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An evaluation of participation by the purchasing function in the corporate strategic planning process

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An Evaluation of Participation by the Purchasing Function in the Corporate Strategic Planning Process

by

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by
Wade C. Ferguson

We hereby certify that this Dissertation submitted by Wade C. Ferguson conforms to acceptable standards, and as such is fully adequate in scope and quality. It is therefore approved as the fulfillment of the Dissertation requirement for the degree of Doctor of Business Administration.

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions or writings of another.

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ABSTRACT

An Evaluation of Participation by
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This study examines the role of the purchasing function in the corporate strategic planning (CSP) process of 219 southeastern U.S. firms, including manufacturing and non-manufacturing firms, representing both the private and public sectors. The research focuses on six research questions to expand the body of knowledge in the area of strategic planning.

The study found that 95% of the responding firms do have a formalized CSP process of some type. Of those firms with a formalized CSP process, 82.78% of the responding purchasing managers indicated that their purchasing departments were involved in the process to some degree, with the majority having some involvement in both development and implementation of strategic plans. In addition, 46.7% indicated their involvement increased in the past 5 years. These findings support claims of substantial increases in purchasing involvement in CSP over the past 10 years.

Conflict reduction appears to be an additional benefit of CSP participation. In concert with the increased participation levels, 57.3% of respondents reported that conflict between purchasing goals and corporate goals seldom occurred.

This increase in purchasing CSP participation may be attributed to a combination "pull and push" phenomena. The purchasing function has been pulled into greater participation by management through improved perceptions of purchasing's ability to contribute to the long range competitiveness of the firm. While simultaneously pushed into greater participation through improved professionalism and self-awareness on behalf of purchasers themselves.

The study found no significant differences in degree of purchasing participation in CSP between manufacturing and non-manufacturing firms, except in the medium involvement category, where purchasers in non-manufacturing firms were significantly more involved than their counterparts in manufacturing. No significant difference was found between private and public organizations.

The study also found that purchasing managers still saw room for improvement in participation levels, with 66.4%

working in firms at actual involvement levels lower than the purchasers' opinion levels.

Six performance measures were correlated with CSP involvement levels; however, no significant relationships were found between any of these measures and purchasing participation in CSP.

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It is to my wife, Judith King Ferguson, that this effort is lovingly dedicated.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

The role of purchasing in the corporate strategic planning process varies from firm to firm. In some companies, purchasing is an important participant in the development of strategic plans, while in others, the execution of the plan is all that is required.

In general, this study examines the role of the purchasing function in the strategic planning process of southeastern U.S. firms, including the type, degree, and effects of participation by the functional area of purchasing in the corporate strategic planning process. Over 700 companies were surveyed, representing the states of Virginia, North Carolina and South Carolina. The list was obtained from the Purchasing Management Association of the Carolinas-Virginia (PMAC-V) providing an industry cross-section which allowed for comparisons of private vs. public enterprises and manufacturing vs. non-manufacturing enterprises.

Importance of Purchasing's Participation in the Strategic Planning Process

Since purchasing is typically responsible for expending over 50% of corporate revenues for requisite goods and services (Chao, 1989, p. 2; Lee & Dobler, 1977, p. 9), the function is appropriately positioned to be a key contributor to both the formulation and execution of a strategic plan. Purchasing is an excellent resource to provide information regarding cost trends, material availability and general data concerning particular suppliers or an entire industry (Adamson, 1991, p. 11). More specifically, purchasing roles which may enhance a firm's strategic planning capabilities, include:

1. improvement of current products/services with new materials or methods
2. support of quality positions with the procurement of appropriate materials
3. act as an early warning system for price or supply problems with negative impacts on the firm (Cavinato, 1984, p. 13)

The purchasing function may provide positive benefits to the firm at both the macro and micro levels of the strategic planning process (Burt & Soukup, 1985, p. 93). For example, at the macro level, purchasing may provide valuable insights into "the company's environment, forecast changes in that environment, share relevant information

[and] identify the company's competitive advantages and disadvantages relative to its suppliers" (Burt & Soukup, 1985, p. 95). At the micro level, purchasing may provide input concerning suppliers, materials, potential supply problems and other data pertinent to the development of an effective strategic plan (Burt & Soukup, 1985, p. 95). Cavinato (1984, p. 16) suggests that purchasing plays a key role in the development of strategic advantages in the areas of cost advantage, product features, product quality, product timing, and product availability.

Not only is participation in the strategic planning process of vital importance to the "long range growth and success of the business enterprise" (Bimmerle, 1990, p. 76), participation also provides important benefits specifically to the purchasing function. Several authors cite involvement in the corporate strategic planning process as vital to the long-term success of the purchasing function (Cannon, 1968; Cavinato, 1986; Freeman & Cavinato, 1990; Leavitt, 1989; Lovering, 1990). According to Chao (1989), increased involvement in the strategic planning process is indicative of a "movement of the purchasing function to a top-level corporate support position, as opposed to only a material-acquisition-and-flow interest" (Chao, 1989, p. 24).

Prior to the 1980's, involvement by the purchasing function in the strategic planning process had been limited.

In 1968, Cannon wrote:

> It is often assumed that these areas [including purchasing] have little or nothing to do with the basic strategies of the firm. The tendency is to consider them as strictly operational or tactical activities which are essential in implementing the marketing and development strategies (Cannon, 1968, p. 444).

Cannon's 1968 opinion was further supported by Dean Ammer in a 1974 study of 750 U.S. industrial managers. Ammer's study found that only 21% of the industrial managers reported that their purchasing managers 'frequently' participated in the planning process or in other decisions not directly related to the purchasing function (Ammer, 1974, p. 38).

However, in the 1980s, some researchers found that purchasing participation in the strategic planning process was increasing. In 1983, Purchasing Magazine reported that approximately 1/3 of all purchasing departments were involved in strategic planning (Staff, 1983, p. 14). A 1988 research study by the Center of Advanced Purchasing Studies (Fearon, 1988) also found that participation by purchasing in the corporate strategic planning process increased during the 1980s. The study's results showed that 43% of 292 respondents reported increased roles/responsibilities in the strategic planning process since 1980.

In conflict with the 1988 CAPS findings, 1986 research findings by Indiana University (Johnson, 1986) suggested that purchasing participation in the corporate strategic

planning process had not increased during the 1980s and that the function was still treated in an isolated fashion by most firms.

Recent professional literature including Leenders, Fearon and England (1989, p. 607), Bimmerle (1990), and Lovering (1990), re-affirms the CAPS findings of increased participation. Considering the potential benefits to the firm of active purchasing involvement in the strategic planning process and the uncertainty regarding participation, there is a need for additional research to ascertain the current level of purchasing involvement in the process.

Research Questions

While many issues may be identified during a study of purchasing's relationship with the corporate strategic planning process, this study gives consideration to the following research questions:

1. To what extent is the purchasing function involved in the corporate strategic planning process? Is the function involved in all phases of the process including the development of strategic plans as well as implementation and control?
2. Has there been a change in the level of participation by the purchasing function in the corporate strategic planning process during the

past five years?

3. Are there differences in the extent of purchasing participation in the corporate strategic planning process between different industry classifications, such as manufacturing vs. non-manufacturing companies or between the public vs. private sectors?
4. What role do purchasing managers believe they should play in the strategic planning process? Is their role perception congruent with actual practice?
5. Are the strategic goals/objectives of the purchasing function consistent with those of the organization? If not, what areas of conflict do purchasing managers perceive?
6. Is there a relationship between functional performance and functional participation in the corporate strategic planning process?

Research Objectives and Contributions

The general objective of this research is to expand the body of knowledge regarding purchasing participation in the corporate strategic planning process. The findings of the study will be beneficial to purchasing practitioners, corporate management and researchers.

Benefits to Professional Practitioners

1. Provide a greater understanding of purchasing's role in the corporate strategic planning process
2. Demonstrate the importance of participation in the corporate strategic planning process, with emphasis on benefits to the purchasing function

Benefits to Corporate Management

1. Demonstrate the importance of purchasing participation in the corporate strategic planning process, with emphasis on the inter-dependant benefits to the corporation and the purchasing function, collectively and individually

Benefits to Researchers

1. Provide a baseline of current purchasing participation in the corporate strategic planning process
2. Provide a basis for additional research regarding functional participation in the corporate strategic planning process

Specific Objectives and Contributions

Objectives and contributions, specifically related to the Research Questions previously stated, are as follows:

1. To determine the current level of participation by the purchasing function in the corporate strategic planning process. This will serve to verify findings of other recent studies (such as Freeman & Cavinato, 1990) and act as a baseline to measure future advances/declines in purchasing participation in the corporate strategic planning process.
2. To determine if the current level of participation represents an increase, decrease or status quo in participation levels over the past 5 years. This will serve to determine if recent trends (Fearon, 1988) of increasing purchasing participation in the corporate strategic planning process are continuing.
3. To determine if purchasing participation in the corporate strategic planning process differs across industry classifications. This will provide more specific information to practitioners and corporate management in the various classifications.
4. To determine if purchasing managers and corporate management (as evidenced by actual practice) maintain the same opinions regarding purchasing participation in the corporate strategic planning process. An understanding of possible

inconsistencies in role perception will improve communication between purchasing and corporate management on the subject of purchasing participation.

5. To determine the degree of consistency between functional and corporate goals/objectives. An understanding of conflicts (functional goals sacrificed in order to achieve corporate goals) will allow purchasing managers to better plan the functional process to provide greater consistency with corporate requirements. Areas of inconsistency may also indicate that management expectations for their purchasing departments may have changed. Insight into such trends will allow purchasing managers to do a better job of preparing their own department to be more consistent with management expectations.
6. To determine if there is a relationship between functional corporate strategic planning participation and the performance of the purchasing function. If performance and participation are positively correlated, this will provide an additional argument for inclusion of the purchasing function in all phases of the corporate strategic planning process.

Definition of Terms

The following definitions apply whenever the terms are used in this study, unless otherwise indicated in the body of the study:

1. Strategy - "The fundamental pattern of present and planned resource deployments and environmental interactions that indicates how the organization will achieve its objectives" (Hofer & Schendel, 1978, p. 25)
2. Corporate strategic planning process (here-in-after abbreviated CSP process) - a formalized corporate process specifically designed for the development and implementation of strategic (long-term) plans
3. Goals - "Ultimate, long-run, open-ended attributes or ends a person or organization seeks" (Hofer & Schendel, 1978, p. 20)
4. Objectives - "Intermediate-term targets that are necessary but not sufficient for the satisfaction of goals" (Hofer & Schendel, 1978, p. 20)

Summary

The purchasing function is uniquely positioned to be a key contributor to the corporate strategic planning process. It has also been suggested that active participation by purchasing in the corporate strategic planning process provides a number of important benefits to both the firm and

the function. However, there has been disagreement regarding the actual extent of purchasing involvement in the process.

This study evaluates purchasing participation in the corporate strategic planning process from a sample of 788 southeastern firms. The level of involvement as well as possible correlations with purchasing performance are examined.

Six research questions are proposed to support the proposed research objectives and research hypotheses (See Chapter III). The benefits of this research are divided into three categories, including:

1. Benefits to Professional Practitioners
2. Benefits to Corporate Management
3. Benefits to Researchers

Presentation Format

The remainder of this study is presented in four additional chapters. Chapter II provides a review of the literature supporting the discussion of purchasing's relationship to the CSP process. Chapter III covers the methodology, hypotheses, and research design. Chapter IV is a presentation and discussion of the research results. Chapter V offers conclusions and suggestions for additional research.

CHAPTER II

REVIEW OF THE LITERATURE

"Although Henri Fayol noted the importance of strategic business planning as long ago as 1916, serious attention really began as recently as 1958 when David W. Ewing published Long Range Planning for Management (New York: Harper & Row)" (Paul, Donovan & Taylor, p. 124). Since 1958, a great deal of attention has been devoted to the subject. Paul et al. note that by 1970, Mockler (1970) had identified 36 major books published on the subject of strategic planning during the preceding 12 year period.

The role of functional corporate divisions such as marketing, finance, accounting, production, and purchasing, in the CSP process, have received various degrees of attention by different authors. Many earlier works on the subject gave little consideration to functional participation; however, the trend in more recent writings suggest a greater emphasis on the type and degree of functional involvement in CSP.

Since the focus of this study is primarily the involvement of a specific functional unit, i.e. purchasing,

in the CSP process, the review of the literature covers the following issues relevant to CSP:

1. CSP and Functional Participation
2. CSP and the Purchasing Function
3. Functional Trade-offs Resulting from the Strategic Planning Process
4. CSP and Performance

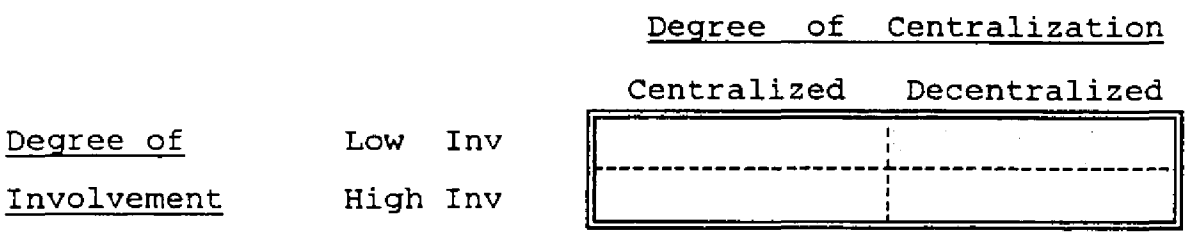
Corporate Strategic Planning and Functional Participation

Whether or not functional units are involved in the CSP process is hardly a debatable issue. Where formalized CSP occurs, functional units, as members of the overall corporate entity, must be involved in the process to some degree. For some organizations, it may only include the implementation of the plan, with minimal input during the development process. For other organizations, the involvement may include a support function during the development of corporate strategic plans. For others, functional units may be actively involved in both the development and implementation phases of the CSP process.

In order to classify both the nature and extent of functional unit participation, the degree of formal planning centralization may be measured and compared to the functional involvement level. A comparison of the two variables, centralization and involvement, is depicted in Figure II.1.

Figure II.1

Centralization of CSP vs. Functional Involvement



The dotted, interior lines of this centralization - involvement matrix suggest both variables should be considered on a relative continuum. The four boxes of the matrix should not be considered as absolute categorizations, but merely as indicators of a particular firm's relative treatment of the CSP process. It should be noted also that the upper right-hand box, representing the Decentralized - Low Involvement category, will not be given further consideration, since decentralization and increased functional involvement are complimentary. It is unlikely that a decentralized CSP process could occur in the absence of a relatively high degree of functional involvement.

Organizations with minimal functional participation are often characterized by central planning groups or central planning functions (Centralized - Low Involvement). In such an organization, functional units only provide input as required by the planning group during the CSP process; however, there is little or no interaction between functions. The primary duties of the functional units in

such an environment are to provide information and implement the corporate strategic plan, as developed by the central planners. Other organizations may continue to favor a centralization of responsibility for CSP, but still encourage increased levels of functional participation in the developmental or plan formulation phase (Centralized - High Involvement).

Organizations favoring a decentralized approach to CSP must encourage a high degree of participation (Decentralized - High Involvement), with functional involvement in all stages of the process including information input, formulation, implementation and control of the corporate plan. Such organizations are characterized by coordinated inter-functional communication as well as detailed interaction between functions and those responsible for the formulation of strategy.

Mintzberg (1973) suggests three possible "modes" of strategy-making in a firm:

1. the entrepreneurial mode
2. the adaptive mode
3. the planning mode

Mintzberg's definition of "the entrepreneurial mode" and "the planning mode," closely correlate with the previous "Centralized - Low Involvement" and "Decentralized - High Involvement" categories, respectively.

According to Mintzberg, any single planning mode, or

combination of modes may exist simultaneously within the same organization at any moment in time. Additionally, firms may change modes over time. The determination of the operating mode for a given firm is dependant upon a complex combination of internal and external environmental factors (Mintzberg, 1973, p. 49).

The degree of functional participation in each of Mintzberg's strategy-making modes may be inferred from his description of each mode. Typical characteristics of an organization (either a firm in general or a sub-unit thereof) operating in the entrepreneurial mode (Centralized - Low Involvement) include centralized power, controlled by a single individual. Strategic decisions are often "dramatic leaps forward in the face of uncertainty" (Mintzberg, 1973, p. 45). In addition, the goals of the organization and those of the controlling entrepreneur (or managing officer) are typically synonymous, thereby reducing the entrepreneur's perceived need for in-depth functional participation. Functional participation in CSP in an "entrepreneurial" strategy-making mode will be minimal.

At the other extreme, an organization operating in the planning mode (Decentralized - High Involvement) will typically place an increased emphasis on a corporate focus, including systematic analysis and assessment and a corporate-wide integration of decisions and strategies. Functional participation in CSP in the "planning mode" will

be at a maximum level, integrating the entire strategy-making process (Mintzberg, 1973, p. 48).

Centralized - Low Involvement CSP

In his 1974 book, Systematic Corporate Planning, Argenti writes, "Strictly interpreted, the word corporate planning precludes planning for any unit other than the entire company. Corporate planning cannot in theory take place in, or for, a part of a company even if that part is a profit-centre" (Argenti, 1974, p. 135). Argenti suggests that CSP is best performed by a central (corporate) planner or planning group. This department may be staffed by senior corporate managers or by lower level managers who act as the assistant of the designated planner(s). Functional input may be obtained by the central planners by appointing several specialists from various functional areas as advisors to the central authority.

In such a system, the primary opportunity for functional input occurs during the Internal Appraisal or Strength-Weakness Analysis stage of the CSP process (Argenti, 1974, pp. 91-96). During this stage, functional departments such as finance, production, marketing, buying, research, and employee relations, may be required to provide information to the central authority upon request.

Centralized - High Involvement CSP

H. Igor Ansoff, a proponent of a high degree of functional involvement in CSP, suggests in several works that there remains a need for centralized responsibility and control of the process (Ansoff, 1977; Ansoff, 1980). In a 1977, Sloan Management Review article, Ansoff identified a need for some organizations to move beyond the concept of a single planner to a planning committee, due to the complexity of modern planning techniques and the diversity of the business environment. Such a committee should include the skills of "the traditional systems designer-expeditor [and] the entrepreneurially-minded new venture analyst, the analytic diagnostician-controller, a skilled forecaster-analyst, and the computer model builder" (Ansoff, 1977, p. 18). Ansoff's case for centralization, with a high degree of functional involvement, is apparent in the following quote:

> Nevertheless, there is still an important distinction to be made between this group of planning workers and the line managers. The responsibilities of the latter as found in practice are to:
>
> - Assure that planning is integrated with implementation and control;
> - Make the necessary decisions, choices, and commitments in the course of the planning process.
>
> (Ansoff, 1977, p. 18)

Ansoff further recognized the benefits of functional input in his discussion of strategic issue management

(Ansoff, 1980). Strategic issue management is a monitoring/feedback process that Ansoff believes is necessary to allow the firm to recognize and react to both external and internal, short-term issues that may effect the firm's ability to meet its objectives (Ansoff, 1980, p. 133). A centralized staff group consisting of top managers is proposed to detect, evaluate and assess the impact of such short-term issues. However, Ansoff further suggests that perhaps top management may not always be in the best position to identify short-term strategic issues, and that functional level managers, closer to the issues themselves, might be better "identifiers" and should be involved in the process at a higher level, rather then acting only as "assessors" and "implementors" (Ansoff, 1980, pp. 135-136).

