service and total distribution costs, it will become evident that particular organizational arrangements are necessary to facilitate the achievement of those objectives.

Not only is an organizational structure a means of achieving company objectives, but it is an indispensable means. This point is well made by Drucker:

Good organization structure does not by itself produce good performance - just as a good constitution does not guarantee great presidents, or good laws a moral society. But a poor organization structure makes good performance impossible no matter how good the individual managers may be.⁵

This statement by Drucker is very relevant to the physical distribution function. Even if a firm recognises the benefits of the integrated approach to physical distribution, they will never be achieved unless an organization structure is established which will permit effective co-ordination of all the diverse activities which comprise physical distribution.

Having emphasised the need to establish an organization structure to ensure the effective integration of the various physical distribution activities, it must be pointed out however, that there is no such thing as "the ideal organization" for a logistics or physical distribution department. Business is too diverse for any one type of organization to be suited to all types of business firms. Several organization charts will be presented in ensuing sections of this chapter but they are to be regarded as illustrative, rather than prescriptive. There

is some doubt as to whether a separate department of physical distribution (or logistics, in the wider sense) is necessary under all conditions and for all firms.

On the basis that improved physical distribution performance can be achieved by relevant changes in its organizational design, the following section deals with organizational alternatives which a firm might consider for physical distribution and/or business logistics.

4.4 Organizational alternatives:

At the outset it needs to be pointed out that there is nothing special about physical distribution organization. The organizational alternatives available to physical distribution have their roots in the standard organizational design literature to which reference will be made in the following sub-sections.

4.4.1 The Classical theory of organization:

It may be said that the Classical theory of organization deals almost exclusively with the "anatomy of formal organization".⁶ It can be traced back to Max Weber's interest in bureaucracy, Frederick W Taylor's interest in scientific management and Henri Fayol's interest in the principles of management. In terms of Scott's ⁷ classification, the Classical theory of organization has four cornerstones. They are (a) the division of labour, (b) the scalar and functional processes, (c) structure and (d) span of control.

4.4.1.1 The division of labour:

Lyndall Urwick has stated the principle of division of labour, or specialization, as follows:

The activities of every member of any organized group should be confined, as far as possible, to the performance of a single function.⁸

The objective behind this principle is to permit the development of a high level of expertise which will ensure the achievement of the overall objectives of the total system. Indeed, the larger and more diverse a firm becomes, the more essential it is to divide up the work and hire specialised staff capable of carrying out the many different tasks.

The recognition of business logistics and physical distribution as being both the last frontier of significant cost savings and a means of actually creating demand, has resulted in many firms appointing business logistics and physical distribution specialists.

4.4.1.2 Scalar and functional processes:

The scalar and functional processes deal with the vertical and horizontal growth of the firm respectively. The scalar process can best be considered in terms of the typical pyramid structure present in most firms. At the top of the pyramid is a job which carries all the authority in the company. Below this position is a series of positions at the director level each carrying authority over particular functions such as marketing, finance, production and personnel. In some companies, a position with authority over logistics can be found at this level. Below this is another level composed of departmental managers to whom specific areas of a director's authority is delegated. Thus in a marketing logistics system, there may be a group of managers responsible for transport, warehousing, inventory analysis, order processing, each reporting to a physical distribution director. Such a structure not only permits the division of work as a means

of achieving specialisation, but it also permits hierarchical co-ordination by linking activities under a central authority.

The division of the firm into specialized parts and the regrouping of these specialised parts into compatible units or departments is part of the functional process. Both the pursuit of the principle of specialization and the grouping together of all or most of the physical distribution activities, are behind the establishment of separate logistics or physical distribution departments.

4.4.1.3 Structure:

"Structure is the logical relationships of functions in an organization, arranged to accomplish the objectives of the company efficiently."⁹ Classical organization theory is usually concerned with two basic structures, namely line and staff.

4.4.1.3.1 Line and staff:

Allen distinguishes between line and staff as follows:

line refers to those positions and elements of the organization which have responsibility and authority and are accountable for accomplishment of primary objectives. Staff elements are those which have responsibility and authority for providing advice and service to the line in the attainment of objectives.¹⁰

In Table IV, 1 Stolle¹¹ provides two lists (which are not exhaustive) of distribution activities of a line and staff nature respectively.

TABLE IV 1: PHYSICAL DISTRIBUTION LINE AND STAFF
ACTIVITIES.

LINE DISTRIBUTION ACTIVITIES.	STAFF DISTRIBUTION ACTIVITIES.
Order processing	Systems and procedures
Communications	Inventory analysis
Inventory management	Materials handling and engineering
Warehousing	
Shipping	Warehouse layout
Transportation	Territory planning
Fleet operations	Marketing Co-ordination
	Cost analysis

Having drawn a distinction between line and staff distribution activities, there are at least three ways that they can be grouped together within a physical distribution structure:

(1) Line activities may be grouped together in one department as shown in Figure 4.2. With this type of structure, staff distribution activities remain with their traditional departments. Cost analysis, for example, would be carried out by the Finance Department.

(2) Staff activities may be grouped together in one department as shown in Figure 4.3. With this type of structure, line distribution activities are performed by the traditional departments. Warehousing and shipping for example, would be carried out by the production department while order processing would be the responsibility of the sales department. As reflected in Figure 4.3, the establishment of a physical distribution staff department may constitute sufficient re-organization.

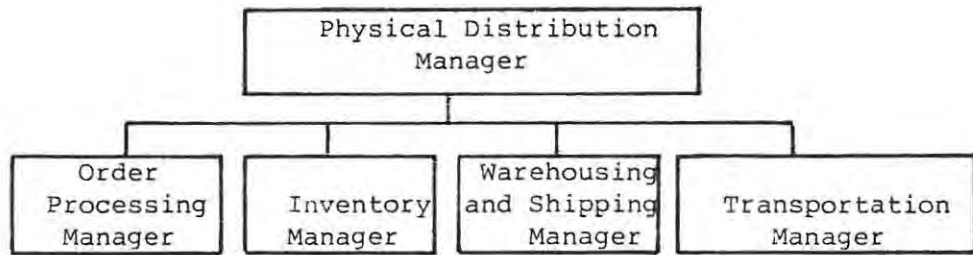


Figure 4.2: Grouping of Line Distribution Activities only.

Source: Stolle, John, F op.cit., p. 286.

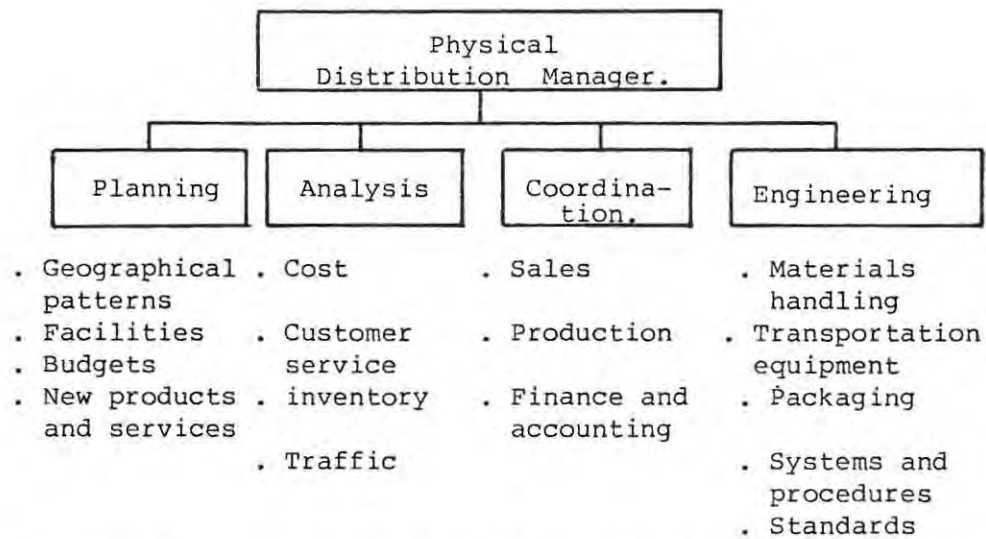


Figure 4.3: Grouping of Staff Distribution Activities Only

Source: Stolle, John F. op.cit. p. 287.

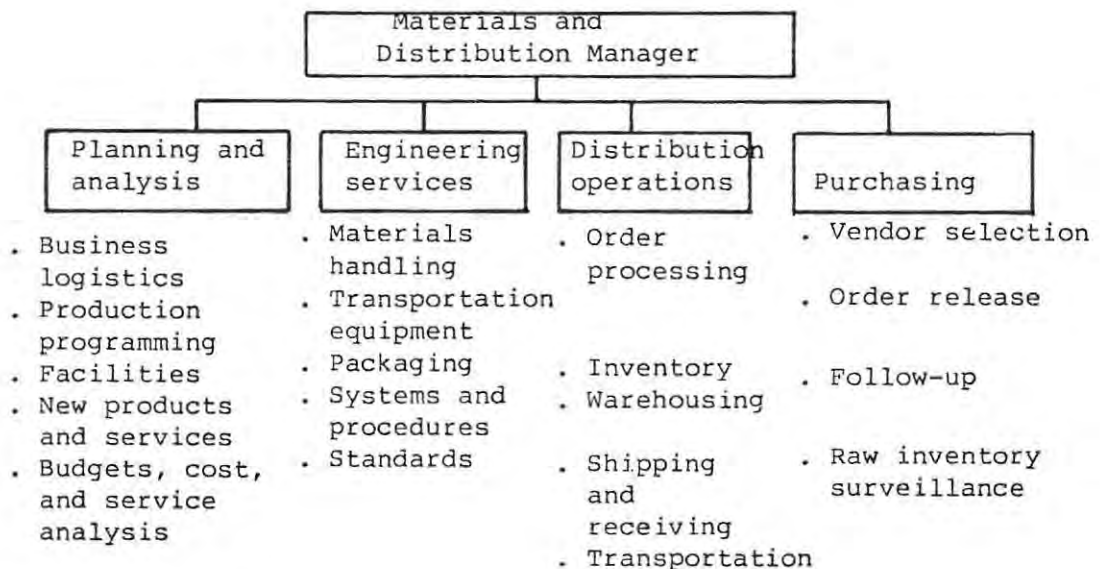


Figure 4.4. Grouping of Both Line and Staff Distribution Activities.

Source: Stolle, John F. op.cit. p 288

In many cases, however, this would be unsatisfactory because the staff group, lacking in authority and responsibility could be expected to encounter resistance to their advice regarding systems modifications.

In addition, the retention of the distribution line activities in the old traditional departments may perpetuate the secondary status of physical distribution, whereas the establishment of a physical distribution line function would increase its status. In any event, however, executives responsible for distribution management must be situated at the same level in the hierarchy as other top executives in the firm.

(3) Finally, line and staff activities may be combined in one department as shown in Figure 4.4.

Which of the three alternative groupings should be selected is heavily dependent on the circumstances facing a particular firm. The line grouping, for example, is most suitable where co-ordination is essential to performing the distribution function at the lowest cost commensurate with the required level of customer service, and where staff activities can be performed effectively and at lower costs by remaining within their traditional departments. The staff grouping, on the other hand, is favoured by divisionalized companies. In these decentralized companies, line distribution activities should be retained in each autonomous division because line activities may differ widely from division to division. It may be uneconomical, however, for each division to maintain its own set of staff distribution activities. In this case, a centralized staff distribution group would be set up at corporate level to give assistance to divisions when needed.

Heskett, Ivie and Glaskowsky say the following about the line and staff grouping:

It eliminates duplication and overlap in such activities, conserves manpower in the process and facilitates the consistent administration of company policies. When action responsibilities for logistics activities are grouped under one manager, decisions affecting two or more of these activities are more likely to be made objectively, with a view toward optimizing the total effect on the firm rather than optimizing one activity at perhaps great cost to other functions and to the firm as a whole. The grouping of logistics activities under a single function provides a stronger voice in management councils, sometimes vital in tempering the plans of manufacturing or sales or both.¹²

Because of the co-ordination it facilitates amongst the various physical distribution activities, Stolle too is emphatic that the line and staff grouping is the pattern which most companies should select:

only when there is a compelling reason to choose another pattern - as when, for instance, staff activities can be performed more economically elsewhere, or when there is no reason to form any distribution organization - should a pattern other than the line and staff grouping be chosen.¹³

Stolle's contention seems to be supported by the findings of Lambert, Robeson and Stock. In a study to examine the status of the integrated physical distribution concept amongst firms in the United States of America, they came to the following conclusions:

the majority of companies in which the (physical distribution) concept has been adopted and implemented have a distribution department. The evidence seems to indicate that a formal department best allows the distribution functions to be performed on a co-ordinated

centralised basis. The formation of such a department would seem to imply that the company recognises the importance and value of distribution activities and is committed to managing them adopters (of the concept) are more likely to have line responsibility for those activities generally considered to require input from the distribution executive.¹⁴

An issue related to the line and staff process is the degree of centralization or decentralization of physical distribution activities regarded as optimum in firms which are divisionalised.

4.4.1.3.2 Decentralization versus Centralization of Physical Distribution Activities:

Divisionalized companies usually maintain head office staff groups to assist the largely independent and autonomous divisions. Thus, while each division may have marketing line and staff groups for example, head office will also have marketing staff. In this situation, the division's marketing staff will be responsible for the marketing of that particular division's product, while the broader issues of corporate marketing tactics and strategy will be the responsibility of the head office marketing staff group. Similar organizational arrangements can prevail for physical distribution line and staff operations as shown in Figure 4.5. In this example, physical distribution staff activities are centralized at head office while the physical distribution line activities are decentralized in each division.

Unlike marketing and production, however, certain aspects of physical distribution encourage greater centralization. In the words of Bowersox:

In general, economies of product flow are

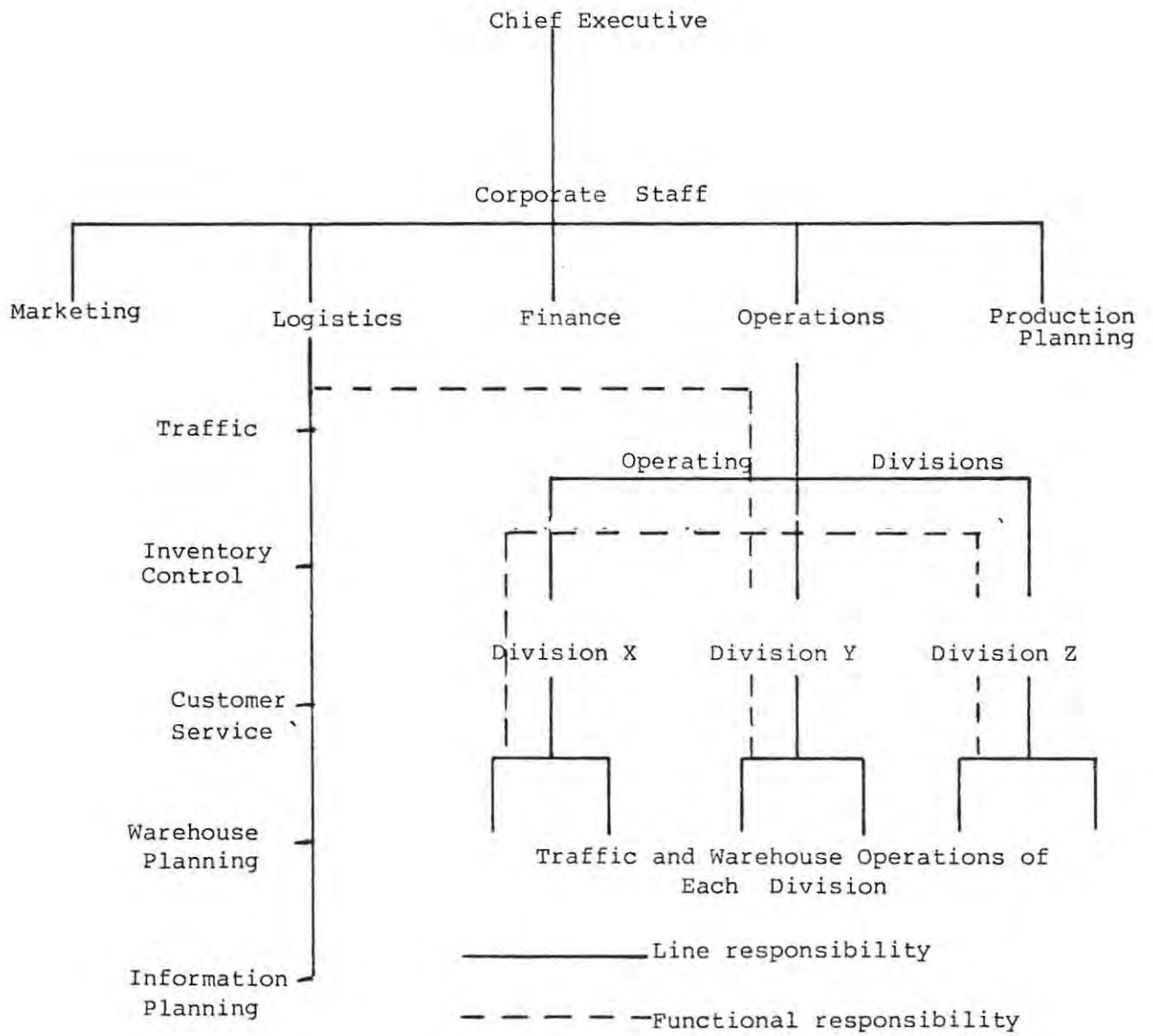


Figure 4. 5: Example of firm with centralized logistics staff activities at head office and decentralized logistics line activities at divisional level.

directly related to volume. Grouping of physical distribution line responsibilities of a number of different divisions into one centralized unit can result in elimination of duplicate facilities, economies of scale and more effective performance.¹⁵

Thus the smaller is the volume of each division, the greater the tendency to centralize even the physical distribution line activities. The extent of such centralization, however, is also subject to the constraint of congruency of marketing efforts. It is difficult to develop one efficient distribution system for products from different autonomous divisions which are sold through different channels to divergent markets.

Regardless of the plans made for physical distribution line activities, physical distribution staff activities benefit from centralization. It is only from a high enough point in the company hierarchy where the view is wide enough, that planning of corporate logistics and physical distribution activities can best take place.

In the final analysis, the most suitable organization for multi-divisional firms is one that combines centralized staff at a corporate level with either centralized line operations at a corporate level or decentralized line operations in individual divisions, as the situation demands. Thus, the line operations of some divisions will be centralized to combine volume, for example, while the volume of others will be sufficient to justify decentralized line operations.

It is also possible, of course, for a multi-divisional firm to create an independent distribution division as illustrated in Figure 4.6.

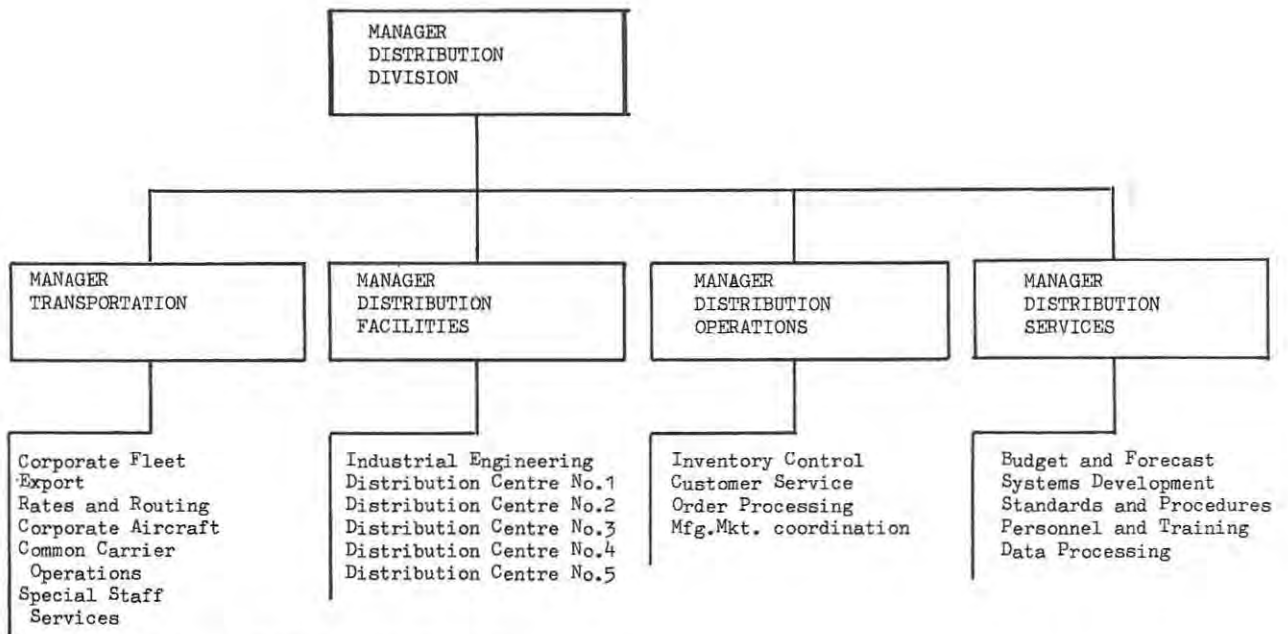


FIGURE 4.6: THE DISTRIBUTION DIVISION

Source: La Londe, B J and Robeson, J F "Corporate Strategy and Organization for Distribution" Journal of Business Policy (Vol. 2, No. 3, Spring 1972) p. 60.

In the words of La Londe and Robeson:

In this option, a company elects to spin off the entire distribution function, both line and staff, which operates as an autonomous operating division. It usually functions much the same as an operating division with cost and profit responsibility.¹⁶

The main advantage of completely divisionalizing the distribution function is that it permits effective cost accountability for the distribution activity. The main disadvantage from a structural point of view, on the other hand, is that the distribution division can become so obsessed with its own objectives that suboptimization results with corporate objectives suffering as a consequence.

Because structure is the vehicle for achieving co-ordination amongst the diverse functions of a firm and for introducing logical and consistent relationships between them, activities such as committees and liaison functions also come under the umbrella of structural considerations.

4.4.1.3.3 Committees and liaison functions:

Some firms have turned to committees as co-ordinating devices particularly for decisions which have long term implications and which impinge on a number of different functions within the firm. The decision to set up a new warehouse, for example, impinges on the finance, physical distribution, production and marketing departments.

The successful implementation of the committee system requires inordinate patience and the proper attitude of participating executives. It is usually not practical to hold a committee responsible for anything, and the appointment of a committee to manage the day-to-day operations of physical distribution activities dispersed throughout the firm, is not practically feasible.

In 1967 Lawrence and Lorsh¹⁷ identified the need for a new management job, which they called the "integrator", in order to achieve unity of effort among the major functional specialists in a business. They described the nature of the integrator's role as follows:

The integrator's role involves handling the non-routine, unprogrammed problems that arise among the traditional functions as each strives to do his own job. It involves resolving interdepartmental conflicts and facilitating decisions, including not only such major decisions as large capital investment but also the thousands of smaller ones regarding product features, quality standards, output, cost targets, schedules, and so on.¹⁸

Although this reads very much like the job description of any general manager, the dynamic nature of the environments in which many firms operate makes the integrating job so important and so complex as to be beyond the scope of any single general manager, no matter how competent.

4.4.1.4 The span of control:

The span of control concept simply relates to the number of sub-ordinates a manager can effectively supervise.

While the Classical theory of organization does provide some insights into the nature of organizations, its value is limited by its concentration on the formal anatomy of organizations to the exclusion of human interactions, informal groups and intraorganizational conflicts.

A second organizational alternative for physical distribution

or logistics, is what might be called a semi-formal approach.

4.4.2 A semi-formal approach to organizational design:

A semi-formal approach to organizational design is reflected in the matrix organization which in turn represents an attempt to apply the systems concept. Central to the systems concept is the idea that functional elements will subordinate their activities in favour of the objectives of the total system. The application of the matrix organization to physical distribution activities reflects the view that physical distribution is best perceived as cross-functional rather than as a separate functional activity; as a set of horizontal, rather than vertical, flows of information and material/goods. The cross-functional view holds that physical distribution is a system embracing many different functional activities within the organization.

The application of the matrix organization to logistics activities is shown in Figure 4.7. De Hayes and Taylor explain Figure 4.7 as follows:

We feel that the matrix organization is the epitome of the joint problem solving and shared authority that is inherent in the logistics system concept... Each programme manager, such as the logistics programme manager is responsible for his programme within established time, cost, quantity and quality constraints. The line organization (the vertical emphases) develops from the programmes but is now a supporting relationship In essence, the logistics manager in the matrix design is part of a shared authority system. He is responsible for the activities outlined for the totality of the system but not each of the traditional areas - (for example, traffic, production scheduling, warehousing and inventory control, forecasting and information processing.)

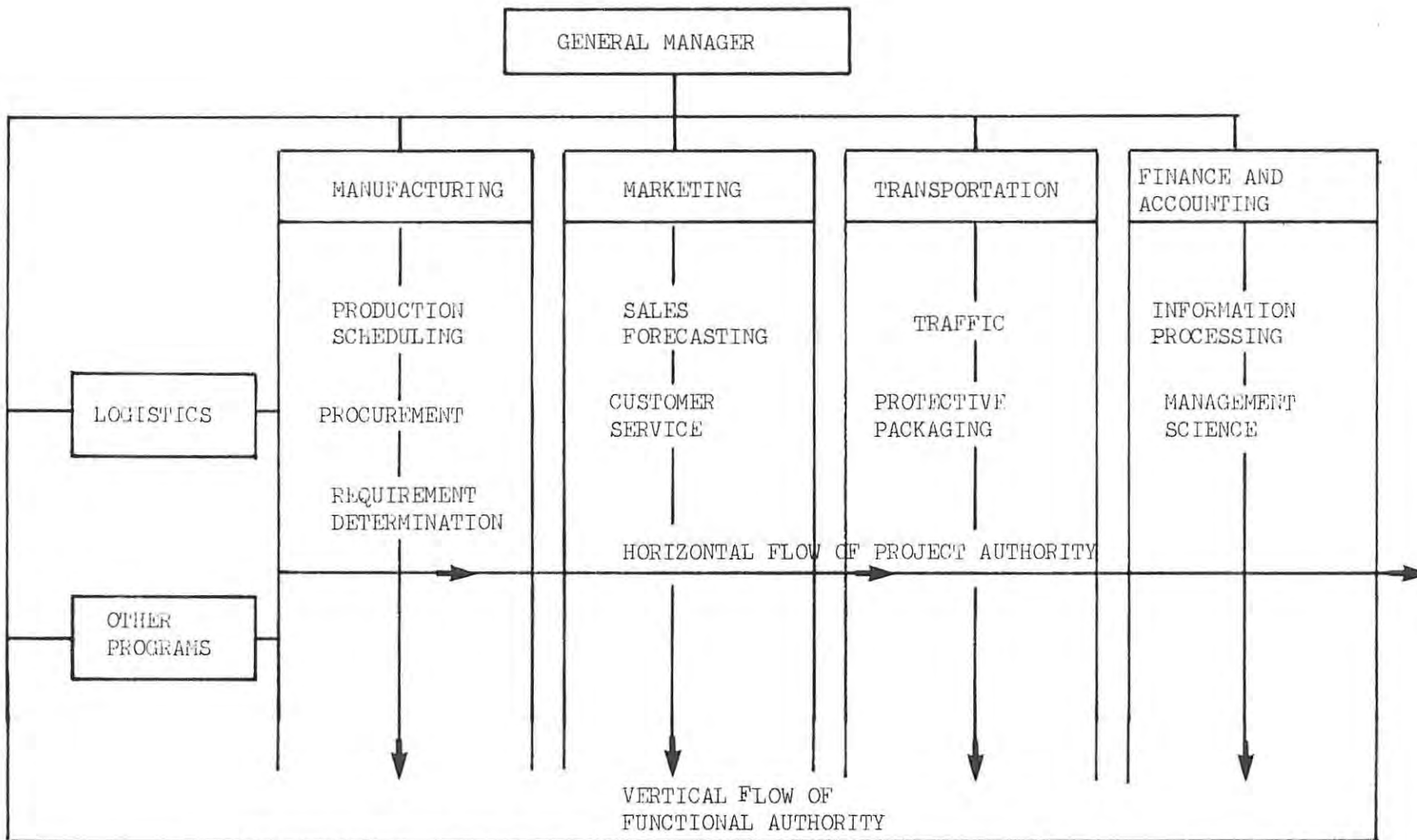


Figure 4.7 The Matrix Organization for Logistics

Source: Adapted from: Daniel W de Hayes and Robert L Taylor, "Making Logistics work in a Firm" Business Horizons (Vol. 15, 1972) p. 44.

There is, therefore, concentration on the system and not only on components. The expenses of these activities are accountable both to the logistics programme office and the functional department.¹⁹

Thus the different functional departments, such as manufacturing, engineering and marketing provide various inputs into the total logistics system, with those inputs being co-ordinated by the logistics manager.

Davis and Lawrence recognise that the matrix design has many benefits but believe that to reap them, managers need to know how to prevent and treat its problems, both real and imagined. The following are some of the potential problems which they have identified:

A formless state of confusion where people do not recognize a "boss" to whom they feel responsible

Managers jockey for power in many organizations, but a matrix design almost encourages them to do so

The mistaken belief that matrix management is the same as group decision making.

When business declines, the matrix becomes the scapegoat for poor management and is discarded

The fear of high costs associated with a matrix

Managers in a matrix can succumb to excessive internal pre-occupation and lose touch with the marketplace

Too much democracy, not enough action.²⁰

A third approach to organization for physical distribution and/or logistics, is associated with the identification of

different stages in the adoption of the physical distribution concept by a firm. This may be called the "life-cycle" approach.

4.4.3 The life-cycle approach:

In the typical traditional organization structure, physical distribution-related functions tend to be widely dispersed throughout the firm. Once management has recognised the benefits to be gained from the adoption of the physical distribution concept, however, organizational changes take place to accommodate and facilitate the implementation of the new concept. These organizational changes, however, are not revolutionary in nature, but rather evolutionary.

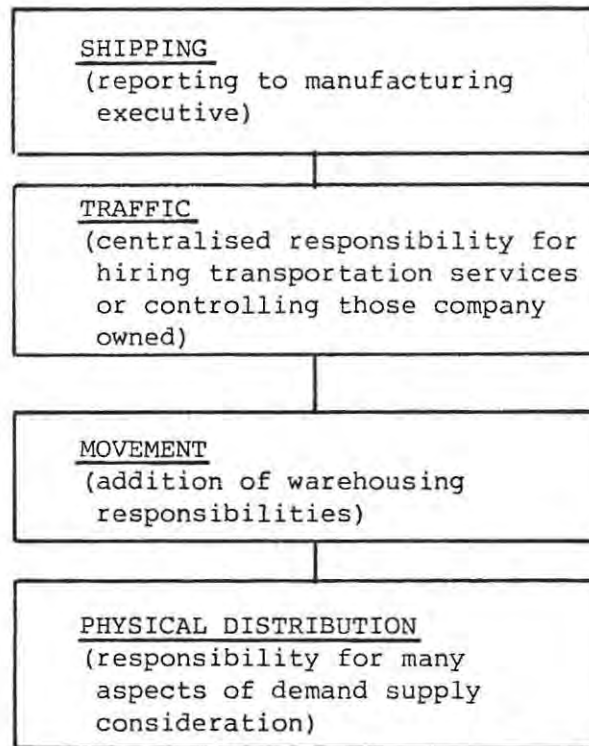
Beier suggests that:

there is a life-cycle for the development of a logistics or physical distribution department within a particular firm. Along with each stage in the life-cycle there are different problems of organising the logistics function and these must be overcome before the next stage may be achieved.²¹

A number of different life-cycle approaches have been postulated:

(a) One of the earliest attempts at identifying the stages of development of physical distribution departments was by Heskett,²² who proposed the scheme illustrated in Table IV 2.

TABLE IV 2.

HESKETT'S LIFE CYCLE HYPOTHESIS

Source: Heskett, J L "Ferment in Marketing's Oldest Area", Journal of Marketing, (October 1962)

Heskett's scheme can be criticised for being too general to be of practical use by firms, for covering too wide a time span in a firm's growth, and for the jump between "movement" and "physical distribution" being too big. On the other hand, however, as Maister says, "the scheme is sufficiently general to describe with some accuracy the evolution of physical distribution organizations in most companies".²³

(b) A second life-cycle approach is suggested by Lancioni.²⁴

In a study to investigate the relationship of physical distribution line and staff positions among 59 United States firms, he found that in the development of physical distribution organizations, the line and staff activities making up the structure evolved sequentially as reflected in Table IV 3.

TABLE IV. 3

LANCIONI's LIFE-CYCLE HYPOTHESIS

LINE ACTIVITY	DEVELOPMENT SEQUENCE	STAFF ACTIVITY
Warehousing	← 1 →	Customer service
Order processing	← 2 →	Finance and budgeting
Traffic	← 3 →	Systems and procedures
Purchasing	← 4 →	Forecasting
Inventory	← 5 →	Personnel and training
Tracing and Expediting	← 6 →	Operations research
Production Scheduling and Inventory Control	← 7	
Value Analysis	← 8	

Largely because most firms recognise it as part of their distribution operation, warehousing tended to be the first line activity incorporated into physical distribution among United States firms. Order processing, because of its clear-cut relationship to other sub-operations in a firm's distribution system, was the second line activity that was made part of distribution management.

The transportation function was the third line activity to be incorporated into formal distribution management structures. Like warehousing and order-processing, it has always been recognised as a vital element in distribution. The fact that it was only the third activity to be included reflects the traditional feelings of transport personnel that their operation is separate and independent. Thus in the United States, transport departments have shown a reluctance to become part of co-ordinated distribution groups.

Lancioni's study revealed that purchasing was the fourth line activity to be included and inventory the fifth. The low sequential position of inventory indicates the ignorance of firms with regard to its impact on distribution systems. In addition, companies have regarded inventory management as a responsibility to be shared between production and distribution.

Tracing and expediting, production scheduling and inventory control, and value analysis are relatively new line functions which have only emerged in the last ten years and have thus only recently become part of distribution management.

With regard to the sequential evolvement of staff functions into physical distribution organizations, customer service ranked first. This was because firms realised the importance of adequate customer service levels to their overall success.

Finance and budgeting followed closely behind customer service because of the importance of balancing the costs of maintaining service levels with the benefits of doing so.

Systems and procedures, forecasting, personnel and training and operations research were third, fourth, fifth and sixth respectively in terms of their sequential inclusion into distribution management.

The lesson to be learnt from Lancioni's study is that the emergence of a combined line and staff structure as illustrated in Figure 4.4 and recommended by Stolle in Section 4.4.1.3, will inevitably take time with many hybrid variations preceding it.

(c) Maister ²⁵ quotes a life-cycle hypothesis presented by Mathias and summarised in Table IV. 4. Mathias investigated a sample of multi-national, natural resources-related firms including aluminium, petroleum, rubber and steel companies. The results for Mathias' sample differ significantly from Lancioni's cross-section of firms particularly with regard to the relatively early integration of transportation and purchasing. This strongly suggests that in making organizational recommendations for physical distribution and logistics, the nature of the industry in which the firm is operating, as well as other peculiar or individual environmental factors, should not be ignored.

TABLE IV. 4.

MATHIAS' LIFE-CYCLE HYPOTHESIS.

Stage I	Traffic Concept	- Headed by Vice-President or Director of Traffic who acts with little co-operation with other managers.
Stage II	Transportation Concept	- Senior Vice-President who is reported to by both Traffic and Purchasing executives. Other management service activities such as EDP operations also included in this group.
Stage III	Distribution Concept	- Addition of control of finished goods inventory, and other distribution functions such as warehousing.
Stage IV	Total Logistics Concept	- Complete co-ordination of inbound and outbound materials flow.

Source: P F Mathias "Organizational Design for Logistical Operations in Multi-national Corporations", an Internal report for the ALCAN Corporation.

(d) Adopting a different approach, Alexander depicts the evolutionary course of physical distribution organizational development since the 1940's in terms of five stages as follows:

1. The traditional production-oriented approach, whereby 'transportation' (along with marketing) is treated rather primitively as more or less an appendage of manufacturing;
2. the impact of the managerial process of decentralization (which actually goes back to the 1920's) in an emerging marketing department with some responsibility for a number of fairly distinct specialities, including some which are now encompassed in physical distribution, such as transportation, warehousing, inventory control and packaging;
3. the predawn of physical distribution consciousness, as reflected in the Stanford study;²⁶
4. the transition from 'transportation' to 'physical distribution' in the late 1950's; and
5. the novel forms and shapes of physical distribution structures, incorporating most or all of the constituent specialities, all of which mirror the ferment of continuing change in physical distribution concepts and techniques.²⁷

(e) Another life-cycle approach is that suggested by Beier.²⁸ He identified the following stages in the life-cycle of logistics or physical distribution departments:

.Pre-logistics stage: At this stage of its development a firm tends to be production or marketing oriented with the authority for physical distribution activities dispersed throughout the firm.

.Initial Logistics Co-ordination: It is during this stage

that the negative effects of isolated decision making in the logistics context are recognised, and some logistics activities are partially integrated in a critical functional area such as marketing, for example.

. Departmentalisation: During this stage, all essential logistics activities are integrated under one dominant function such as marketing or production, or a separate logistics department may even be established.

. Information and Logistics integration: Effective departmentalisation and logistical integration are only achieved once access to relevant logistics cost data and information is gained.

. The programmed systems stage: As the relationship between data processing and distribution grows, more of the operational aspects of logistics will become systematised. During this stage, systems groups and distribution personnel will co-operate to implement analytical models and other aids to logistical decision making. In the words of Beier:

The operations aspects of the logistics function will be controlled by pre-programmed decision systems. The ability of such information systems to provide relevant and timely information to all interested groups within the firm suggests that the severity of the functionalism-co-ordination dilemma will decline.²⁹

Although this does not necessarily mean that the logistics department will disappear from the organization chart, it does mean that at this stage its nature will change dramatically. Logistics will become more of an intermediate and long range planning and co-ordination activity between the other functions of the firm.

(f) Perhaps the most satisfactory life-cycle hypothesis is the one presented by Bowersox³⁰ and summarised in Table IV. 5. In the words of Maister, the key elements of Bowersox's theory are:

(a) the dual, but independent development of materials handling (inbound movement) and physical distribution (outbound movement) in separate departments; (b) the early development of integrated activity authority taking place within traditional organizational boundaries; and (c) recognition of change of status as a stage of development.³¹

TABLE IV. 5.

BOWERSOX'S LIFE-CYCLE HYPOTHESIS

Stage	I	- Dispersed authority for logistics functions Basic concepts and potential of logistics gains management visibility.
Stage	II	- Two or more logistics functions grouped together without significant change in organizational positioning (e.g. transportation and finished goods warehousing within marketing department, materials plans and raw material warehousing within production department). More functions added to physical distribution and/or materials management departments, still with no re-allocations across marketing/production/finance traditional boundaries.
Stage	III	- Physical distribution is isolated and elevated to a position of authority and responsibility equal to that of other major areas. Re-allocation of function across traditional boundaries (e.g. credit authorisation from finance, plant warehousing from production) takes place.
State	IV	- Integration of Physical Distribution with Materials Management (including purchasing and production scheduling, for example) under a single "Logistical Executive".

Source: Donald J Bowersox, Logistical Management. (New York: MacMillan, 1974) pp. 427-433.

The following discussion represents an elaboration of Bowersox's hypothesis:

As stated before, in the typical traditional organization structure, physical distribution-related activities are widely dispersed throughout the firm. Bowersox³² draws attention to the fact that before implementing the integrated physical distribution concept, a considerable amount of planning is required in order to extricate distribution line activities from manufacturing, marketing and finance. As a result, development of physical distribution organization is initially often staff oriented with the new distribution staff functions initiating research and development of distribution activities with the old functional departments handling the line activities.

The first organizational development with regard to line activity that is likely to take place, is the regrouping of physical distribution activities within the traditional functional departments of marketing and production. Marketing will attract those activities related to customer service, while production will concentrate on materials and parts management as shown in Figure 4.8. Bowersox termed this a Type I Logistical Organization. Alexander ³³ in fact, generalized that regardless of how logistics is incorporated into the organization chart, it will always fall under the hegemony of marketing. This is so for a number of reasons:-

Firstly, the objectives of distribution, namely, to deliver goods to customers at the right time, the right place and in the right quantities, is an important component of customer satisfaction - the gospel of marketing.

Secondly, the channel of distribution is not only a vehicle for the physical flow of products, but also for the performance of a variety of marketing functions, promotion in particular.

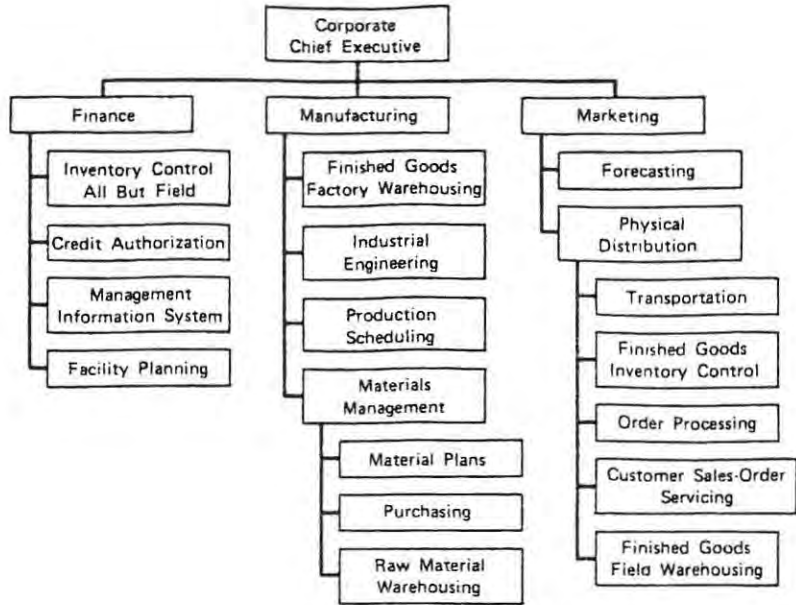


Figure 4. 8: Type I Logistical Organization.

Source: Bowersox, D J. Logistical Management. (New York: MacMillan, 1974) p. 429.

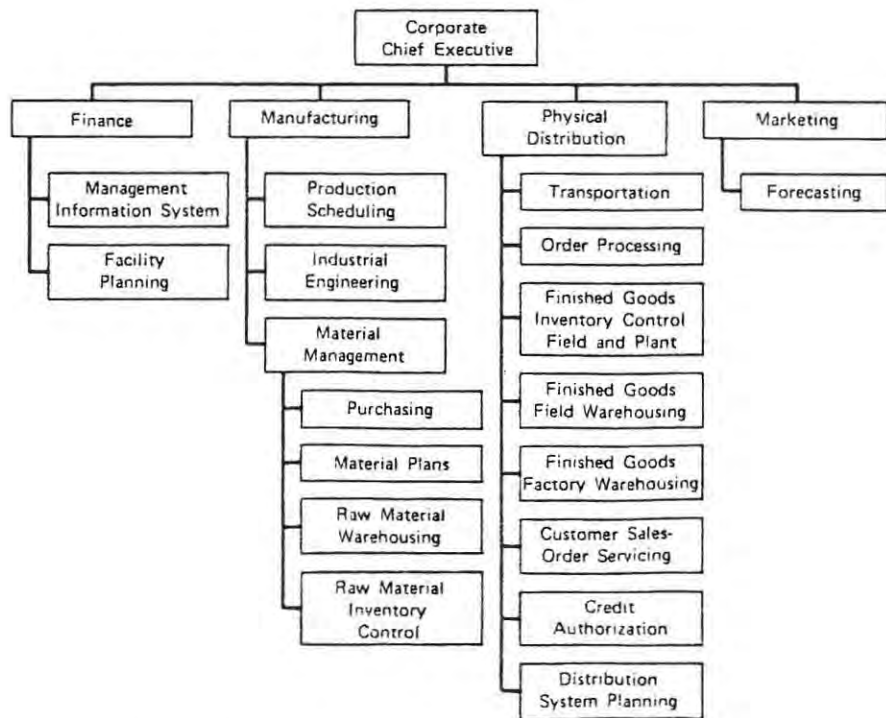


Figure 4. 9: Type II Logistical Organization.

Source: Bowersox, D J. op.cit. p. 430.

Thirdly, a number of aspects of physical distribution are closely related to promotion "e.g. packaging (silent selling), inventory control (merchandising), and warehouse location (market penetration)"³⁴

In the second stage of development (Bowersox's Type II Logistical Organization - See Figure 4.9), physical distribution is elevated to a position equal to that of other major functional areas in the firm, while material management will still remain under production. This is probably due to the visibility of physical distribution as a result of improved customer service performance. Thus quite clearly, although the idea of fully integrated logistics is accepted, by this second stage of development it has not yet been implemented. In the words of Bowersox:

This failure to synthesize all movement management into an integrated system approach results in part from a pre-occupation with specific tasks, such as order processing and purchasing, which are essential to continued operations. A second limiting factor to total unification is the failure at this stage of development to have a fully operational logistical information system.³⁵

Bowersox goes on to quote from a survey of 14 companies in the United States of America in 1972, that most firms with a high level of logistical expertise have an organization structure similar to the Type II one.

Bowersox's Type III Logistical Organization as reflected in Figure 4.10, involves complete integration of all logistical functions and activities, both line and planning, into a single department.

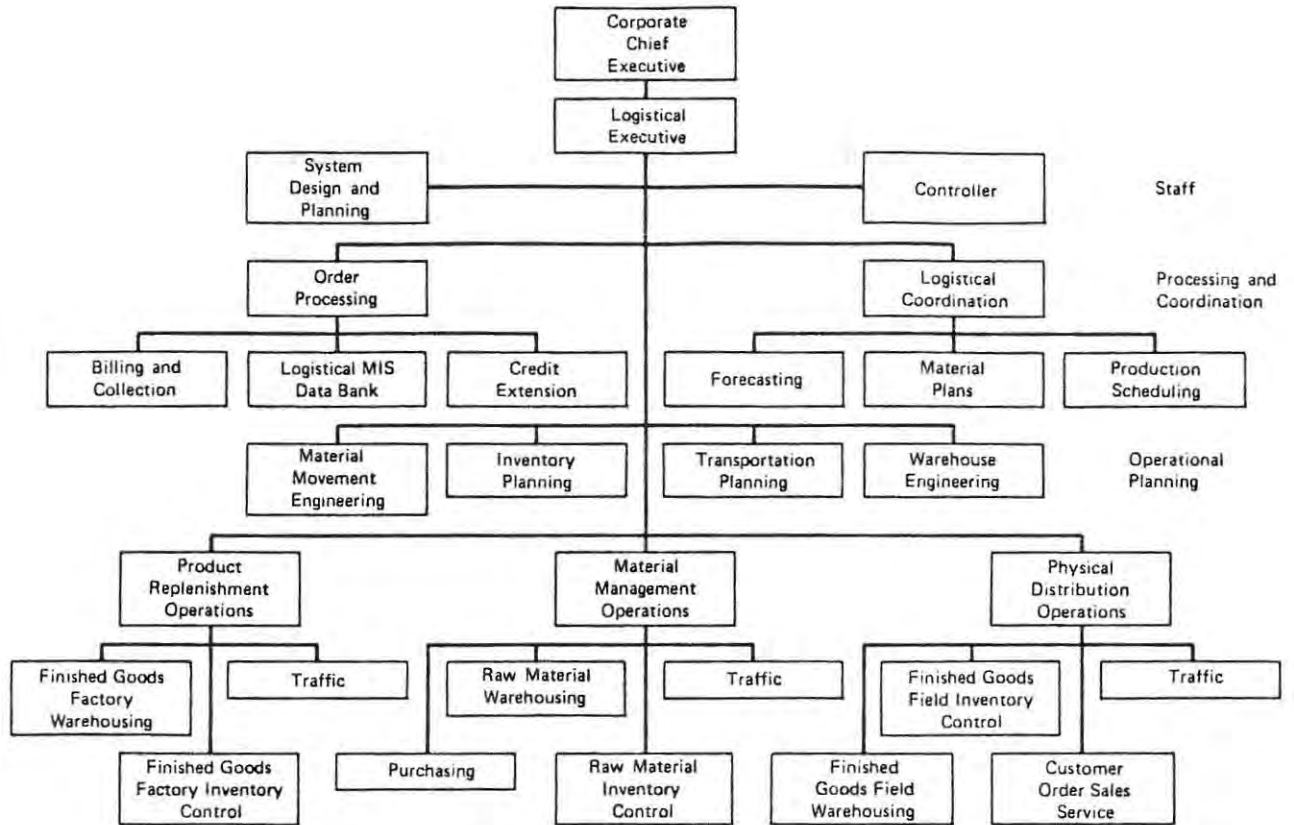


Figure 4. 10: Type III Logistical Organization.

Source: Bowersox, D J; op. cit. p. 432.

The co-ordination group in Figure 4. 10 is concerned with integrating production scheduling, forecasting and the development of materials plans to guide the line operations performed to meet expected sales.

The position of system design and planning in Figure 4. 10 is concerned with long-range strategic planning and the development of the optimum logistical system design in the light of strategic plans. The controller is concerned with measuring the performance of the logistical operation. The need for this function arose because of the inability of the traditional corporate accounting function to report total logistics costs.

Thus the type III organization represents an attempt to implement the systems approach to organizational design and to allow logistics to play its integrative role for the firm as a whole.

To support this notion of the evolutionary nature of logistics and physical distribution organizational development, is the experience of Douwe Egberts, a firm in Holland.³⁶

Having been convinced of the benefits to be derived from adopting the physical distribution concept, the firm recognised the need to improve the organization of distribution and to introduce the concept step by step.

The first step was the centralisation of the different shipping departments into a transportation department under marketing. This move overcame the problem of independent shipping departments aiming at improving their own efficiency without ever taking into account the interests of the overall transportation system.

The second step was the inclusion of order processing and warehousing under the transport manager who in fact became distribution manager - still under marketing. Previously, warehousing was the responsibility of the production department and order processing was directly under the marketing manager. This new arrangement

facilitated co-ordination amongst these activities and resulted in cost decreases.

The third step was the establishment of a separate distribution and transport department ranking equally with marketing and production. This new department was responsible for all the activities with regard to the whole process from the end of the production line to the customer. In the words of Brouwer, "One could say that within the framework of the physical distribution concept as it is usually defined, the ideal situation had been reached".³⁷

A fourth approach which may be adopted towards organizing for physical distribution and logistics is what is known as the contingency approach, the subject of the next sub-section.

4.4.4 The contingency approach:

The contingency approach differs from the others in emphasising the openness of the firm to its environment. It argues that the best way to organize depends on the circumstances within which a firm finds itself. These circumstances are comprised of a firm's markets, its technology and the culture within which it subsists. Since these vary so widely, it is impossible to generalize as to what constitutes the optimum structure for all firms. As the environmental factors differ from firm to firm, so must organizational structures and processes. Khandwalla summarises the contingency approach as follows:

The basic idea of the contingency theorists is that the nature of the organizations technology, its size, its legal incorporation, the character of its markets, and other factors confront the organization with some opportunities as well as constraints and problems and therefore set the tone of the

organization's adaptation as revealed by its structure Contingency theory indicates the kinds of structure that may be appropriate responses to each of several different organizational contexts or situations.³⁸

Writers who have contributed to the contingency approach are Woodward,³⁹ Burns and Stalker,⁴⁰ Lawrence and Lorsch,⁴¹ Thompson⁴² and Galbraith.⁴³ The writers who have probably had the most influence on organizing for physical distribution and logistics, are Lawrence and Lorsch, and Galbraith.

Lawrence and Lorsch introduced the concepts of differentiation and integration into the analysis of organizations. Differentiation refers to the differences in behaviour and thought patterns that develop amongst different functional specialists with regard to their respective areas of specialisation. Lawrence and Lorsch found that the difference among functional units centred around four factors, namely, goals, time, interpersonal orientations and formality of practices. By integration they mean "the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment".⁴⁴ The implication is that differentiation is essential to the achievement of functional expertise. For the achievement of corporate objectives, however, integration or the collaboration between specialised units or individuals, is also essential.

These two concepts are clearly relevant to physical distribution. Physical distribution activities have often been dispersed throughout the firm in order to achieve functional specialisation. These physical distribution activities are, however, interdependent which emphasises the need for co-ordination or integration.

With regard to Galbraith's contribution, it is useful to quote from Persson:

Galbraith has developed the Lawrence and Lorsch model into an information processing model for the analysis and design of organizations. Galbraith argues that different organizational designs are characterised by their information processing capacity The need for such a capacity varies with factors such as task predictability, the amount of relevant elements for decision making and the inter-dependence between these elements.⁴⁵

The following is a list which both elaborates on, and adds to Galbraith's factors, and which indicate that physical distribution activities in the firm are of sufficient importance or complexity to warrant or require their formal organization at one or more places in the firm's organization structure:

(a) Logistics or physical distribution costs:

Clearly the greater the proportion of total costs which physical distribution costs represent, the greater the necessity for all physical distribution-related activities to be brought under the umbrella of one department so that rational trade-offs and cost control is ensured: Bowersox writes:

The cost of performing physical distribution must be a significant expenditure in relationship to total corporate sales. A firm spending 40 per cent of each sales dollar on physical distribution is a far more serious candidate for re-organization than one spending less than 10 per cent.⁴⁶

(b) Size of firm:

In any given industry, the larger firm is likely to operate more manufacturing plants and warehouses, and sell and distribute

to more wholesalers and retailers than the smaller firm. Thus simply on the grounds of a larger scale and higher level of complexity of physical distribution activities, a separate physical distribution department is more justified in a large firm than in a small one.

(c) Customer Service:

The more critical customer service is to the competitive success of a firm, the greater will be the need for recognition and management of physical distribution as a discrete function in the organization.

(d) Nature of the product:

Some goods are simply easier than others to package, handle, warehouse, transport and protect from damage. Where this is the case, the necessity for a separate physical distribution department and more careful management is less immediate.

(e) Production to order or to stock:

If a firm manufactures only to customers' orders, its physical distribution problems are greatly reduced, if not eliminated. In fact physical distribution problems are superceded by production scheduling issues. In such circumstances, the integration of the various physical distribution activities is not of crucial importance and thus the establishment of a separate physical distribution department is probably unnecessary. In contrast, a firm which produces "to stock" is faced with all the problems of warehousing, customer service levels, order-cycle lengths, transportation and inventory levels. In these circumstances, a separate physical distribution department as a means of achieving the desired integration is probably essential.

(f) Structure of the shipping pattern:

Heskett, Ivie and Glaskowsky illustrate the influence of a firm's shipping pattern on the need for a separate physical distribution department as follows:

At one extreme a firm might use only one raw material which is obtained from a single source and can move by only one means of transport to the firm's only plant, and all production is shipped to a single customer at one location, and only one means of transport is feasible for such shipments. At the other extreme, a firm might obtain goods or materials from literally thousands of suppliers and have these goods shipped to any one of dozens of company plant warehouses at various locations; upon completion of the production processes, finished goods might then be shipped to any one of dozens of the company's distribution warehouses and thence to hundreds or thousands of customers.

In each of these cases the logistics costs (both absolute and as a percentage of sales) may be the same, but the first situation could probably be handled by an intelligent young assistant to the office manager, while the latter case would require a sizeable, well-organized, and smoothly operated logistics function headed by a very capable senior executive.⁴⁷

To sum up the factors favouring the establishment of a separate physical distribution department, reference can be made to Maister:

The central themes are complexity and cost. The implicit (dual) hypothesis is that the more complex and costly the physical distribution task, the higher the probability that a physical distribution department will be formed? The complexity is reflected in references to multi-item, multiple location system (which would

certainly appear to be more ripe for the establishment of a logistics function than single item, single location systems), and the references to costs are explicit.....

It is fairly certain that, as a factor in promoting the establishment of a physical distribution department, both absolute and relative levels of distribution costs are relevant. As long as such costs remain an insignificant portion of total costs, no such department is likely to come into existence. Similarly, such departments are more likely to occur in large corporations in which organizational boundaries and responsibilities tend to be more carefully drawn.⁴⁸

To move away from generalizations, reference is made to the study conducted by Persson⁴⁹ in 1977 in which a conceptual framework based upon the works of Lawrence and Lorsch and Galbraith were applied in a logistics context. He found that three factors seemed to explain the different organisation design strategies for logistics co-ordination. These were (a) logistics task predictability, (b) the number of logistics decision elements and (c) the possibility of grouping logistics activities into more or less autonomous groups or decision areas.

The logistics task predictability is a function of the extent to which the firm produces to stock. When it is mainly producing to stock, its logistics task predictability is high. The number of logistics decision elements is indicated by the size of the firm, the number of products and the complexity of the products. The existence of autonomous logistics decision areas involves an identification of separate product groups as far as technology, market or location is concerned.

To quote from Persson:

In an organization where the logistics task predictability is low (e.g. mainly production to order) and where the number of logistics decision elements are few (e.g. a small firm, few products and/or low product complexity) logistics activities are co-ordinated by mechanisms of an informal and of a functional rather than a flow-oriented character.⁵⁰

Examples of these are found in Table IV. 6.

TABLE IV. 6.

INFORMAL AND FUNCTIONAL DESIGN STRATEGIES FOR LOGISTICS CO-ORDINATION.

Design strategies	Examples
Informal co-ordination	- Informal contacts between functional managers
mechanisms within a functional hierarchy	- Simple rules, programmes and procedures - Regular meetings

Source: Göran Persson "Organization Design Strategies for Business Logistics". IJPD and M M (Vol. 8, No. 6, 1978). p. 294.

With a limited number of logistics decision elements, but with a high task predictability, e.g. a bigger proportion of production to stock, the co-ordination of logistics activities is managed by the use of a combination of informal and formal mechanisms within the functional hierarchical framework.⁵¹

Examples of these are found in Table IV. 7.

TABLE IV. 7.

FORMAL AND FUNCTIONAL DESIGN STRATEGIES FOR LOGISTICS
CO-ORDINATION.

Design strategies	Examples
Formal logistics co-ordination within a functional hierarchy	<ul style="list-style-type: none"> - Goals and objectives - Policies - Standards - Advanced (and computerised rules, programmes and procedures)

Source: Persson, Göran "Organization Design Strategies for Business Logistics" op. cit. p. 294.

When the number of logistics decision elements are increasing (indicated by the size of the firm, the range of products and/or complexity) the needs for additional organisation structures for logistics co-ordination are increasing. Thus co-ordination mechanisms with a strong flow-orientation tend to be applied in bigger organizations with a wide range of products and/or complex products.⁵²

Examples of flow oriented organization design strategies for logistics co-ordination are found in Table IV. 8.

TABLE IV. 8.

FLOW-ORIENTED ORGANISATION DESIGN STRATEGIES FOR
LOGISTICS CO-ORDINATION.

Design strategies	Examples
Flow-oriented organisation structures for logistics co-ordination	<ul style="list-style-type: none"> - Product organisation - Divisionalising - Professional co-ordinator - Co-ordinating department - Matrix organisation - Logistics department.

Source: Persson, Göran "Organisation Design Strategies for Business Logistics" op. cit. p. 295.

For a combination of the two contingencies of logistics task predictability and number of logistics decision elements, Persson suggests the design strategies summarised in Table IV. 9.

TABLE IV. 9.

DESIGN STRATEGIES FOR LOGISTICS CO-ORDINATION

	TASK PREDICTABILITY		
		LOW	HIGH
Number of logistics decision elements	High	- Informal, functional and Flow-oriented design strategies	- Informal and Formal, functional and Flow-oriented design strategies
	Low	- Informal, functional strategies	- Informal and Formal, functional strategies

The third contingency, involving the existence of autonomous logistics decision areas, explains more specifically the use of flow-orientated organisation structures for logistics co-ordination. These flow-orientated organization structures are summarised in Table IV. 10.

TABLE IV. 10.

ORGANISATION DESIGN STRATEGIES FOR LOGISTICSCO-ORDINATION:

Amount of autonomous logistics decision areas in the form of separate product - or production-groups		
None identified (or too many)	Few	Many
- Matrix organisation or - Logistics department in line position	- Divisionalised organisation - Extensive use of formal and informal functional strategies for overall logistics co-ordination	- Divisionalisation and - Product organization - Co-ordinator or co-ordinating staff for overall logistics co-ordination

Source: Persson, Göran. "Organisation Design Strategies for Business Logistics" op. cit. p. 296.

The use of both informal and formal methods of communication was also the finding of Lambert, Robeson and Stock:

It was apparent that various forms of communication, both formal and informal, are used to co-ordinate activities within the distribution department of the respondent firms It would appear that a formally structured department of distribution may facilitate the successful implementation of the integrated physical distribution concept but good formal and informal methods of communication within the firm are also important.⁵³

4.5 Inter-functional Management:

Much of the previous discussion has centred upon the need to reduce the potential conflict and sub-optimization amongst physical distribution activities scattered throughout the organization. This invariably results in the collection of these previously dispersed activities into a separate department of some form. While this arrangement may well reduce conflict between physical distribution activities, the establishment of an additional functional area increases the level of conflict between the physical distribution department and other functional departments of the firm. Because each department is theoretically autonomous with regard to responsibility, authority, accountability and reward, interfunctional activity trade-offs do not always occur easily. As a result, sub-optimum performance by the firm as a whole, is not an impossibility. Thus, the physical distribution manager and his superiors must be prepared to deal with the problem of inter-functional management.

Ballou⁵⁴ illustrates the benefits of interfunctional management by referring to the interests which both physical distribution and marketing have in packaging. While marketing is only interested in the promotional aspects of packaging and the impact it may have on sales, physical distribution is mainly interested in the protective, storage and handling features of packaging. The package, however, is a single entity and protective features cannot be separated from promotional features. "Some form of co-operation is needed to achieve a package design that will yield the best balance between marketing revenues and logistics costs. Operating unto themselves, neither function is likely to come up with a package design that is as economically beneficial as the one created by working together."⁵⁵

The position of production scheduling is very similar. Because this activity has such an impact on a variety of logistics activities such as inventory levels, warehouse operations, transportation costs, there is some sense behind placing it under the manager of logistics. On the other hand, however, production scheduling is of critical importance to the cost structure of the production department. How can they be expected to be completely responsible for their costs if they lose control over production scheduling? Thus, quite clearly, some mechanism would be needed to achieve the required co-ordination between the production department and the logistics or physical distribution department.

Lawrence and Lorsch have analysed the problem of inter-functional management in terms of differentiation and integration concepts which were briefly discussed in sub-section 4.4.4. In the words of Walker and Lorsch:

while achievement of both differentiation and integration is possible, it can occur only when well-developed means of communication among specialists exist in the organization and when the specialists are effective in resolving the inevitable cross functional conflicts.⁵⁶

The following have been suggested as a means of ameliorating cross functional conflicts:

(a) Top Management's encouragement:

The problem with this alternative is that top management would need to continually pursue co-ordination to avoid functional areas reverting to their autonomy. This would take up a considerable amount of managerial time and would be restricted to selected problems.

(b) Co-ordinating committees:

Here the committees would be regarded as consisting of members of each of the functional areas involved: this cannot represent the entire solution to the co-ordination problem since these committees do not possess the power of implementation.

(c) Incentives:

Although the budget serves as a major control device, it does not encourage co-ordination between functional areas. This is because each manager works towards keeping costs within his budget and he would find no advantage in accepting a higher level of cost than he would autonomously decide, simply so that the firm as a whole could benefit. One possible way of overcoming this particular problem would be to introduce a system of payment for co-operation. In the words of Ballou:

The manager of a functional area absorbing higher activity level costs than those resulting from the decision made without co-operation would receive

from the functional area to which the benefits occur, compensation in the amount of his cost overrun plus some increment of the realised savings. The primary disadvantage of this approach is the demands that would be made on the information-decision system to determine the performance levels before and after co-operation.⁵⁷

(d) In response to the potential co-ordination problem between the logistics department and production department mentioned earlier, Beier⁵⁸ reports the emergence of liaison positions in many firms in the United States of America to act as points of information exchange between two separate but related departments. The effect of these positions is to create a formal channel of communication between departments and to bring managers together when joint decisions are required. Thus in this way, logistics can become an integrative activity.

TABLE IV. 11.

COMPARISON OF INTEGRATIVE DEVICES IN FIRMS IN THREE DIFFERENT INDUSTRIES.

	Plastics	Food	Container
Degree of differentiation ^a	10,7	8,0	5,7
Major integrative devices	(1) Integrative department (2) Permanent cross-functional teams at three levels of management (3) Direct managerial contact (4) Managerial hierarchy (5) Paper system	(1) Individual integrators (2) Temporary cross-functional teams (3) Direct managerial contact (4) Managerial hierarchy (5) Paper system	(1) Direct managerial contact (2) Managerial hierarchy (3) Paper system

^aHigh score means greater actual differentiation.

Source: Paul R Lawrence and Jay W Lorsch: Organization and Its Environment (Cambridge Mass: Harvard University Press, 1967)

In their study of firms in the plastics, food and container industries, Lawrence and Lorsch found the most popular integrative devices to be those summarised in Table IV. 11.

From this table it can be seen that the higher the degree of differentiation in a firm, the higher and more complex is the integrative mechanism required.

4.6. Inter-organizational Management:

According to Heskett⁵⁹, major challenges in logistics management and continued productivity improvement in the logistics area will in the future not be met by new technological developments. They will instead be achieved by institutional change involving not only the rearrangement of functions and facilities within an organization, but more particularly the rearrangement of functions and facilities among co-operating organizations. This would represent a natural evolution from emphasis on internal cost analyses to internal profit analyses and inter-organizational cost and profit analyses.

It must be appreciated that the functions involved in physically getting products to customers can only be shifted, not eliminated. Thus it is necessary to identify those distribution functions which can be most efficiently performed by each institution in the distribution channel and the types of institutional change needed to permit the efficient flow of products. In allocating physical distribution functions to different institutions, the criterion of control, as well as efficiency, needs to be taken into account. Thompson⁶⁰

proposes that under norms of rationality, organizations seek to keep under their control, activities, which if left to the task environment, would be crucial contingencies.

The question arises as to whether or not the channel of distribution should be viewed as a single entity or what Ballou calls a "superorganization", and managed to the benefit of all concerned? Ballou describes his "superorganization" as "a group of vertically related but legally separate firms that share a common interest in the individual decisions made by each".⁶¹

Heskett has identified at least four types of institutional changes which need to take place in order that improvement in productivity in the logistics area continues. These four arrangements are listed in order of their organizational impact on companies in a channel of distribution.

- 1 The co-ordination of policies and practices to enable co-operating channel members to perform their existing functions more effectively.
- 2 The shift of functions and responsibilities from one institution to another in a channel.
- 3 The creation of joint-venture or third-party institutions to eliminate duplication of the performance of functions in such channels.
- 4 The vertical integration of channel functions which are currently performed by different organizations.⁶²

The co-ordination of policies and practices, the first alternative, is particularly important in the development of unified systems for handling products. In order for a total channel system to benefit from innovations in palletisation and containerisation, greater co-ordination must take place between channel institutions.

With regard to the second alternative, a shift within the channel of one particular function, namely inventory, has already been noticed. Because of the power they wield, large retailers have been able to push the inventory burden onto other channel members. It should be possible, however, for channel institutions to discuss ways in which the traditional channel functions could be allocated most effectively amongst themselves on a co-operative, rather than a conflict basis.

With regard to the third alternative, full service distribution agencies have relatively recently emerged. These organizations are capable of carrying out all warehousing, transportation and even order processing functions on behalf of companies with whom they enter into some form of contractual agreement. This arrangement overcomes the problem of co-ordination between channel members but this advantage must be traded-off against loss of control over the distribution function.

The fourth alternative of vertical integration overcomes the need to achieve inter-organizational co-operation. While it eliminates problems relating to conflict of objectives, however, it does limit the alternatives open to a company in the area of logistics planning. This loss of flexibility needs to be given serious consideration under conditions of rapid market change.

4.7. Resistance to Organizational change:

Attention has already been drawn to the fact that with the implementation of the physical distribution concept, traditional barriers between departments need to be pulled down and individuals recognise that they do not operate in a vacuum but must take into account the requirements of other departments. These

requirements frequently raise the spectre of resistance to change. It is not change, however, which causes resistance and lack of co-operation, but the meaning of change for the people concerned. If people feel that they are going to become redundant as a result of rationalising the total distribution operation, then problems in introducing the revised organizational structure are almost inevitable. As Buxton puts it, "effective implementation of the marketing logistics concept therefore requires a company to become deeply involved in, and committed to solving, a series of (probably continuing) human relations problems".⁶³

This is supported by a survey in the United States which revealed that the most serious problem encountered by companies in the development of physical distribution organization structures, was the breakdown in communication among the operating departments and amongst employees after the new organizational structure was instituted.⁶⁴ Tied to this was the lack of inter-departmental co-operation experienced during the re-organization and the difficulty encountered in defining departmental responsibility.

Just as with the adoption of any other total business concept such as the marketing concept, for example, the introduction of the physical distribution concept must receive the full backing of top management. This is necessary so that their support can be relied upon for co-operation and persuasion, where required. In their study, Lambert, Robeson and Stock found that in firms which had adopted and implemented the physical distribution concept, the senior distribution executive operated at a top management level and was much more involved in corporate level committees or groups:

This is not an unexpected finding since within the systems point of view, distribution is an integral part of the firm. Consequently, the senior distribution executive must be in a position to know what is taking place within the firm and must be able to have an input when decisions directly or indirectly affect the performance of the distribution function.⁶⁵

Lambert, Robeson and Stock also found that "in-house" methods of executive development and employee training have been one of the most useful methods for developing awareness and acceptance of the physical distribution concept.

Because authority and responsibility are being shuffled around in an organizational change and tensions inevitably run high, La Londe and Robeson⁶⁶ argue for a transitional approach in introducing any change in distribution organization to a company. This transitional approach may involve the appointment of either (1) a task force; (2) an external consultant; or (3) staff specialist.

The task force would consist of members from all the functional areas within the firm affected by distribution. Their objective would be to investigate the company's distribution mission. The main advantage of this approach is that it opens the way for dialogue and communication between departments affected by the change, prior to the event. The major disadvantage is that it would inevitably be a lengthy process.

The appointment of an external consultant would yield the dual benefit of providing a high level of expertise as well as a non-company scapegoat for any hostility. In the words of La Londe and Robeson, "this tends to insulate middle management from personnel problems and allows a more rapid introduction of change."⁶⁷

The third alternative, the staff specialist, would be responsible for co-ordinating the distribution efforts of the firm from a staff level. This approach is particularly effective in multi-plant, multi-product firms.

The staff specialist would serve in a consulting and educational role to divisional or plant management and in a co-ordinating role to central management.

Whatever approach is used to ensure co-operation and acceptance of the new order, a fundamental requirement is the total commitment of top management. Buxton states that "once a new system becomes operational, top management must continue to encourage and actively support it, and this usually means in most companies the appointment of a distribution or logistics executive at a senior, perhaps board, level."⁶⁸

4.8 Conclusion:

Having outlined the main principles of four organizational alternatives for physical distribution, it must be re-emphasised that it is not possible to prescribe the universally ideal departmental arrangements for all firms under all conditions. The Contingency approach, which is receiving increasing recognition, has brought to attention the fact that different organizational arrangements can be equally effective in different circumstances; that it is factors such as the size of the firm, the type of industry and whether a firm produces to orders or for stock, for example, which determines the optimum type of organizational structure for a particular firm.

This, however, is not to deny the invaluable contributions which the classical, life-cycle and semi-formal approaches have made. The fundamental principles of these three approaches are all applicable within an overall Contingency approach. A possible solution to the physical distribution and business logistics organizational dilemma is thus, a combination of all four approaches, rather than complete reliance on any one approach.

CHAPTER IV.

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CHAPTER V.

THE PHYSICAL DISTRIBUTION ORIENTATION OF CHIEF EXECUTIVES AND COMPANY PERFORMANCE.

5.1 Introduction:

As stated in Chapter I and elaborated upon in Chapters II to IV, the physical distribution concept is a customer oriented business philosophy, supported by integrated physical distribution activities and aimed at generating customer satisfaction as a means of satisfying fundamental organizational goals, of which profit is perhaps the most important.

A pre-requisite for the implementation of the physical distribution concept is for the firm and its employees to be marketing and physical distribution oriented. This physical distribution orientation is essentially an attitude of mind or outlook which predisposes a firm or an individual to implement and apply the principles of the physical distribution concept as outlined in the earlier chapters of this study.

The extent to which a firm is physical distribution oriented can, it is submitted, be determined through the attitudes of the executives, the attitudes of the employees, or the attitudes which those outside the firm have towards the firm. Of these three, this thesis is concerned with the attitudes of the chief executive.

5.2 A Brief Review of the Relationship Between Attitudes and Behaviour:

The classic definition of attitude, attributed to G Allport in 1935, is that it is "a mental and neural state of readiness to

respond, which is organized through experience and exerts a directive and/or dynamic influence on behaviour".¹ Katz has stated that an "opinion is the verbal expression of an attitude".²

As reflected in the classic definition of attitude, the assumption of a close correlation between attitude and behaviour has existed from the very outset. This correlation remained unverified for a number of years. Eventually, however, two schools of thought emerged, one negative ^{3,4,5}, and questioning the relationship, and the other positive ^{6,7,8} and supporting it.

Engel, Blackwell and Kollat summarise the reasons for this controversy as follows:

- 1 Varying conceptions and definitions
The upshot is that different published studies often are studying different phenomena.
- 2 Varying measurement methods
- 3 Assignment of too much predictive weight to a single variable. Common sense ought to indicate that attitude alone cannot fully explain a complex behavioural act, yet this often has been the expectation.⁹

A way around the controversy would perhaps be to rely on a definition of attitude which does not link attitude to behaviour as emphatically as some of the more traditional definitions.

One such definition is by Fishbein and Ajzen:

Attitudes are learned tendencies to perceive and act in some consistently favourable or unfavourable manner with regard to a given object or idea.¹⁰

Festinger concurs with this "tendency" view when he writes:

a very large number of attitude studies undertaken by social psychologists are not concerned with an eventual prediction of behaviour on the basis of ascertained attitudes We have eventually persuaded ourselves that we can simply assume that there is, of course, a relationship between attitude (change) and subsequent behaviour and, since this relationship is obvious, why should we labour to overcome the considerable technical difficulties of investigating it.¹¹

It needs to be emphasised that the precise relationship, or lack of it, between attitudes and behaviour is not central to this study.

This study in its remaining chapters is concerned with the physical distribution orientation of certain chief executives measured via opinions expressed on the various elements of the physical distribution concept. It is also concerned with the influence of the physical distribution concept as a philosophy of business, on company performance.

5.3 The Influence of the Chief Executive:

The role of the chief executive in the life of a company is vitally important. "No business is likely to be better than its top management, have broader vision than its top people, or perform better than they do".¹²

The job of the chief executive demands successful action in a variety of roles which differ from situation to situation. Henry Mintzberg¹³ identifies three sets of behaviour pertinent to chief executives, namely, interpersonal, informational and decisional. The interpersonal role he designates as figurehead

(for ceremonial duties), leader (of the work of his organization) and liaison agent (for contacts outside his organization). Information roles can be designated as monitor (of information), disseminator (internally), and spokesman (externally). Decisional roles are called entrepreneur, disturbance handler, resource allocator, and negotiator.

Leadership is clearly the most important component of the interpersonal role. According to Tannenbaum and Massarik, "leadership always involves attempts on the part of a leader (influencer) to affect (influence) the behaviour of a follower (influencee) or followers in situation".¹⁴ Leadership thus involves a continuous attempt on the part of the leader to influence the values, attitudes, beliefs, perceptions and goals of the followers.¹⁵ As Sandra van der Merwe states: "his task is to create values, and in doing so, he is able to guide the behaviour of others. Whether written or not, these values have a profound impact on the direction in which the firm moves and the way in which it performs".¹⁶ Richards writes that the managing director is "looked to by lower-level managers as representing the best source of overall direction".¹⁷

One of the main leadership responsibilities of the chief executive, is to secure the required commitment by subordinates to established objectives. In accomplishing this, he will find it useful, if not essential, to be a visible and effective communicator. Being a good communicator "provides a chance to influence the organization with one's own ideas".¹⁸

Christensen, Andrews and Bower seem to elevate the influencing and leadership role of the chief executive above his informational and decisional roles: "what managers know by way of verifiable fact appears less important than

the attitudes, aspirations and values they bring to their tasks".¹⁹ Spranger²⁰ has broken down the set of values which a chief executive brings to his task, into six sub-categories, namely, theoretical, economic, aesthetic, social, political and religious. The physical distribution concept as a "value", would fall into the "theoretical" and "economic" sub-categories.

In summary, the chief executive in his leadership role has the responsibility of formulating a company philosophy, or value orientation, which can serve as a set of guiding principles for employees. Katz warns against the failure to develop a clear value orientation:

Sometimes top management does not develop a clear value orientation, and equal weight is given, to all elements of activities. While this posture's apparent fairness to all parties tends to minimize overt disagreement and conflicts, it inevitably creates inequities.²¹

The informational and decisional roles of the chief executive may be subsumed under the heading of corporate strategy. "Providing direction is the traditional objective assigned to corporate strategy: to give the company a sense of purpose and mission"²² "In effect, then, the general management task of strategy formulation consists of an entrepreneurial size-up of whether the organization is doing the right things and how it can be more effective in what it does. It entails working at being shrewd and perceptive enough to establish the right directions and priorities"²³

In the formulation of corporate strategy, the chief executive must of course exercise his leadership skills. He is the key person in the train of thoughts and discussions which determine the policies of the company.²⁴ In his joint role of leader and formulator of corporate strategy, Drucker compares the chief executive with a conductor of an orchestra:

The manager has the task of creating a true whole that is larger than the sum of its parts, a productive entity that turns out more than the sum of the resources put into it. One analogy is the conductor of a symphony orchestra, through whose effort, vision and leadership individual instrumental parts that are so much noise by themselves become the living whole of music. But the conductor has the composer's score; he is only interpreter. The manager is both composer and conductor.²⁵

5.4 The Chief Executive and a Physical Distribution Oriented Philosophy:

One of the conclusions to be drawn in Section 5.6 is that the adoption of the physical distribution concept will contribute significantly to the achievement of return on investment objectives for firms manufacturing easily substitutable, quickly perishable or quickly obsolescent products. In Section 5.3 it was shown that the chief executive's business philosophy can have a profound effect on the company philosophy and the value orientation of the whole firm. It thus follows, that for the type of firm noted above for which physical distribution is important, it is highly desirable for the chief executive to be physical distribution oriented. What Buell said about marketing orientation, applies emphatically to physical distribution:

if a company is to become truly marketing oriented, all key executives, starting with the company president must understand marketing.²⁶

Also talking about marketing orientation, with which can be linked physical distribution orientation, Levitt has stated:

The chief executive himself has the inescapable responsibility for creating this environment, this viewpoint, this attitude, this aspiration.²⁷

McCarthy too has stated that:

The first and most important step in applying the marketing concept is a wholehearted commitment to a customer orientation. Without acceptance of this concept, at least by top management, any change in the organizational structure will be purely mechanical.²⁸

Fundamental to the physical distribution concept, is the systems concept. The only person or persons in the firm with a broad enough vision necessary for the application of the systems concept, is top management. "Top management is responsible for developing and running a total system of action, which is designed to meet the needs of target customers".²⁹

To sum up, the chief executive who ranks high on physical distribution orientation has a rational framework in terms of which to make decisions. At the centre of the "value system" of such a chief executive are:

- (a) the consumer, the source of all company revenues;
- (b) the systems concept which facilitates co-ordination and rationalisation of costs; and
- (c) profit, to which all business activities should contribute.

5.5 The Basis for Determining the extent of the Physical Distribution Orientation of the Chief Executives:

Underlying the research which is described in the two chapters which follow, is the calculation of a physical distribution orientation index for different chief executives. To obtain this index an attempt was made by means of a questionnaire, to measure the opinions of these chief executives on the various elements

and constituents of the physical distribution concept.

Based on the literature surveyed in previous chapters, it was decided to use the following constituents in a questionnaire as a basis for attempting to determine a physical distribution orientation on the part of certain selected chief executives:

- (1) It is considered necessary for the chief executive to ensure that consumer orientation is accepted as a philosophy of business by all managers responsible for physical distribution activities.
- (2) The chief executive should expect all departments responsible for physical distribution functions to be concerned with the physical distribution needs of customers.
- (3) The chief executive should consider profit to be important in decisions about any aspect of the company's activity.
- (4) It is considered necessary for different departments responsible for different physical distribution activities to set objectives which are consistent with the overall profit objectives of the company.
- (5) The chief executive should believe that the physical distribution needs of customers must be determined through either formal or informal marketing research.
- (6) The chief executive should believe that the manager(s) responsible for the physical distribution function must participate in formulating overall company strategy.
- (7) The chief executive should believe that the creation of time and place utilities in connection with his products is just as important for marketing success as are the price and quality.

- (8) It is considered necessary that the company's organization structure permits co-ordination of, and co-operation between, all physical distribution activities.
- (9) There should be a firm commitment to the idea that departments responsible for physical distribution functions co-ordinate their activities towards achieving company goals.
- (10) It is considered necessary that the needs of customers and ways of meeting those needs, whatever they may be, must play a critical role in the chief executive's planning and policy making.
- (11) The chief executive should believe that decisions on the expansion of physical distribution facilities should be closely related to marketing forecasts.
- (12) The chief executive should recognise that the primary objective of physical distribution management is not merely to minimise the costs of physical distribution.
- (13) Efficient management of physical distribution is considered indispensable to a company generating demand for its products and contributing to a satisfactory profit.

5.6 Physical Distribution Orientation and Company Performance:

The reason why a company selling highly substitutable products, highly perishable or quickly obsolescent products should adopt the physical distribution concept, is that it would conceivably lose ground to competitors if it did not. This argument is supported by A P Sloan Jr of General Motors who writes:

there is a logical way of doing business in accordance with the facts and circumstances of an industry; if there are different concepts among the enterprises involved, these concepts are likely to express competitive forces in their most vigorous and most decisive form.³⁰

The discussion of the three elements of the physical distribution concept in Chapters II to IV, shows that the adoption of the philosophy ought to be reflected favourably in the overall financial performance of a firm manufacturing consumer convenience goods or consumer shopping goods. The sources of the favourable financial performance will be increased sales volumes as a result of optimum customer service strategies, and rationalised physical distribution costs as a result of total cost and trade-off analyses.

In the following two chapters the extent to which physical distribution orientation and outlook influence financial performance in certain South African public companies which manufacture consumer convenience goods and consumer shopping goods, will be tested.

When measuring the financial performance of companies, the difficulty is to determine what criterion realistically and fairly reflects this achievement of a company. Clearly, profit has to come into the picture. Profit, as Drucker says, "is indeed the ultimate test of business performance".³¹ On its own, however, profit is inadequate as a test of performance; what is preferable is a measure of profitability. "A business may earn what appears to be a substantial profit, but when the profit is related to the investment risked, the return may be inadequate. While a business may survive or perhaps subsist, growth is impossible because negligible returns will not attract investment capital".³² This contention is supported by Ansoff who states that "the central purpose of the firm is to maximise long-term return on resources employed within the firm".³³

In a similar vein, Mackensen states that "any appraisal of a company's effectiveness must be based on the successful employment of capital."³⁴

While there is no absolutely correct yardstick of profitability, each of several having its own advantages and disadvantages and dangers, Ansoff selects the rate of return on investment for the following reasons:

- (1) Rate of return on investment is a common and widely accepted yardstick for measuring business success.
- (2) Unlike other formulations, it permits us to side-step the presently unresolved problem of what constitutes the appropriate rate of discount for future uses of capital.
- (3) Rate of return is a common and convenient yardstick for comparison of business prospects in different industries.³⁵

Recognising the deficiencies in the simple statement, "Return on invested capital", Drucker suggests that firms should "measure profitability by projecting net profit - after depreciation charges but before taxes - against original investment at original cost, that is, before depreciation".³⁶

In conclusion, much of the literature reviewed suggested Return on Investment as a reasonable measurement for the evaluation of company performance.³⁷⁻⁴² On these grounds, and also because the Return on Investment figure could easily be obtained for the chosen population, the writer has used Return on Investment as a means of comparing the relative performance of the various companies. The particular formula which was used for the calculation of "Return on Investment" is discussed more fully in Section 6.5

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CHAPTER VI

THE OBJECTIVES OF THE RESEARCH, HYPOTHESES AND RESEARCH METHODOLOGY.

6.1 Introduction:

This Chapter is devoted to a consideration of the specific objectives of the empirical section of this study, the formulation of the hypotheses and the underlying research methodology.

An hypothesis, defined by Crisp as, "a tentative theory or supposition set up and adopted provisionally as a basis for explaining certain facts or relationships and as a guide in the further investigation of other facts or relationships,"¹ is an important and indispensable tool of scientific research. Kerlinger documents four reasons for this contention:

One, they are, so to speak, the working instruments of theory. Hypotheses can be deduced from theory and from other hypotheses..... The second reason is that hypotheses can be tested and shown to be probably true or probably false. Isolated facts are not tested only relations are tested Three, hypotheses are powerful tools for the advancement of knowledge Though constructed by man, hypotheses can be shown to be probably correct or incorrect apart from man's values and opinions. This is so important that we venture to say that there would be no science in any complete sense without hypotheses The fourth point is that hypotheses advance scientific knowledge by helping the investigator to confirm or disconfirm theory.²

Following the research design in Sandra van der Merwe's study entitled "The Influence of the Marketing Concept on Company Performance,"³ major and secondary hypotheses were

established to identify relationships between certain variables which it is submitted, would achieve the objectives of this study. These objectives are set out in the following section.

6.2 The Objectives of the Study:

6.2.1 The Major Objective:

- (i) TO ESTABLISH WHETHER THERE IS A CORRELATION BETWEEN THE PHYSICAL DISTRIBUTION ORIENTATION OF CHIEF EXECUTIVES OF SOUTH AFRICAN PUBLIC COMPANIES WHICH MANUFACTURE CERTAIN TYPES OF CONSUMER CONVENIENCE GOODS AND CONSUMER SHOPPING GOODS,⁴ AND THE PERFORMANCE OF THESE COMPANIES.

6.2.2 The Secondary Objectives:

- (i) TO ESTABLISH WHETHER THERE IS A CORRELATION BETWEEN THE ORIENTATION OF THESE CHIEF EXECUTIVES TO INDIVIDUAL ELEMENTS OF THE PHYSICAL DISTRIBUTION CONCEPT, AND THE PERFORMANCE OF THESE COMPANIES.
- (ii) TO ESTABLISH WHICH ELEMENTS OF THE PHYSICAL DISTRIBUTION CONCEPT CHIEF EXECUTIVES OF COMPANIES IN THE TARGET POPULATION REGARD AS MOST IMPORTANT, SECOND MOST IMPORTANT AND LEAST IMPORTANT.
- (iii) TO DRAW UP A DESCRIPTIVE PROFILE OF THE PHYSICAL DISTRIBUTION ORIENTATION OF THE AVERAGE CHIEF EXECUTIVE IN THE TARGET POPULATION.
- (iv) TO DETERMINE WHETHER THERE IS ANY PATTERN IN THE ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION IN THE COMPANIES IN THE TARGET POPULATION.

6.3 The Formulation of the Hypotheses:

A survey of the literature was used to substantiate a number of assumptions on which the hypotheses were based. In Chapter II,

the role of physical distribution in generating demand was examined. In Chapter III, the impact on costs, and hence profits, of the integrated approach to physical distribution was explored. In Chapter IV, the organizational implications of adopting the physical distribution concept came under scrutiny, while the influence of the chief executive on the orientation of the company was the major topic in Chapter V.

The conclusion to be drawn from the literature survey is that a company for which physical distribution is critical to marketing success, and whose chief executive exhibits a strong physical distribution orientation, is likely to perform better than those companies whose chief executives do not have such a strong physical distribution orientation, or who are not physical distribution oriented.

Because of the difficulty of measuring attitudes towards the physical distribution concept itself, the concept was divided into its three elements of consumer orientation, integration and profit. Each element was in turn broken down into constituents, each of which was represented in the questionnaire by a separate semantic differential.

6.3.1 The Major Hypothesis:

THERE IS A RELATIONSHIP BETWEEN THE PHYSICAL DISTRIBUTION ORIENTATION OF CHIEF EXECUTIVES OF CERTAIN SOUTH AFRICAN COMPANIES MANUFACTURING CONSUMER CONVENIENCE GOODS AND CONSUMER SHOPPING GOODS, AND THE PERFORMANCE OF THESE COMPANIES.

6.3.2 The Secondary Hypotheses:

- (i) THERE IS NO SIGNIFICANT CORRELATION BETWEEN THE ORIENTATION OF THE CHIEF EXECUTIVES IN THE TARGET POPULATION TO EACH OF THE THREE ELEMENTS OF THE PHYSICAL DISTRIBUTION CONCEPT, AND THEIR COMPANIES' PERFORMANCE.

- (ii) THERE IS NO SIGNIFICANT CORRELATION BETWEEN THE ORIENTATION OF THE CHIEF EXECUTIVES TO EACH OF THE CONSTITUENTS INTO WHICH EACH ELEMENT OF THE PHYSICAL DISTRIBUTION CONCEPT WAS BROKEN, AND THEIR COMPANIES' PERFORMANCE.
- (iii) CHIEF EXECUTIVES IN THE TARGET POPULATION REGARD CERTAIN ELEMENTS OF THE PHYSICAL DISTRIBUTION CONCEPT AS MORE IMPORTANT THAN OTHERS.
- (iv) FOR THE TARGET POPULATION COMPANIES, THERE IS NO RELATIONSHIP BETWEEN STRATEGY FOLLOWED AND ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION.
- (v) FOR THE TARGET POPULATION COMPANIES, THERE IS NO RELATIONSHIP BETWEEN JOHANNESBURG STOCK EXCHANGE SECTOR CLASSIFICATION AND ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION.
- (vi) FOR THE TARGET POPULATION COMPANIES, THERE IS NO RELATIONSHIP BETWEEN PERFORMANCE INDEX CLASSIFICATION AND ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION.
- (vii) FOR THE TARGET POPULATION COMPANIES, THERE IS NO RELATIONSHIP BETWEEN PHYSICAL DISTRIBUTION ORIENTATION CLASSIFICATION AND ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION.
- (viii) FOR THE TARGET POPULATION COMPANIES, THERE IS NO RELATIONSHIP BETWEEN INVENTORY MODE CLASSIFICATION AND ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION.

6.4 Definition of the Population:

"Population is defined as the totality of cases that conform to some designated specifications. The specifications define the elements that belong to the target group and those that are to be excluded."⁴⁶ As Sandra van der Merwe states: "When considering a population, the accessibility of information required

by the researcher should be taken into consideration."⁷

Thus in terms of the major hypothesis formulated in Section 6.3.1, the population was in the first instance restricted to South African business enterprises.

Because the intention of the study was to prove or disprove the hypothesis that there is a correlation between the physical distribution orientation of chief executives and the financial performance of their companies, access was needed to profit and loss and balance sheet data. Because this type of data is freely available only for public companies listed on the stock exchange, the population in the second instance was restricted to South African public companies listed on the Johannesburg Stock Exchange.

The population was restricted in the third instance to those public companies listed on the Johannesburg Stock Exchange which manufactured consumer products for which distribution was deemed to be important, if not critical, for marketing success. Such products are those that are easily substitutable for one reason or another (this includes consumer shopping goods as well as consumer convenience goods), easily perishable, or quickly obsolescent, as in the case of fashion clothing, footwear and textiles, for example.

Companies in the following sectors on the Johannesburg Stock Exchange were included in the total population:

- Beverages and Hotels;
- Clothing, Footwear and Textiles;
- Food;
- Furniture and Household Goods;
- Motor;
- Paper and Packaging;
- Pharmaceutical and Medical;
- Printing and Publishing;
- Tobacco and Match;
- Preference Shares (where company not otherwise listed); and
- Debentures (where company not otherwise listed)

Not every company from each of the above sectors was included in the population. The following restrictions were applied:

- (a) In the Motor sector, only those companies manufacturing consumer shopping goods such as motor cars and tyres, were included.
- (b) Only one company, a manufacturer of consumer convenience items such as tissues and household paper products, was included from the Paper and Packaging sector.
- (c) From the Preference Shares and Debentures sectors, only those companies which manufactured consumer goods which were easily substitutable, easily perishable or quickly obsolescent, were selected.
- (d) It was decided to exclude the Sugar sector altogether on the grounds that the South African Sugar Association undertakes the distribution of the products of all the various sugar companies.
- (e) In the Beverages and Hotels sector, companies solely in the hotel business were excluded.
- (f) In the Clothing, Footwear and Textiles sector, those companies in the tannery and wool sorting and combing business, as well as those which were purely investment companies, were excluded.
- (g) In the Furniture and Household Goods sector, pure investment companies, retailers and companies in the catering supplies business were excluded.
- (h) In the Pharmaceutical and Medical sector, companies in the private hospital business were excluded.

The population finally numbered 73 companies and is listed according to Johannesburg Stock Exchange sectors in Appendix A. In view of the relatively small size of the population and in order to eliminate sampling bias and statistical error, it was

decided to send questionnaires to the chief executives of all 73 companies.

6.4.1 Towards the Calculation of a Performance Index:

It will be recalled that the main purpose of this study is to determine whether or not there is a significant correlation between the physical distribution orientation of chief executives and the performance of their companies measured in terms of return on investment.

Because of the fact that environmental conditions in their widest sense do not influence all companies to the same degree, it soon became apparent that the return on investment figure for a company on its own did not signify very much. While a 25 per cent return on investment for a company manufacturing foodstuffs might signify excellent performance, for a company manufacturing furniture it could well signify poor performance. Thus a Performance Index based simply on the average return on investment for all 73 companies was deemed inadequate. Taking into consideration the average Return on Investment for each Johannesburg Stock Exchange sector as a whole was, however, also deemed unsatisfactory. This was so because in each sector not only were there companies which could be regarded as being in different industries, but there were also companies following vastly different strategies. Included together in the Beverages and Hotels sector, for example, were Bertrams Wines, a single product company, and South African Breweries, a conglomerate. Similarly, the Clothing, Footwear and Textiles sector could be construed as including companies from three different industries.