Decentralized - High Involvement CSP

As early as 1957, in a Harvard Business Review article, Wrapp recognized the importance of decentralized, functional involvement in CSP. Wrapp proposed that a high degree of functional involvement in the development stage of CSP would provide for a more effective implementation of the plan. "If line officers are given the responsibility for developing the plans, they will be more ready to support them once they are translated into the action stage" (Wrap, 1957, p.46).

This contention is supported by numerous studies in the

area of participative leadership which have found an increased level of acceptance by employees in participative environments (Bovard, 1951a, 1951b; Levine & Butler, 1952; Likert, 1961a, 1961b; Pennington, Haravey & Bass, 1958). According to Bass, "In general, available evidence supports the contention that participative leadership promotes acceptance of decisions and agreement to a greater extent than does directive leadership" (Bass, 1981, p. 319). Other writers supporting a decentralized - high involvement (participative) approach to strategy formulation include Ackoff (1970), Ackoff (1981), Andrews (1971), Gluck (1980), Kloeze, Molenkamp and Roelofs (1980), and Steiner (1979).

In Ackoff's discussion of adaptive planning in his 1970 book, A Concept of Corporate Planning, Ackoff suggests that participation in the planning process has much greater value than mere implementation of the plans formulated by others. Participation in the process "unleashes large amounts of creativity" and develops "a deeper understanding of the business and its environment" (Ackoff, 1970, p. 137).

According to Ackoff, the firm will only receive maximum value from the CSP process if functional management is deeply involved in the process. To ensure maximum functional involvement, the firm must consider CSP as an integral part of the management function and an on-going process -- one that is a "continuing responsibility of managers and not a sometime activity, usually associated

with crises" (Ackoff, 1970, p. 131). Consequently, in dealing with the issue of decentralization, Ackoff (1970, p. 129) suggests that central planning units are the "kiss of death" to a CSP process.

Where it is appropriate that certain functional managers not be directly involved in CSP, then at the minimum, such managers must be trained in the planning process to ensure their understanding of the process as well as the desired strategic outcomes. Once trained in the process, non-participating managers should be continually updated regarding the status of the process (Ackoff, 1970, p. 133).

Internal Levels of Strategy Development

Some writers recognize that internal strategy development may occur at multiple levels within the firm, such as corporate vs. business level strategies. For example, Ansoff recognized the possibility for "strategic" decisions to occur at any functional level where interface with the outside environment occurs (Ansoff, 1965, p. 121). However, while Ansoff, Cannon, Steiner and Miner, and Hofer and Schendel, do differentiate between internal strategy development levels, other writers such as Chandler, Andrews, Katz, Ackoff, McNichols, Newman and Logan, Uyeterhoeven, et al., Paine and Naumes, and Glueck do not (Hofer & Schendel, 1978, pp. 18-19).

While the number of levels differ between writers (Ansoff, 1965; Ansoff, 1967; Hofer, 1975; Hofer & Schendel, 1978), Hofer and Schendel (1978) and Vancil (1976) suggest a hierarchy of strategic planning levels consisting of at least three levels, i.e. corporate, business unit and functional levels. In order for the strategic planning process to provide optimal benefit to the organization, the various levels must be coordinated toward common goals and objectives (Hofer & Schendel, 1978; Vancil, 1976). Within the hierarchy, each level is distinct although the three levels should "fit together to form a coherent and consistent whole for any particular organization if the organization is to be successful over the long run." However, "this requires that each level of the organization be constrained by each other level, which usually requires functional area strategy to be constrained by business strategy and it, in turn, to be constrained by corporate strategy" (Hofer & Schendel, 1978, p. 29).

Hofer and Schendel differentiate between operating policies which include decisions such as "educational refunds and inventory write-offs" which must be reconsidered periodically and functional area policy decisions which include decisions that are made and changed infrequently, such as the location of a plant (Hofer & Schendel, p. 23). Other functional area policy decisions include geographic coverage, markets or market segments, product line,

distribution and service, pricing and credit, promotion and advertising, packaging, branding, and manufacturing systems (Hofer & Schendel, p. 24). Such functional area decisions must be consistent with and support the overall corporate strategic plan or the effectiveness of the corporate plan will be denigrated (Hofer and Schendel, 1978, p. 23).

Corporate Strategic Planning and the Purchasing Function

Available research examining the relationship of the purchasing function to CSP is limited. However, the professional literature strongly supports the contention that the function must be actively involved in all phases of CSP formulation, implementation and control, for the firm to receive maximum benefit from the CSP process (Adamson, 1991; Ammer, 1974; Burt & Soukup, 1985; Farmer, 1978; Freeman & Cavinato, 1990; Heskett, 1977; Pearson, 1991; Sutton, 1989). Failure to include the contributions of the purchasing function in CSP will place the firm at a competitive disadvantage relative to its competitors that have recognized the positive benefits to be derived from active purchasing participation (Pearson, 1991, p. 6).

Purchasing intelligence is of vital importance to the corporate planning effort. "The greatly accelerated rate of change in social, political, and economic variables as well as in technology forces companies to monitor their environments constantly" (Burt & Soukup, 1985, p. 93). Due

to purchasing's constant external interaction, the function occupies a unique position for monitoring the external environment on both a macro and a micro level. Purchasing can monitor the company's external environment for competitive advantages/disadvantages by providing input on forecasted supply market changes which may result in supply advantages or disadvantages. On the Micro level, Purchasing provides input on specific suppliers, materials, and potential supply problems (Burt & Soukup, 1985, p. 95).

Other specific reasons supporting active participation of purchasing in CSP are summarized by Pearson (1991, p. 6):

1. The supply environment has a significant impact on the value added to the products of many companies.
2. Purchasing plays a key role in supply management, which should be a key ingredient in strategic planning.
3. Greater integration of supply and marketing strategies may allow the firm to increase its competitiveness by taking advantage of shorter product life cycles.
4. A large degree of product quality is determined in the early stages of the product development process, and can be improved by early purchasing participation.

The Extent of Purchasing Participation

In 1974, Dean Ammer performed a study of 750 U.S. industrial managers to determine top management's perception of purchasing vs. the perceptions of the practitioners themselves (Ammer, 1974). This study revealed that the majority of top managers did not see the benefit of purchasing's participation in the strategic planning process. According to Ammer,

> Despite the need for a purchasing voice in all decision making, only 21% of the general managers who responded to my study said that purchasing managers 'frequently' participated in non-purchasing decisions; 53% of the respondents said that this was an 'infrequent' occurrence (Ammer, 1974, p. 38).

He further stated,

> an enlightened minority of general managers do agree that purchasing should actively participate in all decisions concerned with (in order of declining popularity) major changes in product line, market and price forecasting, facilities planning, long-range planning and overall strategy, trade relations, acquisitions, and financial planning (Ammer, 1974, p. 38).

These research findings confirmed the statements of Cannon a few years earlier in his 1968 book, Business Strategy and Policy. Cannon suggested that top management generally considered purchasing (supply) and manufacturing to be "strictly operational or tactical activities which are essential in implementing the marketing and development strategies, but not formative in the direction of the business" (Cannon, 1968, p. 444).

Research performed independently by Farmer (1978) and Spekman and Hill (1980), during the period 1975 to 1977, confirmed Ammer's findings of a low degree of purchasing participation in CSP. Both of these groups of researchers supported Ammer's contention that management generally held a negative impression of purchasing's ability to contribute positively to the CSP process. But, both groups found that in many cases, purchasing managers also held the same negative opinion of themselves, which further contributed to a lack of participation in practice.

Some gains in purchasing participation were reported by Adams and Niebuhr (1981), based on a two year study. Adams and Niebuhr found that "an increasing number of companies [were] integrating long-run purchasing and material planning considerations into the overall short and long-term strategic plan of the company" (Adams & Niebuhr, 1981, p.2). Their findings, although not directly comparable to those of Ammer, seem to indicate an approximate 10% increase in CSP, over the 1974 Ammer study (Adams & Niebuhr, 1981, p.2).

Despite the optimistic findings of Adams and Niebuhr, Ellen Johnson of Indiana University reported in 1986 that the purchasing function was generally viewed as a tactical function, treated in an isolated fashion by top management. She stated, "purchasing generally does not participate in many non-purchasing decisions and does not formally interact on a regular basis with other internal functions" (Johnson,

1986, p. 173). Johnson further suggested that purchasing had been historically neglected as a CSP participant for the following reasons:

1. After WWII, productivity exceeded demand; therefore, the typical corporate emphasis was on marketing rather than on supply issues.
2. Purchasing has traditionally been a low-profile function, causing it to be viewed in isolation by management, rather than in an integrative fashion.
3. Purchasing lacks the 'glamour' of marketing.
4. Many purchasing decisions are judgmental, making quantitative performance measurement difficult.
5. Most purchasers have been selected and trained to perform operational tasks.
6. Purchasing employees have been passive in response to typical management expectations.
7. Performance measurement techniques support the current mode of operations, rather than strategic innovation.
8. Purchasing employees exhibit a natural resistance to change. (Johnson, 1986, p. 174)

In contrast to Johnson's 1986 report, more recent literature suggests a continued increase in purchasing participation in CSP (Bimmerle, 1990; Lovering, 1990). Bimmerle (1990) identifies a movement from a reactive or

"trouble avoidance" stance by purchasing to a proactive or "opportunistic" stance. "By taking an opportunistic approach, the materials management function becomes a strategically important aspect of the long range growth and success of the business enterprise" (Bimmerle, 1990, p. 76).

Functional Trade-Offs Resulting from the Corporate Strategic Planning Process

As previously discussed, strategy formulation may occur on multiple levels, concurrently, within the firm. For example, Hofer and Schendel (1978) identify three levels, i.e. corporate level, business unit level, and functional level. Each level is a part of a planning hierarchy with corporate level strategy at the top of the hierarchy. Of necessity, as strategy is formulated at the lower levels, the lower level activities will be constrained by the decisions made at the higher levels. Thus, business unit strategies will be constrained by corporate strategy, and functional strategies will be constrained by both business unit and corporate strategies. Most firms with successful CSP programs recognize this linkage, and have developed programs for effective synchronization of the various levels (Yee, 1991).

Because of this hierarchy of planning constraints, both business unit and functional managers are often faced with decision making dilemmas as they seek to develop and

implement strategy at their respective levels within the confines of the hierarchy. According to Andrews (1971, p. 117), those involved in CSP must handle and balance four questions:

1. What might we do?
2. What can we do?
3. What do we want to do?
4. What should we do?

"Obviously, the strategy that results from this analysis is based on the manager's personal perception of opportunities, his personal assessment of the strengths and weaknesses of his organization, and his personal aspirations and values" (Vancil, 1976, p. 5). Even though the answers to any and all of the four questions may be relatively subjective, the answers will become the constraining factors for the strategy decisions at lower levels. This typically causes functional managers to have to "sacrifice" what they "want or might do" for higher level perceptions of what they "should and can do."

Also, functional managers must frequently choose between time constrained trade-offs, i.e. short-term vs. long-term benefits. According to Banks and Wheelwright (1979), if no controls are in place, operating managers will typically choose the satisfaction of short-term goals in lieu of long-term goals. This is primarily due to the visibility and measurability of short-term achievements. In

many firms, a balanced emphasis between short and long-term is not effectively communicated to operational managers (Banks & Wheelwright, 1979, p. 116).

To be a successful participator in, and positive contributor to CSP, the purchasing manager must ensure that his strategic activities are synchronized with those of the business unit and/or the corporation (Cavinato, 1986, p. 164). To do so, requires adequate communication of the corporate and business unit strategies to the purchasing manager (Croell, 1980; Leavitt, 1989).

> The purchasing manager has to know what goals the firm's management has set for itself. It is of utmost importance that the purchasing department reflect the objectives of the entire organization, as well as its mode of operation. Knowing in which direction the firm is heading is essential for purchasing in directing its own energies. This is one area that applies, no matter the size of the firm or of the department (Messner, 1982, p. 266).

However, the purchasing manager must also communicate with other functional areas to ensure that the developing strategy will both compliment and support the strategies of other functions (D'Arcy, 1971, p. 27). If sufficient intra-functional communication exists, "the development of the [purchasing] strategy should thus reflect pertinent input from the company's marketing strategy [for example] and vice versa" (Farmer, 1978, p. 8).

In addition to effective communication and coordination of functional strategies, Farmer (1978, p. 11) summarizes

the duties of the purchasing manager who desires to be a successful participant in CSP. They include:

1. working to improve the quality and speed of communications to management
2. being knowledgeable of the corporate strategy, and contribute to the formulation of the strategy
3. developing the information system in conjunction with top management and other materials related departments
4. allocating necessary resources to develop alternate supply strategies
5. not accepting of the status quo

According to P.J. Leavitt, Ph.D, Corporate Purchasing Manager for Cairn Management Co., in order for the purchasing function to be successful throughout the 1990's, the profession must "consider itself a member of the management team and be recognized from within as a corporate team player. [The purchasing function] must be a contributor to the overall success of the firm, a resource that adds positively to the bottom line profit of the corporation. [The function must] always have in view the big picture" (Leavitt, 1989, p. 5).

Corporate Strategic Planning and Performance

CSP and the Performance of the Firm

A number of studies have been performed to determine if there is a positive relationship between formalized strategic planning and organizational success. The results of these studies have been inconclusive.

In 1970, Thune and House, published the results of an extensive study examining the economic performance of 36 firms, before and after the initiation of a formalized planning process. The researchers found a positive correlation between planning and performance, particularly for medium-sized firms in rapidly changing markets. However, Thune and House also noted that formal strategic planning may not be the only determinant of success and that it may only be a characteristic of a well run firm (Thune & House, 1970). A cross-validation study reported by Herold in 1972, confirmed the original Thune and House findings, adding that research and development were also positively correlated with performance (Herold, 1972).

According to Rue and Fulmer (1973), other researchers reporting a positive correlation between formal planning and economic performance include Henry (1968), Guynes (1969), and Ansoff (1971). However, Najjar (1966) and Rue and Fulmer (1973) found little evidence to support the positive correlations reported by others. While Rue and Fulmer could find no conclusive evidence that long-range planning does or

does not "pay off," they suggested that there did seem to be a "simple, across the board relationship between the financial success of the firm and its use of long-range planning" (Rue & Fulmer, 1973, p. 72).

However, later studies reported by Schoeffler, Buzzell and Heany (1974) and Karger and Malik (1975) further support the supposition that a positive relationship exists between formalized strategic planning and financial success.

CSP and the Performance of the Purchasing Function

While a number of studies have attempted to find a positive correlation between formalized strategic planning and the performance of the firm, few, if any, have attempted to determine if CSP has a positive impact on the performance of functional participants in the CSP process, specifically the relationship to the performance of the purchasing function.

Purchasing performance may be measured in many ways. An overview of a small sample of 10 researchers and writers in the field yielded over 60 different proposed performance indicators (See Appendix A). Each researcher in the sample suggested from 6 to 24 different indicators as shown in Figure II.2. Furthermore, according to Chao's 1989 research on the subject of purchasing performance, Monczka, Carter and Hoagland (1979) identified more than 200 performance measures then in use.

Figure II.2

Minimum Number of Proposed Purchasing Performance Measures

Chao (1990)	10
Croell (1980)	14
Hendrick (1990)	15
Hendrick & Ruch (1988)	10
Pooler (1973)	8
Porter (1988)	12
Raedels (1983)	7
Thor (1990)	13
Van Weele (1984)	19
Zenz (1980)	10

In order to consolidate the large number of available measurement criteria, several writers have attempted to subdivide the possibilities into performance assessment categories. For example, Monczka, et al., (1979) propose 15 assessment categories, with specific objectives to be assigned within each category:

1. Price effectiveness
2. Cost savings
3. Workload-in
4. Workload-current
5. Workload-completed
6. Administration and control
7. Efficiency
8. Vendor quality and delivery
9. Materials flow control
10. Regulatory/societal/environmental
11. Procurement planning and research
12. Competition
13. Inventory
14. Transportation
15. Purchasing procedure audits

Leavitt (1989) proposed 16 assessment categories:

1. Cost savings
2. Cost avoidance
3. Improved payment terms
4. Improved transportation terms

5. Economic order quantity
6. ABC analysis
7. Make or buy analysis
8. Inventory reduction
9. Value analysis
10. Anticipatory purchases
11. Sources of supply
12. "Just in time" procurement, blanket orders, systems contracts, and stock-less purchasing
13. Elimination or reduction of progress payments
14. Inter-company transfers
15. Stock purchasing
16. Supplier ideas

Others have suggested categorization based on a delineation between perceived effectiveness and efficiency measurements. For example, Van Weele (1984) proposed four general categories, three pertaining to effectiveness and one pertaining to efficiency:

I. Purchasing Effectiveness
   A. Purchasing materials costs/prices
   B. Quality of purchased materials
   C. Purchasing logistics

II. Purchasing Efficiency
   A. Purchasing organization

Most recently, the National Association of Purchasing Management has attempted to provide guidance to the purchasing profession in the area of performance assessment by performing a number of "benchmarking" studies (Fearon, 1990; Hendrick, 1990; Stanley & Murphy, 1990). Benchmarking establishes a series of performance criteria for a particular industry, based on the specific needs of the industry in question. Industry averages are established and continuously updated, to provide a point of comparison for

individual firms within the particular industry. While the performance criteria differ between industries, the following is a list, representing the telecommunications services industry:

1. Purchasing $ as percent of sales $
2. Purchasing expense as percent of sales $
3. Purchasing expense as a percent of purchasing $
4. Categorization of purchasing expenses as percentages of total purchasing operating expenses
5. Total purchasing headcount as percent of total company headcount
6. Average salaries of professional and clerical purchasing employees
7. Number of purchasing employees per sales $
8. Purchases per purchasing employee
9. Purchases per professional purchasing employee
10. Average purchase order $
11. Number of national contracts per year
12. Active suppliers per professional purchaser
13. Average $ spent per supplier
14. Purchasing expense $ per active supplier
15. "ABC" analysis of $ spent
16. Percent increase/decrease of active suppliers
17. Purchases from minority-owned suppliers
18. Purchases from small business suppliers

19. Purchases from women-owned suppliers
20. Purchase order cycle time
21. Percentage of EDI usage
22. Turnover of professional purchasing employees
23. Transportation expenses as percent of purchasing operating expense
24. Cost Savings reported (including cost avoidance and cost reduction) (Stanley & Murphy, 1990)

While benchmarking is generally accepted by the purchasing profession as a tool for comparative performance measurement, some writers (Pooler, 1973; Porter, 1988) have cautioned against inter-company comparisons due to definitional differences and functional differences between firms. Pooler recommends an internal "TREND" analysis, suggesting that the best way to measure performance is against oneself, comparing the present with the past (Pooler, 1973).