On the basis of Andrews'⁸ findings that the strategy pursued by South African industrial companies exerts a significant

influence on financial performance, it was decided by the researcher to re-classify the 73 companies in the population according to strategic posture, and to take into consideration the average Return on Investment for each strategic posture category in the calculation of the performance index for each company. This represents a departure from sector analysis used by Sandra van der Merwe in her study, and in the opinion of the researcher is a substantial improvement, for the reasons mentioned above.

6.4.2 The Target Population Reclassified according to Strategic Posture:

Rumelt,⁹ refining the pioneering work done by Wrigley,¹⁰ identified a total of nine different strategies which companies could be construed as following:

- Single Business
- Dominant Business
 - Vertical
 - Constrained
 - Linked
 - Unrelated
- Related Business
 - Constrained
 - Linked
- Unrelated Business
 - Unrelated Passive
 - Conglomerate

These nine strategies listed above represent different degrees to which firms have diversified. The following is a summary of the definitions of each of the strategic categories, together with the categorization methodology followed.^{11,12}

A firm's diversification strategy is defined as its commitment to diversity per se, together, with the strengths, skills or purposes that span this diversity, as evidenced by the way in which business activities are related one to another.

The primary measure of diversity is taken to be the specialization ratio, defined as the proportion of a firm's revenues that is attributable to its largest discrete product-market activity. A discrete business (or product-market activity) is one which is strategically independent of the firm's other businesses in the sense that basic changes in its nature and scope can be made without meeting constraints imposed by other of the firm's businesses and without materially affecting the operation and strategic direction of other of the firm's businesses.

Businesses are related to one another when a common skill, resource, market, or purpose applies to each. A firm's related ratio is defined as the proportion of its revenues that are attributable to the largest group of businesses that are related in some way to one another. Each member of this group need only be related to one other business in the group (linked relatedness), though it may be related to all and all may be directly related to one another (constrained relatedness).

The vertical ratio is defined as the proportion of a firm's revenues attributable to all of the by-products, intermediate products and final products of a vertically integrated sequence of manufacturing operations.

A firm's diversification strategy may be described as corresponding to one of the following categories:

Single business - firms that are basically committed to a single business. Among non-vertically integrated firms, Single business companies are those with specialization ratios of 0,95 or more. Among vertically integrated firms, those that have an end-product business that contributes 95% or more of total revenues are classified as Single business firms.

Dominant business - firms that have diversified to some extent but which still obtain most of their revenues from a single business. Among non-vertically integrated firms, those with specialization ratios greater than or equal to 0,7 but less than 0,95 are Dominant business firms. Among vertically integrated firms those that do not qualify as Single business companies fall in the Dominant category.

Dominant vertical - vertically integrated firms (having vertical ratios of 0,7 or more) which produce and sell a variety of end-products, no one of which contributes more than 95% of total revenues.

Dominant constrained - non-vertical Dominant business firms that have diversified by building on some particular strength, skills, or resource associated with the original dominant activity. In such firms the majority of the diversified activities are all related one to another and to the dominant business.

Dominant linked - non-vertical Dominant business firms that have diversified by building on several different strengths, skills or resources, or by building on new strengths, skills or resources as they are acquired. In such firms the majority of the diversified activities are not directly related to the dominant business, but each is somehow related to some other of the firm's activities.

Dominant unrelated - non-vertical Dominant business firms in which the majority of the diversified activities are unrelated to the dominant business.

Related business - non-vertically integrated firms which are diversified, having specialization ratios less than 0,7, and in which diversification has been primarily accomplished by relating new activities to old so that the related ratio is 0,7 or more.

Related Constrained - related business firms that have diversified chiefly by relating new businesses to a specific central skill or resource and in which, therefore, each business activity is related to almost all of the other business activities.

Related Linked - Related business firms which have diversified by relating new businesses to some strength or skill already possessed, but not always the same strength or skill. By diversifying in several directions and exploiting new skills as they are acquired, such firms have become active in widely disparate businesses.

Unrelated business - non-vertical firms which have diversified chiefly without regard to relationships between new businesses and current activities. Such firms are defined by a related ratio of less than 0,7.

Unrelated passive - unrelated business firms that do not qualify as Acquisitive Conglomerates as defined below.

Acquisitive Conglomerates - Unrelated business firms which have aggressive programmes for the acquisition of new unrelated businesses.

Andrews classified into the strategic categories, all the industrial firms quoted on the Johannesburg Stock Exchange over the period 1970 - 1976, and which had not undergone any major strategic change during that period. Andrews' classification of some of the companies included in the population for this study, was taken as a guide, but nevertheless checked to ensure there had not been a major change in strategic posture since 1976.

The population companies which Andrews had not classified, were allocated to the various strategic categories on the basis of information obtained from the Investor's Guide (Pty) Ltd., an investment advisory firm; the Johannesburg Stock Exchange Handbooks, Volumes 1 and 2, 1977 to 1979; and published company accounts.

The allocation of the population companies to the various strategic categories is shown in Appendix B.

6.5 Calculation of a Performance Index:

The performance index was developed from the average of the Return on Investment figures for each company for the years 1976 - 1978 inclusive. It was decided to take an average of three years' performance, rather than simply one year's, in order to get a smoothing effect and to avoid the situation of a particular year being a typical for one reason or another. The Return on Investment figures were obtained for each company for each year from the Bureau of Financial Analysis at the University of Pretoria, South Africa. The following formula for the calculation of Return on Investment was used:

$$\frac{\text{Normal profit before depreciation, investment income, interest and taxation}}{\text{average total assets excluding total investments.}} \times 100$$

This Formula is described in more detail in Footnote number 13 at the end of this Chapter. The profit before depreciation figure was used to overcome the problem of different companies using entirely different depreciation policies, mostly on a subjective basis.

In order to counteract the differences prevailing between companies in different strategic categories, the average Return on

Investment for each strategic category as a whole was taken into account. This provided a more equitable Profitability Index rating when companies in different strategic categories were compared.

The final Performance Index was calculated as:

Return on Investment (for the company)

Average Return on Investment (for the relevant strategic category)

In Appendix C, Column 3 reflects the average Return on Investment for each company for the years 1976 - 1978 inclusive. Column 4 contains the standard deviation, or the measure of dispersion around the mean Return on Investment figure for the three years. Column 5 contains the performance index for the firm which has been calculated by dividing the figure in Column 3 by the average Return on Investment for the strategic category in which the company falls. The average Return on Investment figure for each strategic category as a whole, as well as the related standard deviation, is shown at the end of each strategic category list in Appendix C.

After careful analysis of the figures for Shulton Africa Ltd., it was decided to exclude it from the population. This was done because its unusually high Return on Investment figure, due probably to its method of presenting its accounts, would have distorted the picture.

6.6 Survey design:

The survey technique is widely used to gather from external sources, different types of information not otherwise available¹⁴ Surveys "are also the only known way to get measures of thoughts and attitudes."¹⁵

In a survey, data or information can basically be collected either through the observation of behaviour, or directly from the respondent by some form of questioning. Most surveys collect the desired data using the latter approach, for which the questionnaire is the main research tool. "The major disadvantage of personal observation is the difficulty of obtaining a probability sample of the kind of behaviour under study. Another drawback is the distinct possibility that the observer may selectively record or misinterpret what he sees or hears."¹⁶

Three different methods of communication with questionnaires are available:

- (1) personal interview;
- (2) telephone interview; and
- (3) mail.

"Each method of data collection has its uses, and none is superior in all situations."¹⁷ The telephone interview was immediately dismissed because of the practical difficulties of explaining to respondents what was required of them, without being able to show them examples.

The personal interview was regarded as eminently desirable as a means of collecting the required data and information, notwithstanding the major disadvantages of being costly and difficult to arrange from a research base in Grahamstown, South Africa. Grahamstown is located a considerable distance from the metropolitan centres of Johannesburg, Durban and Cape Town where the majority of interviews would have taken place. It was originally decided to use the personal interview. Detailed discussions with respondents during the pilot study, however, showed equally reliable results could be obtained from a mail survey.

The following basic properties of a mail survey were recognised:

- (a) mail survey questionnaires are self-completion questionnaires;
- (b) hence, the informant can grasp the whole gist of the questionnaire,

- with potentially positive or negative effects upon co-operation;
- (c) he may answer questions in any order;
 - (d) Interpretation of the survey-purpose and of the questionnaire will be an informant variable - each may interpret in his own way....;
 - (e) at the same time, it is thus a standard stimulus, in a way never attainable in a personal interview survey.¹⁸

If the personal interview method had been used, it was intended that the questionnaire be of the self-completion type. Thus the main role of the interviewer would have been to answer queries, and to verify that who was supposed to complete the questionnaire did in fact do so. The potential difficulties of ambiguities and misinterpretations were overcome in the mail survey by a detailed pilot study conducted on a personal interview basis, and the potential anonymity problem, by requiring the person completing the questionnaire to state his name and address at the end of the questionnaire.

The answering of questions in any order was deemed to be an entirely neutral factor, while respondent and/or questionnaire bias was not regarded as a problem. This was so because parts A and B of the questionnaire were of a non-controversial or non-sensitive attitude/opinion nature, while part C was of a non-controversial or non-sensitive factual nature.

After weighing up all the advantages and disadvantages, it was decided to conduct a mail survey. In the covering letter, it was made explicit that the purpose of the questionnaire was to enable the researcher to get, on a random basis, some indication of South African chief executives' attitudes towards physical distribution. Even had the personal interview method been used, it would have been necessary to inform respondents of the calibre of company chief

executives, of this purpose. It was not disclosed in the covering letter, however, that the attitudes of chief executives would be correlated with their companies' performance.

To encourage respondents to complete and return the questionnaires, complete secrecy and the aggregation of all chief executives' replies was guaranteed, and the researcher undertook to send to each respondent a summary of his findings. It was also stressed in the questionnaire itself that there were no right or wrong answers, and that only personal opinions were being sought.

The attractive features of the mail survey for the purposes of this study, were those as stated by Churchill:

If there is an accurate, applicable, and readily available list of population elements, the mail questionnaire allows a wide and representative sample since it costs no more to send a questionnaire across country than it does to send one across town. Even ignoring costs, it is sometimes the only way of contacting the relevant population, such as with busy executives who will not sit still for an arranged personal or telephone interview but may respond to a questionnaire.¹⁹

The length of the questionnaire was considered to be a potential problem. To allay the fears of the respondents on this point, it was explained in the covering letter that although the questionnaire appeared to be a lengthy document, it took less than half-an-hour to complete, a fact verified during the pilot study.

6.6.1 The Questionnaire:

The objectives of the questionnaire were as follows:

- TO ESTABLISH FOR EACH RESPONDENT A RATING FOR EACH CONSTITUENT OF PHYSICAL DISTRIBUTION ORIENTATION.

- TO ESTABLISH A PHYSICAL DISTRIBUTION ORIENTATION INDEX FOR EACH RESPONDENT. THIS INDEX WOULD CONSTITUTE AN AGGREGATION OF THE ABOVE RATINGS. IT IS THIS INDEX WHICH WOULD BE CORRELATED WITH COMPANY PERFORMANCE.
- TO ESTABLISH A PROFILE OF THE PHYSICAL DISTRIBUTION ORIENTATION OF THE AVERAGE CHIEF EXECUTIVE IN THE TARGET POPULATION.
- TO ESTABLISH WHICH ELEMENTS OF THE PHYSICAL DISTRIBUTION CONCEPT CHIEF EXECUTIVES CONSIDER THE MOST IMPORTANT.
- TO ELICIT INFORMATION ON THE ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION IN THE RESPONDENTS' COMPANIES.
- TO DETERMINE THE LENGTH OF TIME THE RESPONDENTS HAVE HELD THEIR POSITIONS OF CHIEF EXECUTIVE.

Boyd, Westfall and Stasch have made the following statement about questionnaire construction:

Questionnaire construction is still much more of an art than a science. No procedures have been established which will automatically lead to a good questionnaire. Most of what is known about making questionnaires is the result of general experience. Neither a basic theory nor even a fully systematized approach to the problem has been developed. Nevertheless, the extensive experience of many researchers have led to a long list of "dos and don'ts" and rules of thumb. These can help but they cannot be substituted for creative imagination in designing a questioning procedure.²⁰

With this in mind, particular attention was paid to questionnaire layout, type of question, wording and question sequencing to encourage response and avoid possible bias.

6.6.1.1 Questionnaire Lay-out:

The physical lay-out and reproduction of a questionnaire can influence its success with respondents.²¹ It was thus deemed desirable to make the questionnaire as simple as possible, within the constraints imposed by the type of data/information required,

and to make it easy to follow as well as attractive.

The format of the questionnaire was planned as follows:

- (i) The first section, Section A, would contain the semantic differential questions with two questions per page.
- (ii) The second section, Section B, would contain the list of six statements representing different elements of the physical distribution concept. These statements were to be ranked in order of importance.
- (iii) The third section, Section C, would contain questions designed to elicit information on the organizational arrangements for physical distribution in the respondents' companies.
- (iv) The fourth section, Section D, would contain a question relating to the length of time the respondents had held their positions, as well as a request to provide their names and addresses.

6.6.1.2 Question sequence:

Mail questionnaires raise unique problems in question sequence. Since the mail questionnaire must sell itself, it is particularly important that the opening questions capture the respondent's interest. Questions should then proceed in logical order. It is obviously not possible, however, to take advantage of sequence position in the same way as in personal interviews. There is clearly no control over the sequence in which questions are answered. Recent research suggests however, that any bias which may occur as a result, may be overestimated.²² As suggested before, because of the nature of the study, the sequencing of the questions and the order in which they were answered was not considered to introduce any bias at all.

6.6.1.3 Wording of Questions:

The wording of questions can have a significant influence on the answers provided by respondents. There are at least four situations in which wording of questions can result in biased answers:

- (i) when the question is ambiguous;
- (ii) when the question exceeds the ability of the respondent to answer;
- (iii) when the question is a leading one or suggests an answer to the respondent;
- (iv) when the question requires an answer which the respondent is unwilling to give.²³

In this study, the final questionnaire was only prepared after the pilot study during which every attempt was made to identify and eradicate the above sources of bias;

In the wording of the semantic differential section, the approach used by Sandra van der Merwe was followed:

A very effective technique was found to be that of using wording which formed a positive or negative statement, with which the respondent was asked to agree or disagree. Positive and negative replies indicated the marketing outlook of the respondent. This was done in order to ensure constant active attention being given by the executive.²⁴

The bipolar statements used for the various semantic differential scales were carefully chosen so that respondents would not feel that there was either a correct or incorrect answer. In addition, the words chosen for the scales were not always directly denotatively opposite. One scale, for example, read: "This is always necessary _____ This is sometimes not necessary".

As Sandra van der Merwe states:

By doing this, it was found that a more accurate reflection of opinion could be drawn from the respondent. This was mainly because the opposite of the positive was not totally negative and therefore he was not tempted to overemphasise a positive response to the question, and so indicate a high degree of marketing orientation.²⁵

6.6.2 The Basic Principles Revisited:

It will be recalled that in Chapter V it was stated that opinions are verbal expressions of attitudes. In measuring attitudes therefore, it is necessary in the first instance to measure opinions. A person's final attitude is comprised of his opinions on a number of different dimensions. In this study, a chief executive's attitude towards physical distribution, or his physical distribution orientation, is comprised of his opinions to the various elements, and/or constituents of the elements, of the physical distribution concept. Each element, or constituent of an element of the physical distribution concept was the subject of a separate scale in the semantic differential section of the questionnaire.

It is clearly possible to have different degrees of physical distribution orientation and the use of scales makes it possible to ascertain this. A chief executive expressing favourable opinions about each of the constituents of the physical distribution concept, for example, will have a high index, or a high degree physical distribution orientation. A chief executive expressing favourable opinions about only some of the constituents of the physical distribution concept, on the other hand, will end up with a low index, or be regarded as only slightly physical distribution oriented.

It will also be recalled that in Chapter V the relationship between attitude and behaviour was briefly explored. The conclusion reached was that while there undoubtedly is some connection between attitude and behaviour, the precise relationship

is open to some speculation. As stated by William Barclay:

Any attempt to validate a measure of attitude by means of a presumed behavioural correlation must necessarily be somewhat inadequate, since behaviour is evidently a compound of attitude plus a host of other variables.²⁶

This study is not concerned with the precise relationship between attitude and behaviour, but only attempts to correlate elements of the chief executive's attitude towards physical distribution, as well as his total attitude or physical distribution orientation, with the performance of his company. The possibility of a chief executive behaving consistently with his degree of physical distribution orientation, is not however, discounted.

6.6.3 Attitude measurement:

It was decided to use attitude scaling, rather than direct questioning to measure the attitudes of the chief executive. This was done for the following reasons:

- (a) people like to appear reasonable both to themselves and to others and direct questioning may well have elicited answers which were plausible but not strictly true;
- (b) the physical distribution concept consists of three elements and without some form of scaling it would not be possible to ascertain an overall physical distribution orientation;
- (c) respondents may not always be able to articulate answers to direct questions; and
- (d) attitude scaling is a useful device for determining the position of an individual with respect to some topic.

6.6.3.1 Semantic Differential:

While a number of different types of scale have been developed to measure attitudes, "since its introduction by Osgood²⁷ and his

associates, the semantic differential has become one of the most popular methods of measuring opinions."²⁸ The semantic differential was the main instrument used to measure physical distribution orientation in this study and constituted, as has been noted, Part A of the questionnaire.

The semantic differential typically requires the respondents to evaluate an item by making a mark at the appropriate place on a seven-point rating scale bounded at each end by bipolar adjectives.²⁹ It has been found that the reactions to the bipolar scales in semantic differentials as traditionally used, tended to be correlated, and that three basic uncorrelated dimensions could be found to account for most of the variation in ratings: firstly, an evaluation dimension represented by pairs of adjectives such as tall-short, co-operative - un-co-operative, good-bad; secondly, a potency dimension represented by bipolar items such as powerful-powerless, strong-weak, full-empty; and thirdly, an activity dimension such as fast-slow, loud-soft, forwards-backwards. The same three dimensions tended to emerge regardless of the object being evaluated.

As stated by Churchill, however, and as it applies to this study, the use of the semantic differential in marketing studies has been different from the traditional approach:

First, instead of applying the basic adjective pairs to the objects of interest, marketers have generated items of their own. These items have not always been antonyms, nor have they been single words. Rather, marketers have used phrases to anchor the ends of the scale Since a negative amount of the attribute is often meaningless notion, lack of the attribute has been used as one end of the scale and a great deal of the attribute as the other. Second, instead of attempting to generate evaluation, potency and activity scores, marketers have been more interested in developing profiles for the brands, stores, companies or whatever is being compared, and total scores by which the objects could be compared.

In this respect, the use of the semantic differential approach in marketing studies has tended to follow the Likert approach to scale construction rather than the semantic differential tradition.³⁰

In summary, the choice of the semantic differential as the primary research instrument for this study, was influenced by the following factors:

It is a quick, efficient means of getting in readily quantifiable form and for large samples not only the direction but the intensity of opinions and attitudes towards a concept

It is easily repeatable and quite reliable

It avoids stereotyped responses and allows for individual frames of reference. The sheer number of scales and concepts and the speed of administration

encourages quick "top-of-mind" responses....

It eliminates some of the problems of question phrasing such as ambiguity and overlapping of statements.³¹

The procedure is flexible

and much simpler to use than either Thurstone or Guttman scales.³²

Each constituent of physical distribution orientation was represented by a separate semantic differential scale. The words used in the bipolar phrases were chosen in such a way that the favourable sounding ones (for example "true", "important", "necessary") did not necessarily signify a physical distribution orientation. It was further found desirable to include adverbs such as "always" and "sometimes" to preclude respondents marking the positive sounding side of the scales simply because the negative sounding side was too drastic. In addition, negative sounding phrases were sometimes placed on the left side of the scale and sometimes on the right. This was designed to prevent a respondent with a positive attitude from simply checking either the right or left hand sides without even bothering to read the descriptions.

Seven centimetre scales were used and Sandra van der Merwe's opinion was supported "that a scale without check marks would have provided a far more refined method of comparison, as firstly, it would not assist the respondent in any way, and secondly, it would provide more than seven alternative positions."³³ It was nevertheless decided to test scales both with and without marks during the pilot study. The pilot study is discussed in Section 6.8.

An index for each constituent of physical distribution orientation (represented by a separate question) could be calculated by taking the point marked on the scale by the respondent, as a percentage of seven centimetres. From the indices for individual constituents, an aggregate, or physical distribution orientation index, for each respondent could be arrived at. This aggregate index would be used as the independent variable in the correlation exercise.

In addition the average score on each semantic scale could be calculated for the whole target population, or segments of it, and presented in profile form. This would provide a description of the physical distribution orientation of the average chief executive in the target population.

6.6.3.2 Rank Order Scale:

The Rank Order technique, Part B of the questionnaire, consisted of a list of six positive statements relating to the various elements of the physical distribution concept. Two statements, 1 and 3, alluded to the consumer orientation element, two, namely 2 and 5, to the integration element and two, namely 4 and 6, to the profit element. The statements were based on those contained in the semantic differential section of the questionnaire.

The object of the exercise was to determine whether any of the three elements of the physical distribution concept was regarded by the population, as more important than the others.

The following advantages and disadvantages of the Rank Order Scale were recognised:

It is simple in concept, easy to administer.... The instructions for ranking objects are easy to comprehend; consequently the technique can be used on self-administered questionnaires.³⁴

It shares the advantage of the paired-comparison method by forcing observers to discriminate among all items, but it avoids errors in transitivity that occur with paired comparisons, for example, a subject reports $S_i \succ S_j$ and $S_j \succ S_k$, but he reports that $S_i \succ S_k$.

Another advantage is that ranking is faster than the comparison of pairs. For example, a respondent can rank 10 items more quickly than he can judge 45 pairs, that is, $10(10-1)/2 = 45$.³⁵

The limitations of rank-order techniques are important also. The forced choice and comparative nature of the technique results in a ranking of objects regardless of the attitudinal position of the respondents to the objects as a group. It could be that the respondent "dislikes" all of the objects in the set. In this case, the object ranked first is the least "disliked".³⁶

The advantages of rank-order scales for a mail questionnaire were considered, on balance, to outweigh the disadvantages. In addition, ranking scales generally give results comparable in most cases with those obtained with more complex techniques. Several studies have shown very similar results from various graphic and ranking scales.^{37,38} During the pilot study, no reluctance to undertake the ranking exercise was encountered; on the contrary, most of the respondents seemed to enjoy the challenge of ranking the six statements.

6.6.3.3 The General Questionnaire:

The final section of the questionnaire, Part C, consisted of a series of straight forward questions designed to elicit objective

information on the organizational arrangements for physical distribution, prevailing in the respondents' companies.

6.7 The Physical Distribution Orientation Indices:

It will be recalled that the physical distribution concept consists of three elements, each of which is manifested in constituents of physical distribution orientation. In Section 6.6.3.1 it was explained that each constituent of physical distribution orientation would be represented by a separate semantic differential scale in Part A of the questionnaire.

Two sets of indices were to be derived from the completed questionnaires:

- (i) An index for each constituent of physical distribution orientation reflecting the chief executives' intensity of attitude towards that particular constituent. The index would be calculated by expressing the point marked on the scale by the respondent, as a percentage of seven centimetres.
- (ii) A total index, consisting of an aggregate of the indices of the constituents of physical distribution. This total index would reflect the chief executives' overall physical distribution orientation.

The need soon arose to distinguish, for example, between two respondents who ended up with the same total index, but where the answers to individual constituents of one of the respondents all clustered around the 0,5 mark, while the other's were high for some constituents but low for others. The former respondent would clearly be the more physical distribution oriented and had to be identified as such.

What also needed to be reflected in the total index was the

fact that the statements and bipolar phrases in the semantic differentials were worded in such a way that scores below the 0,5 mark on any of the scales did not reflect a lower degree of physical distribution orientation, but rather a non-physical distribution orientation. Thus a respondent marking one of the consumer orientation scales, for example, at the 0,2 point was not 0,2 physical distribution oriented but was rather non-physical distribution oriented in terms of that particular constituent.

To cater for both of these problems it was decided to follow Sandra van der Merwe's lead. In calculating the total index, any constituent of physical distribution rated below 0.5 by a chief executive would be scored 0, and any constituent rated greater than 0,5 would be scored as a percentage of that half of the scale. To illustrate the latter point: If a constituent of the integration element of the physical distribution concept, for example, was rated by a chief executive at the point 0,8 on the scale, it would have been given a score of: $(0,8 - 0,50) \div 0,50$, or 0,6, for the purpose of inclusion in the calculation of the total physical distribution orientation index. The final physical distribution orientation index for each respondent was calculated by taking the mean of the scores for each constituent thus calculated. The use of a total score obtained in this way as an indication of a respondent's overall attitude towards physical distribution, or his degree of physical distribution orientation, assumes that all the important factors that determine physical distribution orientation have been included, and that they are all of relatively equal weight. As the semantic differential questionnaire was constructed on the basis of as thorough a literature review as possible, the researcher is confident that the two stated assumptions apply in this study.

6.8 The Pilot Study:

The Pilot Study is the stage in the research process in which fundamental problems in a survey can be corrected.³⁹ "No researcher

can prepare a questionnaire so good that improvements cannot be discovered in field tests."⁴⁰ Pilot studies allow the researcher to check, amongst other things, (a) whether there are a disproportionate number of non-responses to particular questions; (b) whether the respondents seem to understand the questions and whether the issue in each question is clear to respondents. Any requests for explanation, comments, or other reactions by the respondents should be noted.

Pilot studies "are best done by personal interview even if the survey is to be handled by mail or telephone"⁴¹ and the people interviewed in pilot studies should be roughly similar to those who will be covered in the final study.

As Crisp states, "the scale of a pilot study need not be very large."⁴² Notwithstanding that the pilot study was conducted on a personal interview basis for an overall programme which was to be executed by mail, the researcher found it necessary to conduct 10 interviews before the questionnaire was found to be, in his opinion, satisfactory. The respondents for the pilot study were chosen at random from the target population. The firms chosen are listed below alphabetically.

Bakers South Africa Limited;
Berkshire International (S A) Limited;
Bertrams Wines Limited;
Hart Limited;
Hugh Parker Limited;
I L Back and Company Limited;
Ninian and Lester Holdings Limited;
Romatex Limited;
South African Associated Newspapers; and
The Lion Match Company Limited.

The firms chosen, covered all the major strategic categories with the exception of the "Unrelated". As there were only four in this group in the population, the omission was not deemed to be serious. The firms chosen for the pilot study also covered all the major Johannesburg Stock Exchange industrial sectors included in the study, with the exception of "Pharmaceutical and Medical."

The Pilot Study proved to be an invaluable exercise in refining all three sections of the questionnaire, and in eliminating ambiguities both in the instructions and in the questions themselves. After discussions with respondents as to the merits and demerits of semantic scales with full grading at one centimetre intervals on the seven centimetre scale, and scales with only centre gradings, the latter alternative was decided upon. A reaction from respondents was encountered similar to that in Sandra van der Merwe's study: "while the full grading scale helped the respondent understand the relative weighting concept, it did not really assist in any other way. However, the centre grade did, since it gave an indication of the 50% mark."⁴³ The 50% mark represented the dividing line between a physical distribution orientated response and a non-physical distribution oriented response, but which was not always readily apparent from the bipolar phrases.

The respondents in the Pilot Study responded enthusiastically and the majority indicated that they would have readily completed the questionnaire had it been sent in the mail. It thus soon became evident that once the refinements were introduced and ambiguities eliminated, nothing in particular would be gained from conducting the survey on a personal interview basis, apart from ensuring that the person who claimed to have completed the questionnaire had actually done so. An undisguised attempt to cope with the latter problem was introduced into the mail questionnaire, namely the request for the person completing the questionnaire to state his name and address at the end of the questionnaire.

It was recognised that if a mail questionnaire were to be used, some explanation of what the researcher meant by "physical distribution" needed to be included in different questions and/or semantic differential statements.

For example, Question 3. "Different departments responsible for physical distribution activities such as warehousing, finished goods inventory, order processing and transportation must set objectives which are consistent with the overall profit objectives of the company".

In no case did the interview take longer than half-an-hour, including those in which respondents frequently asked for clarification of instructions and questions.

It was found necessary to include in the instructions for the semantic differential section of the main study, a statement to the effect that there were no right nor wrong answers, and that it was simply personal opinions that were being sought.

6.9 Final Questionnaire:

On the basis of the results obtained in the pilot study, modifications were made to the questionnaire and tested. The final questionnaire appears in Appendix D. A typical covering letter which accompanied each mail questionnaire appears in Appendix E. To encourage response, as noted earlier, the following points were stressed in the covering letter:

- (i) anonymity of respondents;
- (ii) the fact that the survey was concerned with "attitudes" and that there were no right or wrong answers;
- (iii) a summary of the results would be sent to participating respondents;
- (iv) that although the questionnaire appeared to be a long document, it would not take more than half-an-hour to complete; and
- (v) a self-addressed, stamped envelope was included in which the completed questionnaire could be returned to the researcher.

6.10 Conclusion:

The researcher confidently believes that he did all that could reasonably have been expected of him to ensure that the calculations, made on the basis of the answers to the questionnaire, were as accurate a reflection of the degree of physical distribution orientation exhibited by respondents, as possible.

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13 The formula can be described in more detail as follows:

$$\frac{a - b + c + d}{e - f - g}$$

where:

a = Trading Profit This is the profit of the company before accounting for investment income, profit or loss of an extraordinary nature and expenses such as auditors' remuneration, depreciation on land, buildings and other fixed assets, rental of fixed assets, directors' remuneration, costs of management and other services.

b = Total costs This consists of auditors remuneration; depreciation on land, buildings and other fixed assets; rental on other fixed assets, directors' remuneration and costs of management and other services.

c = Depreciation for the year on all fixed assets excluding land and buildings.

d = Depreciation for the year on land and buildings

e = Total assets This figure represents the total of all assets employed by the company with the exclusion of intangible assets and cost of control of subsidiaries. This figure is made up by adding together total fixed assets at book value, total long term investments such as long term loans advanced, listed and unlisted investments as well as investments

in unconsolidated subsidiaries and
total current assets.

f = Total long term investments

g = Total current assets

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CHAPTER VII.

THE EMPIRICAL RESULTS OF THE RESEARCH PROGRAM

7.1 Introduction:

This chapter is devoted to a discussion of the responses obtained from the mail questionnaire as well as to a discussion of the research findings. The data obtained from the questionnaires is presented in Tables appearing at the end of this chapter, while the actual results, obtained from the application of various statistical tests and techniques appear in various Appendices at the end of the study. Both these procedures were followed to prevent the narrative from being interrupted and the reader's attention thereby distracted.

7.2 Response to the Mail Questionnaire:

Sixty-two questionnaires were finally sent out. Thirty-six duly completed questionnaires were received within five weeks after mailing. When the number of returns had dropped significantly, a second letter questionnaire and stamped, self-addressed envelope were sent to the outstanding respondents. In the second letter, the respondents were reminded of the purpose of the research and encouraged to participate on the grounds that non-response would bias the results. Within four weeks after the reminder letter and questionnaire, 10 duly completed questionnaires were received. In order to elicit responses from the remaining 16 chief executives, telephone reminders were conducted.¹ Within three weeks after the telephone reminders, a further 11 satisfactorily completed questionnaires were received. The five outstanding questionnaires were eventually received as well, but together with covering letters expressing refusal to participate. One of these stated:

"I have nothing to contribute. We simply put newspapers and magazines onto the back of a truck and take them to our customers".

Another non-participant stated;

Because of the numerous requests we receive from inside and outside the country, from governments, academic institutions, student and professional bodies, organized industry and commerce, trade unions, the press and such like, we have had to reluctantly decline many invitations to participate in such surveys and questionnaires because of our physical inability to cope with the number and frequency of such requests.

Thus of the 62 questionnaires originally mailed, 57 satisfactorily completed ones were returned. The researcher regarded this as a satisfactory response rate and proceeded with the analysis of the data. The only disappointing aspect with regard to the non-participants was that one showed the highest performance index. While it would have been interesting to correlate this chief executive's physical distribution orientation index with his company's performance index, this absence was not considered to significantly distort the results. Of the five non-participants, three were from the "Single business", one from the "Conglomerate" and one from the "Dominant-linked" strategic categories.

It was decided that since modifications made to the final questionnaire as a result of the pilot study were relatively minor, and since the total population was relatively small, all the pilot study data would be included in the final analyses. Thus a total of 67 questionnaires (57 mail and 10 pilot study) were analysed.

The results of the study are presented in the following section.

7.3 Presentation of Results:

The quantitative data obtained from the research appears in Tables VII.4 to VII.9. These Tables appear at the end of this chapter as noted earlier. It is this data which was analysed and which served as a basis for proving or disproving the hypotheses established in Chapter VI.

Table VII. 4 contains the ratings per question made by the respondents.

Table VII. 5 contains the weighted ratings per question, as well as the overall physical distribution orientation index per respondent. The weighting procedure was described in Section 6.7. The overall physical distribution orientation index was calculated by taking the mean of the weighted ratings per question.

Table VII. 6 contains the average weighted rating per question for the population, as well as the average overall physical distribution orientation index for the population.

Table VII. 7 lists the statements as ranked in order of importance by each chief executive.

Table VII. 8 shows the organizational arrangements for physical distribution in each respondent company.

Table VII. 9 refers to the length of time the chief executives held their positions.

The dummy questions, namely Questions 1, 16 and 18 of Section A of the questionnaire, have been omitted from the relevant tables. The dummy questions were included in the questionnaire to focus the attention of the respondents on giving their own personal opinions rather than on giving answers which they perhaps felt ought to be given.

7.3.1 Graphical Presentation of Weighted Ratings per Question:

In Figures 1 to 20 in Appendix F, the results of the semantic differentials are presented in the form of bar charts. Each bar chart shows the distribution of the weighted ratings by the chief executives for the particular semantic differential statement in question.

"The object of the graphs is to present to the reader, a response distribution of the outlook of the executives and so use the information to develop a profile for the average top executive"² in the population.

The range of the vertical scale is from 0,0 to 1,0. The raw scores elicited from the respondents have been grouped as in Table VII. 1.

TABLE VII. 1.

DETERMINATION OF SCALE INTERVALS FOR USE ON BAR CHARTS.

Range of interval on graphs	Mid-point of interval on graphs
0,0 - 0,09	0,05
0,1 - 0,19	0,15
0,2 - 0,29	0,25
0,3 - 0,39	0,35
0,4 - 0,49	0,45
0,5 - 0,59	0,55
0,6 - 0,69	0,65
0,7 - 0,79	0,75
0,8 - 0,89	0,85
0,9 - 1,00	0,95

7,3.2 Graphical Presentation of Ranking of Statements:

The purpose of the ranking exercise was not only to provide feedback on the semantic differential section of the questionnaire, but also to determine whether the chief executives in the population regarded any element of the physical distribution concept as more important than any other. The results of this part of the research have also been presented graphically. The relevant bar charts appear in Figures 1 to 6 in Appendix G at the end of the thesis. Each bar chart shows respectively the number of respondents who ranked each statement the most important, second most important and so on down to sixth most important.

7.4 Analysis and Interpretation of Results:

The analysis and interpretation of results is undertaken in the following two sub-sections. The first is concerned with data to which statistical tests are applied and the second with a descriptive profile of the average chief executive in the population.

7.4.1 Relationship Between Physical Distribution Orientation and Company Performance:

On the basis of the literature review, as has been noted earlier, one major and several secondary hypotheses were established postulating a relationship between certain variables. In order to draw conclusions from the study, it was necessary for the hypotheses to be statistically tested. It was decided to use correlation analysis to measure the amount of association between the variables.³ Correlation analysis is concerned with measuring the strength of the linear relationships between the different variables and testing the statistical relationship of those relationships.

It must be pointed out, however, that the statistical concept of correlation is quite neutral as regards causation. One of the variables may be "caused" by the other, but this can only be known from other than statistical considerations.⁴

To aid the reader, the major hypothesis is repeated here, namely:

THERE IS A RELATIONSHIP BETWEEN THE PHYSICAL
DISTRIBUTION ORIENTATION OF CHIEF EXECUTIVES
OF CERTAIN SOUTH AFRICAN COMPANIES MANUFACTURING
CONSUMER CONVENIENCE GOODS AND CONSUMER SHOPPING
GOODS, AND THE PERFORMANCE OF THESE COMPANIES.

This was designated the alternative hypothesis and expressed as:⁵

$$H_1 : r \neq 0$$

The null hypothesis, that there is no relationship between the

the chief executives' physical distribution orientation and their companies' performance, was expressed as:

$$H_0 : r = 0$$

The correlation undertaken on the computer using the Statistical Package for the Social Sciences was found to be:

$$0,5868 \quad (\text{See Appendix H, Table 1})$$

There was always the possibility that the co-efficient obtained could have occurred "by chance", that is, its significance was suspect because of the probability of a chance occurrence. Therefore, the correlation co-efficient was tested to see whether or not a chance occurrence of that magnitude was likely. This was done by the use of Student's t distribution, using the following formula:

$$t = r \cdot \sqrt{\frac{n - 2}{1 - r^2}}$$

where:

- n = the number of pairs studied,
- r = correlation co-efficient where the degrees of freedom were (n - 2)

The value of "t" for a correlation co-efficient of 0,5868 with 65 degrees of freedom is, 5,82. From statistical tables it can be ascertained that for 65 degrees of freedom, a "t" value of slightly less than 2,00 is required for significance at the 5% level. Thus, in terms of Student's t test, the correlation co-efficient of 0,5868 was found to be significant at the 5% level. This indicated that the relationship which existed was statistically acceptable, that the null hypothesis was rejected and that the alternative hypothesis, which is the major hypothesis of this study, was confirmed.

It was believed, however, that the influence of the chief executive on his company's performance might not have been felt if he had not held his position for at least five years. A

distinction, however, had to be drawn between those respondents on the one hand, who had succeeded their fathers and who had thus been groomed to take over, as well as those respondents who had previously been either joint-managing directors or executive directors, and those who had been promoted from within the company or had come from another company, on the other hand. The former category could be expected to have acquired the same philosophy as their fathers, or to have already been exerting a type of chief-executive influence on the company.

The correlation analysis was therefore repeated excluding respondents who had not been in their positions for at least five years, but including those whose fathers had been chief executive before them, as well as those who had held a joint managing or executive directorship in their company before their appointment as chief executive.

On this basis, 21 respondents were excluded. The revised population appears in Appendix H, Table 2. The correlation co-efficient was :

0,63019

This is significant at the 5% level. This shows an even stronger relationship than before, thus further confirming the major hypothesis.

7.4.2 Relationship Between Company Performance and Elements of the Physical Distribution Concept:

It will be recalled that the Physical Distribution Concept was broken down into three elements, namely, consumer orientation, integration and profit. The elements were in turn broken down into constituents, each of which was represented in the questionnaire by a separate scale. The researcher undertook to determine whether any relationship existed between orientation to each of the elements of the physical distribution concept, and company performance. It will be recalled that the first of the

secondary hypotheses of the study was:

THERE IS NO SIGNIFICANT CORRELATION BETWEEN THE ORIENTATION OF THE CHIEF EXECUTIVES IN THE TARGET POPULATION TO EACH OF THE THREE ELEMENTS OF THE PHYSICAL DISTRIBUTION CONCEPT, AND THEIR COMPANIES' PERFORMANCE.

This was designated as the null hypothesis and expressed as follows:

$$H_0 : r = 0$$

The alternative hypothesis, that there is a significant correlation between each of the elements of the physical distribution concept, was expressed as:

$$H_1(1) : r \neq 0$$

To arrive at a score for each element per respondent, the average of the weighted semantic differential ratings per constituent of each element was taken. Consumer Orientation was reflected in Questions 4, 6, 8, 11, 12, 14, 19, 20 and 23, Integration in Questions 3, 5, 7, 9, 10, 13 and 17 and Profit in Questions 2, 15, 21 and 22. The results of this analysis appear in Tables 1 - 3 in Appendix I.

The correlation co-efficient relating to consumer orientation and company performance was:

0,52

This was significant at the 5% level.

The correlation co-efficient relating to integration was:

0,52

This was significant at the 5% level.

Finally, the correlation co-efficient relating to the profit element and company performance was:

0,25

This was barely significant at the 5% level and was not significant

at the 2% level. For 65 degrees of freedom, a correlation co-efficient of approximately 0,241 is required for statistical significance at the 5% level.⁶

The null hypothesis, and consequently the first secondary hypothesis of the study, was thus clearly rejected. One of the causes of this result was the fact that the correlation between the overall physical distribution orientation and company performance, namely, 0,5868, was so high. This is not only significant at the 5% level, but also at the 0,1% level! Thus it was not really surprising that the correlation of the individual elements of the physical distribution concept and company performance, were also statistically significant.

The fact that the correlation co-efficient associated with the overall physical distribution orientation was noticeably higher than the correlation co-efficients associated with any of the individual elements of the physical distribution concept, reflects that the individual elements on their own have less meaning than when they are united and integrated to represent a single overall philosophy.

7.4.3 Relationship Between Company Performance and Constituents of the Elements of the Physical Distribution Concept:

The constituents of each element of the physical distribution concept were represented by separate questions in the semantic differential section of the questionnaire. Another set of correlation analyses was undertaken to test the relationship between each constituent and company performance.

The second of the secondary hypotheses, it will be recalled, was:

THERE IS NO SIGNIFICANT CORRELATION BETWEEN ORIENTATION OF THE CHIEF EXECUTIVES TO EACH OF THE CONSTITUENTS INTO WHICH EACH ELEMENT OF THE PHYSICAL DISTRIBUTION CONCEPT WAS BROKEN, AND THEIR COMPANIES' PERFORMANCE.

This was designated as the null hypotheses and expressed as

$$H_0 : r = 0.$$

The alternative hypothesis, that there is a relationship, was expressed as

$$H_1 : r \neq 0$$

The results of the correlation analysis appear in Tables 1 - 20 in Appendix J.

From these results it could be concluded, that the null hypothesis, and consequently the second secondary hypothesis of this study, was rejected; there was in fact a statistically significant correlation at the 5% level between orientation by the chief executives to some of the constituents into which the elements of the physical distribution concept were broken, and company performance. The questions for which the correlation co-efficients were statistically significant at the 5% level are shown in Table VII. 2.

TABLE VII. 2.

QUESTIONS WITH STATISTICALLY SIGNIFICANT CORRELATION
CO-EFFICIENTS AT THE 5% LEVEL.

Question No.	Element of Physical Distribution Concept	Correlation Co-efficient
4	Consumer Orientation	0,3033
8	Consumer Orientation	0,3048
15	Consumer Orientation	0,2749
21	Consumer Orientation	0,4077
7	Integration	0,2794
10	Integration	0,3190
14	Integration	0,2986

It is interesting to note that the correlations between company performance and those questions alluding to the profit element, namely, questions 2, 15, 21 and 22, were not statistically significant.

Another set of correlation analyses was undertaken using the weighted ratings appearing in Table VII. 5. The purpose of this was to determine "whether there is a relationship between relative orientation to individual constituents on the part of the top executive and company performance."⁷

The null hypothesis was that there is no relationship between relative orientation to individual constituents and company performance, while the alternative hypothesis was that there is such a relationship.

The results of this second set of correlation analyses appear in Appendix K.

From these results it can be concluded that the null hypothesis is rejected, thus substantiating the finding of the first set of correlation analyses in this sub-section, that the second secondary hypothesis of this study is not proved. There is in fact a statistically significant correlation at the 5% level between relative orientation by the chief executives to some constituents into which the elements of the physical distribution concept was broken, and company performance.

The questions for which the correlation co-efficients were statistically significant at the 5% level are shown in Table VII. 3.

TABLE VII. 3.

QUESTIONS WITH STATISTICALLY SIGNIFICANT CORRELATION
CO-EFFICIENTS AT THE 5% LEVEL (WEIGHTED RATINGS).

Question No.	Element of Physical Distribution Concept	Correlation Co-efficient
4	Consumer Orientation	0,3461
8	Consumer Orientation	0,3193
11	Consumer Orientation	0,2692
15	Consumer Orientation	0,2943
20	Consumer Orientation	0,2483
21	Consumer Orientation	0,3643
3	Integration	0,2940
7	Integration	0,2832
9	Integration	0,2472
10	Integration	0,3796
14	Integration	0,3704

On the basis of weighted ratings, too, the correlations between company performance and those questions alluding to Profit, were not statistically significant at the 5% level.

The correlation co-efficients of those questions alluding to Consumer Orientation and Integration were significantly lower than the correlation co-efficients for overall Consumer Orientation and overall Integration, namely 0,50 each (See Sub-Section 7.3.2). This reflects that the individual constituents represented by each question, have less meaning on their own than when they are united and integrated to represent a single element of the physical distribution concept.

It is because the correlation co-efficients for the overall elements of Consumer Orientation and Integration were so high, namely 0,50 each, that the correlation co-efficients for so many constituents were statistically significant.

7.4.4 Respondents' Opinions on the Relative Importance of the Three Elements of the Physical Distribution Concept:

It will be recalled that the third secondary hypothesis stated:

CHIEF EXECUTIVES IN THE TARGET POPULATION REGARD CERTAIN ELEMENTS OF THE PHYSICAL DISTRIBUTION CONCEPT AS MORE IMPORTANT THAN OTHERS.

Section B of the questionnaire, in which respondents were required to rank in order of importance the statements representing the 3 elements of the physical distribution concept, was designed to test this hypothesis.

The null hypothesis was that there was no preference shown for any of the 6 statements. The alternative hypothesis, constituting a formal secondary hypothesis of the research project, was that there was preference shown for certain statements.

It was decided to use the Kolmogorov-Smirnov Test to determine whether the observed results were in accord with the stated null hypothesis. It was recognised that the hypothesis of no preference could also have been tested with the chi-square goodness-of-fit test. "When the data are ordinal, though, the Kolmogorov-Smirnov test is the preferred procedure. It is more powerful than chi-square in almost all cases, is easier to compute, and does not require a certain minimum expected frequency in each cell as does the chi-square test."⁸

The Kolmogorov-Smirnov Test was applied to the data six separate times. The first application was to the number of chief executives ranking each of the six statements as the most important, the second application was to the number of chief executives ranking each of the six statements as second most important, the third application was to the number of chief executives ranking each of the six statements as third most important, and so on.

The results of these applications of the Kolmogorov-Smirnov Test to these data appear in Appendix L, Tables 1 to 6.

In the first case, Table 1, Appendix L, where the chief executives' ranking of the six statements as the most important was tested, Kolmogorov-Smirnov D was calculated as 0,3259. What is known as Kolmogorov-Smirnov D is equal to the absolute value of the maximum deviation between the observed cumulative proportion and the theoretical cumulative proportion. At the 5% confidence level, the critical value of D for large samples is given by $1,36/\sqrt{n}$, where n is the sample size. In this case, the critical value is 0,17. Calculated D exceeds the critical value, and thus the null hypothesis of no preference amongst the six statements as being the most important is rejected. The data indicate a statistically significant preference by the chief executives in the population for statements 1 and 3, thus confirming the third secondary hypothesis.