Summary

The Review of the Literature was divided into four areas:

1. Corporate Strategic Planning and Functional Participation
2. Corporate Strategic Planning and the Purchasing Function
3. Functional Trade-offs Resulting from the Corporate

Strategic Planning Process

4. Corporate Strategic Planning and Performance

While the literature strongly supports the contention that purchasing must be involved in all phases of CSP, there is some disagreement regarding the current level of actual purchasing involvement. In addition, very little research has been accomplished to determine if relationships exist between CSP participation and the following:

1. functional vs. corporate conflict resulting from functional CSP participation
2. functional performance improvement resulting from CSP participation

This research attempted to fill in the information void in these areas. Obtaining answers to the previously stated research questions will benefit purchasing practitioners, corporate management, and other researchers, as follows:

Benefits to Professional Practitioners

1. Provide a greater understanding of purchasing's role in the corporate strategic planning process
2. Demonstrate the importance of participation in the corporate strategic planning process, with emphasis on benefits to the purchasing function

Benefits to Corporate Management

1. Demonstrate the importance of purchasing participation in the corporate strategic planning process, with emphasis on the inter-dependant benefits to the corporation and the purchasing function, collectively and individually

Benefits to Researchers

1. Provide a baseline of current purchasing participation in the corporate strategic planning process
2. Provide a basis for additional research regarding functional participation in the corporate strategic planning process

Chapter III continues with the methodology used to obtain the research objectives stated in Chapter I.

CHAPTER III

METHODOLOGY

The methodology and research design of this study were guided by the philosophy of scientific research as expressed by Kerlinger (1986).

> Scientific research is systematic, controlled, empirical, and critical investigation of natural phenomena guided by theory and hypotheses about the presumed relations among such phenomena (Kerlinger, 1986, p. 10).

Within this framework, the study attempted to meet the Specific Objectives, stated in Chapter I. These objectives were:

1. To determine the current level of participation by the purchasing function in the corporate strategic planning process.
2. To determine if the current level of participation represents an increase, decrease or status quo in participation levels over the past 5 years.
3. To determine if purchasing participation in the corporate strategic planning process differs across industry classifications.

4. To determine if purchasing managers and corporate management (as evidenced by actual practice) maintain the same opinions regarding purchasing participation in the corporate strategic planning process.
5. To determine the degree of consistency between functional and corporate goals/objectives.
6. To determine if there is a relationship between functional corporate strategic planning participation and the performance of the purchasing function.

Sample

The universe of the research consists of all U.S. firms that have purchasing departments. However, the sample population (N) consisted of a subset, geographically restricted to the southeastern U.S. states of South Carolina, North Carolina and southern Virginia. The sample was obtained from the roster of The Purchasing Management Association of Carolinas - Virginia (PMAC-V), a National Association of Purchasing Management affiliate, with headquarters in Greensboro, NC. The 1991 - 1992 membership roster (Snyder, 1991) lists over 1700 members representing 765 organizations. A review of the organizations listed indicated an appropriate cross-section of government vs. private organizations and manufacturing vs. non-

manufacturing industries.

Pilot Study

A pilot study was conducted prior to proceeding with the actual survey. The objectives of the pilot study were as follows:

1. Ensure the clarity and readability of the survey questions (and change the instrument if necessary)
2. Determine the amount of time required to complete and return the survey
3. Obtain professional feedback to provide additional confirmation of survey validity

Eleven purchasing managers were asked to participate in the pilot study. Ten participants were asked to participate while in attendance at the National Association of Purchasing Management, District V, July, 1992, workshop. Each participant was the Professional Development Chairperson for his or her respective NAPM affiliate. The research and pilot study was described in a group meeting and each participant was provided an instruction sheet and comment sheet (Appendix B), along with a copy of the survey instrument. One additional purchasing manager who was a member of PMAC-V, was asked to participate. As a PMAC-V member, his organization was excluded from the final survey mailing. Thus, all participants were outside the final

sample to ensure that all final respondents completed the instrument only once, reducing the possibility of testing bias in the sample and increasing internal validity.

Four written responses and one verbal response were obtained from the pilot study participants. Criticisms and suggestions were discussed with the research committee and several survey questions were modified. Specifically, changes were made as follows:

1. question 5 was clarified and broadened to include benefits to the purchasing department of CSP participation
2. question 9 was changed to enhance readability
3. question 10 was changed to make revenue categories mutually exclusive

In addition, pilot study participants reported a mean completion time of 31 minutes. This relatively long completion time was attributed to difficulty in obtaining some of the numbers required to answer questions 10 to 20.

Data Collection

A written survey (Appendix C) was conducted to obtain the necessary data for the evaluation of the hypotheses. One survey was mailed directly to a PMAC-V representative of each member organization. Whenever possible, the surveys were mailed to persons having the title of Purchasing Manager, or equivalent. An attempt was made to mail the

survey to the member listed with the highest purchasing management position within the department but below the level of vice-president. A cover letter describing the nature of the research and an endorsement letter signed by the Executive Vice-President of PMAC-V was mailed with each survey, along with a self-addressed stamped return envelope. The survey forms were mailed on August 28, 1992. The mailing was timed to coincide with the mailing of the September-October, 1992, issue of Southern Purchaser, the official magazine of PMAC-V, mailed to all members the first week of September, 1992. The magazine contained an article describing and supporting the research project (Appendix D).

Respondents were allowed a two week response time, with a deadline for return of September 15, 1992. Approximately 220 responses were received by this date. A reminder notice was published in the October, 1992, PMAC-V Newsletter, mailed to all members the first week of October (Appendix D). A final closure date was set for October 15, 1992. An additional 22 surveys were received by the final cut-off date.

The sample size, number of respondents, and percentage of respondents is shown in Table III.1.

Table III.1
Sample Size

Number of Initial Surveys Mailed	788
Total # Returned	242
Response Rate	30.7%

Variables

The variables for this study were divided into seven categories:

1. CSP Participation Variables
2. Desired CSP Participation Variables
3. CSP Participation Change Variables
4. Benefit Variables
5. Conflict Variables
6. Industry Classification Variables
7. Performance Variables

CSP Participation Variables

The first group of variables indicated the actual degree of purchasing involvement in the CSP process. Involvement was categorized on the basis of four possible levels of purchasing participation in the process (survey question 3).

PV0: No Involvement

PV1: Low Involvement - includes participation by purchasing in a single phase of CSP, i.e. implementation of plans only.

PV2: Medium Involvement - includes participation by purchasing in two phases of CSP, i.e. development and implementation of plans.

PV3: High Involvement - includes active participation by purchasing in all phases of CSP, including development, implementation, and control.

Desired CSP Participation Variables

Survey participants were asked to indicate the degree of CSP involvement that he or she believed the purchasing function should be involved in, irrespective of their own actual involvement levels. Desired involvement (survey question 4) was categorized on the basis of the same four possible levels of purchasing participation previously identified.

DPV0: No Involvement

DPV1: Low Involvement - includes participation by purchasing in a single phase of CSP, i.e. implementation of plans only.

DPV2: Medium Involvement - includes participation by purchasing in two phases of CSP, i.e. development and implementation of plans.

DPV3: High Involvement - includes active participation by purchasing in all phases of CSP, including development, implementation, and control.

CSP Participation Change Variables

Survey participants were asked if the level of purchasing CSP participation has changed during the past five years. Participants were asked to indicate if their CSP involvement over the past five years has become "Less," is "About the Same," or has become "More" (survey question 9).

Benefit Variables

Survey participants were asked to identify what level of CSP involvement they thought was appropriate for the purchasing function. Then, based on their opinion of appropriate involvement, they were asked to identify their perceptions of benefits to both the company and the purchasing department of such participation. As a result, the benefit variables were subdivided into benefits to the company of purchasing participation in CSP, and benefits to the purchasing department of CSP participation.

Question 5 asked for benefits to the company, while question 6 asked for benefits to the purchasing department. Respondents who agreed that their company and/or department would benefit from the level of CSP participation they

consider appropriate were then asked to "describe the benefits..." in an open-ended format. Responses obtained from the open-ended portion of question 5 (benefits to the company) were categorized into three groups. The categories with example responses are shown in Table III.2.

Table III.2

Benefits to the Company
if CSP Participation was Consistent
with Managers' Opinion (Q5)

Category 1	-	Aiding in the Procurement of Materials
Examples:		increased time (to procure) improved vendor relations just-in-time inventory systems supplier reduction/development
Category 2	-	Aiding in the Production Process, including improving the final product
Examples:		higher (product) quality planning the materials planning production reduce manufacturing steps production department planning general planning
Category 3	-	Aiding in the bottom-line savings
Examples:		economies of scale reduction of paperwork standardization lower total cost reduce waste profit

Responses obtained from the open-ended portion of question 6 (benefits to the purchasing department) were categorized into four groups. The categories with example responses are shown in Table III.3.

Table III.3

Benefits to the Purchasing Department
if CSP Participation was Consistent
with Managers' Opinion (Q6)

Category 1	-	Aiding in the Procurement of Materials
Examples:		increased time (to procure) improved vendor relations just-in-time inventory systems supplier reduction/development
Category 2	-	Aiding in the Production Process, including improving the final product
Examples:		higher (product) quality planning the materials planning production reduce manufacturing steps production department planning general planning
Category 3	-	Aiding in the bottom-line savings
Examples:		economies of scale reduction of paperwork standardization lower total cost reduce waste profit
Category 4	-	Increasing awareness of the purchasing department, resulting in doing a better job
Examples:		visibility team player feelings professionalism better service status increases more control/power communication professional goals rewards

Conflict Variables

The conflict variables were derived from subjective responses to an open-ended question regarding potential conflicts between purchasing goals and objectives and corporate strategic plans. Respondents were asked to describe where conflicts might exist between corporate and purchasing goals and objectives (question 8). Responses obtained from the open-ended question were categorized into four groups. The categories with example responses are shown in the Table III.4.

Table III.4

Conflict Areas between Purchasing and Corporate Goals and Objectives (Q8)

Category 1	-	Problems with Inventory Management (internal)
Examples:		quantity to order lead times EOQ make vs. buy inventory reduction emergency orders
Category 2	-	Problems with Supply Management (external)
Examples:		upper management involvement in procurement sourcing supplier development national/regional selection of commodity items general purchasing function supplier partnerships
Category 3	-	Problems in Financial Issues
Examples:		pricing & payment delays

Table III.4 (cont.)

Conflict Areas between Purchasing
and Corporate Goals and Objectives (Q8)

Category 4	-	Goals and Philosophy Conflicts
Examples:		goals ethics expediency contract variations labor planning engineering specs vs. available supply

Industry Classification Variables

This group of variables represents four different classifications of firms, divided according to industry function and ownership.

Classification by Function

C1: Manufacturing Firms

C2: Non-manufacturing Firms

Classification by Ownership

C3: Private Ownership - non-government owned

C4: Public Ownership - owned by some government entity, e.g. federal, state or municipal government

Performance Variables

The purchasing performance variables consist of seven

objective measures of purchasing performance.

R1: Total Cost Savings/Cost Avoidances as a percent of total purchases

$$\frac{\text{Total Cost Savings/Cost Avoidances (\$)}}{\text{Total Purchases (\$)}} \times 100$$

R2: Purchasing cost per order

$$\frac{\text{Amount of purchasing operating expenses (\$)}}{\text{Number of Purchase Orders}} \times 100$$

R3: Percent of purchased materials rejected at or after delivery (attributable to purchasing error)

R4: Percent of "on-time" deliveries

$$\frac{\text{Number of "on-time" deliveries}}{\text{Total number of receipts}} \times 100$$

R5: Total purchasing dollars as a % of sales

$$\frac{\text{Total annual purchase dollars (\$)}}{\text{Total revenue (\$)}} \times 100$$

R6: Purchasing headcount as a % of total company headcount

$$\frac{\text{Total purchasing headcount}}{\text{Total number of company employees}} \times 100$$

R7: Average purchase order cycle time

Defined as the amount of time in calendar days from the receipt of a purchase requisition until a purchase order (hard copy or EDI) is issued.

As noted in Chapter II, over 200 possible purchasing performance measures have been identified (Monczka, Carter & Hoagland, 1979). Therefore, in order to enhance the validity of the measures chosen for this study, seven objective measures were chosen that have been cited in more than one work on the subject of purchasing performance. Specifically, in a review of 10 works on the subject (Appendix A) each of the seven measures selected appeared four or more times. This suggests that each of these measures are generally accepted by the profession as valid measures of performance. In addition, only objective measures of performance were selected. Although numerous subjective measures of performance have become commonplace, and are often necessary for a complete understanding of total purchasing performance, such measures will not be used since they are often ambiguous and require judgmental responses. Exclusion of such measures will increase both the reliability and validity of the survey results.

Hypotheses

The basic research questions stated in Chapter I are:

1. To what extent is the purchasing function involved in the CSP process? Is the function involved in all phases of the process including the development of strategic plans as well as implementation and control?
2. Has there been a change in the level of participation by the purchasing function in the CSP process during the past five years?
3. Are there differences in the extent of purchasing participation in the CSP process between different industry classifications, such as manufacturing vs. non-manufacturing companies or between the public vs. private sectors?
4. What role do purchasing managers believe they should play in the CSP process? Is their role perception congruent with actual practice?
5. Are the strategic goals/objectives of the purchasing function consistent with those of the organization? If not, what areas of conflict do purchasing managers perceive?
6. Is there a relationship between functional performance and functional participation in the corporate strategic planning process?

Each of the following hypotheses (and associated sub-

hypotheses) are numbered corresponding to the research questions.

H1: There is a difference in the degree of purchasing involvement in CSP between different firms.

The null hypothesis can be stated as follows:

$H1_o$: There is no difference in the degree of purchasing involvement in CSP between firms.

The degree of purchasing involvement was ranked in one of four categories, i.e. No Involvement (PV0), Low Involvement (PV1), Medium Involvement (PV2) and High Involvement (PV3).

An approximately equal distribution of occurrences in each of the four categories favors acceptance of the null hypothesis. Acceptance indicates the involvement level is evenly distributed within the sample and that there is no tendency for the purchasing function, in general, to be more or less involved in CSP in either a low, medium, or high degree.

However, rejection of the null hypothesis will support the alternative hypothesis (H1) suggesting that the purchasing function in general is more involved in CSP to the particular degree indicated by the actual results. For example, a higher percentage of firms ranking in the low

involvement category (PV1) will indicate an overall tendency for the purchasing function to be involved in the implementation of plans only.

To statistically test the null hypothesis, a Chi-square "goodness of fit" test was performed on the data obtained from survey question 3. The Chi-square is appropriate to test the null hypothesis of no difference between the categories within a single column of data (McClave & Benson, 1991, p. 1008). The resulting p-value indicates the level of significance at which the null hypothesis may be rejected (Kvanli, Guynes & Pavur, 1989, p. 273).

H2: The level of purchasing participation in CSP has increased in the past five years.

The associated null hypothesis was stated as:

$H2_o$: There has been no increase in the level of purchasing participation in CSP in the past five years.

The study participants were asked to select a response regarding changes (if any) in the level of CSP involvement by their purchasing departments during the past five years. The question (question 9) was presented as a Likert scale with responses including "Less Involved" (assigned a value of 1), "About the Same" (assigned a value of 2), and "More

Involved" (assigned a value of 3).

The mean response value will be indicative of trends of purchasing involvement during the past five years. A mean value of 2.0 or less indicates there has been either a decrease in CSP involvement or involvement levels have remained unchanged during the past five years. A mean greater than 2.0 indicates that purchasing participation in CSP has increased during the past five years.

A one-sample Wilcoxon signed-rank test was performed, to test the null hypothesis $H2_o$ (no increase in purchasing participation, i.e. where the population center is less than or equal to 2.0), against the alternative hypothesis H2 (CSP participation has increased, i.e. greater than 2.0). The resulting p-value indicates the level of significance at which the null hypothesis may be rejected (Kvanli, Guynes & Pavur, 1989, p. 273). The Wilcoxon signed-rank test is considerably more powerful than the t-test in this case since there is no assumption that the population is normal (Ryan, Joiner & Ryan, 1982).

H3: There is a difference in the purchasing involvement levels between firms in different industry classifications.

Industry classification was divided according to function and ownership. The Functional Industry

Classification (question 1) was further subdivided into manufacturing firms (Variable C1) and non-manufacturing firms (Variable C2). The Ownership Classification (question 2) was further subdivided into private ownership (Variable C3) and public ownership (Variable C4). To accomplish this comparison, two sub-hypotheses were considered.

H3a: There is a difference in the purchasing involvement levels between firms in the manufacturing sector and firms in the non-manufacturing sector (at Alpha = .05).

H3b: There is a difference in the purchasing involvement levels between privately owned firms and publicly owned firms (at Alpha = .05).

The null of each sub-hypothesis is stated as follows:

$H3a_o$: There is no difference in the purchasing involvement levels between firms in the manufacturing sector and firms in the non-manufacturing sector (at Alpha = .05).

$H3b_o$: There is no difference in the purchasing involvement levels between privately owned firms and publicly owned firms (at Alpha = .05).

A significant difference in percentages between manufacturing firms and service firms in each involvement category suggests rejection of the $H3a_o$ null sub-hypothesis. A significant difference in percentages between public sector firms and private sector firms in each involvement category suggests rejection of the $H3b_o$ null sub-hypothesis. Rejection of either or both null sub-hypotheses will support the appropriate alternative hypothesis, which may suggest that different industry sectors do participate at different levels of purchasing involvement in the CSP process.

For example, rejection may suggest that the purchasing function of firms in the manufacturing sector have greater involvement in CSP than do firms in the non-manufacturing sector; or, the purchasing function of firms in the private sector has greater involvement in CSP than do firms in the public sector.

Each null sub-hypothesis was tested separately, using the Kruskal-Wallis Test. Kruskal-Wallis is an appropriate test when the data are non-parametric (Kerlinger, 1986, p. 269), and is "analogous to one-way analysis of variance (Kerlinger, 1986, p. 270)." For parametric tests such as ANOVA to be appropriate, the data must be classified in accordance with either an interval or ratio scale. In this study, the variables "Involvement Level" and "Desired Involvement Level," are ordinal rather than either interval or ratio in nature. According to Alreck & Settle (1985, p.

415), ordinal data reflects an "ordered sequence, so that the first is less than the second, the second less than the third, and so on, yielding ordinal level data where the intervals between scale points are not known or necessarily equal." Kerlinger (1986, p. 271) suggests, "The Kruskal and Wallis test is most useful in such situations."

Further verification of the previous results was made using cross-tabulation techniques. Cross-tabulation is appropriate when both the dependant and independent variables are categorical (Alreck & Settle, 1985, p. 303). "The object of cross-tabulation is to show whether or not the distributions for one variable differ significantly for each value or level of the other variable (Alreck & Settle, 1985, p. 306). The associated Chi-square value supports the significance of the cross-tab relationship.

H4: There is a difference between the actual degree of purchasing involvement in CSP and purchasing managers' opinions of the degree of involvement they perceive as appropriate (at Alpha = .05).

The null hypothesis may be stated as follows:

$H4_o$: There is no difference between the actual degree of purchasing involvement in CSP and purchasing managers' opinions of the degree of involvement they perceive as appropriate (at Alpha = .05).