Both statements 1 and 3 allude to consumer orientation. The researcher believes that the reason for this not unexpected finding is that operating in a competitive business environment, the chief executives were probably committed to the marketing concept and the marketing of products which consumers needed or wanted, as a business philosophy. They thus probably found it very easy, and necessary, to recognise that they ought as well to consider the physical distribution needs of consumers.

In the second case, where the chief executives' ranking of the six statements as second most important was tested, Kolmogorov-Smirnov D was calculated as 0,2364. This exceeded the critical value of 0,17 and thus the null hypothesis of there being no preference amongst the six statements as being

second most important was rejected. The data indicate a statistically significant preference by the chief executives in the population for statement 6 as being second most important, thus further confirming the third secondary hypothesis. Statement 6 alludes to profit.

When the Kolmogorov-Smirnov Test was applied in the remaining four cases, in no instance was calculated D found to exceed the critical value. This confirmed the null hypothesis of there being no preference amongst the six statements as being third, fourth, fifth or sixth most important. In other words, having revealed consumer orientation as being the most important, the data were inconclusive as to the relative positioning of the other statements, particularly those alluding to integration.

7. 4.5 Patterns of Organizational Arrangements for Physical Distribution:

Section C of the questionnaire was designed to elicit information on the organizational arrangements for physical distribution in the various companies in the population. The various organizational arrangements were grouped together into four broad categories as shown in Table VII. 8.

Sixteen companies (23,9% of the population) treated physical distribution as a part of the marketing/sales department; in 26 companies (38,8%) physical distribution line activities were grouped together (in particular the dispatch functions) with the physical distribution staff activities and/or policy making activities undertaken by the traditional functional departments; in 14 companies (20,9%) physical distribution activities were fragmented and dispersed throughout the organization; and 11 companies (16,4%) had established fully fledged, autonomous physical distribution departments.

While on the surface it may appear that companies adopting organizational arrangements classified as falling into Category B, namely line activities grouped together with staff activities dispersed, were on their way to establishing fully autonomous physical distribution departments, it must be pointed out that the line activities which were integrated were in fact low level, routine activities largely associated with the despatch of finished goods to customers. The important physical distribution planning and policy making activities, which are the major factors in ensuring integration of physical distribution activities, were often as fragmented and widely dispersed through the company as those companies classified in Category C, namely, physical distribution activities fragmented and dispersed through the company.

The total of 40 companies (59,7%) having organizational arrangements falling into Categories B and C lends some support to the results referred to in sub.section 7.3.6, namely that the ranking of the statements relating to the Integration element of the physical distribution concept as being the most important, second most important, third most important and so on, were not statistically significant.

It was then decided to determine whether any relationships existed between the category of organizational arrangement and variables such as the stock exchange sector in which the company fell, strategy pursued by the company, inventory mode, physical distribution orientation of the chief executive, and performance index of the company. In other words, the researcher wished to determine whether organizational arrangements for physical distribution were independent of the stated variables, or whether they were in fact associated with one or more of the stated variables.

The variables were put into a Table in code form as shown in Table VII. 10. The keys to the various codes appear at the end of the Table. A cross tabulation exercise was undertaken on the computer via the Statistical Package for the Social Sciences, and five contingency tables were computed. Contingency tables "are used to study the independence or association of two variables"⁸.

These five contingency tables were as follows:

- (a) organizational arrangements by stock exchange sector;
- (b) organizational arrangements by strategy;
- (c) organizational arrangements by production mode;
- (d) organizational arrangements by physical distribution orientation of the chief executive; and
- (e) organizational arrangements by the performance index of the company.

Because "chi square provides an appropriate test of independence"⁹ with contingency tables, chi square calculations were carried out for each of the 5 tables listed above. The results of these calculations are discussed in the following sub-sections.

7.4.5.1 Relationship between organizational arrangements for physical distribution and strategy followed:

It will be recalled that the fourth secondary hypothesis of the study was:

FOR THE TARGET POPULATION COMPANIES, THERE IS NO RELATIONSHIP BETWEEN STRATEGY FOLLOWED AND ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION.

This constituted the null hypothesis. The alternative hypothesis was that such a relationship does exist.

The relevant contingency table is contained in Table 1 in Appendix M.

The chi square value was 8,96531 with 9 degrees of freedom. This was not statistically significant at the 5% level and consequently the null hypothesis, as well as the fourth sub-hypothesis of the study, was confirmed. In other words, whether a company was pursuing a single business or conglomerate strategy did not appear to exert any influence on the type of organizational arrangements for physical distribution.

7.4.5.2 Relationship between organizational arrangements for physical distribution and Johannesburg Stock Exchange sector classification:

It will be recalled that the fifth secondary hypothesis of the study was:

FOR THE TARGET POPULATION COMPANIES, THERE IS NO RELATIONSHIP BETWEEN JOHANNESBURG STOCK EXCHANGE SECTOR CLASSIFICATION AND ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION.

This constituted the null hypothesis. The alternative hypothesis was that such a relationship does exist.

The relevant contingency table is contained in Table 2 in Appendix M. The chi square value was 30,93926 with 21 degrees of freedom. This was not statistically significant at the 5% level and consequently the null hypothesis, which is the fifth secondary hypothesis of the study, was confirmed. In other words, whether a company was in the tobacco business or whether it was in the furniture business, for example, did not appear to exert any significant influence on the type of organizational arrangements for physical distribution.

7.4.5.3 Relationship between organizational arrangements for physical distribution and performance index classification:

It will be recalled that the sixth secondary hypothesis of the study was:

FOR THE TARGET POPULATION COMPANIES, THERE IS NO RELATIONSHIP BETWEEN PERFORMANCE INDEX CLASSIFICATION AND ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION.

This constituted the null hypothesis. The alternative hypothesis was that such a relationship does exist.

The relevant contingency table is contained in Table 3 in Appendix M. The chi square value was 6,38140 with 6 degrees of freedom. This was not statistically significant at the 5% level and consequently the null hypothesis, which is the sixth secondary hypothesis of the study, was confirmed. In other words, whether a company was a high, medium or low performance company in terms of return on investment, did not appear to exert any significant influence on the type of organizational arrangements for physical distribution.

7.4.5.4 Relationship between organizational arrangements for physical distribution and physical distribution orientation classification of chief executives:

It will be recalled that the seventh secondary hypothesis of the study was:

FOR THE TARGET POPULATION COMPANIES, THERE IS NO RELATIONSHIP BETWEEN PHYSICAL DISTRIBUTION ORIENTATION CLASSIFICATION AND ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION.

This constituted the null hypothesis. The alternative hypothesis was that such a relationship does exist.

The relevant contingency table is contained in Table 4 in Appendix M. The chi square value was 8,75331 with 6 degrees of freedom. This was not statistically significant at the 5%

level and consequently the null hypothesis, which is the seventh secondary hypothesis of the study, was confirmed. In other words, the extent to which chief executives were physical distribution oriented did not appear to exert any significant influence on the type of organizational arrangements for physical distribution.

7.4.5.5 Relationship between organizational arrangements for physical distribution and inventory mode classification:

It will be recalled that the final secondary hypothesis of the study was:

FOR THE TARGET POPULATION COMPANIES THERE IS NO RELATIONSHIP BETWEEN INVENTORY MODE CLASSIFICATION AND ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION.

This constituted the null hypothesis. The alternative hypothesis was that such a relationship does exist.

The relevant contingency table is contained in Table 5 in Appendix M. The chi square was 25,87001 with 6 degrees of freedom. This was statistically significant at the 5% level and consequently the null hypothesis, which is the eighth and final sub-hypothesis of the study, was rejected. In other words, whether a company produced for stock, or only to orders, or some combination of the two, did appear to exert a significant influence on the type of organizational arrangements for physical distribution.

Of the 20 companies in the population which produced only to order, none had autonomous, independent physical distribution departments, 50% had physical distribution activities fragmented and dispersed throughout the organization, 15% had line activities grouped together but planning and policy

activities dispersed, and 35% treated physical distribution as part of the marketing/sales department. This was in a sense, not an unexpected finding. In a company which produces solely to order, the physical distribution task predictability is very low. As a result, it is possible for the effective management of physical distribution to take place in a system in which responsibility for physical distribution is highly fragmented. This finding thus lends support to Persson's conclusions (quoted in Section 4.4.4.6) that in an organization where the logistics task predictability is low, logistics activities are co-ordinated by mechanisms of an informal and of a functional, rather than of a flow-oriented character.

Of the 28 companies in the population which produced only for stock, 32,1% had autonomous, independent physical distribution departments and 42,9% had line activities grouped together but planning and policy activities dispersed. Thus a total of 65% of the companies producing for stock had at least some degree of integration with regard to physical distribution activities. This too lends some support to Persson's conclusions (quoted in Section 4.4.4.6) that in a situation with a high task predictability, namely production for stock, the co-ordination of logistics activities is managed by the use of a combination of informal and formal mechanisms within the functional hierarchical framework. It is interesting to note that very few, only 7,1%, of the companies producing solely for stock had physical distribution activities fragmented and dispersed throughout the organization. It seemed to be recognised, that when producing predominantly for stock, at least some degree of organizational integration was indispensable for the effective management of physical distribution activities.

Of the 19 companies which practised a combination of production to order and production to stock, 57,9% had line activities grouped together but planning and policy activities dispersed, and 21,1% treated physical distribution as part of the marketing/sales department. Facing what might be termed an average degree of task predictability, these companies tended to adopt organizational arrangements with a certain amount of integration but without setting up autonomous, independent physical distribution departments to any great extent. In fact, only 10,5% of those practising a combination of production for stock and to order, had autonomous departments.

In summary, the major hypothesis, as well as most of the secondary hypotheses of this research project were proved. The Secondary hypotheses which were rejected on the basis of the empirical results were:

- (a) that there is no significant relationship between orientation to individual elements of the physical distribution concept and company performance;
- (b) that there is no significant relationship between orientation to the constituents into which each element of the physical distribution concept was broken, and company performance; and
- (c) that there is no relationship between inventory mode classification and organizational arrangements for physical distribution.

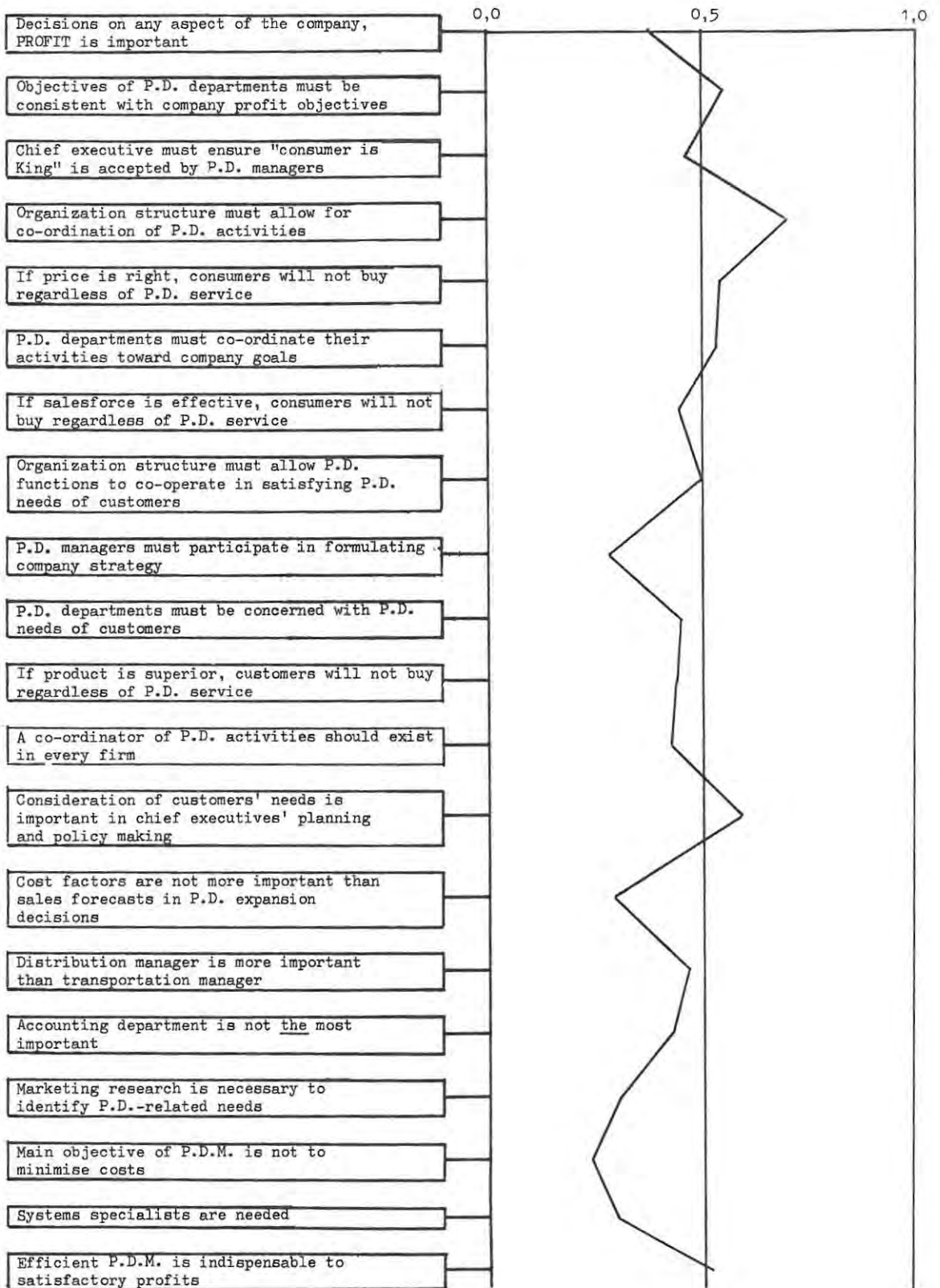
7.5 Profile of Average Chief Executives' Physical Distribution Orientation:

The Profile of the Physical Distribution Orientation of the average chief executive in the population is presented in Figure 7.1. The averages of the weighted ratings for each of the 20 questions, as calculated in Table VII. 6, were used as scale points for the average physical distribution orientation profile.

The blocks in the diagram contain the essence of the questions contained in the questionnaire. The rating scale is the same as the semantic differential scale in the questionnaire, namely, a seven-centimetre scale but marked from 0,0 to 1,00 with the midpoint 0,50. Because this scale is concerned with weighted ratings per question, it is now permissible to state that the average chief executive in the target population is 0,20 physical distribution oriented with regard to the consumer orientation constituent if the average rating on that constituent is 0,20.

The average Physical Distribution Orientation Index for the target population is 0,442 (See Table VII. 6). Thus clearly, the degree of physical distribution orientation displayed by the average chief executive in the target population cannot be regarded as very high. The implications of this are serious when the statistically significant correlation between the physical distribution orientation index and company performance, is taken into account.

FIGURE 7.1
 PROFILE OF AVERAGE PHYSICAL DISTRIBUTION ORIENTATION OF
 CHIEF EXECUTIVES' IN THE TARGET POPULATION



7.6 Conclusion:

The main result of this study as discussed in Chapter VII and detailed in the various Appendices, shows that for certain companies, the relationship between the physical distribution orientation of the chief executive and his company's performance is statistically significant. The implications of this are clear. In a competitive business environment, it is important if not essential, that the chief executive of firms manufacturing products which are easily substitutable, easily perishable or quickly obsolescent, exhibit a high degree of physical orientation. It is only thereby that the rest of the firm will come to subscribe to, and apply, the physical distribution concept, which is critical to the marketing success of the types of firms noted above. The results of the application of the physical distribution concept in these companies are likely to be seen in improved financial performance. The sources of this improved financial performance are increased sales as a result of meeting the physical distribution-related needs of customers, and rationalised costs as a result of applying the total cost concept and undertaking trade-off analyses.

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TABLE VII.4

RELATIVE RATINGS PER QUESTION AND COMPANY PERFORMANCE INDICES (P.I.)																							
FIRM CODE No.	SEMANTIC DIFFERENTIAL QUESTIONS																						P.I.
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	19	20	21	22	23			
1	1,00	1,00	1,00	1,00	1,00	0,91	0,95	0,92	1,00	0,97	1,00	1,00	0,97	0,21	1,00	0,92	0,80	1,00	1,00	0,87	1,87		
2	0,85	0,92	0,85	0,85	0,85	0,85	0,84	0,82	0,88	0,14	0,75	0,78	0,81	0,82	0,85	0,88	0,80	0,95	0,95	0,87	1,67		
3	0,64	0,95	0,90	0,91	0,67	0,90	0,55	0,87	0,97	0,91	0,57	0,90	0,81	0,84	0,91	0,65	0,70	0,05	0,67	0,88	1,71		
4	0,63	0,86	0,84	0,90	0,89	0,79	0,74	0,93	0,50	0,16	0,83	0,19	0,77	0,20	0,50	0,42	0,60	0,31	0,40	0,66	1,61		
5	0,67	0,95	0,95	1,00	0,95	0,91	0,67	0,92	0,05	0,95	0,67	0,68	0,94	0,50	0,64	0,02	0,32	0,50	0,20	0,78	1,57		
6	0,97	0,84	0,82	0,97	0,80	0,95	0,88	0,95	0,87	1,00	0,77	0,90	1,00	0,50	0,77	0,72	0,75	0,75	0,81	1,00	1,56		
7	0,84	0,95	0,91	0,94	0,95	0,91	0,91	0,90	0,92	0,94	1,00	0,97	0,94	0,94	1,00	0,90	0,94	0,18	0,94	0,94	1,47		
8	0,91	0,88	0,92	0,97	0,52	0,94	0,84	0,90	0,88	0,94	0,55	0,81	0,94	0,90	0,91	0,87	0,78	0,47	0,92	0,95	1,41		
9	0,38	0,90	0,92	0,94	0,62	0,82	0,75	0,11	0,81	0,41	0,57	0,90	0,92	0,87	0,97	0,81	0,97	0,55	0,44	0,14	1,37		
10	0,42	0,90	0,87	0,94	0,08	0,57	0,62	0,58	0,91	0,77	0,78	0,91	0,91	0,77	0,85	0,60	0,60	0,94	0,88	0,60	1,73		
11	0,97	0,97	0,57	0,98	0,97	0,57	0,55	0,57	0,97	0,95	0,95	0,95	0,97	0,64	0,40	0,05	0,57	0,41	0,90	0,60	1,03		
12	0,90	0,50	0,92	0,87	0,90	0,90	0,94	0,85	0,25	0,91	0,78	0,05	0,80	0,90	0,50	1,00	0,50	0,80	0,74	0,91	1,27		
13	0,60	0,97	0,92	0,94	0,74	0,81	0,85	0,81	0,60	0,82	0,60	0,60	0,77	0,35	0,85	0,85	0,37	0,35	0,87	0,80	1,29		
14	0,05	0,10	0,60	0,90	0,94	0,60	0,60	0,57	0,94	0,94	0,94	0,60	0,95	0,60	0,91	0,61	0,62	0,94	0,87	0,61	1,27		
15	0,78	0,90	0,68	0,71	0,95	0,91	0,91	0,82	0,31	0,68	0,87	0,80	0,72	0,92	0,94	0,92	0,72	0,35	0,22	0,84	1,21		
16	0,50	0,30	0,77	0,98	0,98	0,71	0,98	0,98	0,05	0,05	0,98	0,75	0,98	0,45	0,94	0,94	0,75	0,87	0,25	1,00	1,19		
17	0,05	0,24	0,67	0,94	0,77	0,94	0,72	0,74	0,12	0,90	0,72	0,74	0,92	0,22	0,80	0,78	0,17	0,57	0,21	0,71	1,21		
18	0,97	0,42	0,37	0,82	0,97	0,94	0,95	0,85	0,90	0,97	0,97	0,97	0,95	0,60	0,95	0,91	0,94	0,67	0,21	0,90	1,19		
19	0,70	0,30	0,90	0,94	0,78	0,60	0,54	0,75	0,41	0,38	0,68	0,70	0,94	0,82	0,50	0,80	0,21	0,07	0,42	0,62	0,94		
20	0,88	0,92	0,84	0,95	0,62	0,92	0,92	0,87	0,51	0,50	0,55	0,77	0,97	0,50	0,60	0,78	0,52	0,50	0,11	0,87	1,19		
21	0,37	0,88	0,87	0,60	0,60	0,65	0,82	0,75	0,65	0,37	0,61	0,60	0,85	0,62	0,50	0,97	0,72	1,00	0,50	1,17			
22	0,05	0,10	0,60	0,90	0,94	0,60	0,60	0,57	0,94	0,94	0,94	0,60	0,95	0,60	0,91	0,61	0,62	0,94	0,87	0,61	1,17		
23	0,58	0,75	0,87	0,92	0,92	0,88	0,84	0,68	0,18	0,80	0,67	0,52	0,62	0,62	0,68	0,77	0,62	0,52	0,40	0,75	1,48		
24	0,82	0,25	0,15	0,88	0,95	0,72	0,87	0,21	0,62	0,68	0,87	0,11	0,92	0,85	0,52	0,82	0,81	0,62	0,11	0,88	1,13		
25	0,61	0,84	0,62	0,94	0,87	0,88	0,88	0,88	0,50	0,88	0,87	0,64	0,68	0,94	0,75	0,94	0,87	0,95	0,70	0,90	1,15		
26	0,57	0,97	0,55	0,04	0,95	0,92	0,95	0,92	0,04	0,95	0,04	0,92	0,92	0,57	0,57	0,97	0,88	0,08	0,58	0,57	1,13		
27	0,74	0,75	0,75	0,75	0,75	0,75	0,71	0,74	0,21	0,25	0,77	0,24	0,25	0,77	0,77	0,28	0,21	0,24	0,21	0,78	1,10		
28	0,80	0,68	0,77	0,78	0,65	0,78	0,50	0,78	0,78	0,78	0,50	0,78	0,78	0,50	0,78	0,60	0,78	0,50	0,78	0,68	1,08		
29	0,94	0,58	0,98	0,77	0,95	0,70	0,87	0,41	0,40	0,44	0,81	0,42	0,84	0,65	0,80	0,75	0,78	0,55	0,57	1,09			
30	0,87	0,85	0,58	0,91	0,64	0,60	0,61	0,85	0,64	0,61	0,64	0,95	0,92	0,61	0,91	0,62	0,60	0,90	0,61	0,85	1,06		
31	0,90	0,40	0,61	0,92	0,88	0,64	0,57	0,55	0,92	0,91	0,90	0,90	0,91	0,38	0,94	0,60	0,61	0,42	0,87	0,60	1,05		
32	0,37	0,38	0,38	0,41	0,95	0,58	0,81	0,68	0,21	0,57	0,71	0,12	0,60	0,57	0,60	0,97	0,72	0,57	0,58	0,55	1,05		
33	0,75	0,98	0,50	0,72	0,98	0,98	0,71	0,98	0,50	0,04	0,78	1,00	0,50	0,04	1,00	0,98	0,74	0,24	0,25	1,00	1,04		
34	0,75	0,68	0,75	0,70	0,68	0,70	0,82	0,71	0,18	0,22	0,75	0,91	0,74	0,28	0,74	0,24	0,78	0,15	0,24	0,75	1,04		
35	0,77	0,97	0,71	0,94	0,94	0,88	0,91	0,71	0,65	0,88	0,90	0,87	0,88	0,50	0,92	0,68	0,71	0,41	0,88	0,90	1,04		
36	0,45	0,88	0,90	0,91	0,40	0,88	0,62	0,92	0,91	0,87	0,42	0,62	0,85	0,10	0,72	0,58	0,60	0,40	0,61	0,91	1,03		
37	0,95	0,85	0,82	0,90	0,84	0,57	0,62	0,64	0,40	0,37	0,64	0,58	0,62	0,64	0,61	0,61	0,61	0,61	0,42	1,00	1,01		
38	0,77	0,77	0,70	0,77	0,77	0,72	0,74	0,72	0,54	0,75	0,77	0,68	0,77	0,77	0,72	0,58	0,77	0,52	0,12	0,72	1,00		
39	0,91	0,85	0,57	0,94	0,62	0,68	0,64	0,70	0,40	0,67	0,70	0,71	0,72	0,35	0,35	0,60	0,22	0,28	0,38	0,60	1,00		
40	0,75	0,71	0,58	0,84	0,70	0,70	0,60	0,71	0,72	0,72	0,64	0,75	0,92	0,65	0,71	0,78	0,68	0,20	0,78	0,75	0,97		
41	0,24	0,77	0,74	0,77	0,78	0,74	0,25	0,71	0,81	0,75	0,17	0,81	0,72	0,25	0,77	0,77	0,20	0,24	0,15	0,77	0,98		
42	0,47	0,97	0,40	0,97	0,58	0,97	0,40	0,90	0,30	0,78	0,37	0,94	0,81	0,02	0,50	0,11	0,90	0,12	0,78	0,88	0,96		
43	0,60	0,62	0,57	0,92	0,58	0,57	0,57	0,92	0,92	0,92	0,90	0,90	0,90	0,92	0,90	0,60	0,04	0,85	0,41	0,57	0,88		
44	0,07	0,77	0,77	0,77	0,77	0,77	0,77	0,77	0,18	0,67	0,75	0,75	0,61	0,45	0,68	0,62	0,72	0,04	0,95	0,92	0,88		
45	0,88	0,91	0,92	0,90	0,75	0,94	0,85	0,91	0,11	0,82	0,81	0,61	0,97	0,61	0,67	0,88	0,70	0,44	0,68	0,78	0,89		
46	0,14	0,11	0,24	0,40	0,65	0,52	0,88	0,60	0,60	0,42	0,60	0,20	0,54	0,91	0,78	0,91	0,84	0,91	0,41	0,52	0,88		
47	0,47	0,94	0,92	0,84	0,81	0,72	0,81	0,77	0,70	0,70	0,64	0,42	0,60	0,35	0,61	0,57	0,35	0,64	0,67	0,70	0,68		
48	0,78	0,72	0,14	0,75	0,82	0,75	0,78	0,75	0,22	0,75	0,80	0,74	0,17	0,80	0,75	0,77	0,74	0,25	0,77	0,75	0,83		
49	0,70	0,97	0,97	0,97	0,50	0,91	0,57	0,34	0,25	0,25	0,92	0,97	0,97	0,50	0,50	1,00	0,97	0,50	1,00	0,52	0,82		
50	0,60	0,85	0,31	0,80	0,75	0,37	0,61	0,65	0,37	0,67	0,67	0,82	0,85	0,64	0,71	0,67	0,31	0,64	0,67	0,67	0,81		
51	0,55	0,74	0,72	0,78	0,75	0,68	0,71	0,70	0,64	0,84	0,60	0,40	0,74	0,57	0,50	0,74	0,72	0,88	0,65	0,68	0,77		
52	0,67	0,95	0,95	1,00	0,95	0,91	0,67	0,92	0,05	0,95	0,67	0,68	0,94	0,50	0,64	0,02	0,32	0,50	0,20	0,78	0,74		
53	0,80	0,81	0,74	0,95	0,74	0,72	0,85	0,50	0,32	0,75	0,80	0,25	0,72	0,50	0,75	0,77	0,72	0,27	0,61	0,55	0,71		
54	0,67	0,95	0,95	1,00	0,95	0,91	0,67	0,92	0,05	0,95	0,67	0,68	0,94	0,50	0,64	0,02	0,32	0,50	0,20	0,78	0,70		
55	0,05	0,68	0,68	0,68	0,68	0,78	0,68	0,68	0,28	0,78	0,68	0,10	0,68	0,74	0,68	0,68	0,34	0,68	0,61	0,68	0,69		
56	0,75	0,81	0,85	0,78	0,68	0,75	0,65	0,70	0,71	0,68	0,74	0,81	0,72	0,82	0,80	0,70	0,21	0,21	0,80	0,72	0,68		
57	0,90	0,78	0,42	0,87	0,67	0,80	0,52	0,52	0,58	0,65	0,45	0,61	0,50	0,44	0,75	0,71	0,55	0,58	0,54	0,75	0,49		
58	0,10	0,67	0,77	0,77	0,64	0,74	0,12	0,74	0,21	0,74	0,08	0,65	0,77	0,27	0,68	0,74	0,78	0,41	0,65	0,70	0,56		
59	0,95	0,94	0,85	0,95	0,62	0,55	0,57	0,55	0,08	0,42	0,94	0,62	0,97	0,85	0,95	0,55	0,61	0,57	0,95	0,57	0,50		
60	0,07	0,92	0,91	0,90	0,35	0,65	0,61	0,90	0,64	0,34	0,61	0,32	0,81	0,92	0,90	0,10	0,61	0,50	0,40	0,94	0,64		

TABLE VII.5

WEIGHTED PHYSICAL DISTRIBUTION ORIENTATION RATINGS PER QUESTION, PHYSICAL DISTRIBUTION ORIENTATION INDEX (P.D.O.I.) PER RESPONDENT AND COMPANIES PERFORMANCE INDEX (P.I.)																							
FIRM CODE No.	SEMANTIC DIFFERENTIAL QUESTIONS																				P.D. O.I.	P.I.	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	19	20	21	22	23			
1	1,00	1,00	1,00	1,00	1,00	0,82	0,90	0,84	1,00	0,94	1,00	1,00	0,94	0	1,00	0,84	0,60	1,00	1,00	0,74	0,88	1,87	
2	0,70	0,84	0,70	0,70	0,70	0,70	0,68	0,64	0,76	0	0,50	0,56	0,62	0,64	0,70	0,76	0,60	0,90	0,90	0,74	0,67	1,67	
3	0,28	0,90	0,80	0,82	0,34	0,80	0,10	0,74	0,94	0,82	0,14	0,80	0,62	0,68	0,82	0,30	0,40	0	0,34	0,76	0,57	1,71	
4	0,26	0,72	0,68	0,80	0,78	0,58	0,48	0,86	0	0	0,66	0	0,54	0	0	0,20	0	0	0,32	0,34	1,61		
5	0,34	0,90	0,90	1,00	0,90	0,82	0,34	0,84	0	0,90	0,34	0,36	0,88	0	0,28	0	0	0	0,56	0,47	1,57		
6	0,94	0,68	0,64	0,94	0,60	0,90	0,76	0,90	0,74	1,00	0,54	0,80	1,00	0	0,54	0,44	0,50	0,50	0,62	1,00	0,70	1,36	
7	0,68	0,90	0,82	0,88	0,90	0,82	0,82	0,80	0,84	0,88	1,00	0,94	0,88	0,88	1,00	0,80	0,88	0	0,88	0,88	0,82	1,47	
8	0,82	0,76	0,84	0,94	0,04	0,88	0,68	0,80	0,76	0,88	0,10	0,62	0,88	0,80	0,82	0,74	0,56	0	0,84	0,90	0,68	1,41	
9	0	0,80	0,84	0,88	0,24	0,64	0,50	0	0,62	0	0,14	0,80	0,84	0,74	0,94	0,62	0,94	0,10	0	0	0,48	1,37	
10	0	0,80	0,74	0,88	0	0,14	0,24	0,16	0,82	0,54	0,56	0,82	0,82	0,54	0,70	0,20	0,20	0,88	0,76	0,20	0,50	1,73	
11	0,94	0,94	0,14	0,96	0,94	0,14	0,10	0,14	0,94	0,90	0,90	0,90	0,94	0,28	0	0,14	0	0,80	0,20	0,51	1,03		
12	0,80	0	0,84	0,74	0,80	0,80	0,88	0,70	0	0,82	0,56	0	0,60	0,80	0	1,00	0	0,60	0,48	0,82	0,56	1,27	
13	0,20	0,94	0,84	0,88	0,48	0,62	0,70	0,62	0,20	0,64	0,20	0,20	0,54	0	0,70	0,70	0	0	0,74	0,60	0,49	1,29	
14	0	0	0,20	0,80	0,88	0,20	0,20	0,14	0,88	0,88	0,88	0,20	0,90	0,20	0,82	0,22	0,24	0,88	0,74	0,22	0,47	1,27	
15	0,56	0,80	0,36	0,42	0,90	0,82	0,82	0,64	0	0,36	0,74	0,60	0,44	0,84	0,88	0,84	0,44	0	0,68	0,55	1,21		
16	0	0	0,54	0,96	0,96	0,42	0,96	0,96	0	0	0,96	0,50	0,96	0	0,88	0,88	0,50	0,74	0	1,00	0,56	1,19	
17	0	0	0,34	0,88	0,54	0,88	0,44	0,48	0	0,80	0,44	0,48	0,84	0	0,60	0,56	0	0,14	0	0,42	0,39	1,21	
18	0,94	0	0	0,64	0,94	0,88	0,90	0,70	0,80	0,94	0,94	0,94	0,90	0,20	0,90	0,82	0,88	0,34	0	0,80	0,67	1,19	
19	0,40	0	0,80	0,88	0,56	0,20	0,08	0,50	0	0	0,36	0,40	0,88	0,64	0	0,60	0	0	0,24	0,32	0,94	0,44	1,19
20	0,76	0,84	0,68	0,90	0,24	0,84	0,84	0,74	0,02	0	0,10	0,54	0,94	0	0,20	0,56	0,04	0	0,74	0,44	1,19		
21	0	0,76	0,74	0,20	0,20	0,30	0,64	0,50	0,30	0	0,22	0,20	0,70	0,24	0	0,94	0,44	1,00	0	1,00	0,41	1,17	
22	0	0	0,20	0,80	0,88	0,20	0,20	0,14	0,88	0,88	0,88	0,20	0,90	0,20	0,82	0,22	0,24	0,88	0,74	0,22	0,47	1,17	
23	0,16	0,50	0,74	0,84	0,84	0,76	0,68	0,36	0	0,60	0,34	0,04	0,24	0,24	0,36	0,54	0,24	0,04	0	0,50	0,40	1,48	
24	0,64	0	0	0,76	0,90	0,44	0,74	0	0,24	0,36	0,74	0	0,84	0,70	0,04	0,64	0,62	0,24	0	0,76	0,43	1,13	
25	0,22	0,68	0,24	0,88	0,74	0,76	0,76	0,76	0	0,76	0,74	0,28	0,36	0,88	0,50	0,88	0,74	0,90	0,40	0,80	0,61	1,15	
26	0,14	0,94	0,10	0	0,90	0,84	0,90	0,84	0	0,90	0	0,84	0,84	0,14	0,14	0,94	0,76	0	0,16	0,14	0,47	1,13	
27	0,48	0,50	0,50	0,50	0,50	0,50	0,42	0,48	0	0	0,54	0	0	0,54	0,54	0	0	0	0,56	0,30	1,10		
28	0,60	0,36	0,54	0,56	0,30	0,56	0	0,56	0,56	0,56	0,00	0,56	0,56	0	0,56	0,20	0,56	0	0,56	0,36	0,39	1,08	
29	0	0,88	0,16	0,96	0,54	0,90	0,40	0,74	0	0	0	0,62	0	0,68	0,30	0,60	0,50	0,56	0,10	0,14	0,40	1,06	
30	0,74	0,70	0,16	0,82	0,28	0,20	0,22	0,70	0,28	0,22	0,28	0,90	0,84	0,22	0,82	0,24	0,20	0,80	0,22	0,70	0,47	1,06	
31	0,80	0	0,22	0,84	0,76	0,28	0,14	0,10	0,84	0,82	0,80	0,80	0,82	0	0,88	0,20	0,22	0	0,74	0,20	0,47	1,05	
32	0	0	0	0	0,90	0,16	0,62	0,36	0	0,14	0,42	0	0,20	0,14	0,20	0,94	0,44	0,14	0,16	0,10	0,24	1,05	
33	0,50	0,96	0	0,44	0,96	0,96	0,42	0,96	0	0	0,56	1,00	0	0	1,00	0,96	0,48	0	0	1,00	0,51	1,04	
34	0,50	0,36	0,50	0,40	0,36	0,40	0,64	0,42	0	0	0,50	0,82	0,48	0	0,48	0	0,56	0	0	0,50	0,34	1,04	
35	0,54	0,94	0,42	0,88	0,88	0,76	0,82	0,42	0,30	0,76	0,80	0,74	0,76	0	0,84	0,36	0,42	0	0,76	0,80	0,61	1,04	
36	0	0,76	0,80	0,82	0	0,76	0,24	0,84	0,82	0,74	0	0,24	0,70	0	0,44	0,16	0,20	0	0,22	0,82	0,42	1,03	
37	0,90	0,70	0,64	0,80	0,68	0,14	0,24	0,24	0	0	0,28	0,16	0,24	0,28	0,22	0,22	0,22	0	1,00	0,35	1,01		
38	0,54	0,54	0,40	0,54	0,54	0,44	0,48	0,44	0,08	0,50	0,54	0,36	0,54	0,54	0,44	0,16	0,54	0,04	0	0,44	0,40	1,00	
39	0,82	0,70	0,14	0,88	0,24	0,36	0,28	0,40	0	0,34	0,40	0,42	0,44	0	0	0,20	0	0	0,20	0,29	1,00		
40	0,50	0,42	0,16	0,68	0,40	0,40	0,20	0,42	0,44	0,44	0,28	0,50	0,82	0,30	0,42	0,56	0,36	0	0,56	0,50	0,41	0,97	
41	0	0,54	0,48	0,54	0,56	0,48	0	0,42	0,62	0,50	0	0,62	0,44	0	0,54	0,54	0	0	0,54	0,34	0,95		
42	0	0,94	0	0,94	0,16	0,94	0	0,80	0	0,56	0	0,88	0,62	0	0	0,80	0	0,56	0,76	0,39	0,96		
43	0,20	0,24	0,14	0,84	0,16	0,14	0,14	0,14	0,84	0,84	0,84	0,80	0,80	0,84	0,80	0,20	0	0,70	0	0,14	0,44	0,88	
44	0	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0	0,34	0,50	0,50	0,22	0	0,36	0,24	0,44	0	0,90	0,82	0,40	0,88	
45	0,76	0,82	0,84	0,80	0,50	0,88	0,70	0,82	0	0,64	0,62	0,22	0,94	0,22	0,34	0,76	0,40	0	0,36	0,56	0,55	0,89	
46	0	0	0	0	0,30	0,04	0,76	0,20	0,20	0	0,20	0	0,08	0,82	0,56	0,82	0,68	0,82	0	0,04	0,27	0,88	
47	0	0,88	0,84	0,68	0,62	0,44	0,62	0,54	0,40	0,40	0,28	0	0,20	0	0,22	0,14	0	0,28	0,34	0,40	0,36	0,68	
48	0,56	0,44	0	0,50	0,64	0,50	0,56	0,50	0	0,50	0,60	0,48	0	0,60	0,50	0,54	0,48	0	0,54	0,50	0,42	0,83	
49	0,40	0,94	0,94	0,94	0	0,82	0,14	0	0	0	0,84	0,94	0,94	0	0	1,00	0,94	0	1,00	0,04	0,49	0,82	
50	0,20	0,70	0	0,60	0,50	0	0,22	0,30	0	0,34	0,34	0,64	0,70	0,28	0,42	0,34	0	0,28	0,34	0,34	0,32	0,81	
51	0,10	0,48	0,44	0,56	0,50	0,36	0,42	0,40	0,28	0,68	0,20	0	0,48	0,14	0	0,48	0,44	0,76	0,30	0,36	0,36	0,77	
52	0,34	0,90	0,90	1,00	0,90	0,82	0,34	0,84	0	0,90	0,34	0,36	0,88	0	0,28	0	0	0	0	0,56	0,47	0,74	
53	0,60	0,62	0,48	0,90	0,48	0,44	0,70	0	0	0,50	0,60	0	0,44	0	0,50	0,54	0,44	0	0,22	0,10	0,37	0,71	
54	0,34	0,90	0,90	1,00	0,90	0,82	0,34	0,84	0	0,90	0,34	0,36	0,88	0	0,28	0	0	0	0	0,56	0,47	0,70	
55	0	0,36	0,36	0,36	0,36	0,56	0,36	0,36	0	0,56	0,36	0	0,36	0,48	0,36	0,36	0	0,36	0,22	0,36	0,30	0,69	
56	0,50	0,62	0,70	0,56	0,36	0,50	0,30	0,40	0,42	0,36	0,48	0,62	0,44	0,64	0,60	0,40	0	0	0,60	0,44	0,44	0,68	
57	0,80	0,56	0	0,74	0,34	0,60	0,04	0,04	0,16	0,30	0	0,22	0	0	0,50	0,42	0,10	0,16	0,08	0,50	0,27	0,49	
58	0	0,34	0,54	0,54	0,28	0,48	0	0,48	0	0,48	0	0,30	0,54	0	0,36	0,48	0,56	0	0,30	0,40	0,30	0,56	
59	0,90	0,88	0,70	0,90	0,24	0,10	0,14	0,10	0	0	0,88	0,24	0,94	0,70	0,90	0,10	0,22	0,14	0,90	0,14	0,45	0,50	
60	0	0,84	0,82	0,80	0	0,30	0,22	0,80	0,28	0	0,22	0	0,62	0,84	0,80	0	0,22	0	0	0,88	0,46	0,64	
61	0,22	0,34	0,54	0,36	0,50	0,36	0,42	0,10	0,22	0,36	0,28	0	0,36	0,28	0	0,84	0	0,16					

TABLE VII.6

AVERAGE WEIGHTED RATING PER QUESTION FOR THE POPULATION	
QUESTION	AVERAGE WEIGHTED RATING
2	0,376
3	0,551
4	0,461
5	0,696
6	0,542
7	0,532
8	0,440
9	0,499
10	0,276
11	0,451
13	0,443
14	0,428
15	0,592
16	0,292
18	0,472
20	0,433
21	0,311
22	0,239
23	0,303
24	0,514

Average Physical Distribution Orientation Index for the
Target Population is 0,442

TABLE VII.7

RANKING OF THE SIX STATEMENTS BY EACH CHIEF EXECUTIVE						
FIRM CODE No.	STATEMENTS IN ORDER OF IMPORTANCE					
	1	2	3	4	5	6
1	3	2	5	1	4	6
2	4	2	5	3	6	1
3	1	3	5	4	2	6
4	1	2	3	4	6	5
5	1	6	4	5	3	2
6	1	6	2	5	3	4
7	1	5	3	4	2	6
8	1	3	2	6	4	5
9	1	3	2	6	4	5
10	3	1	4	5	2	6
11	2	1	4	5	3	6
12	1	6	4	5	2	3
13	1	6	4	5	3	2
14	1	2	3	5	4	6
15	1	6	2	4	5	3
16	5	2	1	3	6	4
17	1	2	3	4	5	6
18	1	6	2	3	5	4
19	4	6	2	1	5	3
20	5	6	3	1	4	2
21	1	5	2	6	3	4
22	1	2	3	5	4	6
23	1	6	4	5	3	2
24	1	6	2	3	4	5
25	6	5	1	3	4	2
26	3	4	5	1	2	6
27	4	1	6	2	5	3
28	1	4	2	6	3	5
29	1	5	2	4	3	6
30	1	2	3	5	6	4
31	4	6	1	5	2	3
32	4	6	3	1	5	2
33	2	5	1	3	4	6
34	2	5	3	4	6	1
35	6	1	5	2	4	3
36	3	2	4	5	1	6
37	3	1	5	2	4	6
38	1	6	2	5	3	4
39	2	3	5	4	6	1
40	4	1	5	6	2	3
41	1	6	2	3	4	5
42	3	2	6	1	5	4
43	5	4	3	2	1	6
44	1	5	3	6	2	4
45	1	4	3	6	2	5
46	3	1	2	5	4	6
47	2	5	1	3	4	6
48	3	6	2	4	5	1
49	1	3	5	2	4	6
50	6	1	4	2	3	5
51	1	6	2	3	5	4
52	1	6	4	5	3	2
53	3	6	2	1	5	4
54	1	6	4	5	3	2
55	1	4	5	3	2	6
56	3	4	5	2	6	1
57	4	1	5	3	6	2
58	1	6	2	5	3	4
59	2	6	1	5	3	4
60	3	6	2	4	1	5
61	1	6	3	5	4	2
62	5	6	3	4	1	2
63	1	6	2	4	3	5
64	3	1	4	5	2	6
65	2	6	1	3	4	5
66	5	6	1	2	4	3
67	1	5	3	2	4	6

TABLE VII.8

ORGANIZATIONAL ARRANGEMENTS FOR PHYSICAL DISTRIBUTION BY COMPANY	
FIRM CODE No.	ORGANIZATIONAL ARRANGEMENTS CODE NUMBER [⊗]
1	A
2	D
3	A
4	D
5	B
6	B
7	B
8	D
9	A
10	B
11	C
12	A
13	A
14	B
15	B
16	A
17	C
18	B
19	B
20	C
21	B
22	B
23	A
24	D
25	B
26	D
27	C
28	A
29	B
30	B
31	A
32	D
33	C
34	D
35	D
36	A
37	D
38	A
39	B
40	B
41	A
42	C
43	C
44	B
45	D
46	B
47	B
48	A
49	B
50	B
51	B
52	B
53	C
54	B
55	A
56	C
57	D
58	C
59	A
60	B
61	C
62	C
63	C
64	A
65	B
66	B
67	C

[⊗]Key to Organizational Arrangement Code Numbers:

- A = Physical distribution treated as part of the marketing or sales department.
- B = Physical distribution line activities grouped together in one department (despatch activities in particular) with physical distribution staff activities and policy making undertaken by the relevant, traditional functional departments.
- C = Physical distribution activities fragmented and dispersed throughout the firm
- D = An autonomous physical distribution department.

TABLE VII.9
 LENGTH OF TIME CHIEF EXECUTIVES HAD HELD THEIR POSITIONS

MORE THAN ONE YEAR BUT LESS THAN TWO
FIRM CODE No.
24
27
30
38
50
67

BETWEEN 2 and 5 YEARS
FIRM CODE No.
4
6
7
8
9
15
19
29
35
55
59
60
61
64
66

MORE THAN 5 YEARS
FIRM CODE No.
1
2
3
5
10
11
12
13
14
16
17
18
20
21
22
23
25
26
28
31
32
33
34
36
37
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63
65

TABLE VII.10
 VARIABLES FOR CROSS TABULATIONS INVOLVING ORGANIZATIONAL
 ARRANGEMENTS FOR PHYSICAL DISTRIBUTION

FIRM CODE No.	STOCK EXCHANGE SECTOR CODE	STRATEGY CODE	INVENTORY MODE CODE	PHYSICAL DISTRIBUTION ORIENTATION INDEX CODE	PERFORMANCE INDEX CODE	ORGANIZATIONAL ARRANGEMENTS CODE
1	6	1	1	1	1	1
2	1	1	2	1	1	4
3	3	2	3	1	1	1
4	3	1	2	3	1	4
5	2	1	2	1	1	2
6	2	1	1	1	1	2
7	2	1	3	1	1	2
8	8	1	2	1	1	4
9	6	1	1	1	1	1
10	3	3	2	1	1	2
11	3	3	1	1	2	3
12	3	1	2	1	1	1
13	2	2	1	1	1	1
14	3	2	2	1	1	2
15	3	1	3	1	1	2
16	2	1	3	1	1	1
17	5	2	1	2	1	3
18	2	1	3	1	1	2
19	2	3	1	3	2	2
20	6	2	1	2	1	3
21	2	2	3	2	1	2
22	3	2	2	1	1	2
23	8	3	2	2	1	1
24	6	1	3	2	2	4
25	3	2	3	1	2	2
26	3	4	2	1	2	4
27	3	2	2	3	2	3
28	7	2	2	2	2	1
29	2	2	3	2	2	2
30	6	1	3	1	2	2
31	2	1	1	1	2	1
32	1	2	3	3	2	4
33	4	2	2	1	2	3
34	5	2	2	1	2	4
35	3	1	2	1	2	4
	<u>Key</u> 1= Beverages and Hotels 2= Clothing, Footwear and Textiles 3= Food 4= Furniture and Household goods 5= Pharmaceutical and Medical 6= Printing and Publishing 7= Tobacco and Match 8= Miscellaneous	<u>Key</u> 1= Single Business 2= Dominant 3= Related 4= Unrelated	<u>Key</u> 1= Make to Order 2= Make for Stock 3= Combination of "to order" and "to stock"	<u>Key</u> 1= High 2= Medium 3= Low	<u>Key</u> 1= High 2= Medium 3= Low	<u>Key</u> 1= Part of marketing/sales 2= Physical distribution <u>line</u> activities grouped together, with physical distribution <u>staff</u> activities undertaken by traditional functional departments 3= Physical distribution activities fragmented 4= Autonomous physical distribution department

TABLE VII.10 (continued)
 VARIABLES FOR CROSS TABULATIONS INVOLVING ORGANIZATIONAL
 ARRANGEMENTS FOR PHYSICAL DISTRIBUTION

FIRM CODE No.	STOCK EXCHANGE SECTOR CODE	STRATEGY CODE	INVENTORY MODE CODE	PHYSICAL DISTRIBUTION ORIENTATION INDEX CODE	PERFORMANCE INDEX CODE	ORGANIZATIONAL ARRANGEMENTS CODE
36	3	2	3	2	2	1
37	7	2	2	3	2	4
38	2	2	1	2	2	1
39	1	2	2	3	2	2
40	3	1	2	2	2	2
41	2	1	1	3	2	1
42	4	2	1	2	2	3
43	2	1	1	2	2	3
44	5	1	2	2	2	2
45	1	4	2	1	3	4
46	4	2	3	3	3	2
47	4	3	3	3	3	2
48	2	4	1	2	3	1
49	3	2	3	1	3	2
50	1	1	2	3	3	2
51	8	1	3	3	3	2
52	2	1	2	1	3	2
53	2	1	1	3	3	3
54	2	2	2	1	3	2
55	7	1	2	3	3	1
56	4	2	3	2	3	3
57	5	3	2	3	3	4
58	2	1	1	3	3	3
59	3	1	2	2	3	1
60	4	3	2	3	3	2
61	2	1	1	3	3	3
62	4	1	3	3	3	3
63	2	2	1	3	3	3
64	2	1	3	3	3	1
65	2	1	1	2	3	2
66	4	2	2	3	3	2
67	2	1	1	2	3	3
	<u>Key</u> 1= Beverages and Hotels 2= Clothing, Footwear and Textiles 3= Food 4= Furniture and Household goods 5= Pharmaceutical and Medical 6= Printing and Publishing 7= Tobacco and Match 8= Miscellaneous	<u>Key</u> 1= Single Business 2= Dominant 3= Related 4= Unrelated	<u>Key</u> 1= Make to Order 2= Make for Stock 3= Combination of "to order" and "to stock"	<u>Key</u> 1= High 2= Medium 3= Low	<u>Key</u> 1= High 2= Medium 3= Low	<u>Key</u> 1= Part of marketing/sales 2= Physical distribution <u>line</u> activities grouped together, with physical distribution <u>staff</u> activities undertaken by traditional functional departments 3= Physical distribution activities fragmented 4= Autonomous physical distribution department

APPENDICES

APPENDIX ATOTAL POPULATION LISTED ACCORDING TO JOHANNESBURG STOCK EXCHANGE SECTORSBeverages and Hotels

Bertrams Wines Limited
 The South African Breweries Limited
 Suncrush Limited
 Unie Wyn Beperk

Clothing, Footwear and Textiles

Adonis Knitwear Holdings
 Berkshire International (South Africa) Limited
 Burlington Industries Limited
 Consolidated Textile Mills Investment Corporation Limited
 Delswa Limited
 Dubin Investments Limited
 Dugson Holdings Limited
 Eddels Holdings Limited
 Ensign Clothing Limited
 Hebotex Textiles Limited
 I L Back and Company Limited
 Mooi River Textiles Limited
 Natal Canvas Rubber Manufacturers Limited
 Ninian and Lester Holdings Limited
 Progress Industries Limited
 Rex Trueform Clothing Company Limited
 Romatex Limited
 Safnit Mills Limited
 Searles Holdings Limited
 South African Bias Binding Manufacturers Limited
 The South African Woollen Mills Limited
 Svenmill Limited
 Towles, Edgar Jacobs Limited
 Veka Limited

Food

Asokor Limited
 Bakers South Affica Limited
 T W Beckett and Company Limited
 Cadbury-Schweppes South Africa Limited
 Federale Voedsel Beperk
 The Imperial Cold Storage and Supply Company Limited
 Irvin and Johnson Limited
 Jabula Foods Limited
 Kanhym Investments Limited
 Karoo Vleisbeurs Beperk
 H Lewis and Company Limited
 Monis and Fattis Industries Limited
 Picardi Cannery Limited
 The Premier Milling Company Limited
 Tiger Oats and National Milling Company Limited

Furniture and Household Goods

Associated Furniture Companies Limited
 B and S Steel Furniture Company Limited
 Columbus Holdings Limited
 Duros Limited
 Gallo (Africa) Limited
 Hugh Parker Limited
 Hart Limited
 Television and Electrical Holdings Limited

Motor

Dunlop (South Africa) Limited
 The General Tyre and Rubber Company (South Africa) Limited
 Toyota (South Africa) Limited

Paper and Packaging

Carlton Paper Corporation Limited

Pharmaceutical and Medical

Adcock Ingram Limited
 Alex Lipworth Limited
 Dermacult Limited
 General Optical Company Limited
 Shulton Africa Limited
 South African Druggists Limited

Printing and Publishing

Die Afrikaanse Pers (1962) Beperk
 Argus Printing and Publishing Company Limited
 Caxton Limited
 Eastern Province Newspapers Limited
 Mathieson and Ashley
 South African Associated Newspapers Limited

Tobacco and Match

The Lion Match Company Limited
 Rembrandt Group Limited
 Utico Holdings

Preference Shares (where Company not otherwise listed)

Cavalla Limited
 Cerebos (Africa) Limited

Debentures (where Company not otherwise listed)

Stellenbosch Wine Trust Limited

APPENDIX BTOTAL POPULATION LISTED ACCORDING TO STRATEGIC CATEGORYSingle Business

Die Afrikaanse Pers (1962) Beperk
 Adonis Knitwear Holdings
 Alex Lipworth Limited
 Argus Printing and Publishing Company Limited
 T W Beckett and Company Limited
 Berkshire International (South Africa) Limited
 Bertrams Wines Limited
 Burlington Industries Limited
 Cadbury-Schweppes South Africa Limited
 Carlton Paper Corporation Limited
 Cavalla Limited
 Caxton Limited
 Cerebos (Africa) Limited
 Consolidated Textile Mills Investment Corporation Limited
 Delswa Limited
 Dugson Holdings Limited
 Duros Limited
 Ensign Clothing Limited
 Eastern Province Newspapers Limited
 I L Back and Company Limited
 The Imperial Cold Storage and Supply Company Limited
 Irvin and Johnson Limited
 Ninian and Lester Holdings Limited
 Picardi Cannery Limited
 Progress Industries Limited
 Rex Trueform Clothing Company Limited
 Safnit Mills Limited
 Shulton Africa Limited
 South African Associated Newspapers Limited
 The South African Woollen Mills Limited
 Stellenbosch Wine Trust Limited
 Svenmill Limited
 Towles, Edgar Jacobs Limited
 Toyota (South Africa) Limited
 Utico Holdings
 Veka Limited

Dominant Vertical

Asokor Limited
 B and S Steel Furniture Company Limited
 Eddels Holdings Limited
 General Optical Company Limited
 Hebotex Textiles Limited
 Karoo Vleisbeurs Beperk
 Mooi River Textiles Limited
 South African Druggists Limited
 Unie Wyn Beperk

Dominant Constrained

Bakers South Africa Limited
 Columbus Holdings Limited
 Jabula Foods Limited
 H Lewis and Company Limited
 The Lion Match Company Limited
 Mathieson and Ashley
 Tiger Oats and National Milling Company Limited

Dominant Linked

Dunlop South Africa Limited
 Hart Limited
 Natal Canvas Rubber Manufacturers Limited
 Rembrandt Group Limited
 Romatex Limited

Dominant Unrelated

Associated Furniture Companies Limited
 Dubin Investments Limited
 Hugh Parker Limited
 Monis and Fattis Industries Limited
 Suncrush Limited

Related Constrained

Federale Voedsel Beperk
 Gallo (Africa) Limited
 The General Tyre and Rubber Company Limited

Related Linked

Dermacult Limited
 Kanhym Investments Limited
 Television and Electrical Holdings Limited
 South African Bias Binding Manufacturers Limited

Unrelated Passive

Searles Holdings

Conglomerate

Adcock Ingram Limited
 The Premier Milling Company Limited
 The South African Breweries Limited

APPENDIX C

POPULATION LISTED ACCORDING TO STRATEGIC CATEGORY TOGETHER WITH AVERAGE RETURN ON INVESTMENT, STANDARD DEVIATION AND PERFORMANCE INDEX

STRATEGIC CATEGORY	COMPANY	AVERAGE RETURN ON INVESTMENT FOR 1976-1978	STANDARD DEVIATION	PERFORMANCE INDEX (P.I.)
(1)	(2)	(3)	(4)	(5)
Single Business	Die Afrikaanse Pers	15,46	1,50	1,06
	Adonis Knitwear Holdings	12,79	1,46	0,88
	Alex Lipworth Ltd	12,83	0,54	0,88
	Argus Printing and Publishing	16,45	0,15	1,13
	T W Beckett and Co	18,53	1,54	1,27
	Berkshire International	21,46	3,12	1,47
	Bertrams Wines Ltd	11,76	2,36	0,81
	Burlington Industries	13,93	0,74	0,95
	Cadbury-Schweppes	17,73	0,89	1,21
	Carlton Paper Corporation	20,63	2,90	1,41
	Cavalla Ltd	35,66	6,06	2,44
	Caxton Ltd	18,73	5,31	1,28
	Cerebos (Africa) Ltd	14,1	4,27	0,97
	Consolidated Textile Mills	10,8	4,49	0,74
	Delswa Ltd	15,33	6,84	1,05
	Dugson Holdings	3,26	2,34	0,22
	Duros Ltd	4,56	4,02	0,31
	Ensign Clothing Ltd	3,6	2,89	0,25
	Eastern Province Newspapers	27,3	0,64	1,87
	I L Back and Co	-7,8	10,74	-0,53
	Imperial Cold Storage	23,56	0,74	1,61
	Irvin and Johnson	14,9	2,33	1,02
	Ninian and Lester	17,36	6,94	1,19
	Picardi Canners Ltd	7,23	3,29	0,50
	Progress Industries	10,4	3,39	0,71
	Rex Trueform	22,73	6,01	1,56
	Safnit Mills	17,33	0,59	1,19
	[Shulton Africa]	[100,86]	[18,38]	-
	South African Associated Newspapers	19,96	1,67	1,37
	South African Woollen Mills	22,9	6,58	1,57
	Stellenbosch Wine Trust	24,43	1,02	1,67
	Svenmill Ltd	6,5	3,69	0,45
	Towles, Edgar Jacobs	8,13	2,24	0,56
Toyota (South Africa)	11,23	2,23	0,77	
Utico Holdings	10,03	1,81	0,69	
Veka Ltd	7,26	2,54	0,50	
	STATISTICS FOR "SINGLE BUSINESS" CATEGORY AS A WHOLE	14,60	7,30	
Dominant Vertical	Asokor Ltd	20,86	0,61	1,17
	B and S Steel Furniture Co	17,16	3,63	0,96
	Eddels Holdings Ltd	4,7	3,67	0,26
	General Optical Co	21,66	0,65	1,21
	Hebotex Textiles	19,46	4,41	1,09
	Karoo Vleisbeurs Bpk	22,6	1,48	1,27
	Mooi River Textiles	17,93	5,74	1,00
	South African Druggists	18,6	1,46	1,04
	Unie Wyn Bpk	17,8	0,43	1,00
	STATISTICS FOR "DOMINANT VERTICAL" CATEGORY AS A WHOLE	17,86	5,27	
Dominant Constrained	Bakers South Africa	17,0	2,33	0,82
	Columbus Holdings	1,86	2,43	0,09
	Jabula Foods	35,23	2,21	1,71
	H Lewis and Co	21,16	0,51	1,03
	The Lion Match Co	20,8	1,2	1,01
	Mathieson and Ashley	24,63	1,95	1,19
	Tiger Oats and National Milling	23,7	0,37	1,15
	STATISTICS FOR "DOMINANT CONSTRAINED" CATEGORY AS A WHOLE	20,62	10,03	

APPENDIX C (continued)

POPULATION LISTED ACCORDING TO STRATEGIC CATEGORY TOGETHER WITH AVERAGE RETURN ON INVESTMENT, STANDARD DEVIATION AND PERFORMANCE INDEX

STRATEGIC CATEGORY (1)	COMPANY (2)	AVERAGE RETURN ON INVESTMENT FOR 1976-1978 (3)	STANDARD DEVIATION (4)	PERFORMANCE INDEX (P.I.) (5)
Dominant Linked	Dunlop South Africa	18,70	2,08	1,02
	Hart Ltd	19,13	5,09	1,04
	Natal Canvas and Rubber	12,86	2,02	0,70
	Rembrandt Group Ltd	19,83	5,46	1,08
	Romatex Ltd	21,6	6,74	1,17
	STATISTICS FOR THE "DOMINANT LINKED" CATEGORY AS A WHOLE		18,42	3,30
Dominant Unrelated	Associated Furniture Companies	14,13	1,64	0,88
	Dubin Investments	20,56	4,01	1,29
	Hugh Parker Ltd	10,83	3,09	0,68
	Monis and Fattis Industries	17,5	0,43	1,10
	Suncrush Ltd	16,83	0,99	1,05
	STATISTICS FOR THE "DOMINANT UNRELATED" CATEGORY AS A WHOLE		15,97	3,67
Related Constrained and Related Linked	Federale Voedsel Bpk	28,13	5,63	1,73
	Gallo (Africa) Ltd	10,4	4,10	0,64
	General Tyre and Rubber	24,03	0,79	1,48
	Dermacult Ltd	8,00	1,34	0,49
	Kanhym Investments	16,73	1,43	1,03
	Television and Electrical	11,05	0,81	0,68
South African Bias Binding	15,23	1,67	0,94	
STATISTICS FOR THE "RELATED" CATEGORIES AS A WHOLE		16,22	7,44	
Unrelated Passive and Conglomerate	Searles Holdings	15,73	1,89	0,83
	Adcock-Ingram	21,76	0,24	1,15
	Premier Milling Co	21,3	1,98	1,13
	South African Breweries	16,7	0,45	0,89
STATISTICS FOR THE "UNRELATED" CATEGORY AS A WHOLE		18,87	3,09	

APPENDIX D
QUESTIONNAIRE

PART A

The purpose of PART A of this survey is to gauge the opinions and attitudes of top executives in South African companies with regard to certain topics. There are thus no right or wrong answers. What is important is your PERSONAL opinion.

You are required to make a tick (✓) on each scale at the point which best describes your opinion or attitude with regard to each statement.

You may make a mark ANYWHERE on the scale. The point marked on each scale represents the mid-point of the scale and is there for your guidance.

Do not spend too much time studying each statement in PART A. It is your first impression and immediate response which is important.

EXAMPLE

The chief executive should participate in every very important business decision.

TRUE A B FALSE
 ✓ ✓ |

Point A reflects strong agreement with the statement, whereas, point B represents only slight agreement.

1. The chief executive should participate in every very important business decision.

FALSE _____ TRUE

2. When you make decisions about any aspect of the company's activity, profit is :-

VERY _____ SOMETIMES NOT
IMPORTANT SO IMPORTANT

3. Different departments responsible for different physical distribution activities such as warehousing, finished goods inventory, order processing and transportation must set objectives which are consistent with the overall profit objectives of the company.

THIS IS		THIS IS
ALWAYS	_____ _____	SOMETIMES
NECESSARY		NECESSARY

-
4. The chief executive is responsible for ensuring that "the consumer is king" is accepted as a philosophy of business by managers in departments responsible for physical distribution functions such as warehousing finished goods inventory, order processing or transportation.

DEFINITELY	_____ _____	DEFINITELY
FALSE		TRUE

5. The company's organization structure should allow for the very best co-ordination and co-operation between all physical distribution activities such as warehousing, finished goods inventory, order processing or transportation.

THIS IS
ALWAYS
NECESSARY



THIS IS
SOMETIMES NOT
NECESSARY

-
6. If the price is right, a customer will buy from a supplier regardless of the level of physical distribution service provided in the way of delivery or stock availability, for example.

SOMETIMES
FALSE



ALWAYS
TRUE

7. Departments responsible for physical distribution functions such as warehousing, finished goods inventory, order processing or transportation, must co-ordinate their activities toward achieving company goals.

DEFINITELY		DEFINITELY
NOT ALWAYS	_____ _____	ALWAYS
TRUE		TRUE

-
8. If the salesforce is effective, the customer will buy from a supplier regardless of the level of physical distribution service provided in the way of delivery or stock availability, for example.

ALWAYS	_____ _____	SOMETIMES
TRUE		FALSE

9. A firm must be organized in such a way that different departments responsible for different physical distribution functions co-operate and discuss ways to satisfy the packaging, delivery, service and other physical distribution needs of their customers.

THIS IS		THIS IS
NOT	_____ _____	VERY
IMPORTANT		IMPORTANT

-
10. The manger(s) responsible for the physical distribution functions must participate in formulating overall company strategy.

DEFINITELY		DEFINITELY
ALWAYS	_____ _____	NOT ALWAYS
TRUE		TRUE

11. Departments responsible for physical distribution functions must be concerned with the customers' physical distribution needs such as packaging, delivery and stock availability, for example.

ALWAYS NOT ALWAYS
TRUE _____ TRUE

12. If a company's product is superior, consumers will buy from that company regardless of the level of physical distribution services provided in the way of delivery or stock availability, for example.

SOMETIMES ALWAYS
FALSE _____ TRUE

13. A position, the responsibility of which is the co-ordination and integration of the various physical distribution activities, must exist in every firm.

ALWAYS		NOT ALWAYS
TRUE	_____ _____	TRUE

-
14. A consideration of the needs of customers and ways of meeting those needs, whatever they may be, must play a critical role in the chief executive's planning and policy making.

THIS IS		THIS IS
VERY	_____ _____	SOMETIMES
IMPORTANT		NOT IMPORTANT

15. When a chief executive has to decide on expanding physical distribution facilities such as warehouses, transport fleets and inventory levels, cost factors as identified by the finance department are more important than sales forecasts.

DISAGREE _____ | _____ AGREE

-
16. The basic principles of business which are regarded as important, differ from firm to firm.

TRUE _____ | _____ FALSE

17. In any company, who would you say is more important:

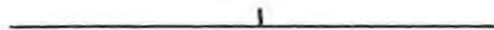
DISTRIBUTION
MANAGER

TRANSPORTATION
MANAGER



18. It is not necessary for an experienced executive to have marketing research information available to know what consumers want in the way of products.

DISAGREE



AGREE

19. The accounting/finance department is in the final analysis, the most important department in the company.

ALWAYS

NOT ALWAYS

TRUE

TRUE

-
20. It is not necessary for an experienced executive to have marketing research information available to know what his customers want in the way of physical distribution services such as delivery, packaging and stock availability, for example.

AGREE

DISAGREE

23. Efficient management of physical distribution is indispensable to a company fulfilling demand for its products and contributing to a satisfactory bottom line on the company's profit and loss account.

DISAGREE



AGREE

PART B

Rank the six statements listed on the next page in order of importance.

Place a "1" beside the statement which in your opinion is the most important;

Place a "2" beside the statement which in your opinion is the second most important;

Place a "3" beside the statement which in your opinion is the third most important;

Place a "4" beside the statement which in your opinion is the fourth most important;

Place a "5" beside the statement which in your opinion is the fifth most important;

Place a "6" beside the statement which in your opinion is the least important.

Once again there are no right or wrong answers. What is important is your PERSONAL opinion.

RANKING

1. It is necessary for the chief executive to ensure that an on-going consideration of the customer is accepted as a philosophy of business by managers in departments responsible for physical distribution activities such as warehousing, finished goods inventory, order processing and transportation.

2. One man should be made responsible for co-ordinating and integrating the various physical distribution activities within a firm.

3. It is essential to take into account the needs of customers when making decisions relating to physical distribution functions such as warehousing, finished goods inventory, order processing and transportation, for example.

4. In any decision to expand or contract physical distribution facilities such as warehousing, transport fleets and inventory levels, their impact on both sales and costs must be considered.

5. It is important to organize the company in such a way that all departments responsible for physical distribution activities can co-ordinate and integrate their activities so as to satisfy the physical distribution needs of customers.

6. The optimum physical distribution system for a company is neither the one which facilitates the highest sales nor the one with the lowest costs, but rather the one which yields the greatest difference between costs and revenues.

PART C

PLEASE PLACE A TICK (✓) IN THE APPROPRIATE BLOCKS

- 1. In your company, which of the following departments is responsible for setting policies relating to the transportation of finished products to customers?

Marketing Department

Distribution Department

Sales Department

Production Department

Finance Department

Other, please specify

.....

Comments, if any:

.....

.....

- 2. Is the department which is responsible for setting transportation policies also responsible for the day to day implementation of those policies?

YES

NO

- 3. If the answer to Question 2 is NO, please specify which department is responsible for the day to day implementation of transportation policies.

.....

.....

.....

4. In your company, which of the following departments is responsible for setting policies relating to inventory levels of finished products?

- Marketing Department
- Distribution Department
- Sales Department
- Production Department
- Finance Department
- Other, please specify
-

Comments, if any:
.....
.....

5. Is the department which is responsible for setting finished goods inventory policies, also responsible for the day to day implementation of those policies?

- YES
- NO

6. If the answer to Question 5 is NO, please specify which department is responsible for the day to day implementation of finished goods inventory policies.
.....
.....
.....

7. In your company, which of the following departments is responsible for setting policies relating to order processing?

- Marketing Department
- Distribution Department
- Sales Department
- Finanace / Accounting Department
- Other, please specify
-

8. Is the department which is responsible for setting order processing policies also responsible for the day to day implementation of those policies?

- YES
- NO

9. If the answer to Question 8 is NO, please specify which department is responsible for the day to day implementation of order processing policies.

.....

10. In your company, which of the following departments is responsible for policies regarding the size, number, location, etc of warehouses?

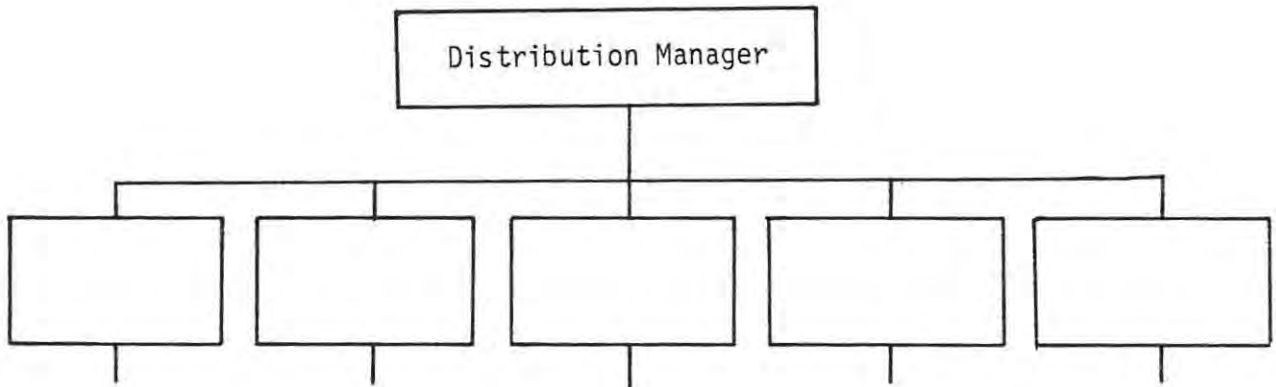
- Production Department
- Marketing Department
- Sales Department
- Distribution Department
- Other, please specify
-

11. Does your company have a separate distribution department?

YES
NO

12. If the answer to Question 11 is YES, please complete the following organization chart for your distribution department showing the functions for which it is responsible and the way they are linked.

ORGANIZATION CHART OF DISTRIBUTION DEPARTMENT



13. To whom does the Distribution Manager report?

.....
.....
.....

14. Which of the following best describes the situation for your most important products?

Manufacturing to order(s)

Manufacturing for stock from which orders are filled

A combination of manufacturing to orders and manufacturing for stock

PART D

PLEASE PLACE A TICK (✓) IN THE APPROPRIATE BLOCK

1. For how many years have you been managing director of your present company?

- Less than one year
- Between 1 and 2 years
- Between 2 and 5 years
- More than 5 years

.....
.....

2. YOUR NAME:

ADDRESS:

.....
.....
.....

3. PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE ENCLOSED STAMPED, SELF-ADDRESSED ENVELOPE.

Thank you very much for your kind co-operation.

APPENDIX E



RHODES UNIVERSITY · GRAHAMSTOWN

P.O. Box 94, Grahamstown, 6140 South Africa
Telegrams 'Rhodescol' Telex 74 7227 Telephone (0461)

EXAMPLE OF COVERING LETTER SENT
TOGETHER WITH THE QUESTIONNAIRE TO MEMBERS OF THE TARGET POPULATION

Your reference

In your reply please quote

Date

Dear Sir

I am a Professor in the Department of Business Administration at Rhodes University and I am currently engaged in research on South African managing directors' attitudes towards physical distribution. I would thus be .. extremely grateful if you would kindly undertake to complete the enclosed questionnaire and return it to me at your earliest convenience in the stamped, self-addressed envelope which is enclosed.

Although it may appear a lengthy document, it does not take more than half-an-hour on average to complete. It is an opinion survey and no reference to company documents for specific items of information is required. On the grounds that the results are going to be aggregated, I can give you a guarantee of complete confidentiality and anonymity. It will not be possible for anyone to separate out the results of any one company.

I am conscious of the fact that I am encroaching on the time of a very busy man but trust that you will be sympathetic to my research endeavours. I shall be pleased to send you a summary of my research results when the project is completed at the end of 1980.

I look forward to hearing from you in the near future.

Yours sincerely

PROFESSOR G E STAUDE

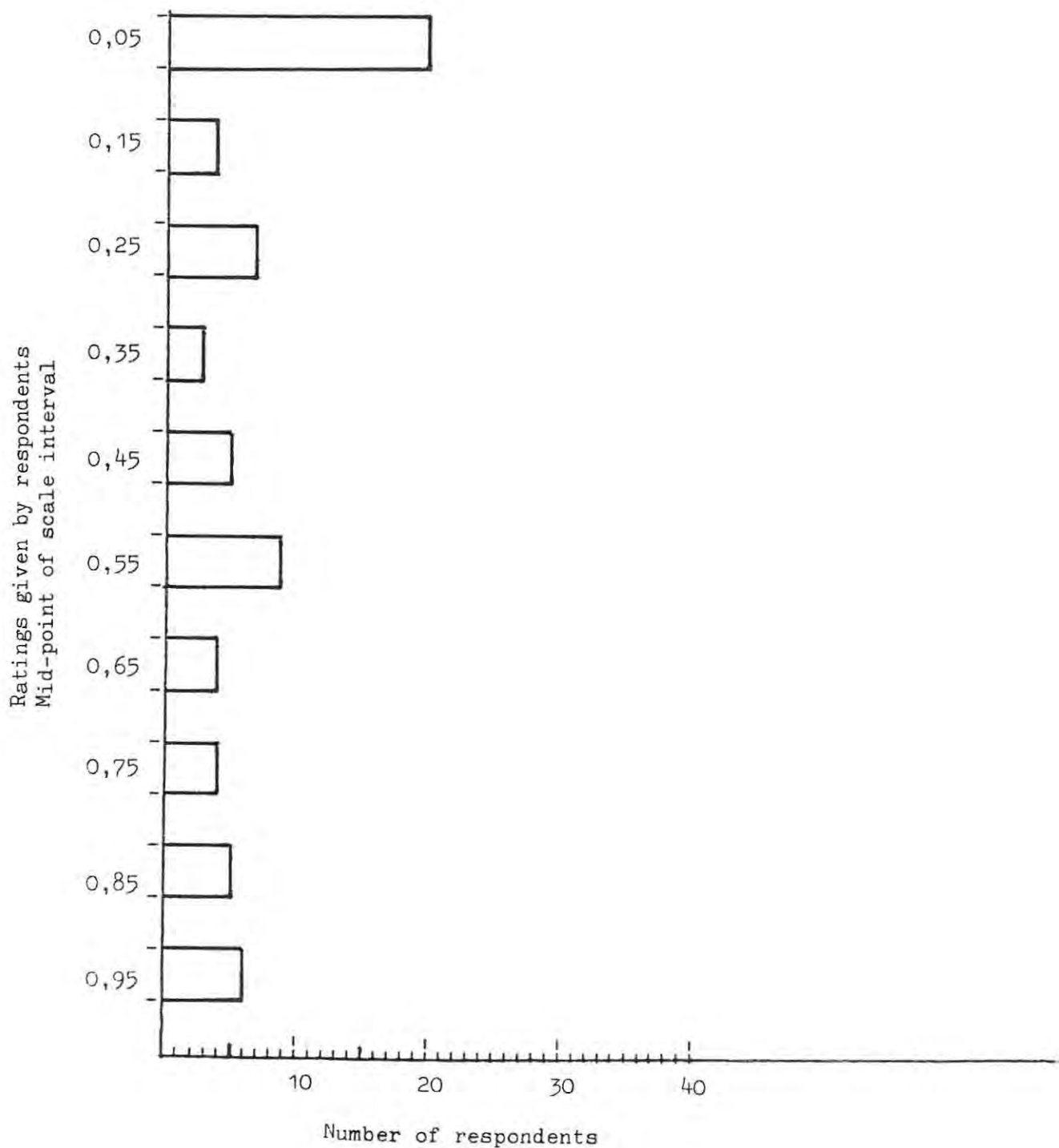
Encls.

APPENDIX F

GRAPHICAL PRESENTATION OF WEIGHTED RATINGS PFR QUESTION

FIGURE 1

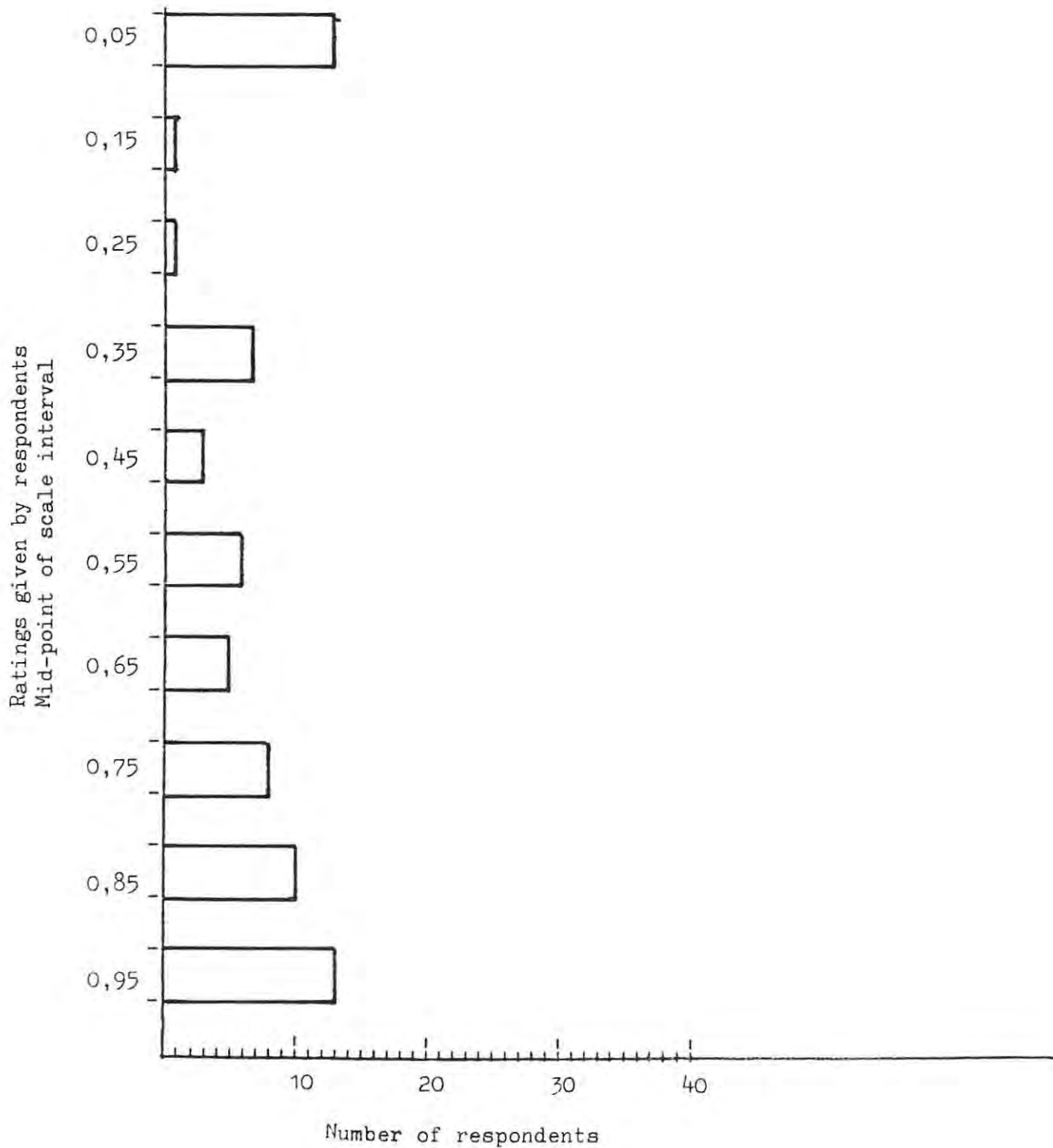
Question 2: When you make decisions about any aspect of the company's activity, profit is:
VERY IMPORTANT/SOMETIMES NOT SO IMPORTANT



APPENDIX F

FIGURE 2

Question 3: Different departments responsible for different physical distribution activities such as warehousing, finished goods inventory, order processing and transportation must set objectives which are consistent with the overall profit objectives of the company.



APPENDIX F

FIGURE 3

Question 4: The chief executive is responsible for ensuring that "the consumer is king" is accepted as a philosophy of business by managers in departments responsible for physical distribution functions such as warehousing, finished goods inventory, order processing or transportation.

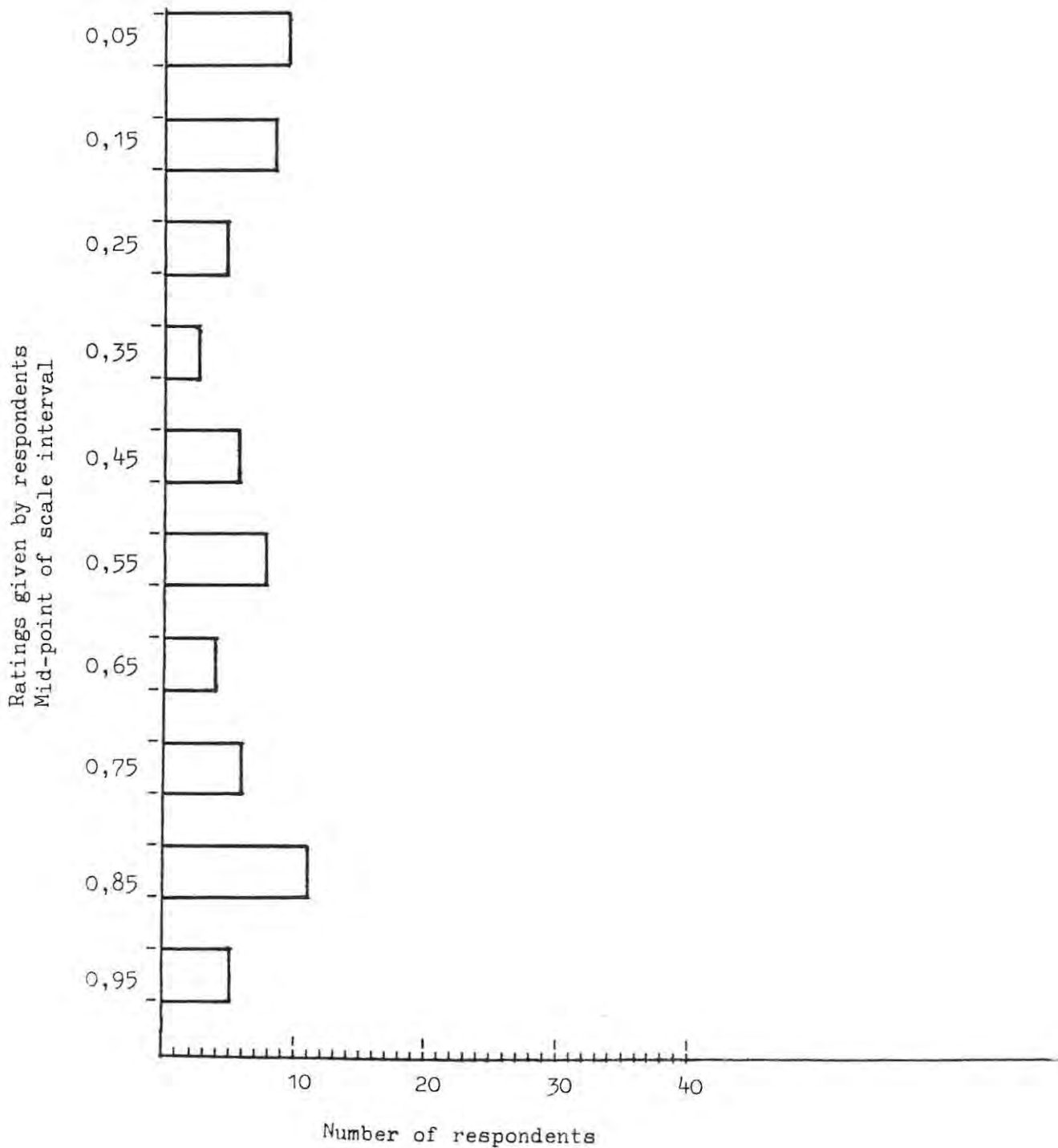
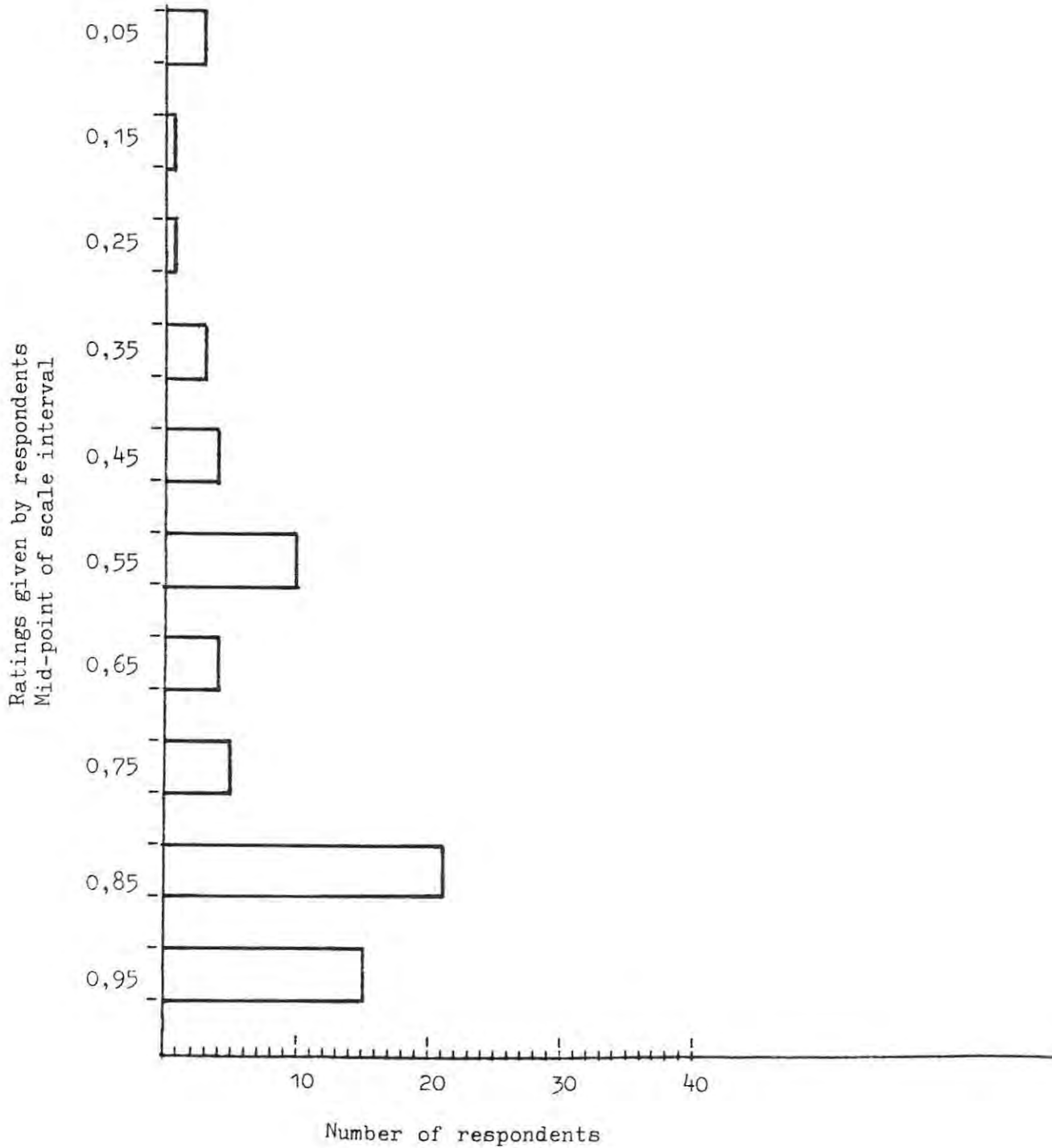


FIGURE 4

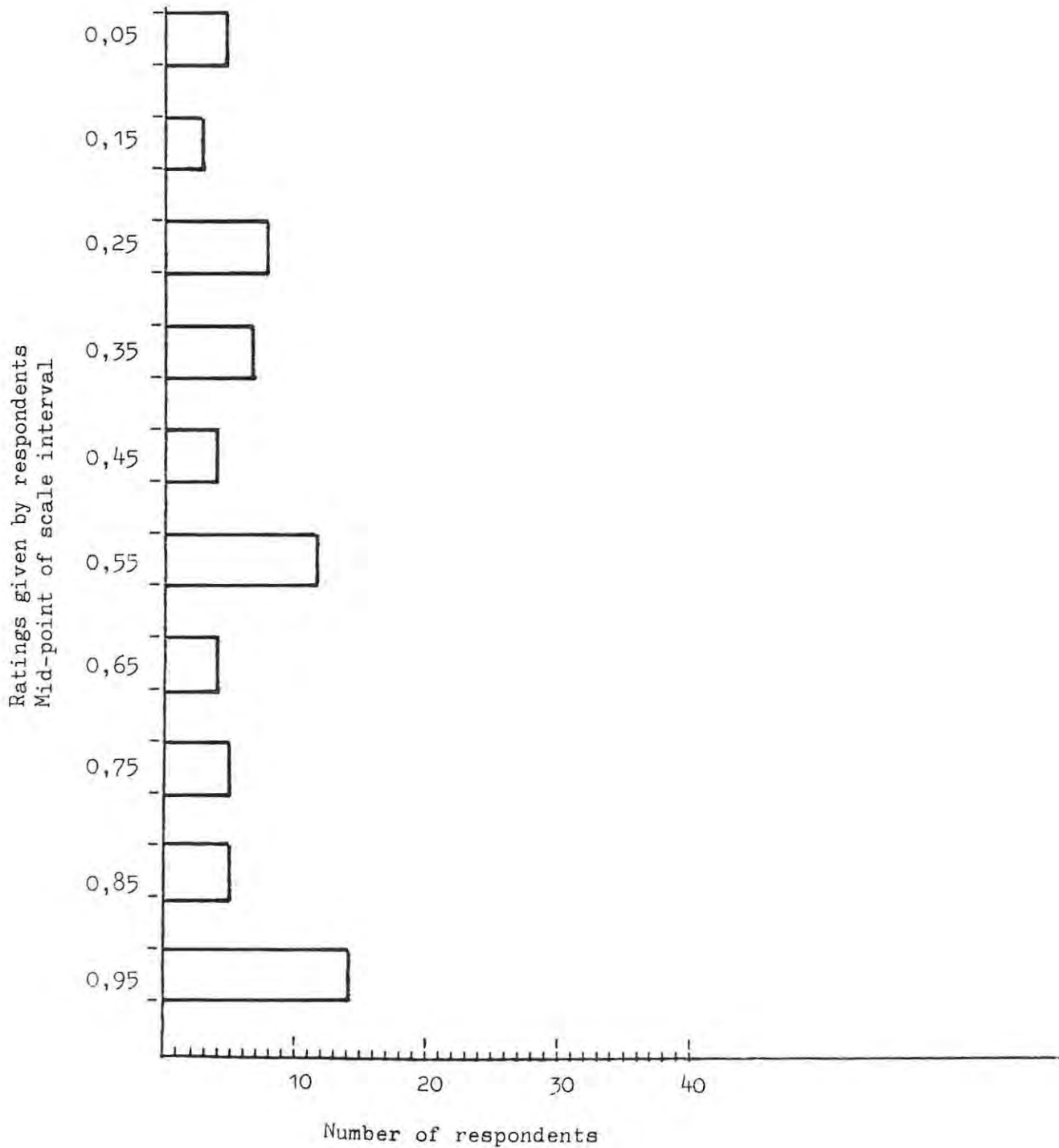
Question 5: The company's organization structure should allow for the very best co-ordination and co-operation between all physical distribution activities such as warehousing, finished goods inventory, order processing or transportation.