Acceptance of the null hypothesis indicates that purchasing managers' opinions regarding CSP involvement are in agreement with current company policy. Rejection of the null hypothesis will support the alternative hypothesis (H4) that purchasing manager's opinions regarding appropriate purchasing involvement in CSP are different from actual involvement levels, which may suggest that purchasing managers believe that participation in CSP should be at a level different from the current participation level.

The actual degree of purchasing involvement was determined by the respondents' selection of the appropriate involvement level category - PV0, PV1, PV2 or PV3 (question 3). In order to determine purchasing managers' opinions of appropriate involvement, the same involvement level categories were also offered with the question , "Which of the following statements BEST describes the level of involvement in the corporate strategic planning process that you believe purchasing SHOULD be involved in at your company?" (question 4). These categories are shown on Table III.5 as DPV0, DPV1, DPV2 and DPV3. The responses to each group of variables were compared to determine if a relationship exists between actual and desired purchasing involvement in CSP.

The null hypothesis was tested using the same non-parametric techniques used for sub-hypotheses H3a and H3b. First, a Kruskal-Wallis Test was performed. Kruskal-Wallis

is appropriate since the variables, "Involvement Level" and "Desired Involvement Level," are both ordinal and categorical (Kerlinger, 1986, pp. 269-271).

The Kruskal-Wallis results were further verified using a cross-tabulation with associated Chi-square value to support the significance of the cross-tab relationship.

In order to provide additional insight into purchasing managers' opinions regarding CSP involvement, questions 5 and 6 were asked to determine what, if any, benefits purchasing managers perceived could be gained by their company and their department if purchasing participation was consistent with their perception of appropriate involvement. The two groups of benefit categories obtained from questions 5 and 6 (benefits to the company and benefits to the purchasing department) were evaluated and the response frequency for each category was determined. No statistical analysis was performed on the benefit responses since the information was obtained solely to provide additional insight to purchasing managers' opinions regarding CSP participation

H5: There is conflict between the strategic plans of the corporation and the strategic plans of the purchasing function.

The null hypothesis may be stated as follows:

$H5_o$: There is no conflict between the strategic plans of the corporation and the strategic plans of the purchasing function.

This null hypothesis was tested through the use of an open-ended question soliciting managers' opinions of conflicts that may exist as a result of CSP participation.

The study participants were asked to select an appropriate response regarding the frequency of conflict (if any) between the goals and objectives of the company vs. the goals and objectives of the purchasing department. The question (question 10) was presented as a Likert scale with responses including "Never" (assigned a value of 1), "Seldom" (assigned a value of 2), "Frequently" (assigned a value of 3), and "Always" (assigned a value of 4).

The mean response value was indicative of purchasing managers' opinions regarding potential conflicts between the purchasing function and the company in general. A mean value of 1.0 indicates that purchasing managers perceive there is no conflict between the goals and objectives of the company and goals and objectives of the purchasing department. A mean greater than 1.0 indicates that purchasing managers do perceive conflicts between the goals and objectives of the company and goals and objectives of the purchasing department.

A one-sample Wilcoxon signed-rank test was performed, to test the null hypothesis $H5_o$ (no conflict, i.e. where the population center is equal to 1.0), against the alternative hypothesis H5 (there is conflict, i.e. greater than 1.0). The resulting p-value indicates the level of significance at which the null hypothesis may be rejected (Kvanli, Guynes & Pavur, 1989, p. 273). The Wilcoxon signed-rank test is considerably more powerful than the t-test in this case since there is no assumption that the population is normal (Ryan, Joiner & Ryan, 1982).

In order to provide additional insight into purchasing managers' opinions regarding goal/objective conflict, question 10 also asked for an open-ended response to allow respondents to describe specific conflict areas. The conflict categories obtained from question 10 were evaluated and the response frequency for each category was determined. No statistical analysis was performed on the conflict responses since the information was obtained solely to provide additional insight to purchasing managers' opinions regarding potential conflict areas.

H6: There is a significant relationship between purchasing participation in CSP and purchasing performance.

Due to the difficulties associated with the development of an acceptable composite measure of purchasing performance, seven sub-hypotheses were proposed to determine if a significant relationship exists between seven specific performance measures and purchasing participation in CSP (at Alpha = .05). The seven sub-hypotheses, stated in the null form, are as follows:

$H6a_o$: There is no significant relationship between purchasing participation in CSP and the percentage of identifiable cost savings/cost avoidances.

$H6b_o$: There is no significant relationship between purchasing participation in CSP and purchasing cost per order.

$H6c_o$: There is no significant relationship between purchasing participation in CSP and the percentage of orders rejected as a result of purchasing errors.

$H6d_o$: There is no significant relationship between purchasing participation in CSP and the percentage of "on-time" deliveries.

$H6e_o$: There is no significant relationship between purchasing participation in CSP and the amount of purchase dollars spent as a percentage of sales.

$H6f_o$: There is no significant relationship between purchasing participation in CSP and the number of purchasing employees as a percentage of total corporate employees.

$H6g_o$: There is no significant relationship between purchasing participation in CSP and purchase order cycle time.

The following summarizes the performance ratios that were computed and compared for each sub-hypothesis:

H6a: Total Cost Savings/Cost Avoidances as a percent of total purchases (R1)

H6b: Purchasing cost per order (R2)

H6c: Percent of purchased materials rejected at or after delivery (attributable to purchasing error) (R3)

H6d: Percent of "on-time" deliveries (R4)

H6e: Total purchasing dollars as a % of sales (R5)

H6f: Purchasing headcount as a % of total company headcount (R6)

H6g: Average purchase order cycle time (R7)

The survey instrument was designed so that respondents were only required to provide numbers which should be readily accessible to them as purchasing managers. It was not necessary for respondents to perform any computations. All computations necessary for the determination of the performance ratios were performed by the researcher with an appropriately formatted Lotus 1-2-3 spreadsheet (Appendix E). Statistical analyses were not performed on the "performance" survey answers (Questions 10 - 20), since these survey responses were only used to calculate the seven performance ratios. However, appropriate analyses were performed to determine if a significant relationship exists between any of the resulting performance ratios and the level of purchasing involvement.

During the review of the survey responses, it was discovered that Ratio 5 (Hypothesis H6e) was impossible to calculate from the responses obtained. The ratio, total purchasing dollars as a % of sales, requires that an exact number be provided for sales; however, the survey was not designed to obtain this number. Question 10 solicited revenue ranges, with the last revenue category remaining open-ended. Although a case could be made to use the mean of the closed intervals, the open-ended interval remained a problem. A statistical technique was considered to calculate an appropriate number for this interval; however, the technique required that there be fewer occurrences in

the open-ended interval than occurred in the next lower interval. This was not the case in this study. Therefore, it was decided to drop Ratio 5, and Hypothesis H6e from further consideration.

The mean, median, trimmed mean, standard deviation, and minimum/maximum points were calculated for each remaining ratio grouping using Minitab. The mean (as opposed to the median or mode) is the best measure of central tendency in this case, since the variables under consideration are ratio variables (Norusis, 1988, p. 102).

Each null sub-hypothesis was tested using the Kruskal-Wallis Test as discussed previously. Kruskal-Wallis is appropriate since the independent variable, "Involvement Level" is both ordinal and categorical (Kerlinger, 1986, pp. 269-271).

The rejection of any null sub-hypothesis supports the appropriate alternate hypothesis that there is a significant relationship between purchasing participation in CSP and the performance measure in question. Failure to reject a null sub-hypothesis will suggest that no significant relationship exists between CSP participation and the specific performance measure.

Validity

The validity of a survey depends upon "the degree that it measures what and only what it is supposed to measure"

(Alreck & Settle, 1985, p. 64). The more extraneous factors bias the results of the survey, the lower the validity of the results and subsequent conclusions. In an attempt to increase the validity of this survey's results, content validity, other internal validity considerations and external validity were considered.

Content Validity

Content validity is "the representativeness or sampling adequacy of ... a measuring instrument. Content validation is guided by the question: Is the substance or content of [the] measure representative of the content or the universe of content of the property being measured?" (Kerlinger, p. 417).

Since content validation is basically an issue of judgement (Kerlinger, p. 418), the participants in the pilot study were used as a "panel of experts" for content evaluation. These participants were all purchasing managers with expertise in the purchasing field.

Each pilot study participant was asked in advance to complete the survey as well as a questionnaire regarding the content and format of the instrument. The participants were asked to judge the validity of the questions regarding strategy. Specifically, do the questions adequately represent the spectrum of possibilities for purchasing participation in CSP.

Other Internal Validity Considerations

According to Campbell and Stanley (cited in Chao, 1989, p. 59), there are at least seven factors which may have a negative impact on the validity of a study.

1. History - extraneous events occurring between successive measurement activities may impact the results. This factor was eliminated since the survey is completed only once by any given respondent.
2. Maturation - changes in respondent's behavior resulting from the passage of time. This factor was reduced since the survey was completed only once and the amount of time required for completion was an average of 31 minutes.
3. Instrumentation - changes in the survey instrument or scoring criteria. This factor was eliminated since only one survey was used and all data was treated in the same fashion.
4. Statistical Regression - results may be affected by normal statistical error resulting from multiple measurement. Again, this factor was reduced by only having one survey. In addition, all survey respondents were volunteers.
5. Selection - results may be affected by special sample selection procedures that may have reduced the randomness of the sample. This factor was

reduced since all respondents were volunteers. However, there is a possibility of some selection bias, since the sample consisted of purchasers who are all members of a professional association.

6. Mortality - results may be effected by a loss of survey respondents. This factor was not applicable.
7. Testing - results may be effected when a task is repeated. Again, both Mortality and Testing factors were reduced since only one respondent completed one survey, one time.

External Validity

External validity is "defined as the degree to which the study's results can be generalized across populations" (Chao, 1989, p. 61). According to Davis and Cosenza (1985, p. 108), three "interactions" may negatively impact the external validity of the study.

1. Testing interaction - extraneous results may be caused by the testing process. This interaction was reduced due to the straight forward methodology of gathering the data. The survey instrument was short (4 pages) and specific, reducing the possibility of a negative impact caused by the test itself. There should have been no interaction between test participants. It is

expected that all respondents completed the survey independently.

2. Selection interaction - results may be skewed as a result of lack of randomness in the sample. There is a risk of negative selection interaction, since all subjects were members of a single professional association. However, the external validity should be increased since all respondents were volunteers, and represent a cross section of different industry types by both function and ownership as well as a variety of firm sizes.
3. Setting interaction - results may be skewed by artificial study settings. No artificial environments or settings were created or used for this study. It is expected that most participants completed the survey in the same type of business environment, in their own office.

Reliability

Reliability may be described as "the accuracy or precision of a measuring instrument" (Kerlinger, 1986, p. 405). There are numerous ways to consider the subject of reliability; however, Kerlinger (1986) suggests three approaches, demonstrated by the following questions:

1. If the same sample is measured more than once with the same or different instrument, will the results

be similar?

2. Are the results obtained from the study true measures of the subject under consideration?
3. Is there any measurement error in the measuring instrument? (Kerlinger, 1986, p. 405)

The first approach encompasses the concept of stability. This issue cannot be approached within the scope of this study, since the instrument was only administered once, to all participants. The stability or "repeatability" question can only be answered by subsequent studies, administering the same instrument to the same, or different samples. Also, since one of the goals of the study was to confirm or reject recent claims of increased purchasing involvement in CSP, the results of this study cannot be compared to other studies for reliability purposes.

The second approach suggests the concept of accuracy. The results and comments obtained from the participants in the pilot study were used to ensure that the instrument is a valid measure of purchasing participation in CSP.

The third approach includes a consideration of internal reliability. This issue was partially addressed by ensuring that the instrument questions were stated in a clear and unambiguous fashion (Kerlinger, 1986, p. 415). Pilot study participants were questioned regarding the clarity and ambiguity of each question to ensure the reduction of response error.

In order to statistically estimate internal reliability, Kerlinger (1986, p. 408), offers two equivalent definitions of reliability:

> 1. Reliability is the proportion of the "true" variance to the total obtained variance of the data yielded by a measuring instrument.
> 2. Reliability is the proportion of error variance to the total variance yielded by a measuring instrument subtracted from 1.00, the index 1.00 indicating perfect reliability.

From the second definition, the following equation may be derived for the determination of a reliability coefficient:

$$r_{tt} = 1 - \frac{V_e}{V_t}$$

Where: r_{tt} = the reliability coefficient

V_e = error variance

V_t = true variance

A practical approach to statistical estimation of internal reliability is the split-half technique (McDaniel & Gates, 1991, p. 338). Use of this technique involves randomly splitting the responses for each scale item into two separate subsets and then determining the reliability coefficient between the two groups. Unfortunately, the calculated coefficient will vary depending upon the method of splitting the samples. To overcome this deficiency, the Cronbach Alpha technique was used to compute "the mean reliability coefficient estimates for all possible ways of splitting a set of items in half" (McDaniel & Gates, 1991, p. 338). The Cronbach Alpha technique was used to determine

a reliability coefficient for each survey question requiring a scale response, i.e questions 7 and 9. The balance of the survey questions were not appropriate for the determination of the reliability coefficient since these are not scale items.

The closer the calculated reliability coefficient is to 1.00, the greater the assumed reliability of the instrument. However, according to Lehman (1989, p. 223), reliability coefficients in the range of .5 to .7 should be expected for this type of research.

A reliability coefficient of .657 was obtained for question 7, and a coefficient of .527 was obtained for question 9. These results fall within the .5 to .7 range, indicating an acceptable level of internal reliability.

Summary

This Chapter has presented a research methodology to satisfy the six objectives of the study. These objectives are:

1. To determine the current level of participation by the purchasing function in the corporate strategic planning process.
2. To determine if the level of purchasing participation in the corporate strategic planning process has changed in the past five years.

3. To determine if purchasing participation in the corporate strategic planning process differs across industry classifications.
4. To determine if purchasing managers and corporate management (as evidenced by actual practice) maintain the same opinions regarding purchasing participation in the corporate strategic planning process.
5. To determine the degree of consistency between functional and corporate goals/objectives.
6. To determine if there is a relationship between functional corporate strategic planning participation and the performance of the purchasing function.

Seven variable categories were developed including:

1. CSP Participation Variables
   - PV0: No Involvement
   - PV1: Low Involvement
   - PV2: Medium Involvement
   - PV3: High Involvement.
2. Desired CSP Participation Variables
   - DPV0: No Involvement
   - DPV1: Low Involvement
   - DPV2: Medium Involvement
   - DPV3: High Involvement.

3. CSP Participation Change Variables

4. Benefit Variables

Benefit to the Firm Categories

1: Aiding in the Procurement of Materials

2: Aiding in the Production Process

3: Aiding in Bottom-Line Savings

Benefit to Purchasing Categories

1: Aiding in the Procurement of Materials

2: Aiding in the Production Process

3: Aiding in Bottom-Line Savings

4: Increasing Awareness of the Purchasing Department

5. Conflict Variables

1: Problems With Inventory Management (internal)

2: Problems With Supply Management (external)

3: Problems With Financial Issues

4: Goals and Philosophy Conflicts

6. Industry Classification Variables

Classification by Function

C1: Manufacturing firms

C2: Service firms

Classification by Ownership

C3: Private Ownership

C4: Public Ownership

7. Performance Variables

R1: Total cost savings/cost avoidances as a percent of total purchases

R2: Purchasing cost per order

R3: Percent of purchased materials rejected at or after delivery (attributable to purchasing error)

R4: Percent of "on-time" deliveries

R5: Total purchasing dollars as a percent of sales (omitted from the study)

R6: Purchasing headcount as a percent of total company headcount

R7: Average purchase order cycle time

The analytical tools include Kruskal-Wallis, Chi-square, Wilcoxon signed-rank test, mean and standard deviation, as summarized in Table III.5. Chapter IV continues with the research results and analysis.

Table III.5

Summary of Hypotheses, Variables and Analysis

Hypotheses	Variables	Analysis
H1	Participation Level (PV0, PV1, PV2 & PV3)	Category Percentages Chi-square
H2	Change in CSP Participation	Wilcoxon Signed Rank Test
H3a	Functional Industry Classification (C1 & C2) Participation Level (PV0, PV1, PV2 & PV3)	Kruskal-Wallis Test Cross-tab (X^2)
H3b	Ownership Class (C3 & C4) Participation Level (PV0, PV1, PV2 & PV3)	Kruskal-Wallis Test Cross-tab (X^2)
H4	Participation Level (PV0, PV1, PV2 & PV3) Desired Part. Level (DPV0, DPV1, DPV2 & DPV3)	Kruskal-Wallis Test Cross-tab (X^2)
	Benefits to the Firm (Categories 1 - 3)	Comparison of Category Percentages
	Benefits to Purchasing (Categories 1 - 4)	Comparison of Category Percentages
H5	Conflict Perception	Wilcoxon Signed Rank Test
	Conflict Categories (Categories 1 - 4)	Comparison of Category Percentages
H6a	Participation Level (PV0, PV1, PV2 & PV3) Performance Ratio (R1)	Mean & SD Kruskal-Wallis Test
H6b	Participation Level (PV0, PV1, PV2 & PV3) Performance Ratio (R2)	Mean & SD Kruskal-Wallis Test

Table III.5 (cont.)

Summary of Hypotheses, Variables and Analysis

Hypotheses	Variables	Analysis
H6c	Participation Level (PV0, PV1, PV2 & PV3) Performance Ratio (R3)	Mean & SD Kruskal-Wallis Test
H6d	Participation Level (PV0, PV1, PV2 & PV3) Performance Ratio (R4)	Mean & SD Kruskal-Wallis Test
H6e	Participation Level (PV0, PV1, PV2 & PV3) Performance Ratio (R5)	Omitted due to survey inconsistency
H6f	Participation Level (PV0, PV1, PV2 & PV3) Performance Ratio (R6)	Mean & SD Kruskal-Wallis Test
H6g	Participation Level (PV0, PV1, PV2 & PV3) Performance Ratio (R7)	Mean & SD Kruskal-Wallis Test

CHAPTER IV

RESEARCH RESULTS AND ANALYSIS

This study examines six basic research questions, as stated in Chapter I.

1. To what extent is the purchasing function involved in the CSP process? Is the function involved in all phases of the process including the development of strategic plans as well as implementation and control?
2. Has there been a change in the level of participation by the purchasing function in the CSP process during the past five years?
3. Are there differences in the extent of purchasing participation in the CSP process between different industry classifications, such as manufacturing vs. non-manufacturing companies or between the public vs. private sectors?
4. What role do purchasing managers believe they should play in the strategic planning process? Is their role perception congruent with actual practice?
5. Are the strategic goals/objectives of the purchasing function consistent with those of the

organization? If not, what areas of conflict do purchasing managers perceive?

6. Is there a relationship between functional performance and functional participation in the corporate strategic planning process?

Hypotheses and associated null hypotheses were developed and tested for each basic research question. The results and analysis of the research findings are presented in this chapter, with each basic research question examined sequentially.

To what extent is the purchasing function involved in the corporate strategic planning process?

To examine this question, the following hypothesis was considered:

H1: There is a difference in the degree of purchasing involvement in CSP between different firms.

The associated null hypothesis was stated as:

$H1_o$: There is no difference in the degree of purchasing involvement in CSP between different firms.