APPENDIX F

FIGURE 5

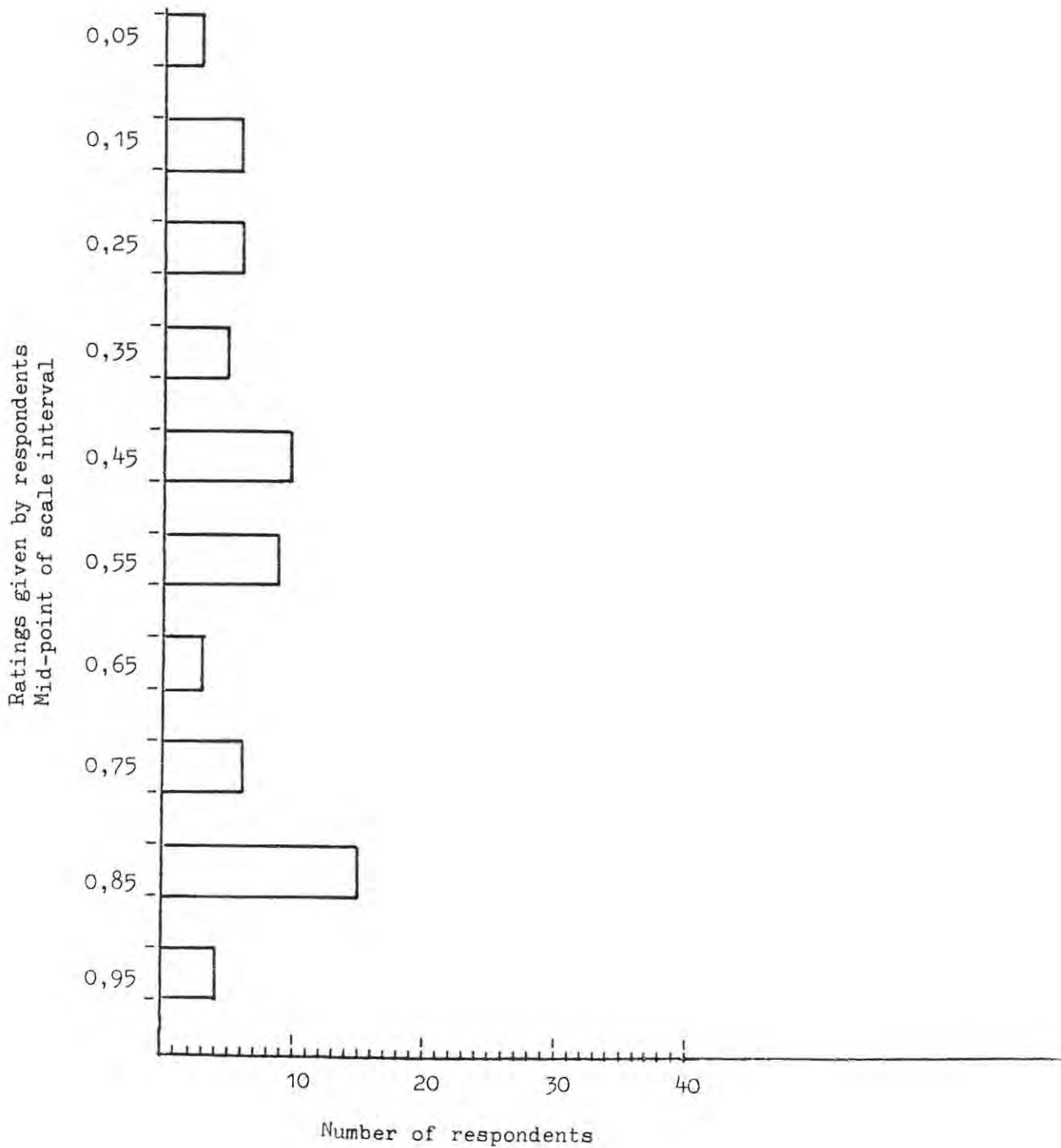
Question 6: If the price is right, a customer will buy from a supplier regardless of the level of physical distribution service provided in the way of delivery or stock availability, for example.



APPENDIX F

FIGURE 6

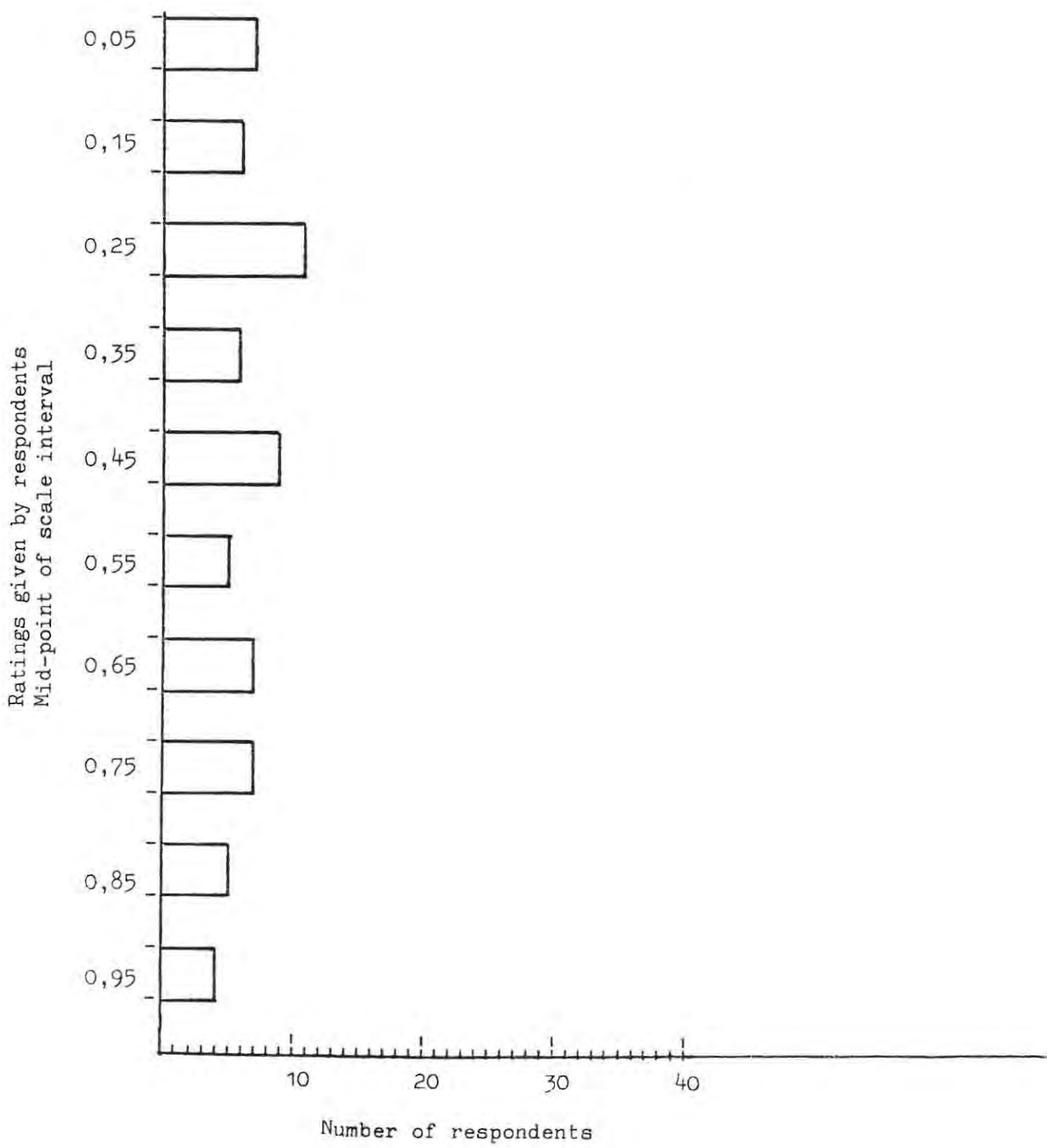
Question 7: Departments responsible for physical distribution functions such as warehousing, finished goods inventory, order processing or transportation; must co-ordinate their activities toward achieving company goals.



APPENDIX F

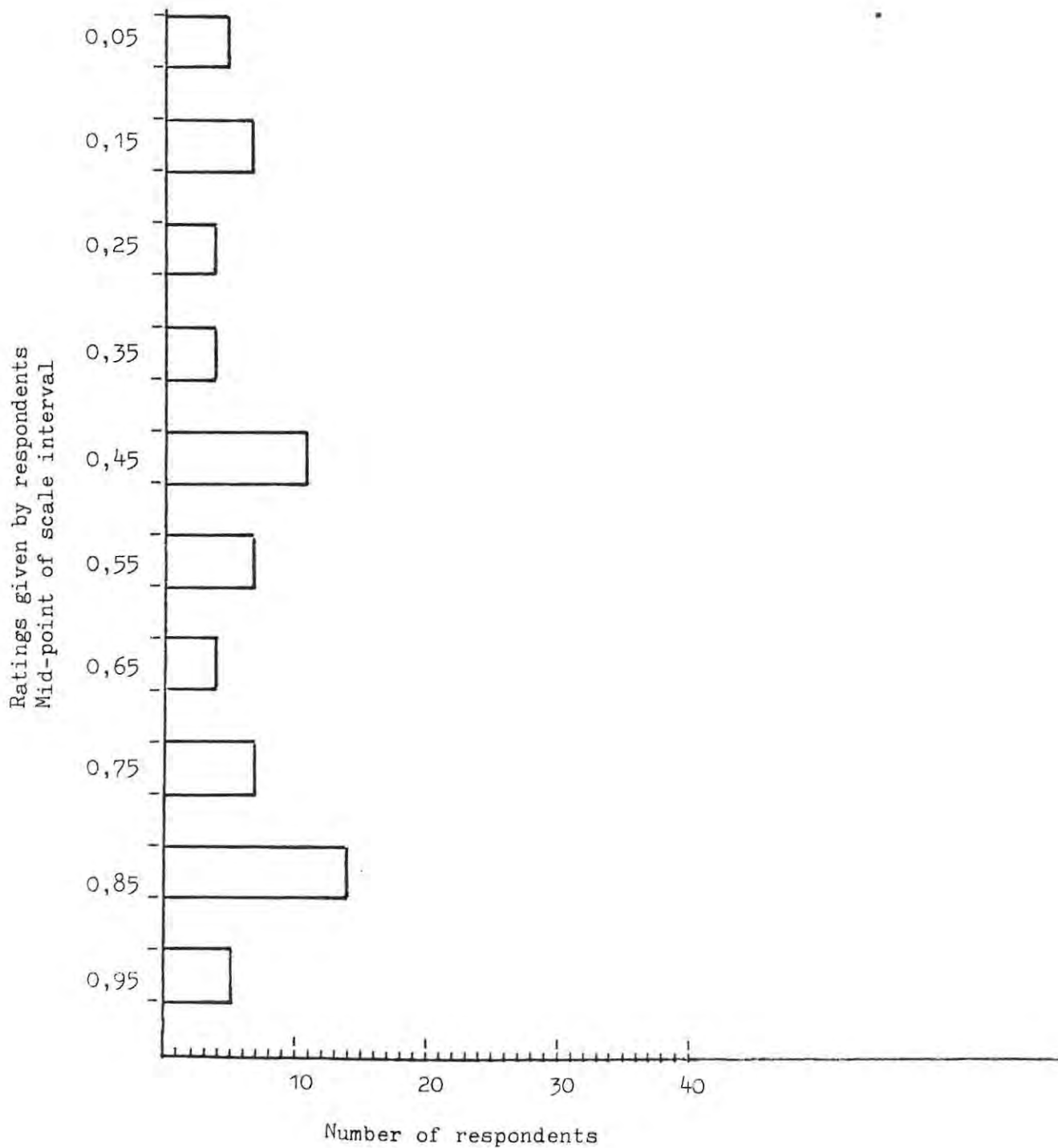
FIGURE 7

Question 8: If the sales force is effective; the customer will buy from a supplier regardless of the level of physical distribution service provided in the of delivery or stock availability, for example.



APPENDIX FFIGURE 8

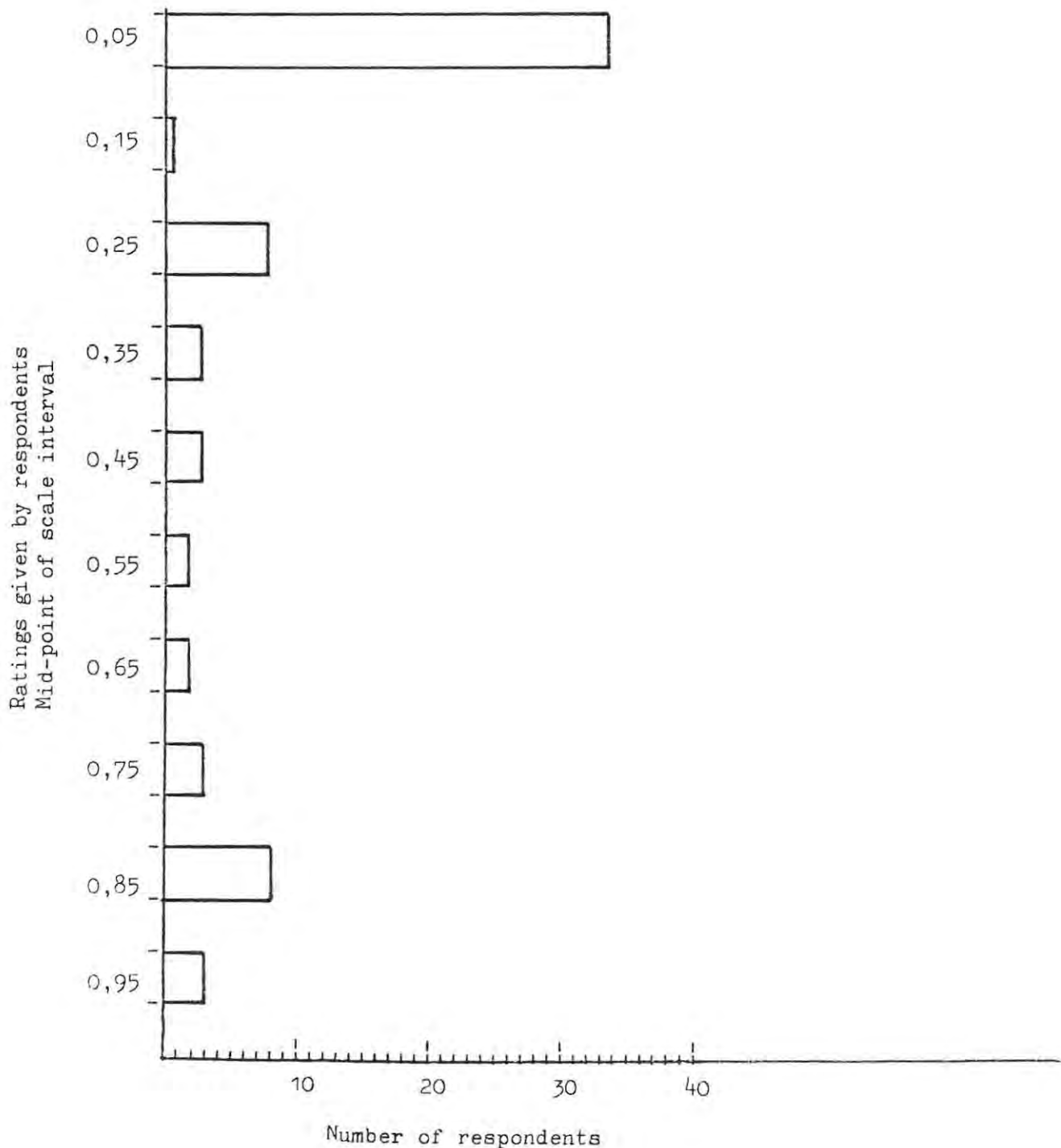
Question 9: A firm must be organized in such a way that different departments responsible for different physical distribution functions co-operate and discuss ways to satisfy the packaging, delivery, service and other physical distribution needs of their customers.



APPENDIX F

FIGURE 9

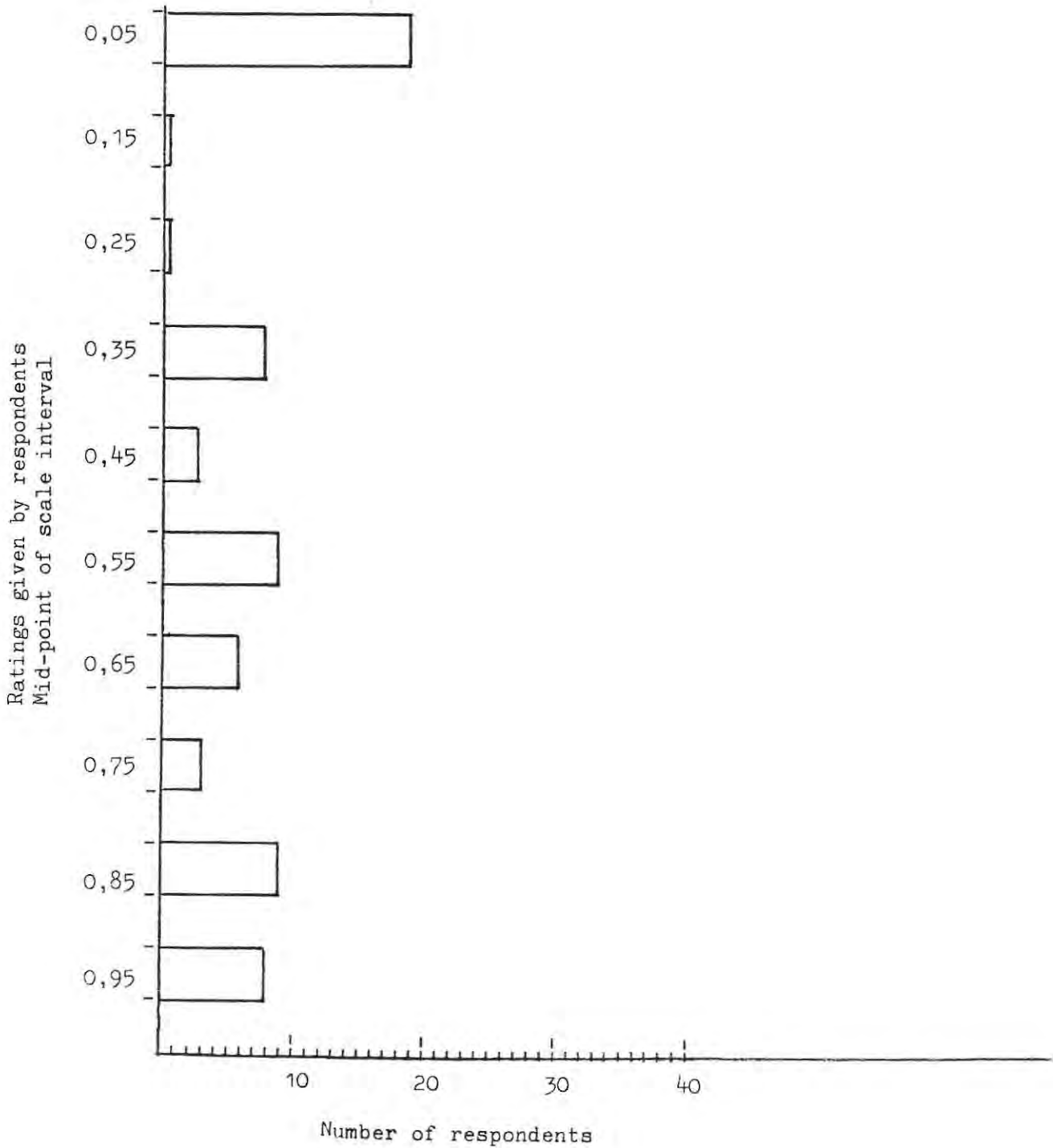
Question 10: The manager(s) responsible for the physical distribution functions must participate in formulating overall company strategy.



APPENDIX F

FIGURE 10

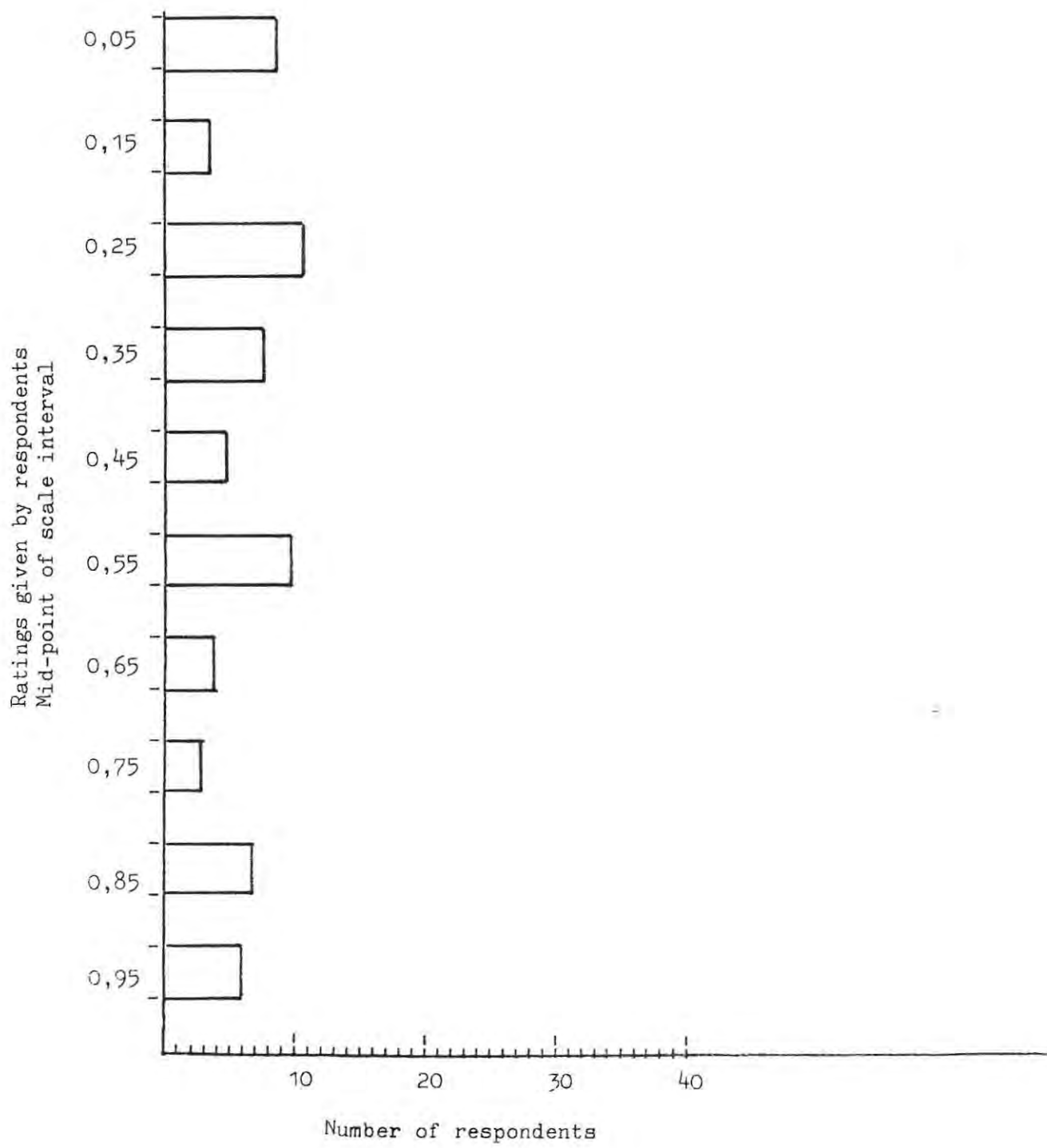
Question 11: Departments responsible for physical distribution functions must be concerned with the customers' physical distribution needs such as packaging, delivery and stock availability, for example.



APPENDIX F

FIGURE 11

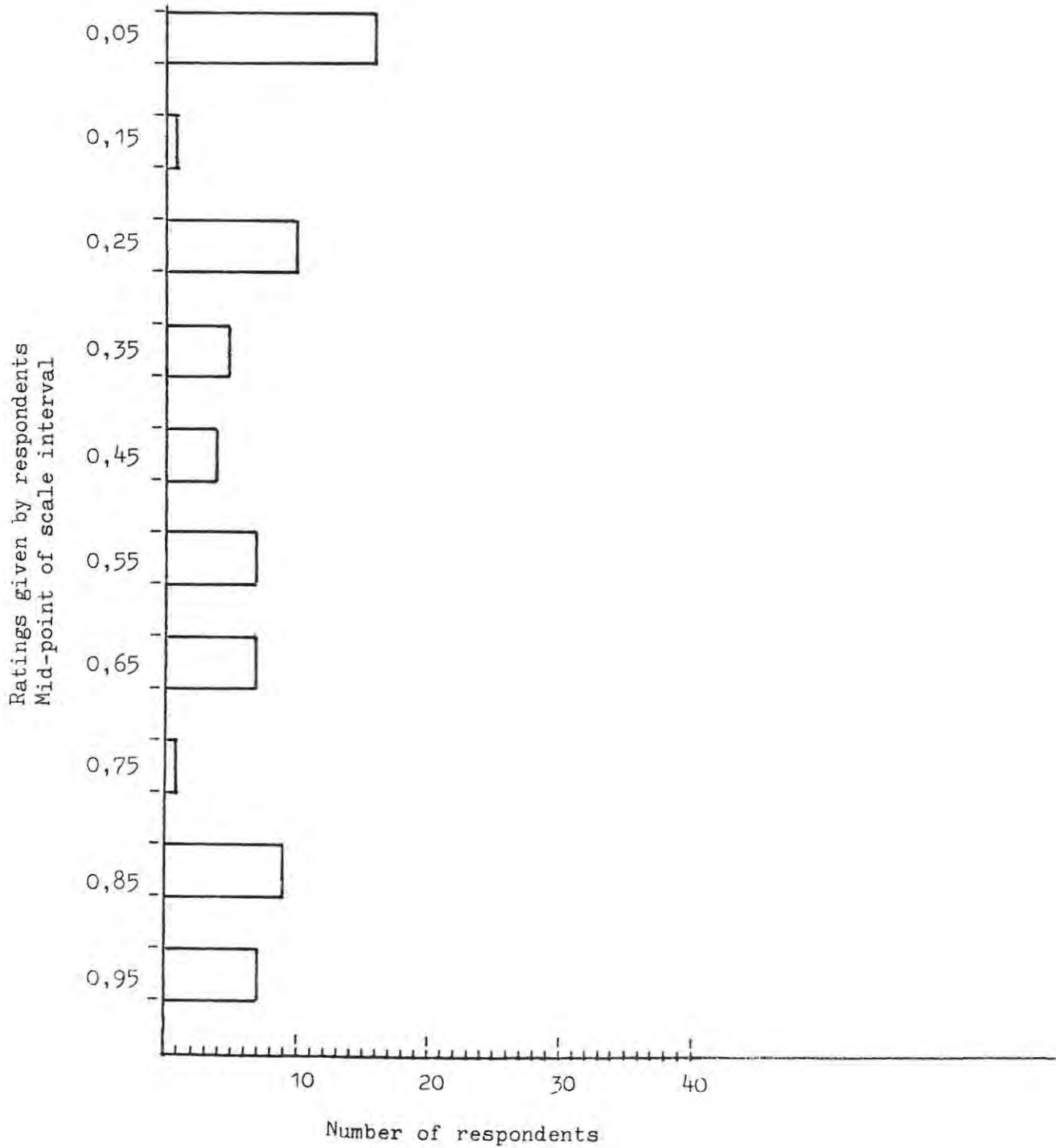
Question 12: If a company's product is superior, consumers will buy from that company regardless of the level of physical distribution services provided in the way of delivery or stock availability, for example.



APPENDIX F

FIGURE 12

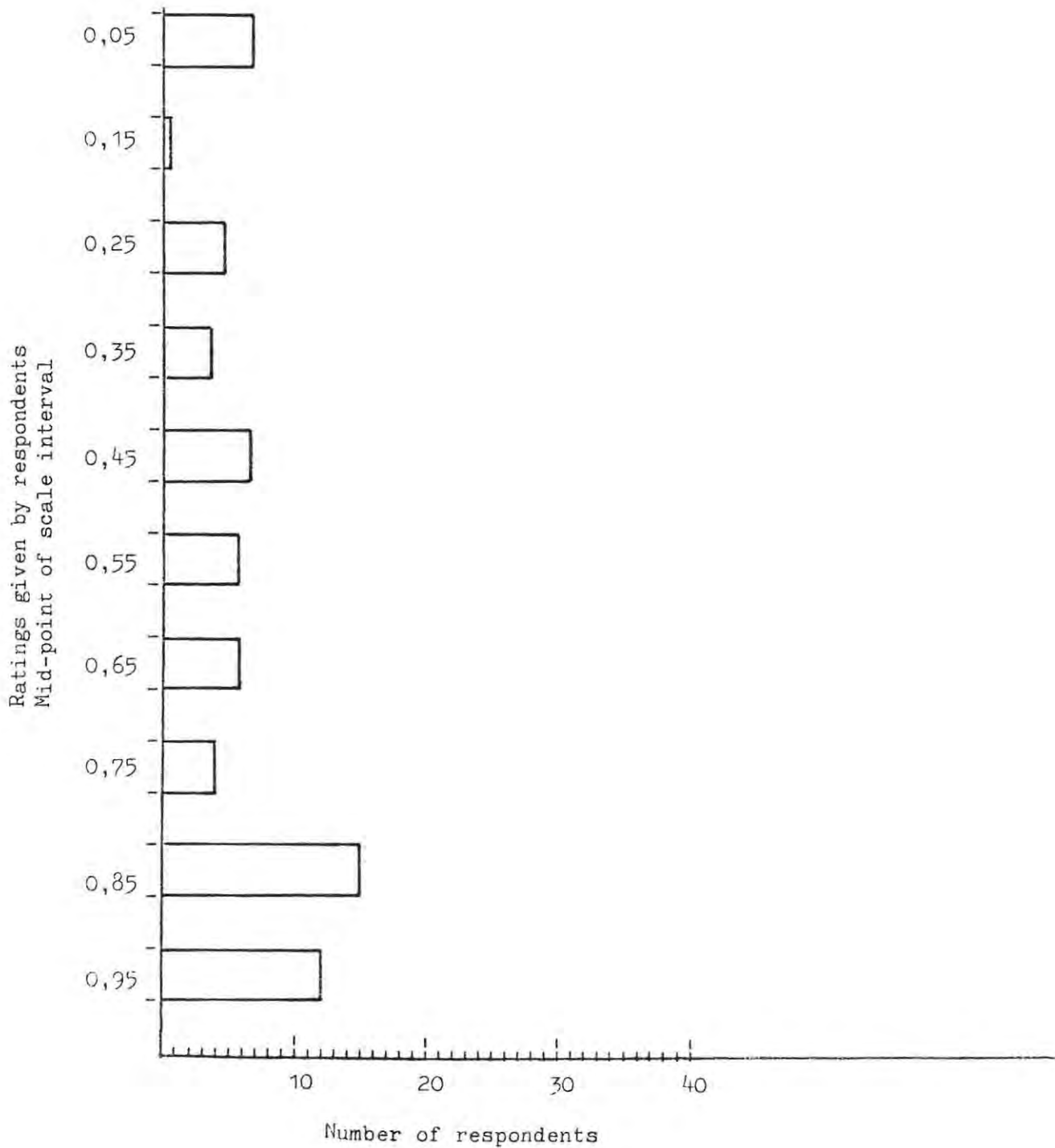
Question 13: A position, the responsibility of which is the co-ordination and integration of the various physical distribution activities, must exist in every firm.



APPENDIX F

FIGURE 13

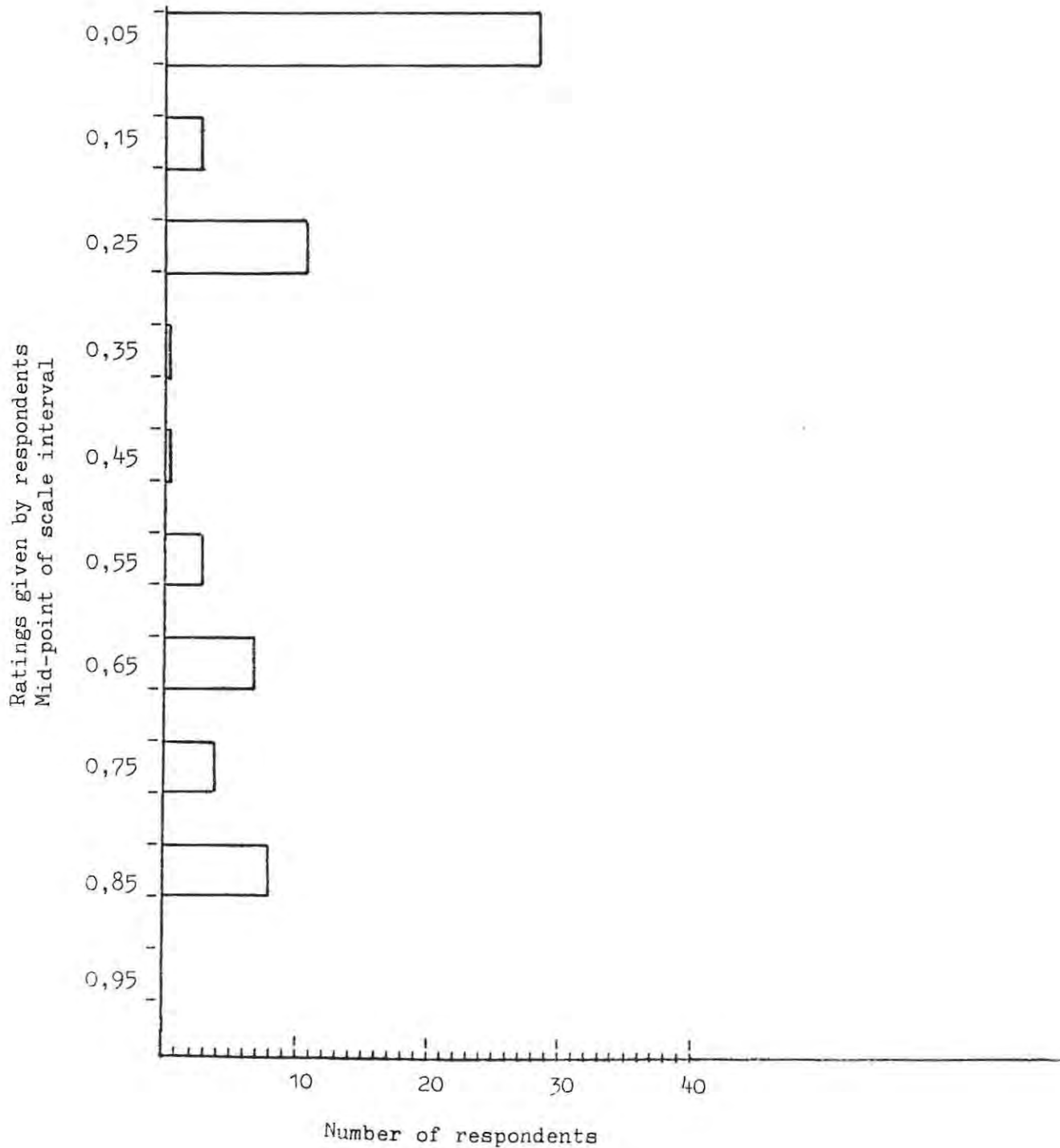
Question 14: A consideration of the needs of customers and ways of meeting those needs, whatever they may be, must play a critical role in the chief executive's planning and policy making.



APPENDIX F

FIGURE 14

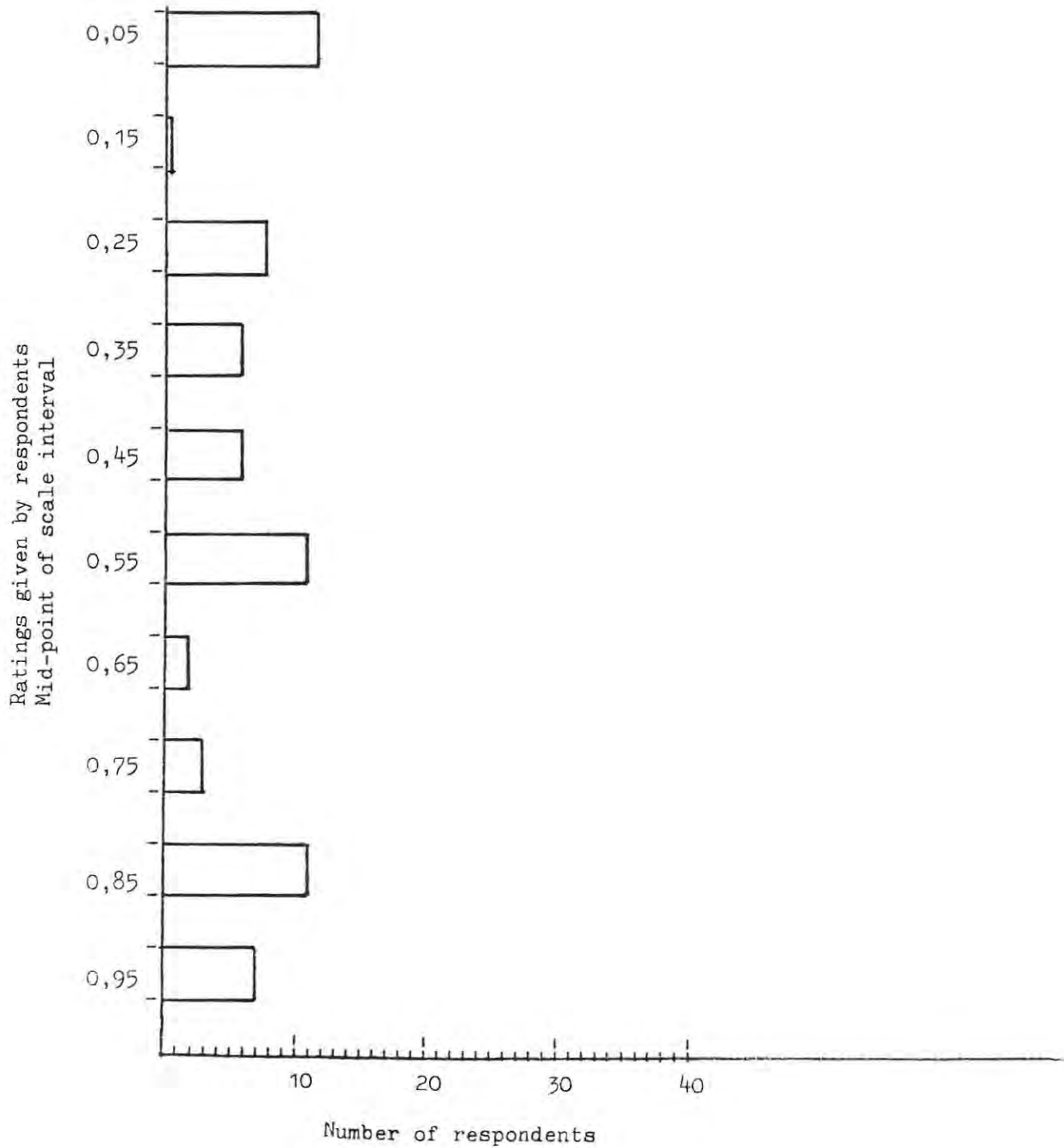
Question 15: When a chief executive has to decide on expanding physical distribution facilities such as warehouses, transport fleets and inventory levels, cost factors as identified by the finance department are more important than sales forecasts.



APPENDIX F

FIGURE 15

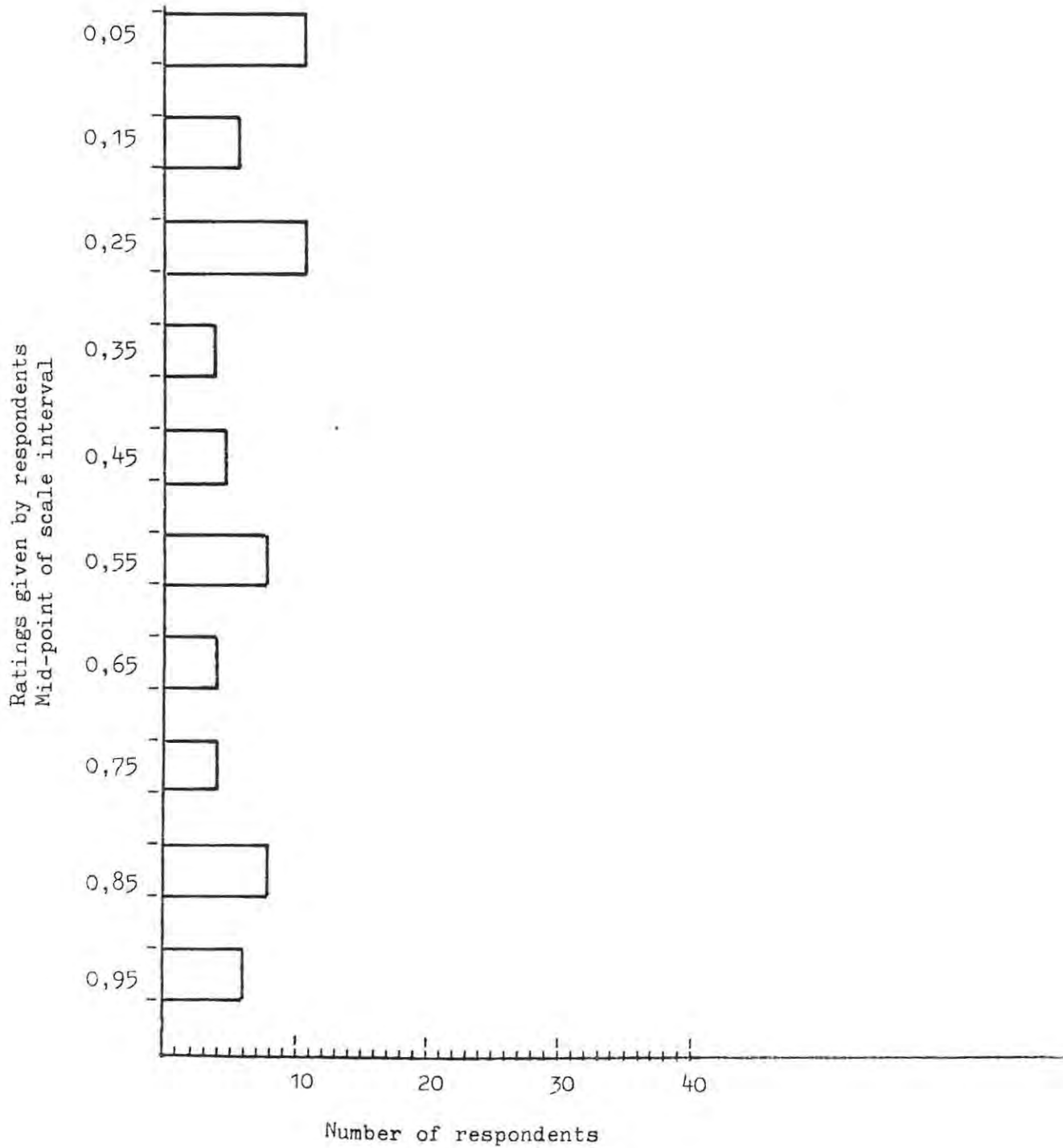
Question 17: In any company, who would you say is more important? Distribution Manager or Transportation Manager.



APPENDIX F

FIGURE 16

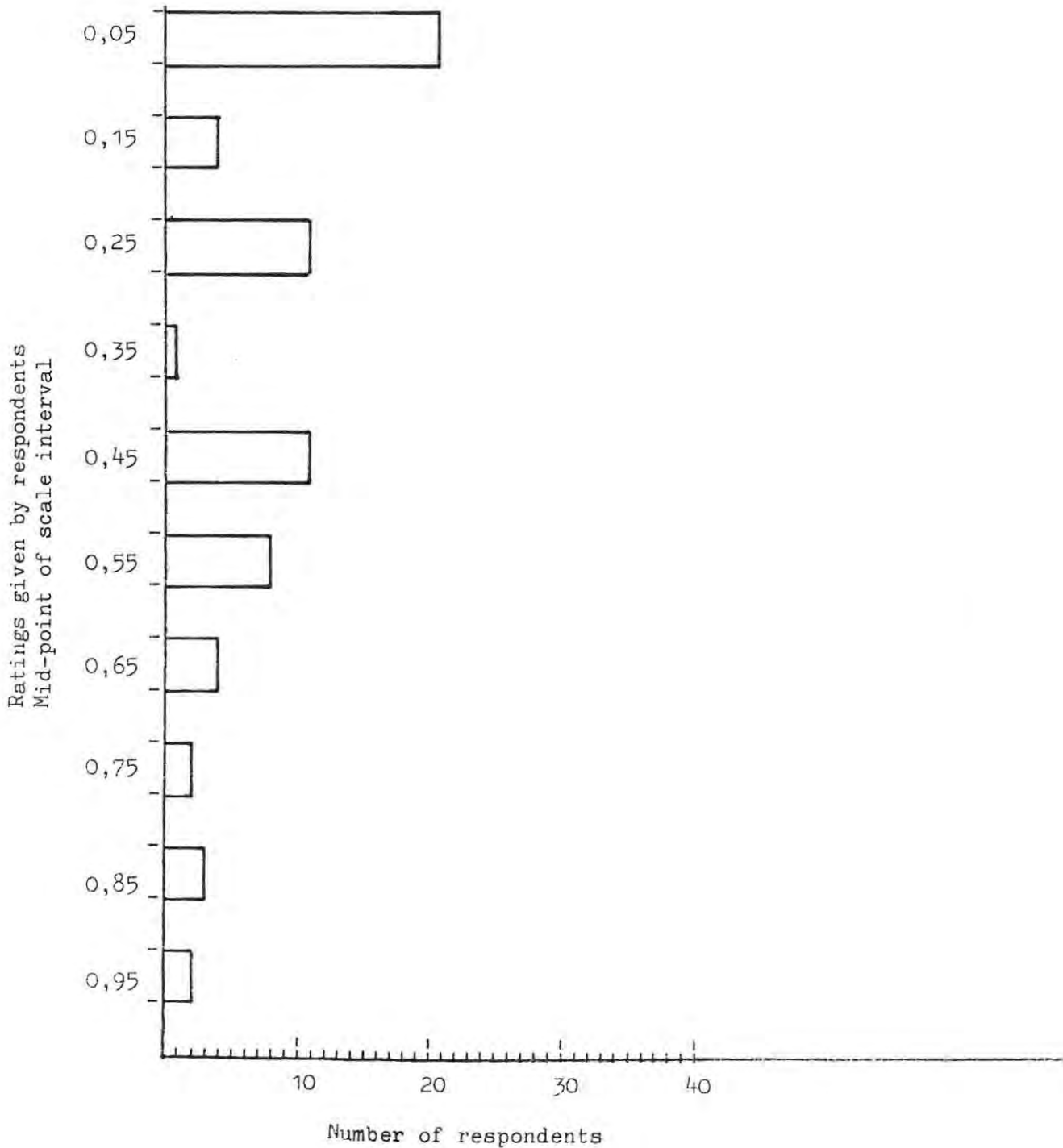
Question 19: The accounting/finance department is in the final analysis, the most important department in the company.