Data to evaluate the null hypothesis were obtained with question 3 on the survey instrument:

> Which of the following statements BEST describes actual purchasing involvement in a formalized corporate strategic planning process at your company?

As discussed in Chapter III, an approximately equal distribution of occurrences in each involvement category would suggest acceptance of the null hypothesis, indicating

that involvement levels are evenly distributed within the sample and that there is no tendency for the purchasing function to be more involved in CSP in a low, medium, or high degree. Failure to reject the null hypothesis suggests a tendency for the purchasing function in general to be more involved in CSP to the particular degree indicated by the results in Table IV.1.

Table IV.1

Degree of Purchasing Involvement in CSP (Q3)

Involvement Category	N	%
PV0	18	7.56
PV1	68	28.57
PV2	79	33.19
PV3	50	21.02
PV4	23	9.66
Total	238	100.00

The results show a non-uniform distribution between the five categories, suggesting the rejection of the null hypothesis. With 82.78% of the usable sample reporting some involvement with CSP, 17.22% had no CSP involvement (9.66% had no formalized CSP program).

The results further indicate the largest number of respondents (33.19%) reporting purchasing involvement in CSP to a medium degree (PV2), i.e. development and implementation of plans. The second largest group (28.57%) reported low involvement (PV1), i.e. implementation of plans only. The smallest group of 21.02%, reported involvement in

all phases of CSP (PV3).

To statistically test the null hypothesis and determine if the percentage differences between the categories was significant, a Chi-square "goodness of fit" test was performed. The Minitab program generated an H = 60.60 and a p value = 0. Since the computed Chi-square value of 60.60 is greater than the critical Chi-square table value of 14.86 (alpha = .05, D.F. = 4), this strongly suggests a rejection of the null hypothesis and supports the alternate hypothesis (H1), i.e. There is a difference in the degree of purchasing involvement in CSP between different firms. This conclusion is further supported by the extremely low p value (approaching 0). A classical approach towards p values (Kvanli, Guynes & Pavur, 1989, p. 275) suggests rejection of the null hypothesis if p is less than alpha (.05).

For the remainder of the hypotheses, the 23 respondents reporting no formalized CSP process at their firms (PV4) were omitted from the study. These respondents were omitted since the remainder of the study is applicable only to those firms with a formalized CSP process. This reduced the usable sample to 219.

Has there been a change in the level of participation by the purchasing function in the CSP process during the past five years?

Hypothesis H2 was proposed to examine this question.

H2: The level of purchasing participation in CSP has increased in the past five years.

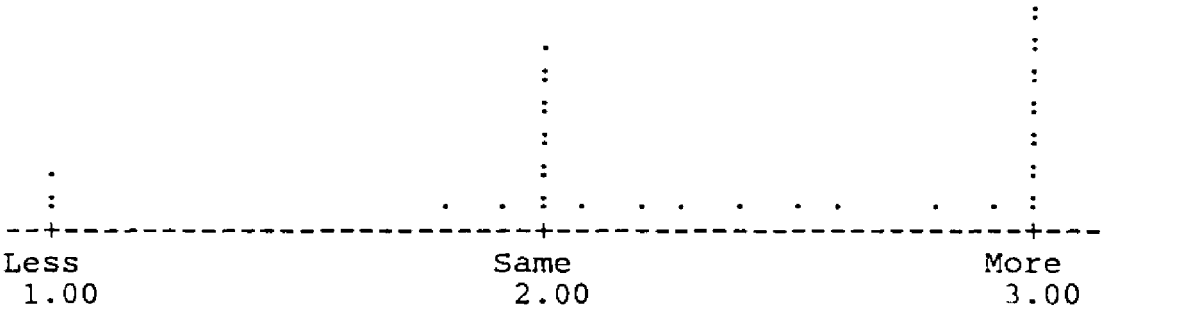
The associated null hypothesis was stated as:

$H2_o$: There has been no increase in the level of purchasing participation in CSP in the past five years.

Survey question 9 was employed to consider this null hypothesis, and the responses are shown in Figure IV.1.

Figure IV.1

Dotplot of Change in CSP Involvement in the Past 5 Years



Each dot represents 7 points N = 212, N missing = 7

The mean response to question 9 was 2.43, suggesting there has been an overall increase in purchasing participation in CSP during the past five years. In addition, 46.7% of the 212 responses indicated 3.0 (more involvement).

A one-sample Wilcoxon signed-rank test was employed to test the null hypothesis $H2_o$ against the alternate hypothesis H2. The population center for the test was assigned as 2.0 since at this point or below, no change in CSP participation was indicated. The p value resulting from

the Wilcoxon comparison using Minitab was so close to zero that Minitab reported a p value = 0. This strongly suggests rejection of the null hypothesis and supports alternate hypothesis H2, i.e. the level of purchasing participation in CSP has increased in the past five years.

Are there differences in the extent of purchasing participation in the corporate strategic planning process between different industry classifications?

Hypothesis H3 was proposed to examine this question.

H3: There is a difference in the purchasing involvement levels between firms in different industry classifications.

As stated in Chapter III, industry classification was divided according to function and ownership. The Functional Industry Classification was subdivided into two categories, i.e. manufacturing firms vs. non-manufacturing firms. The Ownership Classification was also subdivided into two categories, i.e. private ownership vs. public ownership.

In order to examine each industry classification independently, two additional sub-hypotheses and associated null hypotheses were generated.

H3a: There is a difference in the purchasing involvement levels between firms in the manufacturing sector and firms in the non-manufacturing sector (at Alpha = .05).

H3b: There is a difference in the purchasing involvement levels between privately owned firms and publicly owned firms (at Alpha = .05).

The associated null hypotheses were stated as:

$H3a_o$: There is no difference in the purchasing involvement levels between firms in the manufacturing sector and firms in the service sector (at Alpha = .05).

$H3b_o$: There is no difference in the purchasing involvement levels between privately owned firms and publicly owned firms (at Alpha = .05).

Null hypothesis $H3a_o$ (involvement levels vs. functional industry classification) was tested by comparing the responses obtained from survey question 1 with those obtained from survey question 3. Using the Minitab program, a Kruskal-Wallis test was performed, which yielded the output in Table IV.2.

Table IV.2

Functional Industry Classification (Q1)
vs. Involvement Level (Q3)
Kruskal-Wallis

LEVEL	NOBS	MEDIAN	AVE. RANK	Z VALUE
PV0	18	1.000	114.2	0.59
PV1	68	1.000	102.3	-0.61
PV2	76	1.000	98.4	-1.35
PV3	49	1.000	119.9	1.82
OVERALL	211		106.0	

211 CASES WERE USED
8 CASES CONTAINED MISSING VALUES

H = 4.29 d.f. = 3 p = 0.233
H = 7.50 d.f. = 3 p = 0.058 (adj. for ties)

(Note: For Table IV.2 and for all similar Tables in Chapter IV, the following explanations apply:

LEVEL refers to the CSP Participation Variables (PVO, PV1, PV2 & PV3 as defined in Chapter III.

NOBS means "Number of Observations"

Z-VALUE indicates the number of standard deviations to the left (negative) or right (positive) of the mean)

Kvanli, Guynes and Pavur (1989, p. 860) suggest rejection of the null hypothesis if H is greater than the critical value of Chi-square at the appropriate alpha and degrees of freedom. In this case,

Reject H3a if H > $X^2_{.05,3}$ or 7.81

The Minitab program computes H unadjusted and adjusted for ties. In this case, both H values are less than the critical value of 7.81 (Kvanli, Guynes & Pavur, 1989, p. A12), suggesting a failure to reject null hypothesis $H3a_o$. Failure to reject the null hypothesis suggests there is no

difference between purchasing participation in CSP between firms in the manufacturing vs. non-manufacturing sectors. This conclusion is further supported by a consideration of the p values. The p value "is often called the observed alpha or observed significance level" (Kvanli, Guynes & Pavur, 1989, p. 273). It is the smallest value of alpha at which the null hypothesis can be rejected.

A classical approach towards p values (Kvanli, Guynes & Pavur, 1989, p. 275) suggests failure to reject if p is greater than or equal to alpha (.05). Again, the p value for both Minitab computations is greater than .05, suggesting a failure to reject the null hypothesis.

To further confirm the fail to reject conclusion, a Chi-square cross tabulation was performed with Minitab, yielding the output in Table IV.3.

Table IV.3

Functional Industry Classification (Q1)
vs. Involvement Level (Q3)
Chi-Square Cross Tabulation

		PV0	PV1	PV2	PV3	ALL
Mfg	N	12	53	62	30	157
	Row %	7.64	33.76	39.49	19.11	100.00
	Col %	66.67	77.94	81.58	61.22	74.41
Service	N	6	15	14	19	54
	Row %	11.11	27.78	25.93	35.19	100.00
	Col %	33.33	22.06	18.42	38.78	25.59
Total		18	68	76	49	211
		8.53	32.23	36.02	23.22	100.00
		100.00	100.00	100.00	100.00	100.00

CHI-SQUARE = 7.537 WITH D.F. = 3 (P-value between .05 and .10)

The results of the Chi-square output also support the Kruskal-Wallis test, failing to reject null hypothesis $H3a_o$, since the computed Chi-square value of 7.537 is less than the critical Chi-square table value of 7.81 (alpha = .05, D.F. = 3).

It should be noted, however, that while both the Kruskal-Wallis and Chi-square test indicate a failure to reject the null hypothesis, the failure to reject recommendation is relatively weak. In fact, a "general rule of thumb" approach to the consideration of the p value in lieu of the classical approach, suggests that for many business applications, a p value between .01 and .1 is inconclusive (Kvanli, Guynes & Pavur, 1989, p. 276). The computed p value for both Kruskal-Wallis (adjusted for ties) and Chi-square falls within the .01 and .1 range, while the computed p value for the Kruskal-Wallis (unadjusted) falls above .1, supporting the fail to reject recommendation.

This inconsistency may be explained by a visual examination of the cross tabulation. While the statistical analysis suggests no significant differences in involvement levels between manufacturing and service industries, there does appear to be a relatively large difference in involvement at the PV3 level (purchasing is actively involved in all phases of the strategic planning process, including development, implementation and control). It appears that service related firms are more involved at this

level (35.19%) than are manufacturing firms (19.11%).

Null hypothesis $H3b_o$ (involvement levels vs. ownership classification) was tested by comparing the responses obtained from survey question 2 with those obtained from survey question 3. Using the Minitab program, a Kruskal-Wallis test was performed, which yielded the output in Table IV.4.

Table IV.4

Ownership Classification (Q2)
vs. Involvement Level (Q3)
Kruskal-Wallis

LEVEL	NOBS	MEDIAN	AVE. RANK	Z VALUE
PV0	17	1.000	96.7	-0.65
PV1	67	1.000	106.2	0.04
PV2	77	1.000	106.9	0.17
PV3	50	1.000	107.4	0.18
OVERALL	211		106.0	

211 CASES WERE USED
8 CASES CONTAINED MISSING VALUES

H = 0.44 d.f. = 3 p = 0.932
H = 1.17 d.f. = 3 p = 0.761 (adj. for ties)

Applying the same decision rules discussed for null hypothesis $H3a_o$, a consideration of both H and p values favor a strong failure to reject the null hypothesis $H3b_o$. Both H values (unadjusted and adjusted for ties) are much less than the Chi-square critical value of 7.81 (alpha = .05, D.F. = 3). Both p values exceed .1 suggesting a failure to reject under both a classical and "general rule of thumb" approach to p value interpretation. This failure to reject strongly supports the null hypothesis that there

are no differences in purchasing participation in CSP between public vs. private organizations.

To further confirm the strong fail to reject conclusion, a Chi-square cross tabulation was also performed using Minitab, yielding the output in Table IV.5.

Table IV.5

Ownership Classification (Q2)
vs. Involvement Level (Q3)
Chi-Square Cross Tabulation

		PV0	PV1	PV2	PV3	ALL
Private	N	16	57	65	42	180
	Row %	8.89	31.67	36.11	23.33	100.00
	Col %	94.12	85.07	84.42	84.00	85.31
Public	N	1	10	12	8	31
	Row %	3.23	32.26	38.71	25.81	100.00
	Col %	5.88	14.93	15.58	16.00	14.69
Total		17	67	77	50	211
		8.06	31.75	36.49	23.70	100.00
		100.00	100.00	100.00	100.00	100.00

CHI-SQUARE = 1.173 WITH D.F. = 3 (P-value greater than .10)

The results of the Chi-square output strongly fail to reject null hypothesis $H3b_o$, supporting the Kruskal-Wallis results. The computed Chi-square value of 1.173 is much less than the critical Chi-square table value of 7.81 (alpha = .05, D.F. = 3).

<u>What role do purchasing managers believe they should play in the strategic planning process?</u>

Hypothesis H4 was proposed to examine this question.

H4: There is a difference between the actual degree of purchasing involvement in CSP and purchasing managers' opinions of the degree of involvement they perceive as appropriate (at Alpha = .05).

The associated null hypothesis was stated as:

$H4_o$: There is no difference between the actual degree of purchasing involvement in CSP and purchasing managers' opinions of the degree of involvement they perceive as appropriate (at Alpha = .05).

Survey question 4 was employed to consider the null hypothesis. Questions 5 and 6 were used to gain additional insight into managers' opinions regarding the benefits of CSP participation.

A summary of responses to question 4 (managers' opinion regarding appropriate CSP participation) is presented in Table IV.6. Response (0), "Purchasing should not be involved in any way," was not selected by any respondents and was deleted from the remainder of the analysis for hypothesis H4.

Table IV.6

Managers' Opinion of Appropriate CSP Involvement (Q4)

Manager's Opinion	N	%
Opinion 1 (DPV1)	10	4.61
Opinion 2 (DPV2)	65	29.95
Opinion 3 (DPV3)	142	65.44
Total	217	100.00

(Note: Opinions 1 through 3 equate to the "Desired CSP Participation Variables" (DPV1, DPV2 & DPV3) as defined in Chapter III, as follows:

DPV1: Low Involvement - includes participation by purchasing in a single phase of CSP, i.e. implementation of plans only

DPV2: Medium Involvement - includes participation by purchasing in two phases of CSP, i.e. development and implementation of plans

DPV3: High Involvement - includes active participation by purchasing in all phases of CSP, including development, implementation, and control)

Null hypothesis $H3_o$ was tested by comparing the responses obtained from survey question 4 with those obtained from survey question 3. This comparison provides insight into the degree of congruence between purchasing managers' opinions regarding appropriate CSP involvement with actual CSP involvement. Acceptance of the null hypothesis indicates that purchasing managers' opinions regarding CSP involvement are in agreement with current company policy. Rejection of the null hypothesis suggests

that purchasing managers believe that purchasing participation in CSP should be at a level different from the current participation level.

Using the Minitab program, a Kruskal-Wallis test was performed, which yielded the output in Table IV.7.

Table IV.7

Managers' Opinion of Involvement (Q4)
vs. Actual Involvement Category (Q3)
Kruskal-Wallis

LEVEL	NOBS	MEDIAN	AVE. RANK	Z VALUE
PV0	18	3.000	95.1	-0.89
PV1	67	2.000	88.9	-2.97
PV2	79	3.000	107.1	-0.08
PV3	50	3.000	137.6	3.93
OVERALL	214		107.5	

214 CASES WERE USED
5 CASES CONTAINED MISSING VALUES

H = 18.64 d.f. = 3 p = 0.000
H = 26.89 d.f. = 3 p = 0.000 (adj. for ties)

Both H and p values strongly favor rejection of null hypothesis $H4_o$. Both H values (unadjusted and adjusted for ties) are much greater than the Chi-square critical value of 7.81 (alpha = .05, D.F. = 3). Both p values are approaching zero, and certainly much less than alpha = .05 (classical approach) and less than .01 ("rule of thumb" approach).

To further confirm the strong rejection of the null hypothesis, a Chi-square cross tabulation was also performed using Minitab, yielding the output in Table IV.8.

Table IV.8

Managers' Opinion of Involvement (Q4)
vs. Actual Involvement Category (Q3)
Chi-Square Cross Tabulation

		PV0	PV1	PV2	PV3	ALL
Opinion 1	N	2	7	0	1	10
	Row %	20.00	70.00	--	10.00	100.00
	Col %	11.11	10.45	--	2.00	4.67
Opinion 2	N	6	27	29	2	64
	Row %	9.37	42.19	45.31	3.12	100.00
	Col %	33.33	40.30	36.71	4.00	29.91
Opinion 3	N	10	33	50	47	140
	Row %	7.14	23.57	35.71	33.57	100.00
	Col %	55.56	49.25	63.29	94.00	65.42
Total		18	67	79	50	214
		8.41	31.31	36.92	23.36	100.00
		100.00	100.00	100.00	100.00	100.00

CHI-SQUARE = 35.009 WITH D.F. = 6 (p-value < .005)

The results of the Chi-square output also support the Kruskal-Wallis test, strongly suggesting rejection of null hypothesis $H4_o$, since the computed Chi-square value of 35.009 is much greater than the critical Chi-square table value of 12.5916 (alpha = .05, D.F. = 6).

The strong rejection of null hypothesis $H4_o$ supports the alternate hypothesis H4, that purchasing managers' opinions of appropriate CSP involvement levels do differ from actual practice. Only 83 out of 214 usable respondents (38.8%) reported actual involvement consistent with their opinion of appropriate involvement (i.e. Opinion 1 = PV1, Opinion 2 = PV2, Opinion 3 = PV3).

A review of the Chi-square cross tabulation shows that 70% of respondents with Opinion 1 (involvement in implementation only) also worked in firms where this was actual practice. However, this combination only represents 7 respondents out of 214. Significant differences in opinion vs. actual practice can be seen among respondents with Opinions 2 and 3. In these categories over 50% of the respondents' opinions differ from actual practice. For respondents with Opinion 2 (some involvement including development and implementation), 54.68% do not work in PV2 firms. For respondents with Opinion 3 (active involvement including development, implementation and control), 66.42% do not work in PV3 firms. It is also apparent that the majority of respondents with Opinion 2 or 3, believed that their actual participation in CSP should be greater than it actually is. For Opinion 2 respondents, 51.56% worked in firms with actual involvement levels lower than the respondents' opinion (PV0 or PV1). For Opinion 3 respondents, 66.42% worked in firms with actual involvement levels lower than the respondents' opinion (PV0, PV1 or PV2).

To further evaluate purchasing managers' opinions concerning the CSP process, survey questions 5 and 6 were asked to obtain qualitative responses from respondents to assess opinions regarding perceived benefits obtained from the level of CSP participation that managers consider

appropriate. Question 5 asked for benefits to the company, while Question 6 asked for benefits to the purchasing department. Respondents who agreed that their company and/or department would benefit from the level of CSP participation they consider appropriate were then asked to "describe the benefits..." in an open-ended format.

Responses obtained from the open-ended portion of Question 5 (benefits to the company) were categorized into three company benefit groups as follows:

Category 1 - Aiding in the Procurement of Materials

Category 2 - Aiding in the Production Process, including improving the final product

Category 3 - Aiding in the bottom-line savings

A summarization of managers' opinions regarding the benefits to their companies of purchasing involvement in CSP at the level they believe appropriate is provided in Table IV.9.