APPENDIX F

FIGURE 17

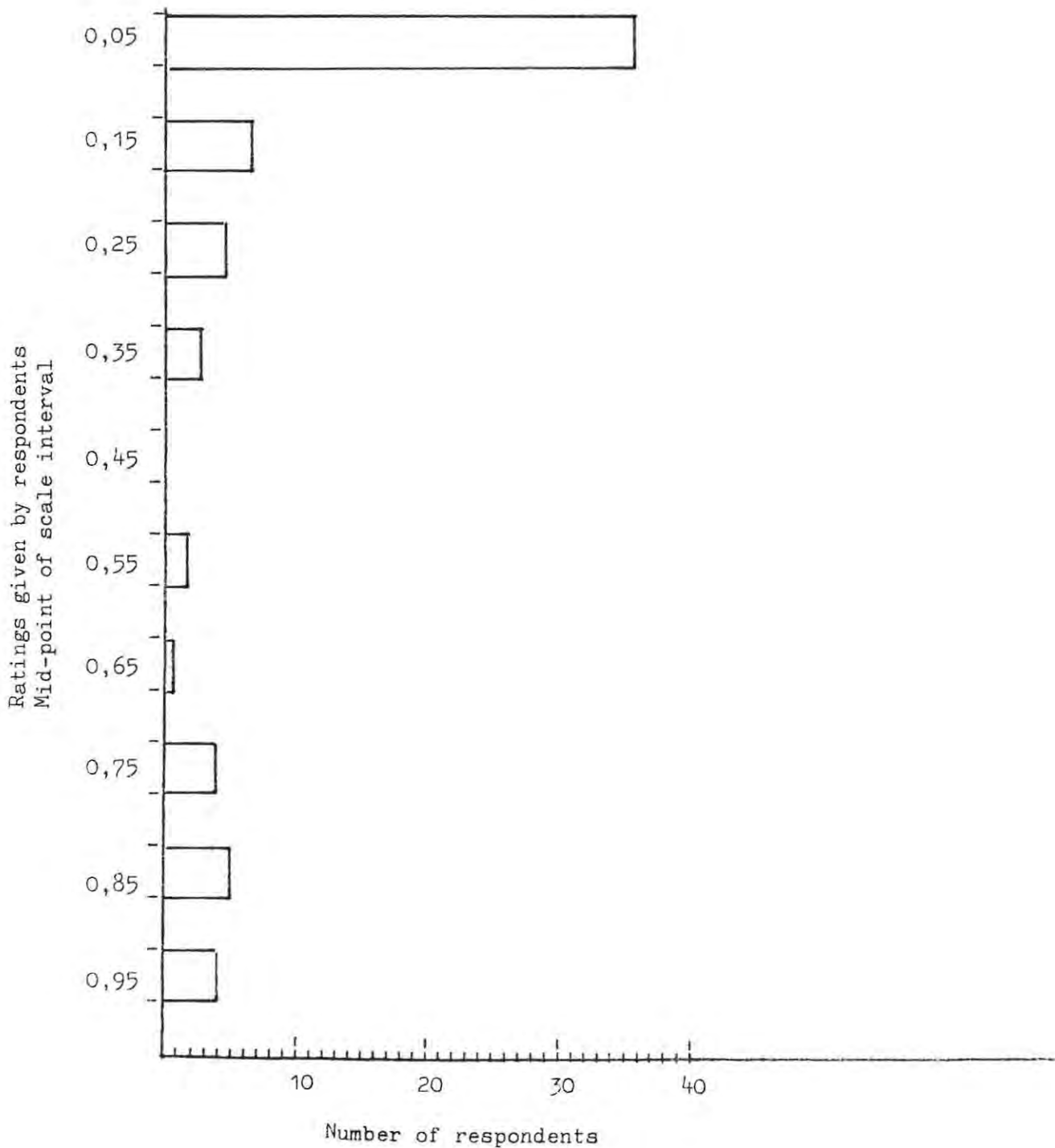
Question 20: It is not necessary for an experienced executive to have marketing research information available to know what his customers want in the way of physical distribution services such as delivery, packaging and stock availability, for example.



APPENDIX F

FIGURE 18

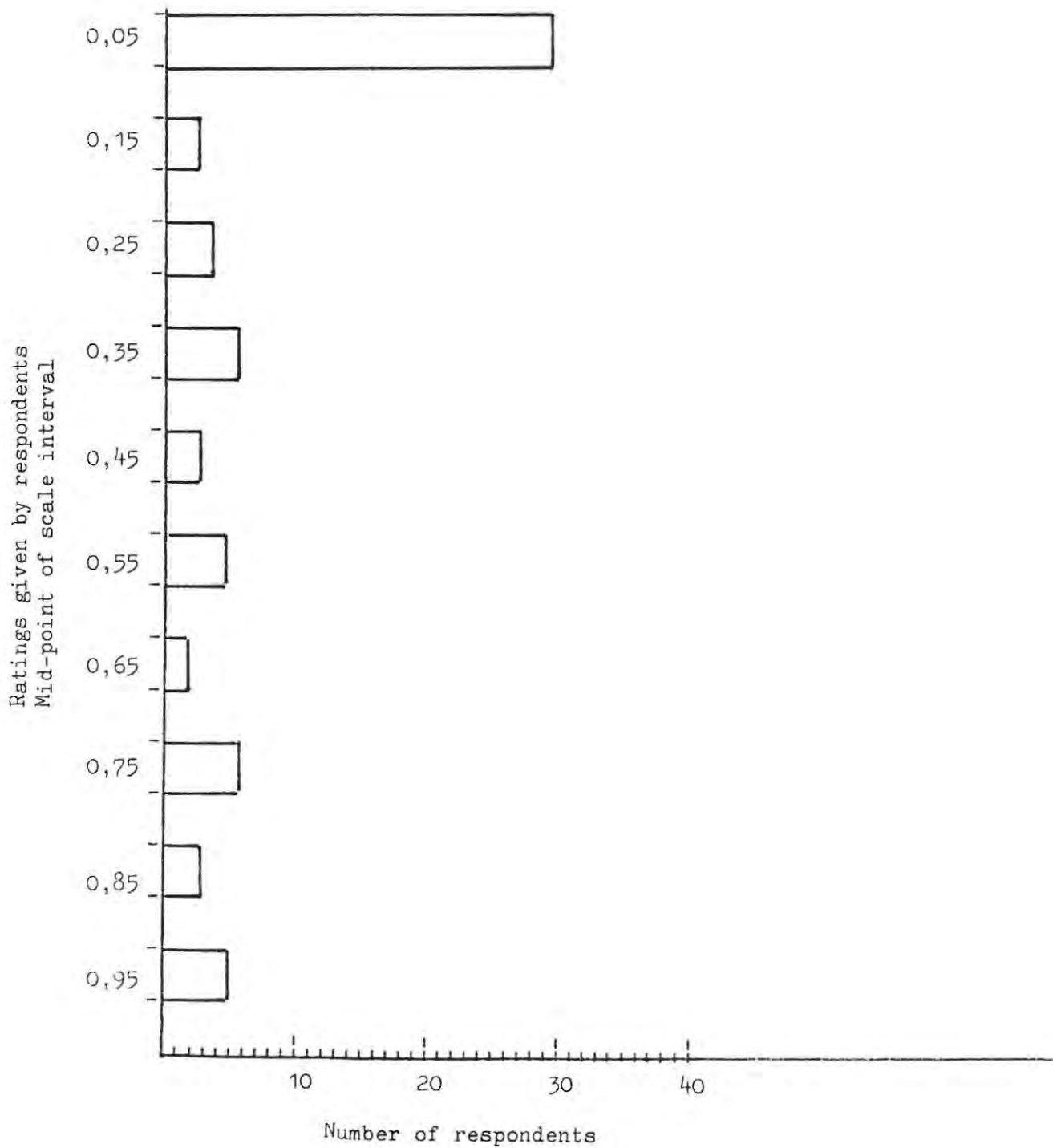
Question 21: The primary objective of physical distribution management must be to minimise the costs of physical distribution.



APPENDIX F

FIGURE 19

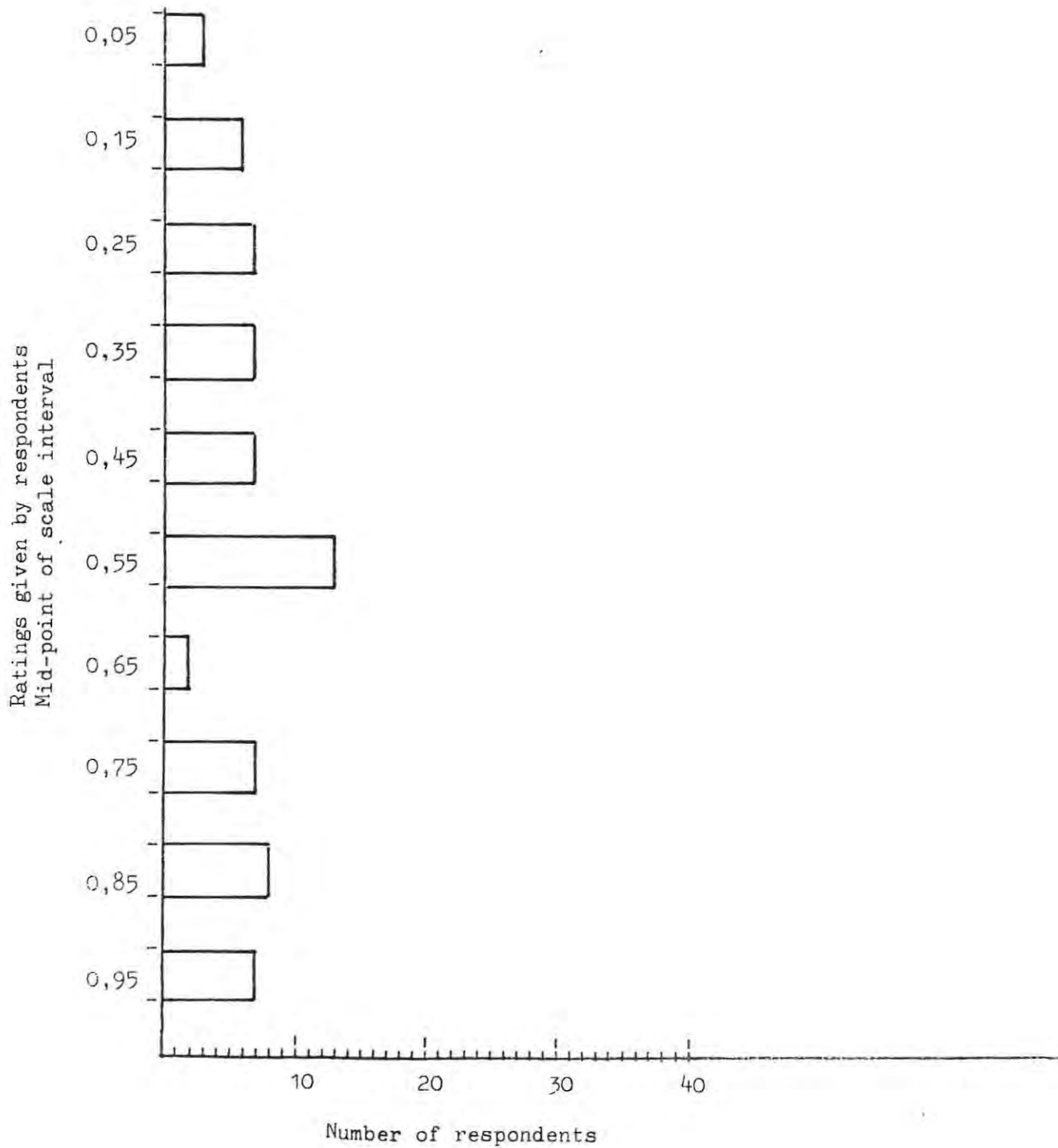
Question 22: Systems specialist (whether in-house or outside consultants) are needed by manufacturers to design optimum physical distribution programmes, particularly in the areas of vehicle scheduling, vehicle routeing and inventory control, for example.



APPENDIX F

FIGURE 20

Question 23: Efficient management of physical distribution is indispensable to a company fulfilling demand for its products and contributing to a satisfactory bottom line on the company's profit and loss account.



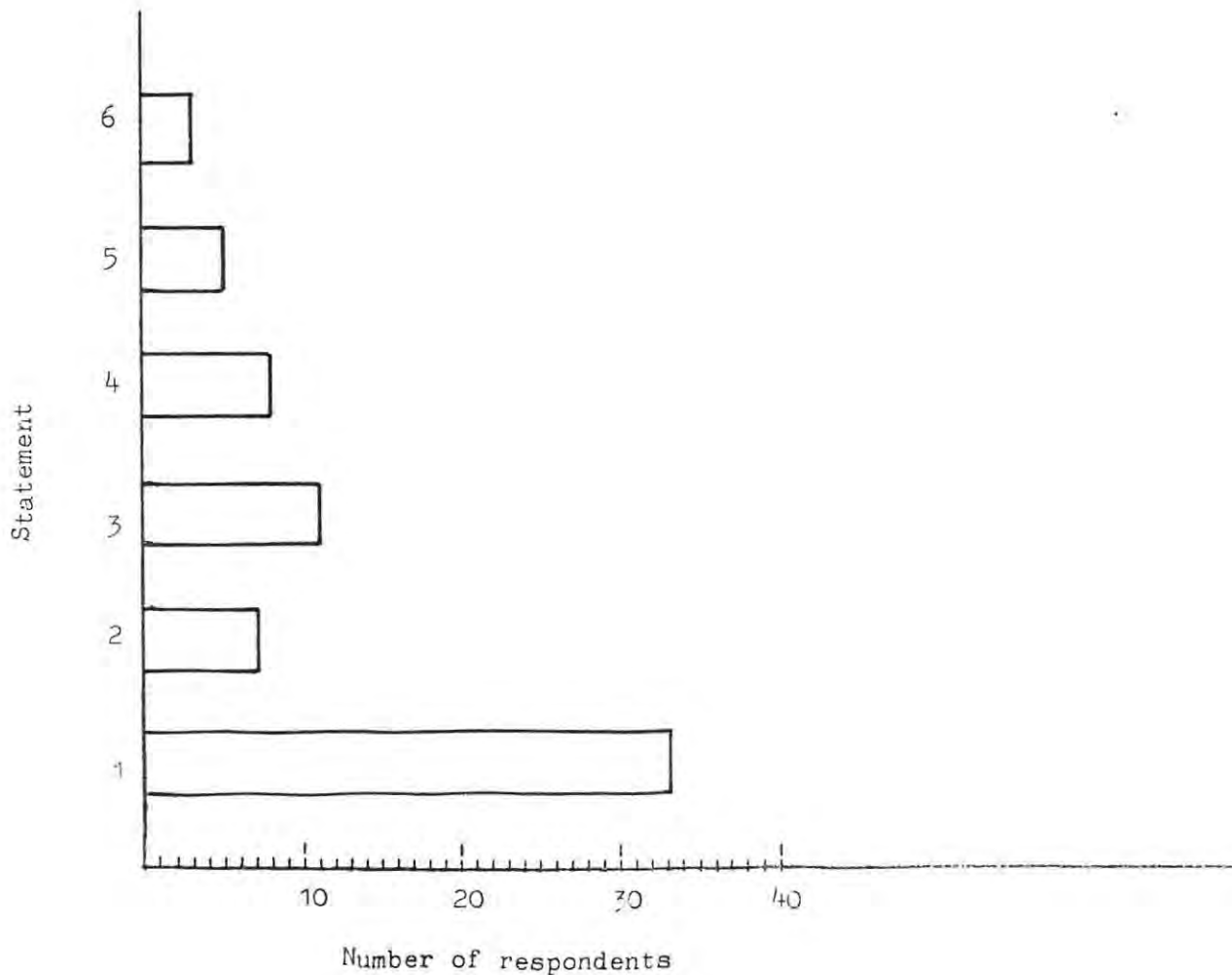
APPENDIX G

GRAPHICAL PRESENTATIONS OF RANKING OF STATEMENTS

FIGURE 1

Graph showing statements ranked as being the most important.

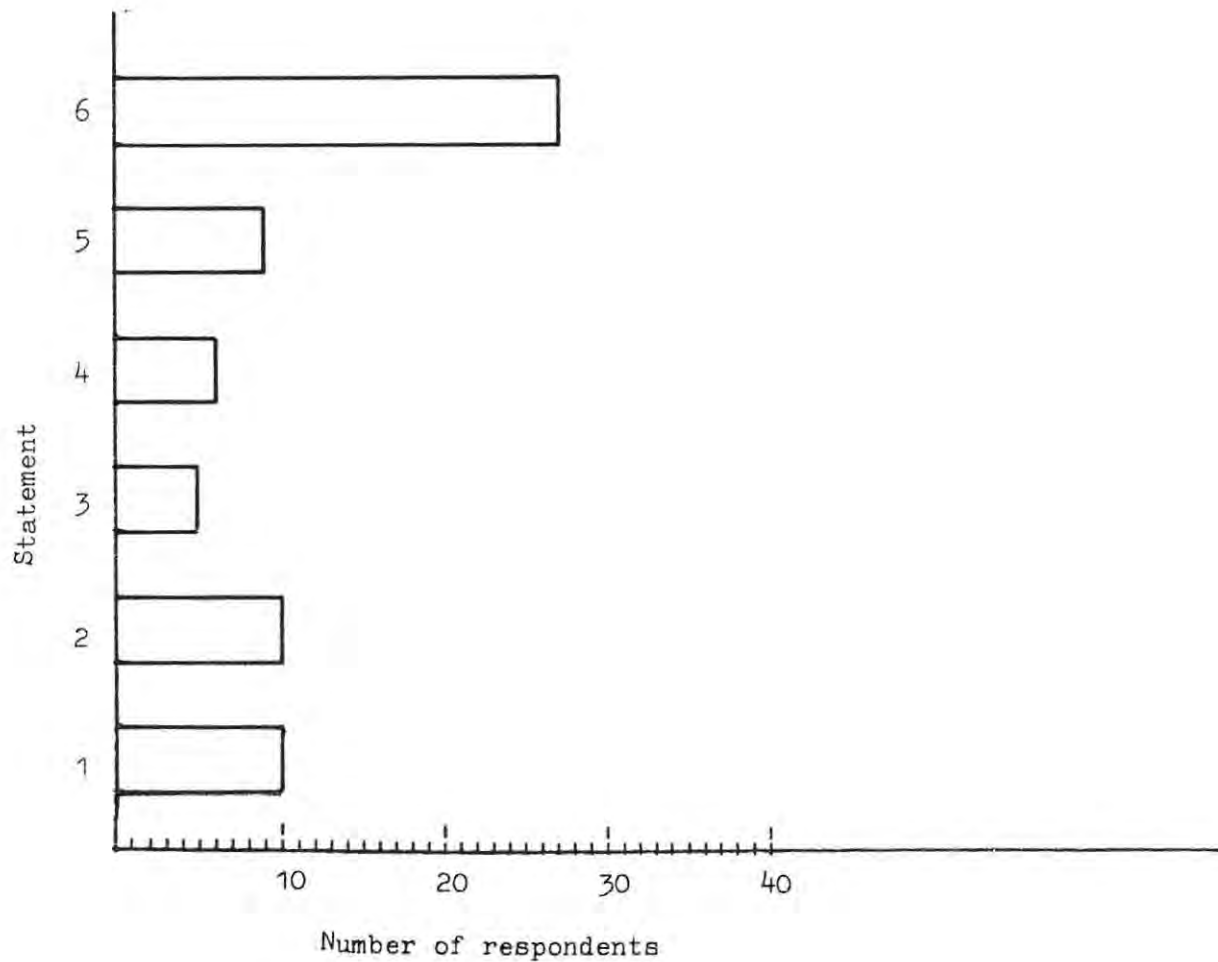
33 of the respondents ranked statement 1 as the most important. In other words, 49,25% of the respondents believed that statement 1 contained the most important business principle of the 6 presented to them. When the Kolmogorov-Smirnov Test was applied, this was found to be statistically significant.



APPENDIX GFIGURE 2

Graph showing statements ranked as being second most important.

27 of the respondents ranked Statement 6 as the second most important. In other words, 40,29% of the respondents believed that Statement 6 contained the second most important business principle of the 6 presented to them. When the Kolmogorov-Smirnov Test was applied, this was also found to be statistically significant.

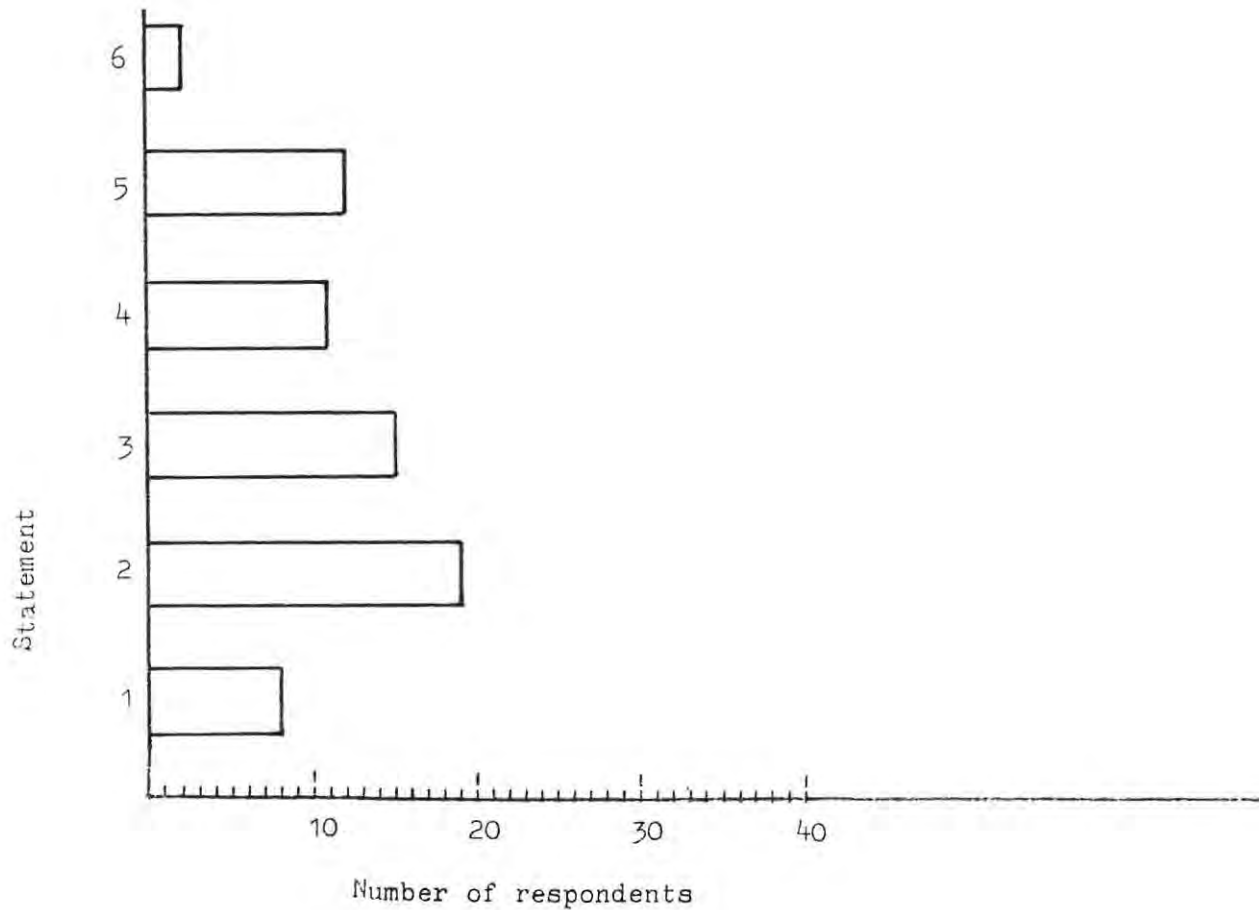


APPENDIX G

FIGURE 3

Graph showing statements ranked as being third most important.

Although 19 (28,3%) respondents ranked statement 2 as being third most important, when the Kolmogorov-Smirnov Test was applied this was not found to be statistically significant at the 5% level.

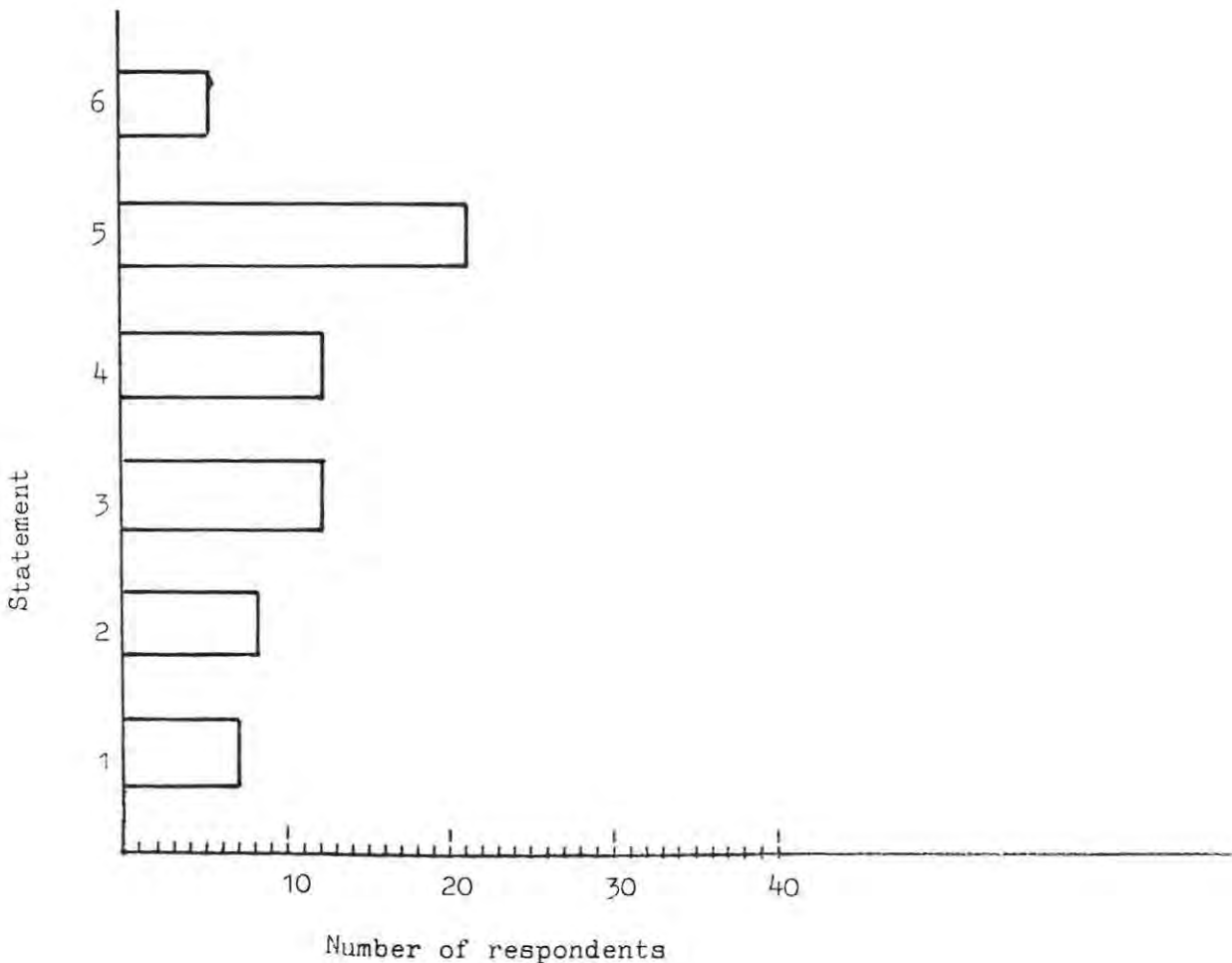


APPENDIX G

FIGURE 4

Graph showing statements ranked as being fourth most important.

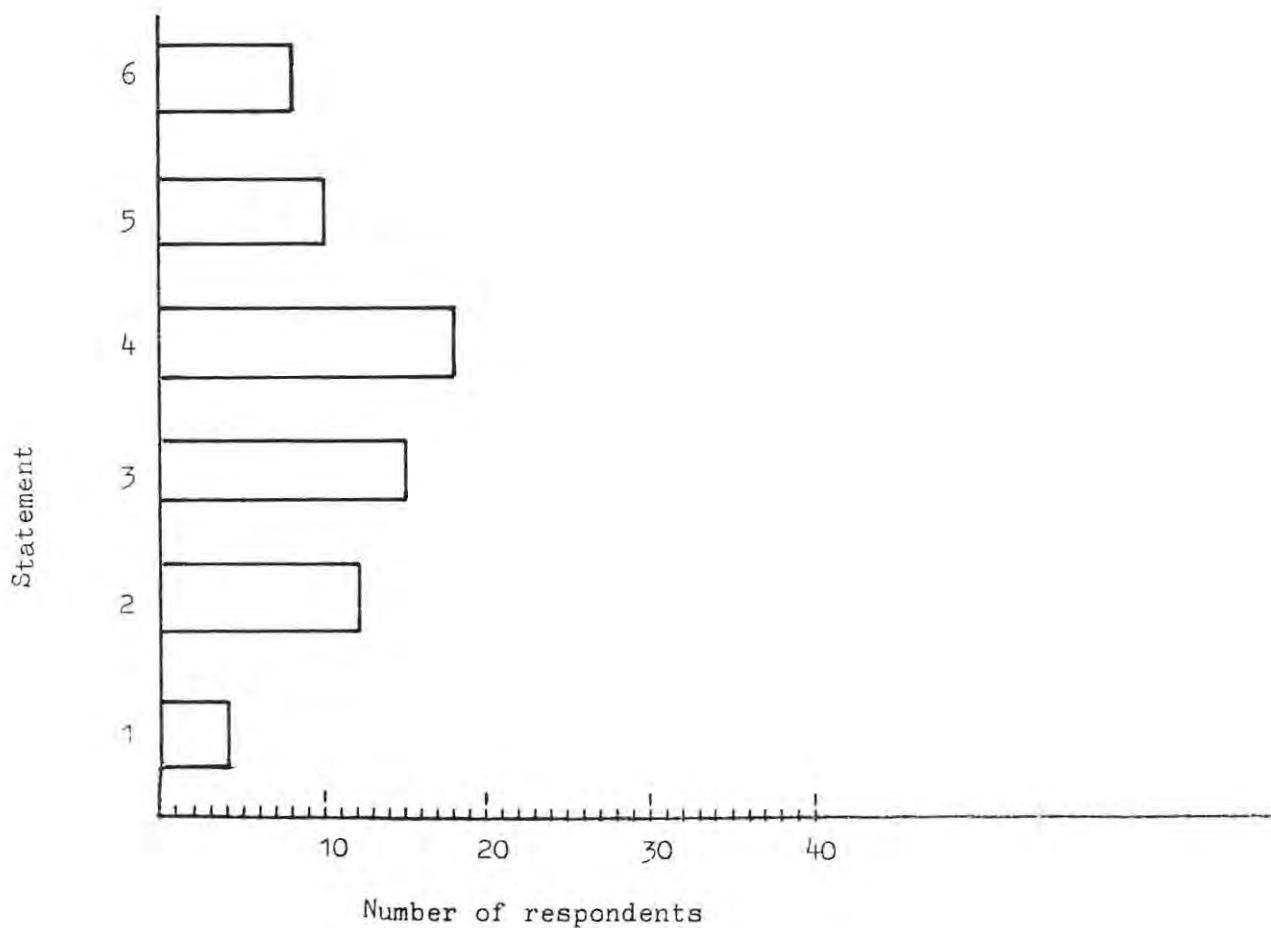
Although 21 (31,34%) respondents ranked statement 5 as being fourth most important, this was not found to be statistically significant when the Kolmogorov-Smirnov Test was applied.



APPENDIX GFIGURE 5

Graph showing statements ranked as being fifth most important.

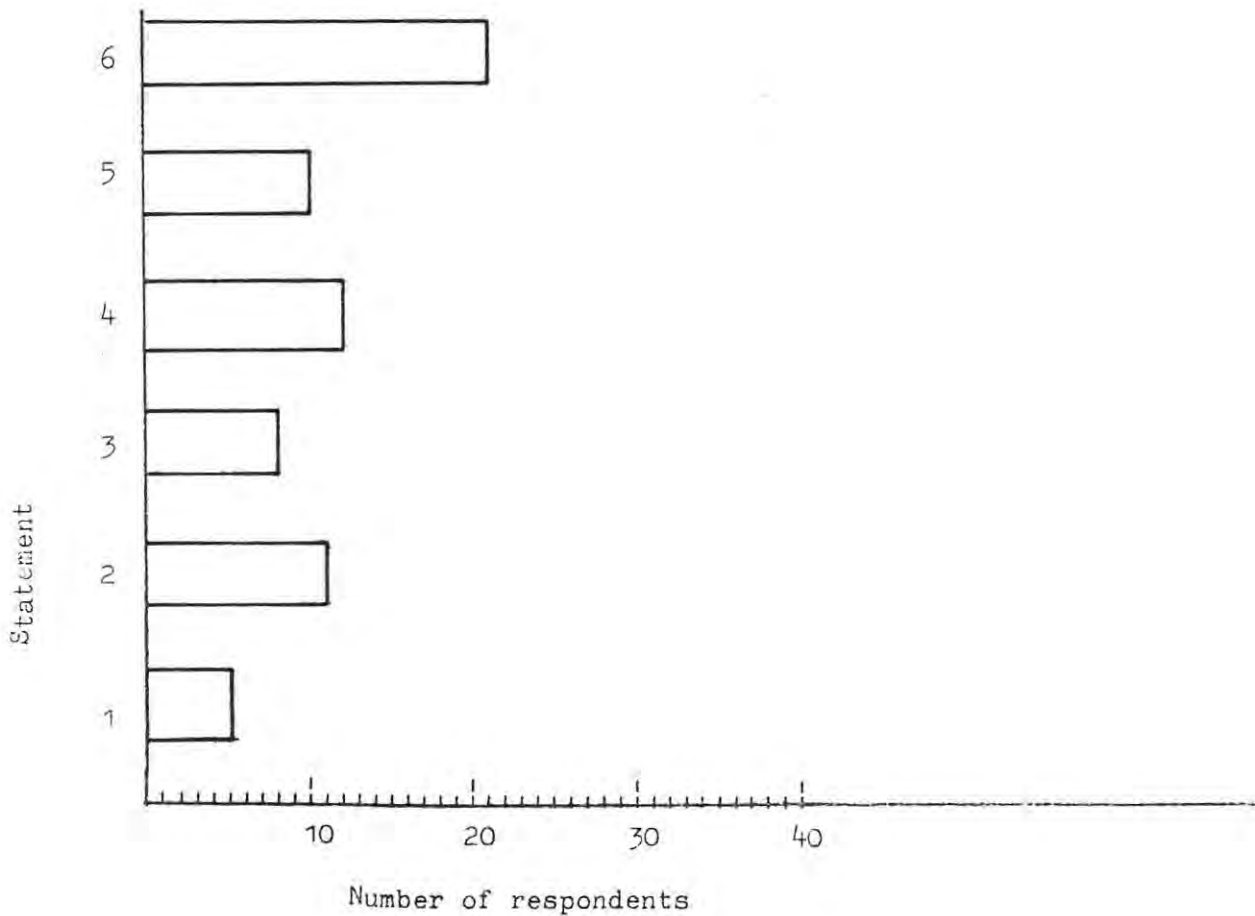
The respondents' rankings were distributed amongst the statements in such a way that the Kolmogorov-Smirnov Test showed no preference for any one statement as being fifth most important.



APPENDIX GFIGURE 6

Graph showing statements ranked as being sixth most important.

Although 21 (31,34%) respondents ranked statement 6 as being sixth most important, this was not found to be statistically significant at the 5% level when the Kolmogorov-Smirnov Test was applied.



APPENDIX H

TABLE 1

CORRELATION OF PHYSICAL DISTRIBUTION ORIENTATION OF CHIEF EXECUTIVES
AND COMPANY PERFORMANCE

FIRM CODE No.	PHYSICAL DISTRIBUTION ORIENTATION INDEX	PERFORMANCE INDEX
1	0,88	1,87
2	0,67	1,67
3	0,57	1,71
4	0,34	1,61
5	0,47	1,57
6	0,70	1,56
7	0,82	1,47
8	0,68	1,41
9	0,48	1,37
10	0,50	1,73
11	0,51	1,03
12	0,56	1,27
13	0,49	1,29
14	0,47	1,27
15	0,55	1,21
16	0,56	1,19
17	0,39	1,21
18	0,67	1,19
19	0,32	0,94
20	0,44	1,19
21	0,41	1,17
22	0,47	1,17
23	0,40	1,48
24	0,43	1,13
25	0,61	1,15
26	0,47	1,13
27	0,30	1,10
28	0,39	1,08
29	0,40	1,09
30	0,47	1,06
31	0,47	1,05
32	0,24	1,05
33	0,51	1,04
34	0,34	1,04
35	0,61	1,04
36	0,42	1,03
37	0,35	1,01
38	0,40	1,00
39	0,29	1,00
40	0,41	0,97
41	0,34	0,95
42	0,39	0,96
43	0,44	0,88
44	0,40	0,88
45	0,55	0,89
46	0,27	0,88
47	0,36	0,68
48	0,42	0,83
49	0,49	0,82
50	0,32	0,81
51	0,36	0,77
52	0,47	0,74
53	0,37	0,71
54	0,47	0,70
55	0,30	0,69
56	0,44	0,68
57	0,27	0,49
58	0,30	0,56
59	0,45	0,50
60	0,46	0,64
61	0,31	0,45
62	0,33	0,31
63	0,26	0,26
64	0,26	0,25
65	0,40	0,22
66	0,20	0,09
67	0,41	-0,53

The correlation co-efficient equals 0,5868 which is statistically significant at the 5% level.

APPENDIX H

TABLE 2

CORRELATION OF PHYSICAL DISTRIBUTION ORIENTATION OF CHIEF EXECUTIVES AND COMPANY PERFORMANCE (EXCLUDING EXECUTIVES NOT IN THEIR POSITIONS FOR AT LEAST FIVE YEARS)

FIRM CODE No.	PHYSICAL DISTRIBUTION ORIENTATION INDEX	PERFORMANCE INDEX
1	0,88	1,87
2	0,67	1,67
3	0,57	1,71
5	0,47	1,57
10	0,50	1,73
11	0,51	1,03
12	0,56	1,27
13	0,49	1,29
14	0,47	1,27
16	0,56	1,19
17	0,39	1,21
18	0,67	1,19
20	0,44	1,19
21	0,41	1,17
22	0,47	1,17
23	0,40	1,48
25	0,61	1,15
26	0,47	1,13
28	0,39	1,08
31	0,47	1,05
32	0,24	1,05
33	0,51	1,04
34	0,34	1,04
36	0,42	1,03
37	0,35	1,01
39	0,29	1,00
40	0,41	0,97
41	0,34	0,95
42	0,39	0,96
43	0,44	0,88
44	0,40	0,88
45	0,55	0,89
46	0,27	0,88
47	0,36	0,68
48	0,42	0,83
49	0,49	0,82
51	0,36	0,77
52	0,47	0,74
53	0,37	0,71
54	0,47	0,70
56	0,44	0,68
57	0,27	0,49
58	0,30	0,56
62	0,33	0,31
63	0,26	0,26
65	0,40	0,22

The correlation co-efficient equals 0,63019 which is statistically significant at the 5% level

APPENDIX I

TABLE 1

CORRELATION OF ORIENTATION TO AN INDIVIDUAL ELEMENT (CONSUMER ORIENTATION) OF THE PHYSICAL DISTRIBUTION CONCEPT AND COMPANY PERFORMANCE

FIRM CODE No.	"CONSUMER ORIENTATION" ORIENTATION INDEX	PERFORMANCE INDEX
1	0,88	1,87
2	0,52	1,67
3	0,47	1,71
4	0,40	1,61
5	0,53	1,57
6	0,72	1,56
7	0,87	1,47
8	0,62	1,41
9	0,45	1,37
10	0,38	1,73
11	0,47	1,03
12	0,70	1,27
13	0,52	1,29
14	0,51	1,27
15	0,62	1,21
16	0,75	1,19
17	0,48	1,21
18	0,79	1,19
19	0,39	0,94
20	0,46	1,19
21	0,54	1,17
22	0,51	1,17
23	0,52	1,48
24	0,62	1,13
25	0,66	1,15
26	0,60	1,13
27	0,28	1,10
28	0,34	1,08
29	0,26	1,09
30	0,34	1,06
31	0,46	1,05
32	0,41	1,05
33	0,48	1,04
34	0,39	1,04
35	0,66	1,04
36	0,40	1,03
37	0,39	1,01
38	0,46	1,00
39	0,24	1,00
40	0,41	0,97
41	0,34	0,95
42	0,32	0,96
43	0,36	0,88
44	0,46	0,88
45	0,66	0,89
46	0,32	0,88
47	0,38	0,68
48	0,42	0,83
49	0,53	0,82
50	0,30	0,81
51	0,44	0,77
52	0,53	0,74
53	0,47	0,71
54	0,53	0,70
55	0,34	0,69
56	0,38	0,68
57	0,18	0,49
58	0,36	0,56
59	0,37	0,50
60	0,33	0,64
61	0,46	0,45
62	0,33	0,31
63	0,27	0,26
64	0,26	0,25
65	0,45	0,22
66	0,22	0,09
67	0,38	-0,53

The correlation co-efficient equals 0,52 which is statistically significant at the 5% level

APPENDIX I

TABLE 2

CORRELATION OF ORIENTATION TO AN INDIVIDUAL ELEMENT (PROFIT) OF THE PHYSICAL DISTRIBUTION CONCEPT AND COMPANY PERFORMANCE

FIRM CODE No.	"PROFIT" ORIENTATION INDEX	PERFORMANCE INDEX
1	0,75	1,87
2	0,78	1,67
3	0,32	1,71
4	0,06	1,61
5	0,08	1,57
6	0,51	1,56
7	0,61	1,47
8	0,61	1,41
9	0,21	1,37
10	0,54	1,73
11	0,50	1,03
12	0,67	1,27
13	0,23	1,29
14	0,45	1,27
15	0,35	1,21
16	0,18	1,19
17	0,03	1,21
18	0,37	1,19
19	0,26	0,94
20	0,19	1,19
21	0,31	1,17
22	0,45	1,17
23	0,11	1,48
24	0,39	1,13
25	0,60	1,15
26	0,11	1,13
27	0,25	1,10
28	0,29	1,08
29	0,33	1,09
30	0,49	1,06
31	0,38	1,05
32	0,11	1,05
33	0,12	1,04
34	0,12	1,04
35	0,31	1,04
36	0,05	1,03
37	0,35	1,01
38	0,28	1,00
39	0,20	1,00
40	0,34	0,97
41	0,00	0,95
42	0,14	0,96
43	0,43	0,88
44	0,22	0,88
45	0,33	0,89
46	0,41	0,88
47	0,15	0,68
48	0,42	0,83
49	0,35	0,82
50	0,27	0,81
51	0,32	0,77
52	0,08	0,74
53	0,20	0,71
54	0,08	0,70
55	0,26	0,69
56	0,43	0,68
57	0,26	0,49
58	0,07	0,56
59	0,66	0,50
60	0,21	0,64
61	0,16	0,45
62	0,12	0,31
63	0,08	0,26
64	0,16	0,25
65	0,33	0,22
66	0,07	0,09
67	0,59	-0,53

The correlation co-efficient equals 0,25 which is statistically significant at the 5% level

APPENDIX I

TABLE 3

CORRELATION OF ORIENTATION TO AN INDIVIDUAL ELEMENT (INTEGRATION) OF THE PHYSICAL DISTRIBUTION CONCEPT AND COMPANY PERFORMANCE

FIRM CODE No.	"INTEGRATION" ORIENTATION INDEX	PERFORMANCE INDEX
1	0,95	1,87
2	0,70	1,67
3	0,83	1,71
4	0,42	1,61
5	0,60	1,57
6	0,78	1,56
7	0,88	1,47
8	0,79	1,41
9	0,66	1,37
10	0,61	1,73
11	0,57	1,03
12	0,32	1,27
13	0,59	1,29
14	0,43	1,27
15	0,59	1,21
16	0,53	1,19
17	0,47	1,21
18	0,69	1,19
19	0,28	0,94
20	0,58	1,19
21	0,32	1,17
22	0,43	1,17
23	0,40	1,48
24	0,21	1,13
25	0,55	1,15
26	0,51	1,13
27	0,36	1,10
28	0,53	1,08
29	0,62	1,09
30	0,63	1,06
31	0,53	1,05
32	0,10	1,05
33	0,76	1,04
34	0,41	1,04
35	0,69	1,04
36	0,66	1,03
37	0,32	1,01
38	0,40	1,00
39	0,39	1,00
40	0,46	0,97
41	0,53	0,95
42	0,64	0,96
43	0,54	0,88
44	0,43	0,88
45	0,55	0,89
46	0,14	0,88
47	0,45	0,68
48	0,41	0,83
49	0,52	0,82
50	0,38	0,81
51	0,29	0,77
52	0,60	0,74
53	0,35	0,71
54	0,60	0,70
55	0,28	0,69
56	0,53	0,68
57	0,40	0,49
58	0,35	0,56
59	0,44	0,50
60	0,54	0,64
61	0,19	0,45
62	0,47	0,31
63	0,35	0,26
64	0,32	0,25
65	0,41	0,22
66	0,25	0,09
67	0,35	-0,53

The correlation co-efficient equals 0,52 which is statistically significant at the 5% level

APPENDIX J

RATINGS BETWEEN ORIENTATION TO CONSTITUENTS OF THE ELEMENTS OF THE PHYSICAL DISTRIBUTION
CONCEPT AND COMPANY PERFORMANCE (UNWEIGHTED RATINGS)

TABLE 1
RATING ON QUESTION 2, AND COMPANY PERFORMANCE

FIRM CODE No.	RANKING ON QUESTION 2	PERFORMANCE INDEX
1	1,00	1,87
2	0,85	1,67
3	0,64	1,71
4	0,63	1,61
5	0,67	1,57
6	0,97	1,56
7	0,84	1,47
8	0,91	1,41
9	0,38	1,37
10	0,42	1,73
11	0,97	1,03
12	0,90	1,27
13	0,60	1,29
14	0,05	1,27
15	0,78	1,21
16	0,50	1,19
17	0,05	1,21
18	0,97	1,19
19	0,70	0,94
20	0,88	1,19
21	0,37	1,17
22	0,05	1,17
23	0,58	1,48
24	0,82	1,13
25	0,61	1,15
26	0,57	1,13
27	0,74	1,10
28	0,80	1,08
29	0	1,09
30	0,87	1,06
31	0,90	1,05
32	0,37	1,05
33	0,75	1,04
34	0,75	1,04
35	0,77	1,04
36	0,45	1,03
37	0,95	1,01
38	0,77	1,00
39	0,91	1,00
40	0,75	0,97
41	0,24	0,95
42	0,47	0,96
43	0,60	0,88
44	0,07	0,88
45	0,88	0,89
46	0,14	0,88
47	0,47	0,68
48	0,78	0,83
49	0,70	0,82
50	0,60	0,81
51	0,55	0,77
52	0,67	0,74
53	0,80	0,71
54	0,67	0,70
55	0,05	0,69
56	0,75	0,68
57	0,90	0,49
58	0,10	0,56
59	0,95	0,50
60	0,07	0,64
61	0,51	0,45
62	0,24	0,31
63	0,30	0,26
64	0,74	0,25
65	0,74	0,22
66	0,58	0,09
67	0,75	-0,53

The correlation co-efficient is 0,1295. This is not statistically significant at the 5% level

APPENDIX J

TABLE 2

RATING ON QUESTION 3, AND COMPANY PERFORMANCE

FIRM CODE No.	RANKING ON QUESTION 3	PERFORMANCE INDEX
1	1,00	1,87
2	0,92	1,67
3	0,95	1,71
4	0,86	1,61
5	0,95	1,57
6	0,84	1,56
7	0,95	1,47
8	0,88	1,41
9	0,90	1,37
10	0,90	1,73
11	0,97	1,03
12	0,50	1,27
13	0,97	1,29
14	0,10	1,27
15	0,90	1,21
16	0,30	1,19
17	0,24	1,21
18	0,42	1,19
19	0,30	0,94
20	0,92	1,19
21	0,88	1,17
22	0,10	1,17
23	0,75	1,48
24	0,25	1,13
25	0,84	1,15
26	0,97	1,13
27	0,75	1,10
28	0,68	1,08
29	0,94	1,09
30	0,85	1,06
31	0,40	
32	0,38	1,05
33	0,98	1,04
34	0,68	1,04
35	0,97	1,04
36	0,88	1,03
37	0,85	1,01
38	0,77	1,00
39	0,85	1,00
40	0,71	0,97
41	0,77	0,95
42	0,97	0,96
43	0,62	0,88
44	0,77	0,88
45	0,91	0,89
46	0,11	0,88
47	0,94	0,68
48	0,72	0,83
49	0,87	0,82
50	0,85	0,81
51	0,74	0,77
52	0,95	0,74
53	0,81	0,71
54	0,95	0,70
55	0,68	0,69
56	0,81	0,68
57	0,78	0,49
58	0,67	0,56
59	0,94	0,50
60	0,92	0,64
61	0,67	0,45
62	0,81	0,31
63	0,67	0,26
64	0,58	0,25
65	0,68	0,09
66	0,54	0,09
67	0,45	-0,53

The correlation co-efficient is 0,1690. This is not statistically significant at the 5% level

APPENDIX J

TABLE 3

RATING ON QUESTION 4, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 4	PERFORMANCE INDEX
1	1,00	1,87
2	0,85	1,67
3	0,90	1,71
4	0,84	1,61
5	0,95	1,57
6	0,82	1,56
7	0,91	1,47
8	0,92	1,41
9	0,92	1,37
10	0,87	1,73
11	0,57	1,03
12	0,92	1,27
13	0,92	1,29
14	0,60	1,27
15	0,68	1,21
16	0,77	1,19
17	0,67	1,21
18	0,37	1,19
19	0,90	0,94
20	0,84	1,19
21	0,87	1,17
22	0,60	1,17
23	0,87	1,48
24	0,15	1,13
25	0,62	1,15
26	0,55	1,13
27	0,75	1,10
28	0,77	1,08
29	0,58	1,09
30	0,58	1,06
31	0,61	1,05
32	0,38	1,05
33	0,50	1,04
34	0,75	1,04
35	0,71	1,04
36	0,90	1,03
37	0,82	1,01
38	0,70	1,00
39	0,57	1,00
40	0,58	0,97
41	0,74	0,95
42	0,40	0,96
43	0,57	0,88
44	0,77	0,88
45	0,92	0,89
46	0,24	0,88
47	0,92	0,68
48	0,14	0,83
49	0,97	0,82
50	0,31	0,81
51	0,72	0,77
52	0,95	0,74
53	0,74	0,71
54	0,95	0,70
55	0,68	0,69
56	0,85	0,68
57	0,42	0,49
58	0,77	0,56
59	0,85	0,50
60	0,91	0,64
61	0,77	0,45
62	0,74	0,31
63	0,77	0,26
64	0,60	0,25
65	0,55	0,22
66	0,55	0,09
67	0,40	-0,53

The correlation co-efficient is 0,3033. This is statistically significant at the 5% level

APPENDIX J

TABLE 4

RATING ON QUESTION 5, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 5	PERFORMANCE INDEX
1	1,00	1,87
2	0,85	1,67
3	0,91	1,71
4	0,90	1,61
5	1,00	1,57
6	0,97	1,56
7	0,94	1,47
8	0,97	1,41
9	0,94	1,37
10	0,94	1,73
11	0,98	1,03
12	0,87	1,27
13	0,94	1,29
14	0,90	1,27
15	0,71	1,21
16	0,94	1,21
18	0,82	1,19
19	0,94	0,94
20	0,95	1,19
21	0,60	1,17
22	0,90	1,17
23	0,92	1,48
24	0,88	1,13
25	0,94	1,15
26	0,04	1,13
27	0,75	1,10
28	0,78	1,08
29	0,98	1,09
30	0,91	1,06
31	0,92	1,05
32	0,41	1,05
33	0,72	1,04
34	0,70	1,04
35	0,94	1,04
36	0,91	1,03
37	0,90	1,09
38	0,77	1,00
39	0,94	1,00
40	0,84	0,97
41	0,77	0,95
42	0,97	0,96
43	0,92	0,88
44	0,77	0,88
45	0,90	0,89
46	0,40	0,88
47	0,84	0,68
48	0,75	0,83
49	0,97	0,82
50	0,80	0,81
51	0,78	0,77
52	1,00	0,74
53	0,95	0,71
54	1,00	0,70
55	0,68	0,69
56	0,78	0,68
57	0,87	0,49
58	0,77	0,56
59	0,95	0,50
60	0,90	0,64
61	0,68	0,45
62	0,78	0,31
63	0,67	0,26
64	0,71	0,25
65	0,95	0,22
66	0,58	0,09
67	0,85	0,53

The correlation co-efficient is 0,2253. This is not statistically significant at the 5% level.