Table IV.9

Benefits to the Company
if CSP Participation was Consistent
with Managers' Opinion (Q5)

Benefit Category	N	%
1 - Aiding in the procurement of materials	73	29.5%
2 - Aiding in the production process, including the final product	106	42.9%
3 - Aiding in the bottom-line savings	68	27.6%
Total	247	100.0%

Note: Since multiple responses were possible, N could exceed the total number of usable responses (219).

Responses obtained from the open-ended portion of Question 6 (benefits to the purchasing department) were categorized into four department benefit groups as follows:

Category 1 - Aiding in the Procurement of Materials

Category 2 - Aiding in the Production Process, including improving the final product

Category 3 - Aiding in the bottom-line savings

Category 4 - Increased awareness of the purchasing department, resulting in doing a better job

A summarization of managers' opinions regarding the benefits to their purchasing departments of purchasing involvement in CSP at the level they believe appropriate is

provided in Table IV.10.

Table IV.10

Benefits to the Purchasing Department if CSP Participation was Consistent with Managers' Opinion (Q6)

Benefit Category	N	%
1 - Aiding in the procurement of materials	36	16.9%
2 - Aiding in the production process, including the final product	77	36.2%
3 - Aiding in the bottom-line savings	25	11.7%
4 - Increasing awareness of the purchasing department, resulting in doing a better job	75	35.2%
Total	213	100.0%

Note: Since multiple responses were possible, N could exceed the total number of usable responses (219).

Are the strategic goals/objectives of the purchasing function consistent with those of the organization?

Hypothesis H5 was proposed to examine this question.

H5: There is conflict between the strategic plans of the corporation and the strategic plans of the purchasing function.

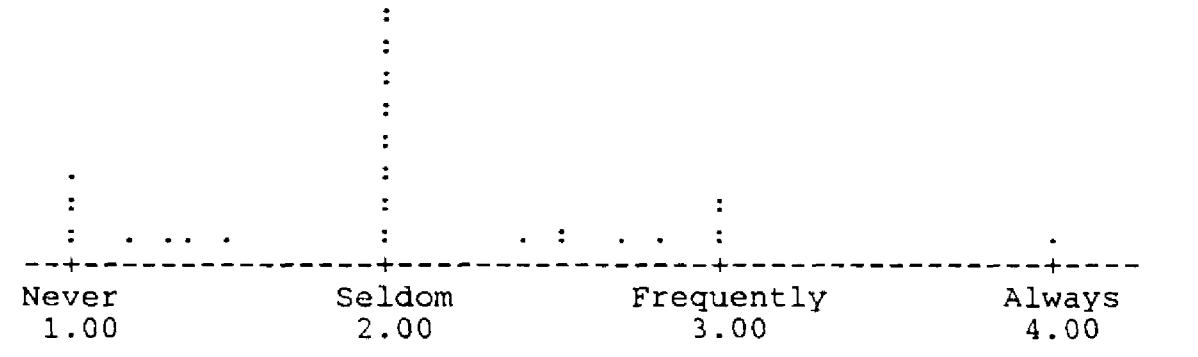
The associated null hypothesis was stated as:

$H5_o$: There is no conflict between the strategic plans of the corporation and the strategic plans of the purchasing function.

Survey question 7 was employed to consider this null hypothesis. Question 8 was used to gain additional insight into managers' opinions regarding the purchasing goals and objectives that may conflict with corporate strategic plans.

Figure IV.2

Dotplot of Conflict Frequency



Each dot represents 8 points N = 212, N missing = 7 Each

The mean response to Question 7 was 2.018, indicating that generally speaking there is "seldom" conflict between purchasing goals and objectives and corporate strategic plans. However, while there is some conflict, purchasing managers in this study feel that the conflict is minimal since 122, or 57.3%, of the 213 respondents to this question selected "seldom" (2.0).

A one-sample Wilcoxon signed-rank test was employed to test the null hypothesis $H5_o$ against the alternate hypothesis H5. The population center for the test was assigned as 1.0 since at this point, no conflict between corporate and functional strategic plans was reported. The

p value resulting from the Wilcoxon comparison using Minitab was so close to zero that Minitab reported a p value = 0. This strongly suggests rejection of the null hypothesis and supports the alternate hypothesis H5, i.e. there is conflict between the strategic plans of the corporation and the strategic plans of the purchasing function.

To further evaluate the question of potential goal conflict, respondents were asked to describe where conflicts might exist between corporate and purchasing goals and objectives (Q8). Responses obtained from the open-ended Question 8 (goals and objectives most often in conflict) were categorized into four conflict groups as follows:

Category 1 - Problems with Inventory Management (internal)

Category 2 - Problems with Supply Management (external)

Category 3 - Problems in Financial Issues

Category 4 - Goals and Philosophy Conflicts

A summarization of managers' opinions regarding the potential areas of conflict between purchasing and corporate goals and objectives resulting from CSP is provided in Table IV.11.

Table IV.11

Conflict Areas Between Purchasing and Corporate Goals and Objectives (Q8)

Conflict Category	N	%
1 - Inventory Mgmt (Internal)	39	19.4%
2 - Supply Mgmt (External)	35	17.4%
3 - Financial Issues	42	20.9%
4 - Goals & Philosophy	85	42.3%
Total	201	100.0%

Note: Since multiple responses were possible, N could exceed the total number of usable responses (219).

Is there a relationship between functional performance and functional participation in the corporate strategic planning process?

Hypothesis H6 was proposed to examine this question.

H6: There is a significant relationship between purchasing participation in CSP and purchasing performance.

As stated in Chapter III, due to the difficulties associated with the development of an acceptable composite measure of purchasing performance, seven sub-hypotheses and associated null hypotheses were proposed to determine if a significant relationship exists between any of these seven specific performance measures and purchasing participation in CSP (at Alpha = .05). The seven sub-hypotheses and null hypotheses are as follows:

H6a: There is a significant relationship between purchasing participation in CSP and the percentage of identifiable cost savings/cost avoidances.

H6b: There is a significant relationship between purchasing participation in CSP and purchasing cost per order.

H6c: There is a significant relationship between purchasing participation in CSP and the percentage of orders rejected as a result of purchasing errors.

H6d: There is a significant relationship between purchasing participation in CSP and the percentage of "on-time" deliveries.

H6e: There is a significant relationship between purchasing participation in CSP and the amount of purchase dollars spent as a percentage of sales.

H6f: There is a significant relationship between purchasing participation in CSP and the number of purchasing employees as a percentage of total corporate employees.

H6g: There is a significant relationship between purchasing participation in CSP and purchase order cycle time.

The associated null hypotheses were stated as:

$H6a_o$: There is no significant relationship between purchasing participation in CSP and the percentage of identifiable cost savings/cost avoidances.

$H6b_o$: There is no significant relationship between purchasing participation in CSP and purchasing cost per order.

$H6c_o$: There is no significant relationship between purchasing participation in CSP and the percentage of orders rejected as a result of purchasing errors.

$H6d_o$: There is no significant relationship between purchasing participation in CSP and the percentage of "on-time" deliveries.

$H6e_o$: There is no significant relationship between purchasing participation in CSP and the amount of purchase dollars spent as a percentage of sales.

$H6f_o$: There is no significant relationship between purchasing participation in CSP and the number of purchasing employees as a percentage of total corporate employees.

$H6g_o$: There is no significant relationship between purchasing participation in CSP and purchase order cycle time.

Survey questions 10 through 20 were used to gather

information for the computation of the performance ratios. As indicated in Chapter III, no statistical analysis was performed on the responses to these questions. Analyses was only performed to determine the relationship between each computed performance ratio and actual purchasing involvement in CSP (Q3). A Lotus 1-2-3 spreadsheet was used to record and calculate the performance ratios, and the resulting ratios imported back into the Minitab program. The calculated ratios are provided in Appendix E. Ratio 6 was omitted from consideration due to measurement problems caused by the presentation of question 10, as discussed in Chapter III. A summary evaluation, using Minitab, of the computed ratios for the entire usable sample are presented in Table IV.12.

Table IV.12

Summary Statistics
Performance Ratios
Minitab

RAT	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	MIN	MAX
R1	101	118	2.830	1.781	2.380	3.343	0.100	25.000
R2	154	65	352	43	99	1441	1	15000
R3	195	24	3.832	2.000	2.881	7.432	0.000	90.000
R4	148	71	82.64	87.00	84.19	14.89	8.00	99.00
R6	216	3	1.937	1.172	1.467	3.118	0.005	30.769
R7	212	7	7.597	4.250	6.477	8.365	0.000	45.000

(Note: For Table IV.12, the following explanations apply:

RAT means "ratio" and refers to the performance ratio variables identified in Chapter III

N = number of surveys with sufficient information to calculate the appropriate ratio

N* = number of surveys with insufficient information and the appropriate ratio could not be calculated

TRMEAN means "trimmed mean," and is a 5% trimmed mean as described below)

In reviewing these summary statistics, an abnormal response condition appears for R1, "total cost savings/cost avoidances as a percent of total purchases." Over half of the respondents did not answer survey question 13 and therefore, this ratio was impossible to compute in 54% of the cases. The low response rate suggests that a large number of firms either do not have cost savings programs, or that they have insufficient records for their programs. The low response rate for this ratio is also a cause to question the validity of the results of the R1 comparison with CSP participation (i.e. hypothesis H6a).

A second abnormal response condition appears for R2, "purchasing cost per order." The maximum response of $15,000 per order is intuitively unlikely. This value was checked against the actual survey response to verify if an input error had occurred. It was found that $15,000 per order was the actual response and the input was correct. This suggests either an error on the part of the respondent or a misunderstanding of the question.

A further review of responding firm "sizes" based on annual revenues reported in question 10, reveals at least two, extremely large corporations, and several very small

firms. Such extremes may not be representative of the sample. Therefore, to compensate for discrepancies such as that noted for R2, and for firm size extremes, it is suggested that the TRMEAN (trimmed mean) shown in Table IV.12 is a better measure of central tendency than the mean, in this case. Such a modification may be utilized when "it is clear that extreme values are included in the data" (Parsons, p. 59). The trimmed mean in Minitab "is a 5% trimmed mean [with] the smallest 5% (rounded to the nearest integer) and the largest 5% of the values trimmed; the middle 90% are then averaged" (Ryan, Joiner & Ryan, 1982, p. 91). Thus, the trimmed mean of $99.00 cost per purchase order appears much more reasonable than does the mean value of $352.00 cost per purchase order.

Null hypothesis $H6a_o$ was tested by comparing the responses obtained from survey question 3 with the ratios calculated for Ratio 1, total cost savings/cost avoidances as a percent of total purchases. Using the Minitab program, a Kruskal-Wallis test was performed, which yielded the output in Table IV.13.

Table IV.13

Performance Ratio 1 (Total cost savings/cost avoidances as a percent of total sales) vs. CSP Involvement (Q3)
Kruskal-Wallis

LEVEL	NOBS	MEDIAN	AVE. RANK	Z VALUE
PV0	4	1.787	51.7	0.12
PV1	27	1.781	49.1	-0.19
PV2	43	1.667	45.7	-1.31
PV3	25	2.000	58.1	1.63
OVERALL	99		50.0	

99 CASES WERE USED
120 CASES CONTAINED MISSING VALUES
* NOTE * One or more small samples

H = 2.99 d.f. = 3 p = 0.393
H = 3.00 d.f. = 3 p = 0.393 (adj. for ties)

Applying the previously discussed decision rules for both H and p values, a consideration of both H and the p value strongly favor a failure to reject the null hypothesis $H6a_o$. Both H values (unadjusted and adjusted for ties) are much less than the Chi-square critical value of 7.81 (alpha = .05, D.F. = 3). Both p values exceed .1 suggesting a failure to reject under both a classical (fail to reject if $p > .05$) and "general rule of thumb" (fail to reject if $p > .1$). Therefore, the null hypothesis that there is no significant relationship between cost savings/cost avoidances and CSP participation must be accepted.

However, as previously noted, the validity of this conclusion must be questioned due to the small (46%) number of usable responses used to generate the data. Fifty-four percent of those responding to the survey did not provide

data for the computation of this ratio.

Null hypothesis $H6b_o$ was tested by comparing the responses obtained from survey question 3 with the ratios calculated for Ratio 2, purchasing cost per order. Using the Minitab program, a Kruskal-Wallis test was performed, which yielded the output in Table IV.14.

Table IV.14

Performance Ratio 2 (Purchasing cost per order) vs. CSP Involvement (Q3)
Kruskal-Wallis

LEVEL	NOBS	MEDIAN	AVE. RANK	Z VALUE
PV0	15	40.00	77.2	0.06
PV1	44	33.33	65.0	-2.06
PV2	60	50.00	78.8	0.52
PV3	33	75.00	87.4	1.61
OVERALL	152		76.5	

152 CASES WERE USED
67 CASES CONTAINED MISSING VALUES

H = 5.22 d.f. = 3 p = 0.157
H = 5.22 d.f. = 3 p = 0.157 (adj. for ties)

A consideration of both H and p values favor a strong failure to reject the null hypothesis $H6b_o$. The H value is much less than the Chi-square critical value of 7.81 (alpha = .05, D.F. = 3). Both p values exceed .1 suggesting a failure to reject under both a classical (fail to reject if $p > .05$) and "general rule of thumb" (fail to reject if $p > .1$). Therefore, the null hypothesis that there is no significant relationship between purchasing cost per order and CSP participation must be accepted.

Null hypothesis $H6c_o$ was tested by comparing the

responses obtained from survey question 3 with the ratios calculated for Ratio 3, percent of purchased materials rejected at or after delivery. Using the Minitab program, a Kruskal-Wallis test was performed, which yielded the output in Table IV.15.

Table IV.15

Performance Ratio 3 (Percent of purchased materials rejected at or after delivery) vs. CSP Involvement (Q3) Kruskal-Wallis

LEVEL	NOBS	MEDIAN	AVE. RANK	Z VALUE
PV0	16	2.000	102.9	0.48
PV1	64	3.000	104.4	1.39
PV2	70	2.000	85.0	-2.17
PV3	42	2.000	101.1	0.61
OVERALL	192		96.5	

192 CASES WERE USED
27 CASES CONTAINED MISSING VALUES

H = 4.78 d.f. = 3 p = 0.190
H = 4.95 d.f. = 3 p = 0.176 (adj. for ties)

A consideration of both H and p values favor a failure to reject the null hypothesis $H6c_o$. Both H values (unadjusted and adjusted for ties) are less than the Chi-square critical value of 7.81 (alpha = .05, D.F. = 3). Both p values exceed .1 suggesting a failure to reject under both a classical (fail to reject if p > .05) and "general rule of thumb" (fail to reject if p > .1). Therefore, the null hypothesis that there is no significant relationship between percent of purchased materials rejected at or after delivery and CSP participation must be accepted.

Null hypothesis $H6d_o$ was tested by comparing the responses obtained from survey question 3 with the ratios calculated for Ratio 4, percent of "on-time" deliveries. Using the Minitab program, a Kruskal-Wallis test was performed, which yielded the output in Table IV.16.

Table IV.16

Performance Ratio 4 (Percent of "on-time" deliveries) vs. CSP Involvement (Q3)
Kruskal-Wallis

LEVEL	NOBS	MEDIAN	AVE. RANK	Z VALUE
PV0	14	90.23	81.9	0.73
PV1	45	83.33	66.0	-1.52
PV2	57	90.00	82.0	1.81
PV3	31	85.00	67.4	-0.98
OVERALL	147		74.0	

147 CASES WERE USED
72 CASES CONTAINED MISSING VALUES

H = 4.83 d.f. = 3 p = 0.185
H = 4.87 d.f. = 3 p = 0.182 (adj. for ties)

A consideration of both H and p values favor a failure to reject the null hypothesis $H6d_o$. Both H values (unadjusted and adjusted for ties) are less than the Chi-square critical value of 7.81 (alpha = .05, D.F. = 3). Both p values exceed .1 suggesting a failure to reject under both a classical (fail to reject if $p > .05$) and "general rule of thumb" (fail to reject if $p > .1$). Therefore, the null hypothesis that there is no significant relationship between "on-time" deliveries and CSP participation must be accepted.

Null hypothesis $H6f_o$ was tested by comparing the responses obtained from survey question 3 with the ratios

calculated for Ratio 6, purchasing headcount as a % of total company headcount. Using the Minitab program, a Kruskal-Wallis test was performed, which yielded the output in Table IV.17.

Table IV.17

Performance Ratio 6 (Purchasing headcount as a % of total company headcount) vs. CSP Involvement (Q3) Kruskal-Wallis

LEVEL	NOBS	MEDIAN	AVE. RANK	Z VALUE
PV0	18	1.0556	92.4	-1.05
PV1	68	1.0000	102.8	-0.68
PV2	78	0.9028	100.8	-1.12
PV3	49	1.6000	128.1	2.73
OVERALL	213		107.0	

213 CASES WERE USED
6 CASES CONTAINED MISSING VALUES

H = 7.86 d.f. = 3 p = 0.050
H = 7.86 d.f. = 3 p = 0.050 (adj. for ties)

A consideration of both H and p values favor rejection of the null hypothesis $H6f_o$; however, the rejection is relatively weak since H = 7.86 only exceeds the Chi-square critical value of 7.81 (alpha = .05, D.F. = 3) by .04. Under the classical approach to p value evaluation, the p value would suggest a failure to reject since the p value is equal to alpha (.05). However, under a "rule of thumb" p value evaluation, the p value of .05 would be inconclusive since p lies between .01 and .1. Therefore, it is considered inconclusive as to whether the null hypothesis $H6f_o$ should be rejected, and the null hypothesis that there

is no significant relationship between purchasing headcount as a % of total company headcount will remain undetermined.

Null hypothesis $H6g_o$ was tested by comparing the responses obtained from survey question 3 with the ratios calculated for Ratio 7, average purchase order cycle time. Using the Minitab program, a Kruskal-Wallis test was performed, which yielded the output in Table IV.18.

Table IV.18

Performance Ratio 7 (Average purchase order cycle time) vs. CSP Involvement (Q3)
Kruskal-Wallis

LEVEL	NOBS	MEDIAN	AVE. RANK	Z VALUE
PV0	17	4.000	106.8	0.13
PV1	67	5.000	111.4	1.06
PV2	77	4.000	103.1	-0.35
PV3	48	3.750	98.4	-0.86
OVERALL	209		105.0	

209 CASES WERE USED
10 CASES CONTAINED MISSING VALUES

H = 1.42 d.f. = 3 p = 0.702
H = 1.43 d.f. = 3 p = 0.699 (adj. for ties)

A consideration of both H and p values favor a strong failure to reject the null hypothesis $H6g_o$. Both H values (unadjusted and adjusted for ties) are much less than the Chi-square critical value of 7.81 (alpha = .05, D.F. = 3). Both p values greatly exceed .1 suggesting a failure to reject under both a classical (fail to reject if p > .05) and "general rule of thumb" (fail to reject if p > .1). Therefore, the null hypothesis that there is no significant relationship between average purchase order cycle time and

CSP participation must be accepted.

Summary

This chapter has presented the research results and analysis of the six hypotheses and associated sub-hypotheses developed in response to the six research questions stated at the beginning of this chapter. Table IV.19 summarizes these results.

Chapter V continues with conclusions and implications for future research, based on the results and analysis of Chapter IV.

Table IV.19

Summary of Results

Null Hypothesis	Results
$H1_o$: There is no difference in the degree of purchasing involvement in CSP between different firms.	Reject - Only 21.02% of sample reported active involvement in all phases of CSP (PV3) (PV0) - 7.56% (PV1) - 28.57% (PV2) - 33.19%
$H2_o$: There has been no change in the level of purchasing participation in CSP in the past 5 years.	Reject - purchasing involvement in CSP has increased in past 5 years
$H3a_o$: There is no difference in the purchasing involvement levels between firms in the manufacturing sector and firms in the non-manufacturing sector (at alpha = .05).	Fail to Reject (weak) - There appears to be no significant differences in CSP involvement between functional sectors, except in active involvement category (PV3), where there appears to be a tendency for more non-manufacturing purchasing departments to be involved in CSP than manufacturing.
$H3b_o$: There is no difference in the purchasing involvement levels between privately owned firms and publicly owned firms (at alpha = .05).	Fail to Reject (strong) - There appears to be no significant differences in CSP involvement between different ownership classifications.
$H4_o$: There is no difference between the actual degree of purchasing involvement in CSP and purchasing managers' opinions of the degree of involvement they perceive as appropriate (at alpha = .05).	Reject (strong) - Purch. managers' opinions of appropriate CSP involvement are significantly different from actual practice. Only 38.8% reported actual involvement consistent with opinions of appropriate involvement.

Table IV.19(cont.)

Summary of Results

Hypothesis	Results
$H5_o$: There is no conflict between the strategic plans of the corporation and the strategic plans of the purchasing function.	Reject - Although conflict does exist, 57.3% report frequency of occurrence is "Seldom"
$H6a_o$: There is no significant relationship between purchasing participation in CSP and the percentage of identifiable cost savings/cost avoidances.	Fail to Reject - No significant relationship between CSP and cost savings/cost avoidances. Validity questionable due to small number of responses
$H6b_o$: There is no significant relationship between purchasing participation in CSP and purchasing cost per order.	Fail to Reject - No significant relationship between CSP and purchasing cost per order.
$H6c_o$: There is no significant relationship between purchasing participation in CSP and the percentage of orders rejected as a result of purchasing errors.	Fail to Reject - No significant relationship between CSP and percent of orders rejected.
$H6d_o$: There is no significant relationship between purchasing participation in CSP and the percentage of "on-time" deliveries.	Fail to Reject - No significant relationship between CSP and percentage of "on-time" deliveries.
$H6f_o$: There is no significant relationship between purchasing participation in CSP and the number of purchasing employees as a % of total corporate employees.	Inconclusive

Table IV.19(cont.)

Summary of Results

Hypothesis	Results
$H6g_o$: There is no significant relationship between purchasing participation in CSP and purchase order cycle time.	Fail to Reject (Strong) - No significant relationship between CSP and purchase order cycle time.

CHAPTER V

CONCLUSIONS

This study has examined the role of the purchasing function in the strategic planning process of 219 southeastern U.S. firms, including firms in both manufacturing and non-manufacturing, representing both the private and public sectors. The research was guided by six research questions that were used to formulate the six hypotheses and related sub-hypotheses. In addition, a specific research objective was associated with each question. The research objectives, stated in Chapter I, are as follows:

1. To determine the current level of participation by the purchasing function in the corporate strategic planning process. This will serve to verify findings of other recent studies (such as Freeman & Cavinato, 1990) and act as a baseline to measure future advances/declines in purchasing participation in the corporate strategic planning process.

2. To determine if the current level of participation represents an increase, decrease or status quo in participation levels over the past 5 years. This will serve to determine if recent trends (Fearon, 1988) of increasing purchasing participation in the corporate strategic planning process are continuing.
3. To determine if purchasing participation in the corporate strategic planning process differs across industry classifications. This will provide more specific information to practitioners and corporate management in the various classifications.
4. To determine if purchasing managers and corporate management (as evidenced by actual practice) maintain the same opinions regarding purchasing participation in the corporate strategic planning process. An understanding of possible inconsistencies in role perception will improve communication between purchasing and corporate management on the subject of purchasing participation.
5. To determine the degree of consistency between functional and corporate goals/objectives. An understanding of conflicts (functional goals sacrificed in order to achieve corporate goals)

will allow purchasing managers to better plan the functional process to provide greater consistency with corporate requirements. Areas of inconsistency may also indicate that management expectations for their purchasing departments may have changed. Insight into such trends will allow purchasing managers to do a better job of preparing their own department to be more consistent with management expectations.

6. To determine if there is a relationship between functional corporate strategic planning participation and the performance of the purchasing function. If performance and participation are positively correlated, this will provide an additional argument for inclusion of the purchasing function in all phases of the corporate strategic planning process.

Each of these objectives will be discussed as the focus for the conclusions of this study. Then, the potential benefits of the research will be discussed. The potential benefits identified in Chapter I include:

Benefits to Professional Practitioners

1. Provide a greater understanding of purchasing's role in the corporate strategic planning process

2. Demonstrate the importance of participation in the corporate strategic planning process, with emphasis on benefits to the purchasing function

Benefits to Corporate Management

1. Demonstrate the importance of purchasing participation in the corporate strategic planning process, with emphasis on the inter-dependant benefits to the corporation and the purchasing function, collectively and individually

Benefits to Researchers

1. Provide a baseline of current purchasing participation in the corporate strategic planning process
2. Provide a basis for additional research regarding functional participation in the corporate strategic planning process

The chapter concludes with a discussion of research limitations and suggestions for future research.

Determine the current level of participation by the purchasing function in the corporate strategic planning process

The responses obtained from survey question 3, indicate that 95% of the responding firms do have a formalized CSP

process of some type. Of those firms with a formalized CSP process, 82.78% of the responding purchasing managers indicated that their purchasing departments were involved in the process to some degree (See Table IV.1). The levels of purchasing involvement, ranked in descending order, are as follows:

33.19% - medium involvement (PV2) - purchasing has some involvement in the development and implementation of corporate strategic plans

28.57% - low involvement (PV1) - purchasing's involvement is limited to the implementation of corporate strategic plans as developed by top management

21.02% - high involvement (PV3) - purchasing is actively involved in all phases of CSP including development, implementation and control

These results suggest a substantial increase in purchasing participation in CSP since the 1983 Purchasing Magazine report of only 1/3 of all purchasing departments involved in CSP (Staff, 1983, p. 14).

In 1974, Ammer reported that only 21% of purchasing managers 'frequently' participated in the planning process or in other decisions not directly related to the purchasing function (Ammer, 1974, p. 38). Although it is difficult to directly match Ammer's term 'frequently' with the involvement categories of this study, the percentage of

involvement in the medium and high categories, 33.19% and 21.02% respectively, suggest substantial increases in CSP participation. The results of this study also support the claims of increased purchasing participation in CSP in recent articles such as Leenders, Fearon and England (1989), Bimmerle (1990), and Lovering (1990).

It is suggested that the substantial increase in purchasing CSP participation may be attributed to a combined "pull" and "push" phenomena. The efforts of professional associations, such as the National Association of Purchasing Management, to improve the professionalism of the purchasing function and inform upper management of purchasing's contribution to the corporate bottom line, have had a positive impact on upper management perceptions, causing purchasing to be "pulled" into greater CSP participation.

At the same time, purchasers have become more aware of their own corporate value. Studies by Farmer (1978) and Spekman and Hill (1980) revealed a negative self-image by the purchasing function regarding the ability to contribute to the long-term well being of the firm. However, this research found that 96.7% of purchasing managers believed that purchasing should be involved in a medium to high degree in CSP. This desire to participate has also resulted in an upward "push" on management, from purchasers, for increased CSP participation.

To determine if the current level of participation represents an increase, decrease or status quo in participation levels over the past 5 years

Survey question 9 asked purchasing managers to state if their involvement in CSP has changed over the past 5 years. Of the 212 responses to this question, 46.7% indicated "Purchasing has become more involved in the past 5 years." These results support other reports of increasing purchasing involvement in CSP during the 1980s (Bimmerle, 1990; Fearon, 1988; Leenders, Fearon and England, 1989; Lovering, 1990;) and demonstrates that the positive trend of increasing involvement is continuing into the 1990s.

To determine if purchasing participation in the corporate strategic planning process differs across industry classifications

A comparison of actual CSP involvement levels (survey question 3) with the functional classification of the business, i.e. manufacturing vs. non-manufacturing (survey question 1) indicates that there is no statistically significant difference in overall CSP participation between the two groups. However, the failure to reject the null hypothesis is somewhat weak, and an examination of the chi-square table (Table IV.3) shows a substantial difference between the two groups (35.19% for non-manufacturing vs. 19.11% for manufacturing) at the high involvement level (PV3).

The higher percentage of active involvement by purchasing in non-manufacturing CSP may indicate a greater awareness by such firms of purchasing's ability to contribute to the bottom line. In this study, the non-manufacturing sector includes hospitals, distributors and utilities, all of which have come under extreme pressure in recent years to increase productivity.

A comparison of actual CSP involvement levels (survey question 3) with the ownership classification of the business, i.e. private vs. public (survey question 2) strongly suggests that there is no significant difference in CSP participation between private and public entities. This finding is consistent with the overall trend of public organizations to "look" and "act" like private sector firms, again, due to the need to increase productivity which has impacted even non-profit organizations.

<u>To determine if purchasing managers and corporate management (as evidenced by actual practice) maintain the same opinions regarding purchasing participation in the corporate strategic planning process</u>

To evaluate this objective, responses regarding actual CSP involvement (survey question 3) were compared to purchasing managers' opinion of appropriate involvement in CSP. It was found that 207 out of 214, or 96.7%, responding purchasing managers thought the purchasing function should be in a medium (PV2) to high (PV3) level of CSP

participation. In this group, over 50% of the respondents' opinions regarding CSP participation differed from actual participation. For those purchasing managers who felt purchasing should be involved at a high degree of involvement (PV3), 66.42% worked in firms where actual involvement levels were lower than the managers' opinion.

Although these results suggest that purchasing managers' opinions of appropriate purchasing CSP participation are higher than those of general corporate management, the results also suggest an increased awareness by purchasing managers of their own importance in achieving corporate strategic goals and objectives.

In the late seventies and early eighties, Farmer (1978) and Spekman and Hill (1980) suggested that both corporate management and purchasing managers actually shared a negative opinion regarding the ability of the purchasing function to contribute positively to CSP. This common belief further contributed to a lack of actual participation in practice. With nearly 97% of respondents believing that purchasing participation in CSP should be at a medium to high level, the previously self-held negative impression has apparently been dispelled. Purchasing managers' opinions, stated in the survey, regarding benefits to both the firm and to the purchasing department, of increased CSP participation, also reflect a greater awareness by purchasing managers of their ability to contribute to the

long term health of the organization.

(For perceived benefits see Tables III.2 and III.3).

To determine the degree of consistency between functional and corporate goals/objectives

Survey question 7 asked purchasing managers to respond with a frequency of conflict between corporate and purchasing goals and objectives. Of the 213 responses to this question, 122 or 57.3% of the respondents stated that the goals and objectives of purchasing were "Seldom" in conflict with those of the corporation. When conflict does occur, purchasers reported it occurred in four possible areas including problems with inventory management, problems with supply management, problems with financial issues, and conflicts between goals and philosophies. (For specific conflict areas, see Table III.4.)

This finding should be viewed as an important result of the increases in CSP participation previously identified. It is suggested that the lower the level of involvement in CSP, the greater the potential for conflict between functional and corporate levels. Participation in the CSP process promotes communication and acceptance, both of which are vital to the reduction of goal conflicts.

To determine if there is a relationship between functional corporate strategic planning participation and the performance of the purchasing function

No significant relationships were found between any of the six performance measures tested and purchasing participation in CSP. This does not mean that purchasing performance is not impacted by CSP participation, but perhaps only that the specific measures selected are not representative of improvement resulting from CSP participation. Since the performance measures selected were all strictly quantitative measures, generally accepted by the profession, it may be found that functional improvement resulting from CSP participation is reflected in more qualitative measures such as vendor performance management (Chao, 1990; Hendrick & Ruch, 1988; Porter, 1988; Thor, 1990; Van Weele, 1984), teaming (Chao, 1990), professionalism (Chao, 1990), management (Van Weele, 1984; Hendrick & Ruch, 1988) or coordination (Van Weele, 1984).

Problems of combining the performance measures of dissimilar firms may have biased the results. Large performance variations typically exist between firms of different size and firms in different industries. The results may be different if firms are regrouped by size or type.

In addition, the failure to find a significant relationship between functional performance and CSP participation does not mean there is no relationship between

functional participation and corporate performance. This study did not address the broader issue of corporate performance improvement resulting from purchasing involvement in CSP. Such an investigation should be the subject of future study.

Benefits of this Research

Benefits to Professional Practitioners

Substantial increases in purchasing CSP participation have occurred over the past decade, resulting from a mutual recognition by both corporate management and purchasing managers of the importance of purchasing contributions to the CSP process. However, as evidenced by the discrepancy between actual CSP participation and purchasing managers' opinions of appropriate participation, the profession still has opportunities to further increase CSP participation. Such increases will continue to occur as long as purchasing continues to demonstrate to top management its ability to positively impact the bottom line of the organization through CSP participation.

Purchasing management must continually recognize the strengths of the function, regarding CSP, and market those strengths to upper management. According to Pearson (1991), as stated in Chapter II, a firm that does not include purchasing in the CSP process, positions itself at a competitive disadvantage against its competitors who have

recognized the importance of purchasing's role. Specific reasons, summarized by Pearson (1991, p. 6), supporting purchasing participation include:

1. The supply environment has a significant impact on the value added to the products of many companies.
2. Purchasing plays a key role in supply management, which should be a key ingredient in strategic planning.
3. Greater integration of supply and marketing strategies may allow the firm to increase its competitiveness by taking advantage of shorter product life cycles.
4. A large degree of product quality is determined in the early stages of the product development process, and can be improved by early purchasing participation.

The purchasing manager must also recognize the benefits of active CSP participation which may accrue to the purchasing department in addition to overall corporate benefits. Purchasing managers participating in this research identified benefits to the purchasing function (See Table III.3) which include benefits in the areas of material procurement, production, reduced departmental costs, and increased visibility of the function within the organization.

Benefits to Corporate Management

Corporate management must recognize the many strategic benefits to the firm of active participation by purchasing in the CSP process. Purchasing should not be viewed as merely a tactical or operational function (Cannon, 1968, p. 444). Many potential benefits for the corporation have already been discussed in this study. Purchasing managers participating in this research identified benefits to the corporation (See Table III.2) which include benefits in the areas of material procurement, production, and increased savings on the bottom line.

Corporate management should also recognize the increased productivity and operational savings which result from reduced goal conflict. While goal conflict seldom occurs, according to purchasing managers, conflict still occurs in the areas of inventory management, supply management, financial issues, and philosophy (See Table III.4). Conflict between functional and corporate goals will be further reduced as the function is more actively involved in the CSP process.

Benefits to Researchers

The results of this research provide a baseline of current purchasing participation in the CSP process. For the usable sample of 219 southeastern firms, 82.78% report some level of involvement with CSP. The greatest number of

respondents, 33.19%, are involved in CSP at a medium involvement level (PV2), i.e. involvement in the development and implementation of corporate strategic plans, 28.57% are involved in CSP at a low involvement level (PV1), and 21.02% are involved in CSP at a high involvement level (PV3). The results also indicate a continued trend of increasing involvement by the function in CSP, with 46.7% of respondents indicating their involvement in CSP has increased in the past 5 years.

Limitations of this Research and Suggestions for Future Research

Although the universe of this research consists of all U.S. firms that have purchasing departments, this study only investigated a geographical subset of this universe, limited to the southeastern states of Virginia, North Carolina, and South Carolina, additional studies could be conducted in other geographical areas of the country to determine if the findings for the southeast are universal, or if the findings of this study are geographically unique.

Since the sample was drawn from member companies of a professional purchasing association, i.e. The Purchasing Management Association of Carolinas-Virginia, additional studies that include non-members should be performed to determine if the sample was biased by membership in a professional association. It is possible that the education

and professional development offered to members of the association may be a factor in the high percentage of purchasing departments reporting CSP participation.

Additional studies could also be performed to supplement the investigation of possible significant correlations between participation in CSP and functional performance. Since no significant correlations were found between the selected purchasing performance measures and CSP participation, additional studies could be conducted to determine if relationships exist between CSP participation and other performance measures, including some of the more qualitative measures mentioned previously. Also, firms should be regrouped by size or type to alleviate wide performance variations of dissimilar firms which may have biased the results of this study.

Finally, this study did not investigate if a significant relationship exists between purchasing participation in CSP and corporate performance. If a significant relationship between purchasing CSP participation and specific corporate performance measures could be found, it would provide additional evidence supporting the value of purchasing participation in CSP.

APPENDIX A

PROPOSED PERFORMANCE MEASURES BY VARIOUS WRITERS, 1973 - 1990

Proposed Performance Measures by Various Writers
1973 - 1990

Performance Measure	Pooler 1973	Croell 1980	Zenz 1980	Raedels 1983	Van Weele 1984	Hendrick & Ruch 1988	Porter 1988	Chao 1990	Hendrick 1990	Thor 1990
Cost Savings or Avoidance	x	x	x	x	x					x
# of orders	x	x			x					x
Cost/order	x	x		x						x
Prices paid vs market	x			x						x
$ spent as % of sales	x	x				x	x		x	
# Purch emp vs # co emp	x	x				x			x	
$ saved vs. $ spent	x									
Total Purchs	x	x					x			
Rejections vs purchases		x	x		x	x	x	x		x
On-time deliveries		x	x	x	x	x	x	x		x
Inventory management		x		x	x	x			x	x
Operating exp (purch)		x								
# or purch employees		x								
$ Sales/yr		x								

Performance Measure	Pooler 1973	Croell 1980	Zenz 1980	Raedels 1983	Van Weele 1984	Hendrick & Ruch 1988	Porter 1988	Chao 1990	Hendrick 1990	Thor 1990
$ value of on-order		x								
Cancellation charges		x								
Mfg downtime			x		x				x	
Material substitutes			x							
Purch exp vs mfg exp			x							
Competition			x		x					
# of rush orders			x							x
Expediting expenses			x				x			
Supplier tech assist.			x							
Info-system (EDI)				x	x		x			
Prices paid vs budget				x		x		x		
Coordination					x					
Transportatn					x					
Specificatns					x					
Purchasing engineering					x					
Re-work					x					x

Performance Measure	Pooler 1973	Croell 1980	Zenz 1980	Raedels 1983	Van Weele 1984	Hendrick & Ruch 1988	Porter 1988	Chao 1990	Hendrick 1990	Thor 1990
Lead time					x					
Order qty					x					
Vendor perf management					x	x	x	x		x
Prodecures					x					x
Management					x	x				
Expertise					x	x		x		
Cycle Time						x	x	x		x
# suppliers per item							x			x
# of ship points							x			
# long term contracts							x			
Ind purch as % of sales							x			
Negotiations								x		
Teaming								x		
Profes-sionalism								x		
Accuracy								x		
Purch exp vs sales									x	
Sales per purch emp									x	

Performance Measure	Pooler 1973	Croell 1980	Zenz 1980	Raedels 1983	Van Weele 1984	Hendrick & Ruch 1988	Porter 1988	Chao 1990	Hendrick 1990	Thor 1990
Purchases/ purch emp									x	
Purchases/ prof purch employee									x	
Active suppliers/ purch emp									x	
Act supp/ prof purch employee									x	
$ per active supplier									x	
% minority purchases									x	
Minorities as % of supply base									x	
% women-owned purchs									x	
Small business as % of sup bs									x	
Minimum # of performance measures proposed	8	14	10	7	19	10	12	10	15	13

APPENDIX B

PILOT STUDY COMMENT SHEET

PILOT STUDY
COMMENT SHEET

** PLEASE RETURN NO LATER THAN AUGUST 12, 1992 **

1. Approximately how long did it take you to complete the 4 page survey instrument? _____

2. Are the instructions clear and understandable?
Yes _____ No _____ (If No, do you have suggestions for making them clearer?