APPENDIX J

TABLE 5

RATING ON QUESTION 6, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 6	PERFORMANCE INDEX
1	1,00	1,87
2	0,85	1,67
3	0,67	1,71
4	0,89	1,61
5	0,95	1,57
6	0,80	1,56
7	0,95	1,47
8	0,52	1,41
9	0,62	1,37
10	0,08	1,73
11	0,97	1,03
12	0,90	1,27
13	0,74	1,29
14	0,94	1,27
15	0,95	1,21
16	0,98	1,19
17	0,77	1,21
18	0,97	1,12
19	0,78	0,94
20	0,62	1,19
21	0,60	1,17
22	0,94	1,17
23	0,92	1,48
24	0,95	1,13
25	0,87	1,15
26	0,95	1,13
27	0,75	1,10
28	0,65	1,08
29	0,77	1,09
30	0,64	1,06
31	0,88	1,05
32	0,95	1,05
33	0,98	1,04
34	0,68	1,04
35	0,94	1,04
36	0,40	1,03
37	0,84	1,01
38	0,77	1,00
39	0,62	1,00
40	0,70	0,97
41	0,78	0,95
42	0,58	0,96
43	0,58	0,88
44	0,77	0,88
45	0,75	0,89
46	0,65	0,88
47	0,81	0,68
48	0,82	0,83
49	0,50	0,82
50	0,75	0,81
51	0,75	0,77
52	0,95	0,74
53	0,74	0,71
54	0,95	0,70
55	0,68	0,69
56	0,68	0,68
57	0,67	0,49
58	0,64	0,56
59	0,62	0,50
60	0,35	0,64
61	0,75	0,45
62	0,74	0,31
63	0,77	0,26
64	0,61	0,25
65	0,95	0,22
66	0,55	0,09
67	0,85	-0,53

The correlation co-efficient is 0,1139. This is not statistically significant at the 5% level.

APPENDIX J

TABLE 6

RATING ON QUESTION 7, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 7	PERFORMANCE INDEX
1	0,91	1,87
2	0,85	1,67
3	0,90	1,71
4	0,79	1,61
5	0,91	1,57
6	0,95	1,56
7	0,91	1,47
8	0,94	1,41
9	0,82	1,37
10	0,57	1,73
11	0,57	1,03
12	0,90	1,27
13	0,81	1,29
14	0,60	1,27
15	0,91	1,21
16	0,71	1,19
17	0,94	1,21
18	0,94	1,19
19	0,60	0,04
20	0,92	0,19
21	0,65	1,17
22	0,60	1,17
23	0,88	1,48
24	0,72	1,13
25	0,88	1,15
26	0,92	1,13
27	0,75	1,10
28	0,78	1,08
29	0,95	1,09
30	0,60	1,06
31	0,64	1,05
32	0,58	1,05
33	0,98	1,04
34	0,70	1,04
35	0,88	1,04
36	0,88	1,03
37	0,56	1,01
38	0,72	1,00
39	0,68	1,00
40	0,70	0,97
41	0,74	0,95
42	0,97	0,96
43	0,57	0,88
44	0,77	0,88
45	0,94	0,89
46	0,52	0,88
47	0,72	0,68
48	0,75	0,83
49	0,91	0,82
50	0,37	0,81
51	0,68	0,77
52	0,91	0,74
53	0,72	0,71
54	0,91	0,70
55	0,78	0,69
56	0,75	0,68
57	0,80	0,49
58	0,74	0,56
59	0,55	0,50
60	0,65	0,64
61	0,68	0,45
62	0,72	0,31
63	0,77	0,26
64	0,78	0,25
65	0,54	0,22
66	0,62	0,09
67	0,85	-0,53

The correlation co-efficient is 0,2794. This is statistically significant at the 5% level

APPENDIX J

TABLE 7

RATING ON QUESTION 8, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 8	PERFORMANCE INDEX
1	0,95	1,87
2	0,84	1,67
3	0,55	1,71
4	0,74	1,61
5	0,67	1,57
6	0,88	1,56
7	0,91	1,47
8	0,84	1,41
9	0,75	1,37
10	0,62	1,73
11	0,55	1,03
12	0,94	1,27
13	0,85	1,29
14	0,60	1,27
15	0,91	1,21
16	0,98	1,19
17	0,72	1,21
18	0,95	1,19
19	0,54	0,94
20	0,92	1,19
21	0,82	1,17
22	0,60	1,17
23	0,84	1,48
24	0,87	1,13
25	0,88	1,15
26	0,95	1,13
27	0,71	1,10
28	0,50	1,08
29	0,70	1,09
30	0,61	1,06
31	0,57	1,05
32	0,81	1,05
33	0,71	1,04
34	0,82	1,04
35	0,91	1,04
36	0,62	1,03
37	0,62	1,01
38	0,74	1,00
39	0,64	1,00
40	0,60	0,97
41	0,25	0,95
42	0,40	0,96
43	0,57	0,88
44	0,77	0,88
45	0,85	0,89
46	0,88	0,88
47	0,81	0,68
48	0,78	0,83
49	0,57	0,82
50	0,61	0,81
51	0,71	0,77
52	0,67	0,74
53	0,85	0,71
54	0,67	0,70
55	0,68	0,69
56	0,65	0,68
57	0,52	0,49
58	0,12	0,56
59	0,57	0,50
60	0,61	0,64
61	0,71	0,45
62	0,78	0,31
63	0,67	0,26
64	0,71	0,25
65	0,52	0,22
66	0,60	0,09
67	0,75	-0,53

The correlation co-efficient is 0,3048. This is statistically significant at the 5% level

TABLE 8

RATING ON QUESTION 9, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 9	PERFORMANCE INDEX
1	0,92	1,87
2	0,82	1,67
3	0,87	1,71
4	0,93	1,61
5	0,92	1,57
6	0,95	1,56
7	0,90	1,47
8	0,90	1,41
9	0,11	1,37
10	0,58	1,73
11	0,57	1,03
12	0,85	1,27
13	0,81	1,29
14	0,57	1,27
15	0,82	1,21
16	0,98	1,19
17	0,74	1,21
18	0,85	1,19
19	0,75	0,94
20	0,87	1,19
21	0,75	1,17
22	0,57	1,17
23	0,68	1,48
24	0,21	1,13
25	0,88	1,15
26	0,92	1,13
27	0,74	1,10
28	0,78	1,08
29	0,87	1,09
30	0,85	1,06
31	0,55	1,05
32	0,68	1,05
33	0,98	1,04
34	0,71	1,04
35	0,71	1,04
36	0,92	1,03
37	0,64	1,01
38	0,72	1,00
39	0,70	1,00
40	0,71	0,97
41	0,71	0,95
42	0,90	0,96
43	0,57	0,88
44	0,77	0,88
45	0,91	0,89
46	0,60	0,88
47	0,77	0,68
48	0,75	0,83
49	0,34	0,82
50	0,65	0,81
51	0,70	0,77
52	0,92	0,74
53	0,50	0,71
54	0,92	0,70
55	0,68	0,69
56	0,70	0,68
57	0,52	0,49
58	0,74	0,56
59	0,55	0,50
60	0,90	0,64
61	0,55	0,45
62	0,78	0,31
63	0,77	0,26
64	0,85	0,25
65	0,68	0,22
66	0,62	0,09
67	0,78	-0,53

The correlation co-efficient is 0,1647. This is not statistically significant at the 5% level.

APPENDIX J
TABLE 9

RATING ON QUESTION 10, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 10	PERFORMANCE INDEX
1	1,00	1,87
2	0,88	1,67
3	0,97	1,71
4	0,50	1,61
5	0,05	1,57
6	0,87	1,56
7	0,92	1,47
8	0,88	1,41
9	0,81	1,37
10	0,91	1,73
11	0,97	1,03
12	0,25	1,27
13	0,60	1,29
14	0,94	1,27
15	0,31	1,21
16	0,05	1,19
17	0,12	1,21
18	0,90	1,19
19	0,41	0,94
20	0,51	1,19
21	0,65	1,17
22	0,94	1,17
23	0,18	1,48
24	0,62	1,13
25	0,50	1,15
26	0,04	1,13
27	0,21	1,10
28	0,78	1,08
29	0,41	1,09
30	0,64	1,06
31	0,92	1,05
32	0,21	1,05
33	0,50	1,04
34	0,18	1,04
35	0,65	1,04
36	0,91	1,03
37	0,40	1,01
38	0,54	1,00
39	0,40	1,00
40	0,72	0,97
41	0,81	0,95
42	0,30	0,96
43	0,92	0,88
44	0,18	0,88
45	0,11	0,89
46	0,60	0,88
47	0,70	0,68
48	0,22	0,83
49	0,25	0,82
50	0,37	0,81
51	0,64	0,77
52	0,05	0,74
53	0,32	0,71
54	0,05	0,70
55	0,28	0,69
56	0,71	0,68
57	0,58	0,49
58	0,21	0,56
59	0,08	0,50
60	0,64	0,64
61	0,61	0,45
62	0,78	0,31
63	0	0,26
64	0,34	0,25
65	0,65	0,22
66	0,60	0,09
67	0,21	-0,53

The correlation co-efficient is 0,3190. This is statistically significant at the 5% level

APPENDIX J

TABLE 10

RATING ON QUESTION 11, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 11	PERFORMANCE INDEX
1	0,97	1,87
2	0,14	1,67
3	0,91	1,71
4	0,16	1,61
5	0,95	1,57
6	1,00	1,56
7	0,94	1,41
9	0,41	1,37
10	0,77	1,73
11	0,95	1,03
12	0,91	1,27
13	0,82	1,29
14	0,94	1,27
15	0,68	1,21
16	0,05	1,19
17	0,90	1,21
18	0,97	1,19
19	0,38	0,94
20	0,50	1,19
21	0,37	1,17
22	0,94	1,17
23	0,80	1,48
24	0,68	1,13
25	0,88	1,15
26	0,95	1,13
27	0,25	1,10
28	0,78	1,08
29	0,40	1,09
30	0,61	1,06
31	0,91	1,05
32	0,57	1,05
33	0,04	1,04
34	0,22	1,04
35	0,88	1,04
36	0,87	1,03
37	0,37	1,01
38	0,75	1,00
39	0,67	1,00
40	0,72	0,97
41	0,75	0,95
42	0,78	0,96
43	0,92	0,88
44	0,67	0,88
45	0,82	0,89
46	0,42	0,88
47	0,70	0,68
48	0,75	0,83
49	0,25	0,82
50	0,67	0,81
51	0,84	0,77
52	0,95	0,74
53	0,75	0,71
54	0,95	0,70
55	0,78	0,69
56	0,68	0,68
57	0,65	0,49
58	0,74	0,56
59	0,42	0,50
60	0,34	0,64
61	0,68	0,45
62	0,75	0,31
63	0	0,26
64	0,52	0,25
65	0,82	0,22
66	0,80	0,09
67	0,40	-0,53

The correlation co-efficient is 0,1668. This is not statistically significant at the 5% level

APPENDIX J

TABLE 11

RATING ON QUESTION 12, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 12	PERFORMANCE INDEX
1	1,00	1,87
2	0,75	1,67
3	0,57	1,71
4	0,83	1,61
5	0,67	1,57
6	0,77	1,56
7	1,00	1,47
8	0,55	1,41
9	0,57	1,37
10	0,78	1,73
11	0,95	1,03
12	0,78	1,27
13	0,60	1,29
14	0,94	1,27
15	0,87	1,21
16	0,98	1,19
17	0,72	1,21
18	0,97	1,19
19	0,68	0,94
20	0,55	1,19
21	0,61	1,17
22	0,94	1,17
23	0,67	1,48
24	0,87	1,13
25	0,87	1,15
26	0,04	1,13
27	0,77	1,10
28	0,50	1,08
29	0,44	1,09
30	0,64	1,06
31	0,90	1,05
32	0,71	1,05
33	0,78	1,04
34	0,75	1,04
35	0,90	1,04
36	0,42	1,03
37	0,64	1,01
38	0,77	1,00
39	0,70	1,00
40	0,64	0,97
41	0,17	0,95
42	0,37	0,96
43	0,92	0,88
44	0,75	0,88
45	0,81	0,89
46	0,60	0,88
47	0,64	0,68
48	0,80	0,83
49	0,92	0,82
50	0,67	0,81
51	0,60	0,77
52	0,67	0,74
53	0,80	0,71
54	0,67	0,70
55	0,68	0,69
56	0,74	0,68
57	0,45	0,49
58	0,08	0,56
59	0,94	0,50
60	0,61	0,64
61	0,64	0,45
62	0,74	0,31
63	0,67	0,26
64	0,50	0,25
65	0,95	0,22
66	0,60	0,09
67	0,75	-0,53

The correlation co-efficient is 0,1461. This is not statistically significant at the 5% level

APPENDIX J

TABLE 12

RATING ON QUESTION 13, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 13	PERFORMANCE INDEX
1	1,00	1,87
2	0,78	1,67
3	0,90	1,71
4	0,19	1,61
5	0,68	1,57
6	0,90	1,56
7	0,97	1,47
8	0,81	1,41
9	0,90	1,37
10	0,91	1,73
11	0,95	1,03
12	0,05	1,27
13	0,60	1,29
14	0,60	1,27
15	0,80	1,21
16	0,75	1,19
17	0,74	1,21
18	0,97	1,19
19	0,70	0,94
20	0,77	1,19
21	0,60	1,17
22	0,60	1,17
23	0,52	1,48
24	0,11	1,13
25	0,64	1,15
26	0,92	1,13
27	0,24	1,10
28	0,78	1,08
29	0,81	1,09
30	0,95	1,06
31	0,90	1,05
32	0,12	1,05
33	1,00	1,04
34	0,91	1,04
35	0,87	1,04
36	0,62	1,03
37	0,58	1,01
38	0,68	1,00
39	0,71	1,00
40	0,75	0,97
41	0,81	0,95
42	0,94	0,96
43	0,90	0,88
44	0,75	0,88
45	0,61	0,89
46	0,20	0,88
47	0,42	0,68
48	0,74	0,83
49	0,97	0,82
50	0,82	0,81
51	0,40	0,77
52	0,68	0,74
53	0,25	0,71
54	0,68	0,70
55	0,10	0,69
56	0,81	0,68
57	0,61	0,49
58	0,65	0,56
59	0,62	0,50
60	0,32	0,64
61	0,20	0,45
62	0,78	0,31
63	0,61	0,26
64	0,18	0,22
65	0,18	0,22
66	0,80	0,09
67	0,42	-0,53

The correlation co-efficient is 0,2986. This is statistically significant at the 5% level

APPENDIX J

TABLE 13

RATING ON QUESTION 14, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 14	PERFORMANCE INDEX
1	0,97	1,87
2	0,81	1,67
3	0,81	1,71
4	0,77	1,61
5	0,94	1,57
6	1,00	1,56
7	0,94	1,47
8	0,94	1,41
9	0,92	1,37
10	0,91	1,73
11	0,97	1,03
12	0,80	1,27
13	0,77	1,29
14	0,95	1,27
15	0,72	1,21
16	0,98	1,19
17	0,92	1,21
18	0,95	1,19
19	0,94	0,94
20	0,97	1,19
21	0,85	1,17
22	0,95	1,17
23	0,62	1,48
24	0,92	1,13
25	0,68	1,15
26	0,92	1,13
27	0,25	1,10
28	0,78	1,08
29	0,42	1,09
30	0,92	1,06
31	0,91	1,05
32	0,60	1,05
33	0,50	1,04
34	0,74	1,04
35	0,88	1,04
36	0,85	1,03
37	0,62	1,01
38	0,77	1,00
39	0,72	1,00
40	0,92	0,97
41	0,72	0,95
42	0,81	0,96
43	0,90	0,88
44	0,61	0,88
45	0,97	0,89
46	0,54	0,88
47	0,60	0,68
48	0,17	0,83
49	0,97	0,82
50	0,85	0,81
51	0,74	0,77
52	0,94	0,74
53	0,72	0,71
54	0,94	0,70
55	0,68	0,69
56	0,72	0,68
57	0,50	0,49
58	0,77	0,56
59	0,97	0,50
60	0,81	0,64
61	0,68	0,45
62	0,24	0,31
63	0,65	0,26
64	0,78	0,25
65	0,95	0,22
66	0,58	0,09
67	0,82	-0,53

The correlation co-efficient is 0,2749. This is statistically significant at the 5% level

APPENDIX J

TABLE 14

RATING ON QUESTION 15, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 15	PERFORMANCE INDEX
1	0,21	1,87
2	0,82	1,67
3	0,84	1,71
4	0,20	1,61
5	0,50	1,57
6	0,50	1,56
7	0,94	1,47
8	0,90	1,41
9	0,87	1,37
10	0,77	1,73
11	0,64	1,03
12	0,90	1,27
13	0,35	1,29
14	0,60	1,27
15	0,72	1,21
16	0,98	1,19
17	0,92	1,21
18	0,95	1,19
19	0,94	0,94
20	0,97	1,19
21	0,85	1,17
22	0,95	1,17
23	0,62	1,48
24	0,92	1,13
25	0,68	1,15
26	0,92	1,13
27	0,25	1,10
28	0,50	1,08
29	0,84	1,09
30	0,61	1,06
31	0,38	1,05
32	0,57	1,05
33	0,04	1,04
34	0,28	1,04
35	0,50	1,04
36	0,10	1,03
37	0,64	1,01
38	0,77	1,00
39	0,35	1,00
40	0,65	0,97
41	0,25	0,95
42	0,02	0,96
43	0,92	0,88
44	0,45	0,88
45	0,61	0,89
46	0,91	0,88
47	0,35	0,68
48	0,80	0,83
49	-0,50	0,82
50	0,64	0,81
51	0,57	0,77
52	0,50	0,74
53	0,50	0,71
54	0,50	0,70
55	0,74	0,69
56	0,82	0,68
57	0,44	0,49
58	0,27	0,56
59	0,85	0,50
60	0,92	0,64
61	0,64	0,45
62	0,22	0,31
63	0,51	0,26
64	0,42	0,25
65	0,82	0,22
66	0,52	0,09
67	0,85	-0,53

The correlation co-efficient is 0,0729. This is not statistically significant at the 5% level

APPENDIX J

TABLE 15

RATING ON QUESTION 17, AND COMPANY PERFORMANCE

FIRM CODE No	RATING ON QUESTION 17	PERFORMANCE INDEX
1	1,00	1,87
2	0,85	1,67
3	0,91	1,71
4	0,50	1,61
5	0,64	1,57
6	0,77	1,56
7	1,00	1,47
8	0,91	1,41
9	0,97	1,37
10	0,85	1,73
11	0,40	1,03
12	0,50	1,27
13	0,85	1,29
14	0,91	1,27
15	0,94	1,21
16	0,94	1,19
17	0,80	1,21
18	0,95	1,19
19	0,50	0,94
20	0,60	1,19
21	0,50	1,17
22	0,91	1,17
23	0,68	1,48
24	0,52	1,13
25	0,75	1,15
26	0,57	1,13
27	0,77	1,10
28	0,78	1,08
29	0,65	1,09
30	0,91	1,06
31	0,94	1,05
32	0,60	1,05
33	1,00	1,04
34	0,74	1,04
35	0,92	1,04
36	0,72	1,03
37	0,61	1,01
38	0,72	1,00
39	0,35	1,00
40	0,71	0,97
41	0,77	0,95
42	0,50	0,96
43	0,90	0,88
44	0,68	0,88
45	0,67	0,89
46	0,78	0,88
47	0,61	0,68
48	0,75	0,83
49	0,50	0,82
50	0,71	0,81
51	0,50	0,77
52	0,64	0,74
53	0,75	0,71
54	0,64	0,70
55	0,68	0,69
56	0,80	0,68
57	0,75	0,49
58	0,68	0,56
59	0,95	0,50
60	0,90	0,64
61	0,50	0,45
62	0,17	0,31
63	0,75	0,26
64	0,72	0,25
65	0,95	0,22
66	0,62	0,09
67	0,75	-0,53

The correlation co-efficient is 0,2340. This is not statistically significant at the 5% level

APPENDIX J

TABLE 16

RATING ON QUESTION 19, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 19	PERFORMANCE INDEX
1	0,92	1,87
2	0,88	1,67
3	0,65	1,71
4	0,42	1,61
5	0,02	1,57
6	0,72	1,56
7	0,90	1,47
8	0,87	1,41
9	0,81	1,37
10	0,60	1,73
11	0,05	1,03
12	1,00	1,27
13	0,85	1,29
14	0,61	1,27
15	0,92	1,21
16	0,94	1,19
17	0,78	1,21
18	0,91	1,19
19	0,80	0,94
20	0,78	1,19
21	0,97	1,17
22	0,61	1,17
23	0,77	1,48
24	0,82	1,13
25	0,94	1,15
26	0,97	1,13
27	0,28	1,10
28	0,60	1,08
29	0,80	1,09
30	0,62	1,06
31	0,60	1,05
32	0,97	1,05
33	0,98	1,04
34	0,24	1,04
35	0,68	1,04
36	0,58	1,03
37	0,61	1,01
38	0,58	1,00
39	0,60	1,00
40	0,78	0,97
41	0,77	0,95
42	0,11	0,96
43	0,60	0,88
44	0,62	0,88
45	0,88	0,89
46	0,91	0,88
47	0,57	0,68
48	0,77	0,83
49	1,00	0,82
50	0,67	0,81
51	0,74	0,77
52	0,02	0,74
53	0,77	0,71
54	0,02	0,70
55	0,68	0,69
56	0,70	0,68
57	0,71	0,49
58	0,74	0,56
59	0,55	0,50
60	0,10	0,64
61	0,92	0,45
62	0,21	0,31
63	0,55	0,26
64	0,61	0,25
65	0,52	0,22
66	0,55	0,09
67	0,78	-0,53

The correlation co-efficient is 0,1796. This is not statistically significant at the 5% level

APPENDIX J

TABLE 17

RATING ON QUESTION 20, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 20	PERFORMANCE INDEX
1	0,80	1,87
2	0,80	1,67
3	0,70	1,71
4	0,60	1,61
5	0,32	1,57
6	0,75	1,56
7	0,94	1,47
8	0,78	1,41
9	0,97	1,37
10	0,60	1,73
11	0,57	1,03
12	0,50	1,27
13	0,37	1,29
14	0,62	1,27
15	0,72	1,21
16	0,75	1,19
17	0,17	1,21
18	0,94	1,19
19	0,21	0,94
20	0,52	1,19
21	0,72	1,17
22	0,62	1,17
23	0,62	1,48
24	0,81	1,13
25	0,87	1,15
26	0,88	1,13
27	0,21	1,10
28	0,78	1,08
29	0,75	1,09
30	0,60	1,06
31	0,61	1,05
32	0,72	1,05
33	0,74	1,04
34	0,78	1,04
35	0,71	1,04
36	0,60	1,03
37	0,61	1,01
38	0,77	1,00
39	0,22	1,00
40	0,68	0,97
41	0,20	0,95
42	0,90	0,96
43	0,04	0,88
44	0,72	0,88
45	0,70	0,89
46	0,84	0,88
47	0,35	0,68
48	0,74	0,83
49	0,97	0,82
50	0,31	0,81
51	0,72	0,77
52	0,32	0,74
53	0,72	0,71
54	0,32	0,70
55	0,34	0,69
56	0,21	0,68
57	0,55	0,49
58	0,78	0,56
59	0,61	0,50
60	0,61	0,64
61	0,18	0,45
62	0,21	0,31
63	0,14	0,26
64	0,57	0,25
65	0,24	0,22
66	0,58	0,09
67	0,24	-0,53

The correlation co-efficient is 0,4077. This is statistically significant at the 5% level

APPENDIX J

TABLE 18

RATING ON QUESTION 21, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 21	PERFORMANCE INDEX
1	1,00	1,87
2	0,95	1,67
3	0,05	1,71
4	0,31	1,61
5	0,50	1,57
6	0,75	1,56
7	0,18	1,47
8	0,47	1,41
9	0,55	1,37
10	0,94	1,73
11	0,41	1,03
12	0,80	1,27
13	0,35	1,29
14	0,94	1,27
15	0,35	1,21
16	0,87	1,19
17	0,57	1,21
18	0,67	1,19
19	0,07	0,94
20	0,50	1,19
21	1,00	1,17
22	0,94	1,17
23	0,52	1,48
24	0,62	1,13
25	0,95	1,15
26	0,08	1,13
27	0,24	1,10
28	0,50	1,08
29	0,78	1,09
30	0,90	1,06
31	0,42	1,05
32	0,57	1,05
33	0,24	1,04
34	0,15	1,04
35	0,41	1,04
36	0,40	1,03
37	0,61	1,01
38	0,52	1,00
39	0,28	1,00
40	0,20	0,97
41	0,24	0,95
42	0,12	0,96
43	0,85	0,88
44	0,04	0,88
45	0,44	0,89
46	0,91	0,88
47	0,64	0,68
48	0,25	0,83
49	0,50	0,82
50	0,64	0,81
51	0,88	0,77
52	0,50	0,74
53	0,27	0,71
54	0,50	0,70
55	0,68	0,69
56	0,21	0,68
57	0,58	0,49
58	0,41	0,56
59	0,57	0,50
60	0,50	0,64
61	0,58	0,45
62	0,17	0,31
63	0,65	0,26
64	0,58	0,25
65	0,61	0,22
66	0,54	0,09
67	0,85	-0,53

The correlation co-efficient is 0,0571. This is not statistically significant at the 5% level

APPENDIX J

TABLE 19

RATING ON QUESTION 22, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 22	PERFORMANCE INDEX
1	1,00	1,87
2	0,95	1,67
3	0,67	1,71
4	0,40	1,61
5	0,20	1,57
6	0,81	1,56
7	0,94	1,47
8	0,92	1,41
9	0,44	1,37
10	0,88	1,73
11	0,90	1,03
12	0,74	1,27
13	0,87	1,29
14	0,87	1,27
15	0,22	1,21
16	0,25	1,19
17	0,21	1,21
18	0,21	1,19
19	0,42	0,94
20	0,11	1,19
21	0,50	1,17
22	0,87	1,17
23	0,40	1,48
24	0,11	1,13
25	0,70	1,15
26	0,58	1,13
27	0,21	1,10
28	0,78	1,08
29	0,55	1,09
30	0,61	1,06
31	0,87	1,05
32	0,58	1,05
33	0,25	1,04
34	0,24	1,04
35	0,88	1,04
36	0,61	1,03
37	0,42	1,01
38	0,12	1,00
39	0,38	1,00
40	0,78	0,97
41	0,15	0,95
42	0,78	0,96
43	0,41	0,88
44	0,95	0,88
45	0,68	0,89
46	0,41	0,88
47	0,67	0,68
48	0,77	0,83
49	1,00	0,82
50	0,67	0,81
51	0,65	0,77
52	0,20	0,74
53	0,61	0,71
54	0,20	0,70
55	0,61	0,69
56	0,80	0,68
57	0,54	0,49
58	0,65	0,56
59	0,95	0,50
60	0,40	0,64
61	0,07	0,45
62	0,75	0,31
63	0,21	0,26
64	0,50	0,25
65	0,42	0,22
66	0,35	0,09
67	0,74	-0,53

The correlation co-efficient is 0,1400. This is not statistically significant at the 5% level

APPENDIX J

TABLE 20

RATING ON QUESTION 23, AND COMPANY PERFORMANCE

FIRM CODE No.	RATING ON QUESTION 23	PERFORMANCE INDEX
1	0,87	1,87
2	0,87	1,67
3	0,88	1,71
4	0,66	1,61
5	0,78	1,57
6	1,00	1,56
7	0,94	1,47
8	0,95	1,41
9	0,14	1,37
10	0,60	1,73
11	0,60	1,03
12	0,91	1,27
13	0,80	1,29
14	0,61	1,27
15	0,84	1,21
16	1,00	1,19
17	0,71	1,21
18	0,90	1,19
19	0,62	0,94
20	0,87	1,19
21	0	1,17
22	0,61	1,17
23	0,75	1,48
24	0,88	1,13
25	0,90	1,15
26	0,57	1,13
27	0,78	1,10
28	0,68	1,08
29	0,57	1,09
30	0,85	1,06
31	0,60	1,05
32	0,55	1,05
33	1,00	1,04
34	0,75	1,04
35	0,90	1,04
36	0,91	1,03
37	1,00	1,01
38	0,72	1,00
39	0,60	1,00
40	0,75	0,97
41	0,77	0,95
42	0,88	0,96
43	0,57	0,88
44	0,92	0,88
45	0,78	0,89
46	0,52	0,88
47	0,70	0,68
48	0,75	0,83
49	0,52	0,82
50	0,67	0,81
51	0,68	0,77
52	0,78	0,74
53	0,55	0,71
54	0,78	0,70
55	0,68	0,69
56	0,72	0,68
57	0,75	0,49
58	0,70	0,56
59	0,57	0,50
60	0,94	0,64
61	0,95	0,45
62	0,74	0,31
63	0,65	0,26
64	0,77	0,25
65	0,65	0,22
66	0,70	0,09
67	0,78	-0,53

The correlation co-efficient is 0,0892. This is not statistically significant at the 5% level

APPENDIX KRELATIONSHIP BETWEEN ORIENTATION TO CONSTITUENTS
OF THE ELEMENTS OF THE PHYSICAL DISTRIBUTION CONCEPT,
AND COMPANY PERFORMANCE (WEIGHTED RATINGS)

1. The correlation co-efficient for the weighted ratings on Question 2, and company performance index was:

0,1377

This was not statistically significant at the 5% level.

2. The correlation co-efficient for the weighted ratings on Question 3, and company performance index was:

0,2940

This was statistically significant at the 5% level.

3. The correlation co-efficient for the weighted ratings on Question 4, and company performance index was:

0,3461

This was statistically significant at the 5% level.

4. The correlation co-efficient for the weighted ratings on Question 5, and company performance index was:

0,3047

This was statistically significant at the 5% level.

5. The correlation co-efficient for the weighted ratings on Question 6, and company performance index was:

0,1998

This was not statistically significant at the 5% level.

APPENDIX K (continued)

6. The correlation co-efficient for the weighted ratings on Question 7, and company performance index was:
 $0,2832$
This was statistically significant at the 5% level.
7. The correlation co-efficient for the weighted ratings on Question 8, and company performance index was:
 $0,3193$
This was statistically significant at the 5% level.
8. The correlation co-efficient for the weighted ratings on Question 9, and company performance index was:
 $0,2472$
This was on the border line of being statistically significant at the 5% level.
9. The correlation co-efficient for the weighted ratings on Question 10, and company performance index was:
 $0,3796$
This was statistically significant at the 5% level.
10. The correlation co-efficient for the weighted ratings on Question 11, and company performance index was:
 $0,2692$
This was statistically significant at the 5% level.
11. The correlation co-efficient for the weighted ratings on Question 12, and company performance index was:
 $0,1635$
This was not statistically significant at the 5% level.
12. The correlation co-efficient for the weighted ratings on Question 13, and company performance index was:
 $0,3704$
This was statistically significant at the 5% level.

APPENDIX K (continued)

13. The correlation co-efficient for the weighted ratings on Question 14, and company performance index was:

0,2943

This was statistically significant at the 5% level.

14. The correlation co-efficient for the weighted ratings on Question 15, and company performance index was:

0,0600

This was not statistically significant at the 5% level.

15. The correlation co-efficient for the weighted ratings on Question 17, and company performance index was:

0,2133

This was not statistically significant at the 5% level.

16. The correlation co-efficient for the weighted ratings on Question 19, and company performance index was:

0,2483

This was on the borderline of being statistically significant at the 5% level.

17. The correlation co-efficient for the weighted ratings on Question 20, and company performance index was:

0,3643

This was statistically significant at the 5% level.

18. The correlation co-efficient for the weighted ratings on Question 21, and company performance index was:

0,1291

This was not statistically significant at the 5% level.

19. The correlation co-efficient for the weighted ratings on Question 22, and company performance index was:

0,2105

This was not statistically significant at the 5% level.

APPENDIX K (continued)

20. The correlation co-efficient for the weighted ratings on Question 23, and company performance index was:

0,1975

This was not statistically significant at the 5% level.

APPENDIX L

KOLMOGOROV-SMIRNOV TEST

TABLE 1

CHIEF EXECUTIVES' RANKING OF THE SIX STATEMENTS AS THE MOST IMPORTANT				
STATEMENT	NUMBER WHO RANKED EACH AS THE MOST IMPORTANT	PER CENT	THEORETICAL CUMULATIVE DISTRIBUTION %	CUMULATIVE DISTRIBUTION OF OBSERVED %
1	33	49,26	16,67	49,26
2	7	10,45	33,34	59,71
3	11	16,42	50,01	76,13
4	8	11,94	66,68	88,07
5	5	7,46	83,34	95,53
6	3	4,47	100	100

Calculated D equals 32,59% or 0,3259.

The critical value equals 0,17. The calculated D is greater than the critical value and thus the null hypothesis of there being no preference for any of the statements as the most important, is rejected.

APPENDIX L

TABLE 2

CHIEF EXECUTIVES' RANKING OF THE SIX STATEMENTS AS SECOND MOST IMPORTANT				
STATEMENT	NUMBER WHO RANKED EACH AS SECOND MOST IMPORTANT	PER CENT	THEORETICAL CUMULATIVE DISTRIBUTION %	CUMULATIVE DISTRIBUTION OF OBSERVED %
1	10	14,92	16,67	14,92
2	10	14,92	33,34	29,84
3	5	7,46	50,01	37,30
4	6	8,96	66,68	46,26
5	9	13,44	83,34	59,70
6	27	40,30	100	100

Calculated D equals 23,64% or 0,2364.

The critical value equals 0,17. Calculated D is greater than the critical value and therefore the null hypothesis is rejected.

APPENDIX L

TABLE 3

CHIEF EXECUTIVES' RANKING OF THE SIX STATEMENTS AS THIRD MOST IMPORTANT				
STATEMENT	NUMBER WHO RANKED EACH AS THIRD MOST IMPORTANT	PER CENT	THEORETICAL CUMULATIVE DISTRIBUTION %	CUMULATIVE DISTRIBUTION OF OBSERVED %
1	8	11,95	16,67	11,95
2	19	28,35	33,34	40,30
3	15	22,38	50,01	62,68
4	11	16,42	66,68	79,10
5	12	17,91	83,34	97,10
6	2	2,99	100	100

Calculated D equals 13,67% or 0,1367. The critical value equals 0,17. Calculated D is smaller than the critical value and therefore the null hypothesis of no preference is proved.

APPENDIX L

TABLE 4

CHIEF EXECUTIVES' RANKING OF THE SIX STATEMENTS AS FOURTH MOST IMPORTANT				
STATEMENT	NUMBER WHO RANKED EACH AS FOURTH MOST IMPORTANT	PER CENT	THEORETICAL CUMULATIVE DISTRIBUTION %	CUMULATIVE DISTRIBUTION OF OBSERVED %
1	7	10,45	16,67	10,45
2	8	11,94	33,34	22,39
3	12	17,91	50,01	40,30
4	12	17,91	66,68	58,21
5	21	31,34	83,34	89,55
6	7	10,45	100	100

Calculated D equals 10,95% or 0,1095. The critical value equals 0,17. The calculated D is smaller than the critical value and therefore the null hypothesis is proved.

APPENDIX L

TABLE 5

CHIEF EXECUTIVES' RANKING OF THE SIX STATEMENTS AS FIFTH MOST IMPORTANT				
STATEMENT	NUMBER WHO RANKED EACH AS FIFTH MOST IMPORTANT	PER CENT	THEORETICAL CUMULATIVE DISTRIBUTION %	CUMULATIVE DISTRIBUTION OF OBSERVED %
1	4	5,97	16,67	5,97
2	12	17,91	33,34	23,88
3	15	22,39	50,01	46,27
4	18	26,87	66,68	73,14
5	10	14,93	83,34	88,07
6	8	11,93	100	100

Calculated D equals 10,70% or 0,1070. The critical value equals 0,17. The Calculated D is less than the critical value and the null hypothesis is therefore proved.

APPENDIX L

TABLE 6

CHIEF EXECUTIVES' RANKING OF THE SIX STATEMENTS AS SIXTH MOST IMPORTANT				
STATEMENT	NUMBER WHO RANKED EACH AS SIXTH MOST IMPORTANT	PER CENT	THEORETICAL CUMULATIVE DISTRIBUTION %	CUMULATIVE DISTRIBUTION OF OBSERVED %
1	5	7,46	16,67	7,46
2	11	16,42	33,34	23,88
3	8	11,94	50,01	35,82
4	12	17,91	66,68	53,73
5	10	14,93	83,34	68,66
6	21	31,34	100	100

Calculated D equals 14,68% or 0,1468. The critical value equals 0,17. The Calculated D is smaller than the critical value and the null hypothesis is therefore proved.

APPENDIX M
CONTINGENCY TABLES RELATING TO ORGANIZATIONAL ARRANGEMENTS FOR
PHYSICAL DISTRIBUTION IN THE TARGET POPULATION

TABLE 1

CONTINGENCY TABLE: ORGANIZATIONAL ARRANGEMENTS BY STRATEGY FOLLOWED						
		STRATEGY FOLLOWED				
		Single Business	Dominant	Related	Unrelated	Total
Organizational Arrangements	Part of marketing/sales	9 (28,1%)	5 (20%)	1 (14,3%)	1 (33,3%)	16 (23,9%)
	Line grouped, staff dispersed	12 (37,5%)	10 (40%)	4 (57,1%)	0	26 (38,8%)
	Fragmented	6 (18,7%)	7 (28%)	1 (14,3%)	0	14 (20,9%)
	Autonomous	5 (15,6%)	3 (12%)	1 (14,3%)	2 (66,7%)	11 (16,4%)
	Total	32 (47,8%)	25 (37,3%)	7 (10,4%)	3 (4,5%)	67 100%

The chi square value is 8,96531 with 9 degrees of freedom. This is not statistically significant at the 5% level

APPENDIX M

TABLE 2

		CONTINGENCY TABLE: ORGANIZATIONAL ARRANGEMENTS BY JOHANNESBURG STOCK EXCHANGE SECTOR CLASSIFICATION								
		JOHANNESBURG STOCK EXCHANGE SECTOR CLASSIFICATION								
		Beverages + Hotels	Clothing, Footwear, Textiles	Food	Furniture	Pharmaceutical	Printing	Tobacco Match	Misc.	Total
Organizational Arrangements	Part of marketing/sales	0 -	7 (30,4%)	4 (25%)	0 -	0 -	2 (40%)	2 (66,7%)	1 (33,3%)	16 (23,9%)
	Line grouped, Staff dispersed	2 (40%)	10 (43,5%)	7 (43,7%)	4 (50%)	1 (25%)	1 (20%)	0 -	1 (33,3%)	26 (38,8%)
	Fragmented	0 -	6 (26,1%)	2 (12,5%)	4 (50%)	1 (25%)	1 (20%)	0 -	0 -	14 (20,9%)
	Autonomous	3 (60%)	0 -	3 (18,7%)	0 -	2 (50%)	1 (20%)	1 (33,3%)	1 (33,3%)	11 (16,4%)
	Total	5 (7,5%)	23 (34,3%)	16 (23,9%)	8 (11,9%)	4 (6%)	5 (7,5%)	3 (4,5%)	3 (4,5%)	67 100%

The chi square value is 30,93926 with 21 degrees of freedom. This is not statistically significant at the 5% level

APPENDIX M

TABLE 3

CONTINGENCY TABLE: ORGANIZATIONAL ARRANGEMENTS BY PERFORMANCE INDEX CLASSIFICATION		PERFORMANCE INDEX CLASSIFICATION			
		High	Medium	Low	Total
Organizational Arrangements	Part of marketing/sales	7 (33,3%)	5 (21,7%)	4 (17,4%)	16 (23,9%)
	Line grouped, Staff dispersed	9 (42,9%)	7 (30,4%)	10 (43,5%)	26 (38,8%)
	Fragmented	2 (9,5%)	5 (21,7%)	7 (30,4%)	14 (20,9%)
	Autonomous	3 (14,3%)	6 (26,1%)	2 (8,7%)	11 (16,4%)
	Total	21 (31,3%)	23 (34,3%)	23 (34,3%)	67 100%

The chi square value is 6,38140 with 6 degrees of freedom.
This is not statistically significant at the 5% level

APPENDIX M

TABLE 4

		PHYSICAL DISTRIBUTION ORIENTATION CLASSIFICATION			
		High	Medium	Low	Total
Organizational Arrangements	Part of marketing/sales	7 (25%)	6 (33,3%)	3 (14,3%)	16 (23,9%)
	Line grouped, Staff dispersed	13 (46,4%)	5 (27,8%)	8 (38,1%)	26 (38,8%)
	Fragmented	2 (7,1%)	6 (33,3%)	6 (28,6%)	14 (20,9%)
	Autonomous	6 (21,4%)	1 (5,6%)	4 (19,0%)	11 (16,4%)
	Total	28 (41,8%)	18 (26,9%)	21 (31,3%)	67 100%

The chi square value is 8,75331 with 6 degrees of freedom. This is not statistically significant at the 5% level

APPENDIX M

TABLE 5

CONTINGENCY TABLE: ORGANIZATIONAL ARRANGEMENTS BY INVENTORY MODE CLASSIFICATION					
		INVENTORY MODE CLASSIFICATION			
		Produce to order	Produce for stock	Combination	Total
Organizational Arrangements	Part of marketing/sales	7 (35%)	5 (17,9%)	4 (21,1%)	16 (23,9%)
	Line grouped; Staff dispersed	3 (15%)	12 (42,9%)	11 (57,9%)	26 (38,8%)
	Fragmented	10 (50%)	2 (7,1%)	2 (10,5%)	14 (20,9%)
	Autonomous	0 -	9 (32,1%)	2 (10,5%)	11 (16,4%)
	Total	20 (29,9%)	28 (41,8%)	19 (28,4%)	67 100%

The chi square value is 25,87001 with 6 degrees of freedom. This is statistically significant at the 5% level

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