_____

_____

_____

3. Are any of the specific questions difficult to understand? If so, do you have suggestions for making them clearer?

_____

_____

_____

4. Is any of the information requested difficult or impossible to obtain? If so, which items?

_____

_____

_____

5. Where options are provided for answers, such as "Manufacturing vs. Non-manufacturing" are the options sufficient, or are there cases where more choices should be provided for you to answer? If so, which items?

_____

_____

_____

Pilot Study Comments
Page 2

6. Do you have any general suggestions or comments for improving the survey? (Such as adding or deleting questions, changing wording, etc.)

_____

_____

_____

_____

APPENDIX C

CSP SURVEY

CSP SURVEY
COVER LETTER

August 28, 1992

Dear Fellow Purchasing Professional:

Your assistance is needed to obtain important information regarding the role of purchasing in the corporate strategic planning process. The results of this survey will benefit professional purchasers and our management by providing a greater understanding of purchasing's role in the corporate strategic planning process and determining the benefits to the profession and the corporation of purchasing participation in the process.

This survey package has been mailed to a single purchasing representative in each firm on the 1991 - 1992 PMAC-V membership roster. Every attempt has been made to ensure that only one survey has been mailed to each company; however, some duplication is inevitable. Only one person need respond from each firm, but it is imperative that every PMAC-V member firm be represented. If you feel you are not the correct person to complete this survey, please pass the survey on to the appropriate individual. But, please help to ensure that your company is represented in the final results.

The survey is designed so that you can complete it in a short amount of time (typically 15 - 30 minutes). Please answer ALL questions, even if the response is only your "best guess." You can be absolutely sure that all responses will be strictly confidential, and complete anonymity is guaranteed. A postpaid envelope has been included for your convenience in returning the completed survey by September 15, 1992.

We genuinely appreciate your participation in this PMAC-V supported research project. Your response is vitally important to the success of this effort. Again, please return the completed form no later than September 15, 1992.

Thank you for your help!

Sincerely,

Wade C. Ferguson, C.P.M.
Vice-President, PMAC-V

STRATEGIC PLANNING AND THE PURCHASING FUNCTION

__ __ __ 01-03/

Please complete the following information pertaining to your most recently completed calendar or fiscal year. Be sure that the information provided covers a 12 month period. Please answer ALL questions, even if the response is only your "best guess."

When the term "Corporate Strategic Planning" is used in this survey, it means a formalized company-wide process specifically designed for the development and implementation of strategic (long-term) plans.

1. My company's business is primarily
   1 - Manufacturing _____
   2 - Non-Manufacturing _____ 05/

2. My company's ownership is
   1 - Private (Non-government) _____
   2 - Public (Federal, state, municipal government) _____ 07/

3. Which of the following statements BEST describes actual purchasing involvement in a formalized corporate strategic planning process at your company?

   _____ Purchasing is not involved in any way (0)

   _____ Purchasing's involvement is limited to implementing the plan as developed by top management (1)

   _____ Purchasing has some involvement in the development of strategic plans as well as their implementation (2)

   _____ Purchasing is actively involved in all phases of the strategic planning process, including development, implementation and control (follow-up) (3)

   _____ My company does not have a formalized strategic planning process. (4) 09/

4. Which of the following statements BEST describes the level of involvement in the corporate strategic planning process that you believe purchasing SHOULD be involved in at your company?

_____ Purchasing should not be involved in any way (0)

_____ Purchasing should be involved only in the implementation of strategic plans as developed by top management (1)

_____ Purchasing should have some involvement in the development of strategic plans as well as their implementation (2)

_____ Purchasing should be actively involved in all phases of the strategic planning process, including development, implementation and control (follow-up) (3) 11/

5. If Purchasing were involved in the strategic planning process to the degree that you believe it should be (your answer to Question 4), your COMPANY would benefit.

1-Agree _____ 2-Disagree _____ 3-Don't know _____ 13/

If you "Agree," describe the benefits to your company:

_____

_____

_____ 15/

6. If Purchasing were involved in the strategic planning process to the degree that you believe it should be (your answer to Question 4), your PURCHASING DEPARTMENT would benefit.

1-Agree _____ 2-Disagree _____ 3-Don't know _____ 17/

If you "Agree," describe the benefits to your department:

_____

_____

_____ 19/

7. The goals and objectives of the purchasing department conflict with corporate strategic plans . . . (Circle the appropriate response)

Never	Seldom	Frequently	Always	
+----------	+----------	+----------	+	21/

8. Please complete the following statement.

When purchasing goals and objectives conflict with corporate strategic plans, the goals and objectives that are most often in conflict are . . .

_____

_____

_____ 23/

9. In your experience, has there been a change in the level of purchasing involvement in corporate strategic planning at your company in the past five years? (Circle the appropriate response.)

Purchasing has become less involved n past 5 years	About the Same	Purchasing has become more involved in past 5 years	
+----------	----------	+	25/

10. What is the total annual revenue for your company? (May be obtained from your Annual Report?)

Less than $500,000	_____	(1)
$ 500,000 - $999,999	_____	(2)
$ 1M - $4,999,999	_____	(3)
$ 5M - $9,999,999	_____	(4)
$10M - $49,999,999	_____	(5)
$50M and Above	_____	(6) 27/

11. What is the total number of purchase dollars expended by the purchasing department? $ _____

12. What is the total annual operating expense for purchasing? (Please include all actual dollars charged directly to the purchasing budget, e.g. payroll, materials, capital equipment, etc.) $ _____

13. What were the total amount of annual cost savings/cost avoidances submitted by the purchasing department? If you do not have a cost savings/cost avoidance program, please circle "NP" below.

    $ _____ NP

14. How many total employees work for your company? _____

15. What is the total headcount for your purchasing department? (Please include all personnel involved in the Purchasing function including clerical/administrative support staff). _____

16. Total number of purchase orders issued _____

17. Total number of receipts
    (In many cases, this is the same as the number of receiving reports issued.)

    _____

18. Considering the total number of receipts, how MANY deliveries were received "on-time?"

    _____

19. What percentage of purchased materials are rejected by your company receiving personnel or the user?

    _____ %

20. What is the average purchase order cycle time? (Cycle time is the elapsed time in calendar days from the receipt of a purchase requisition until a purchase order is received by a supplier.)

    _____ days

21. Please send me the results of this survey.

    1 - Yes _____ 2 - No _____

You may STOP here! Thank-you for taking your time to complete this survey. Please return the survey in the enclosed postage-paid envelope immediately. Your help is deeply appreciated.

APPENDIX D

ARTICLES AND NOTICES

SOUTHERN PURCHASER ARTICLE

Snyder, V.G., Jr. (Ed.)(1992, September-October). 1991-1992 Nova University and PMAC-V to conduct strategic planning study. The Southern Purchaser, 11.

During the month of September, a research study will be conducted to assess the degree of involvement by PMAC-V member firms in the corporate strategic planning process and the possible relationship of strategic planning involvement to purchasing performance. This study is supported by the PMAC-V as a part of its on-going commitment to encourage research on current procurement issues.
The study is being performed by Wade Ferguson, PMAC-V Vice President and Professional Development Chairman, with Dr. Edward Pierce and Dr. William Johnson of Nova University and Dr. Mark Hartley of The College of Charleston.

According to many practitioners and academicians, the purchasing function is uniquely positioned to be a key contributor to the corporate strategic planning process. It has also been suggested that in-depth participation by purchasing in the corporate strategic planning process provides a number of important benefits to both the firm and the purchasing function. However, there is disagreement regarding the actual extent of purchasing involvement in the process.

The survey results will benefit both professional practitioners and corporate management by providing a greater understanding of purchasing's role in the corporate strategic planning process as well as to determine the benefits to the profession and the corporation of purchasing participation in the process.

The survey form will be mailed to a purchasing representative in each firm on the 1991 - 1992 PMAC-V membership roster. Every attempt has been made to ensure that only one survey is mailed to each company; however, some duplication is inevitable. Only one person need respond from each firm, but it is imperative that every PMAC-V member firm be represented.

Please be assured that all responses will be confidential, and complete anonymity is guaranteed.

Watch for this important purchasing survey in your September mail. The researchers wish to thank each PMAC-V member in advance
for taking the time to complete and return the survey form.

The results of the survey will be shared in the Southern Purchaser and other professional publications at the earliest possible opportunity.

PMAC-V NEWSLETTER NOTICE
October, 1992

From PMAC-V V.P. Wade Ferguson, C.P.M.

STRATEGIC PLANNING STUDY REMINDER

If you received a copy of the NOVA University/PMAC-V Strategic Planning Survey and have NOT returned the completed survey, there is still time to do so. It is important that every PMAC-V member firm be represented in this study, so please complete and return your survey immediately. Many thanks to those who have already participated!

APPENDIX E

PERFORMANCE RATIOS

PERFORMANCE RATIOS

(Computed from responses to questions 11-20;
R5 was impossible to compute from data as
gathered and has been omitted)

Respondent	Ratio R1	R2	R3	R4	R6	R7
1	4.1667	75.0	5.000	85.0000	2.0761	3.0
2	0.2222	120.0	2.000	95.0000	0.1750	12.0
3	*	*	5.000	*	2.0000	14.0
4	*	20.0	0.000	*	1.3333	1.0
5	*	*	11.000	8.0000	1.5000	1.0
6	5.5380	100.0	3.000	*	0.5363	4.0
7	*	36.7	2.000	88.0000	0.7143	3.5
8	6.6667	411.4	1.000	90.0000	2.6471	3.0
9	2.5706	417.2	2.000	95.0047	3.7500	5.0
10	2.7778	*	5.000	80.0000	1.5833	20.0
11	1.3333	107.0	5.000	90.0000	2.0000	10.0
12	*	17.5	2.000	*	0.2500	2.5
13	1.2500	*	4.000	*	5.0000	1.0
14	1.5000	133.3	2.000	95.0000	0.6000	6.0
15	*	*	*	*	8.1081	3.5
16	1.2000	137.9	*	*	1.2692	15.0
17	*	50.0	20.000	75.0000	1.7391	2.0
18	0.9963	15.7	1.000	92.0001	0.2558	1.0
19	*	24.1	3.000	75.0000	0.9677	1.5
20	*	25.0	2.000	88.0000	0.8000	2.0
21	*	*	1.000	79.8077	2.2222	30.0
22	*	35.0	2.000	79.9825	2.0619	2.0
23	*	15.4	1.000	91.6667	1.8462	5.0
24	*	*	*	*	2.6667	4.5
25	*	3.1	1.000	*	1.5556	42.0
26	0.6000	*	1.000	*	2.0870	10.0
27	*	40.0	90.000	95.0000	1.1111	4.0
28	*	28.5	5.000	80.0000	2.0667	2.0
29	*	*	1.000	90.0000	1.5385	1.5
30	*	60.0	3.000	90.0000	2.6087	3.0
31	*	*	10.000	25.0000	10.0000	14.0
32	*	27.8	1.000	93.0000	0.8000	2.0
33	2.0000	*	*	*	0.0145	5.0
34	2.1750	33.3	4.000	87.0000	2.1429	5.0
35	4.5000	33.3	1.000	99.0000	0.8000	45.0
36	3.9734	31.8	1.000	96.9996	1.7500	4.5
37	0.6000	*	*	*	1.4000	*
38	*	45.2	0.500	83.3333	2.2857	3.0
39	1.6000	13.8	1.000	83.3333	0.6154	7.0
40	0.8000	84.8	1.000	80.0000	1.6000	25.0

Ratio

Respondent	R1	R2	R3	R4	R6	R7
41	*	33.3	0.100	93.7500	0.0913	5.0
42	*	*	*	*	13.6957	*
43	*	30.0	1.000	95.0000	0.4000	3.0
44	*	149.4	2.000	85.0000	0.1059	18.0
45	8.3333	100.0	1.000	*	0.5000	5.0
46	*	*	5.000	*	22.2222	3.0
47	5.8571	35.7	10.000	*	2.1505	6.0
48	*	*	1.000	*	0.8696	*
49	2.0000	50.0	2.000	70.0000	0.1368	3.0
50	3.8636	11.5	1.000	95.0000	0.2000	1.5
51	*	210.5	5.000	50.0000	0.5625	20.0
52	*	16.7	0.010	80.0000	0.4286	3.0
53	2.2222	20.0	0.100	98.0000	0.3200	7.0
54	1.1111	50.0	2.000	90.0000	0.2000	3.0
55	*	47.6	2.000	94.9600	3.3333	3.0
56	*	54.5	0.030	97.9301	10.0000	4.0
57	*	*	5.000	80.0000	0.0800	35.0
58	6.4000	22.1	20.000	88.8889	1.6667	3.0
59	0.1600	250.0	*	*	1.4000	30.0
60	*	5000.0	*	*	8.3333	14.0
61	8.7881	109.9	*	*	0.6863	5.0
62	2.7241	266.7	0.080	90.0000	2.7778	10.0
63	*	*	10.000	*	0.2727	30.0
64	0.5833	16.7	1.000	75.0000	0.6667	14.0
65	8.3333	30.0	1.000	90.0000	3.0000	10.0
66	*	*	*	*	1.3043	*
67	*	93.7	1.000	*	4.8780	16.0
68	*	31.0	*	75.0000	0.5000	3.0
69	1.2500	37.5	1.000	87.5000	1.3333	0.0
70	3.5000	83.3	1.500	95.0000	3.7333	2.0
71	0.5000	21.1	2.000	85.0000	0.6667	3.0
72	3.1429	106.2	*	*	1.6667	7.0
73	2.5000	66.7	2.000	*	1.2778	4.0
74	0.9434	18.8	1.670	76.9231	0.6000	4.0
75	*	*	5.000	80.0000	1.0000	5.0
76	0.3125	333.3	1.000	*	1.6667	30.0
77	5.0000	*	5.000	*	0.9600	3.5
78	*	*	9.000	80.0000	0.8750	13.0
79	*	96.6	0.020	*	4.9180	3.0
80	*	*	1.000	*	2.0833	5.0
81	1.1481	*	5.000	*	1.1667	2.0
82	*	*	5.000	*	0.5000	5.0
83	25.0000	520.8	0.002	95.0000	0.2833	3.0
84	*	87.5	5.000	66.6667	0.8000	16.0
85	*	58.8	0.005	95.0000	2.6667	1.0
86	*	*	0.000	*	0.8000	2.0
87	*	15000.0	5.000	60.0000	0.6250	12.0

Ratio

Respondent	R1	R2	R3	R4	R6	R7
88	*	3125.0	10.000	75.0000	2.0000	5.0
89	2.2857	60.0	1.500	80.0000	1.2000	2.0
90	3.3333	*	3.000	*	1.4388	4.0
91	0.9500	69.1	2.000	*	1.2739	7.0
92	*	57.2	2.000	80.0000	1.6000	3.0
93	*	4000.0	0.000	*	30.7692	0.0
94	*	800.0	2.000	90.0000	2.0000	10.0
95	1.6000	39.5	6.000	80.0000	3.0769	5.0
96	0.1000	20.0	*	90.0000	6.2500	1.0
97	1.2500	34.7	1.000	94.4231	0.1000	3.0
98	*	*	2.000	*	0.2500	8.5
99	*	32.0	1.000	*	0.1333	2.3
100	*	*	1.000	40.0000	0.8000	4.0
101	3.5625	71.4	*	*	1.3889	2.0
102	*	*	*	*	0.3545	*
103	*	18.5	1.000	68.4444	1.6000	4.0
104	4.5000	134.5	1.800	95.0000	2.3333	5.0
105	*	9.6	10.000	*	1.0000	30.0
106	*	31.8	1.000	90.4523	1.3333	2.0
107	1.4037	24.4	3.500	97.1296	1.3333	5.3
108	*	*	3.000	*	6.4516	17.5
109	4.0000	1785.7	1.000	*	1.5000	40.0
110	1.5583	55.1	2.000	90.9988	0.3667	2.0
111	0.8500	80.7	*	95.0000	8.8889	1.5
112	10.0000	*	3.000	*	0.6000	8.0
113	*	71.7	1.000	90.0000	0.4286	3.0
114	0.3571	20.0	5.000	85.0000	0.4667	4.0
115	*	*	1.000	*	0.0600	10.0
116	1.5667	168.4	6.000	81.0000	1.0000	10.0
117	*	195.8	1.000	95.7447	0.7059	5.0
118	*	15.0	*	90.0000	1.8182	3.5
119	*	27.0	2.000	*	0.5495	1.0
120	2.7264	43.5	1.000	36.0000	2.0000	10.0
121	*	285.7	10.000	*	3.5000	7.0
122	3.4286	100.0	2.000	98.7000	1.3846	2.0
123	*	1.3	1.000	50.0000	*	14.0
124	1.9197	*	2.000	80.0000	5.7143	2.0
125	*	*	5.000	85.0000	3.1429	8.0
126	1.2500	80.0	3.000	85.0000	0.1304	5.0
127	*	40.0	5.000	*	0.1065	20.0
128	1.6667	25.0	4.000	95.0000	3.6364	3.0
129	*	12.0	1.000	75.0000	1.6667	25.0
130	0.3571	*	0.500	66.6667	6.4516	3.0
131	0.5000	*	10.000	*	0.2917	2.0
132	4.8818	197.3	3.500	92.6000	0.9231	4.0
133	*	*	*	*	3.3333	2.0
134	*	7.0	2.000	95.0000	5.5556	1.5

Ratio

Respondent	R1	R2	R3	R4	R6	R7
135	*	22.2	5.000	74.0741	1.9608	4.0
136	*	*	1.000	*	0.3333	1.0
137	15.0000	*	2.000	*	3.0000	3.0
138	1.0000	0.6	1.000	95.0000	1.3333	1.0
139	3.5000	18.7	2.000	96.0000	1.0435	2.0
140	9.6154	*	0.050	*	0.2000	20.0
141	*	2.5	4.000	90.0000	0.1000	5.0
142	1.7812	95.5	2.300	85.0000	0.9231	6.0
143	*	14.6	10.000	60.0000	1.2000	4.0
144	*	5555.6	2.000	95.0000	0.2000	7.0
145	*	*	3.000	60.0000	0.1200	20.0
146	1.8000	*	9.000	*	1.2000	8.0
147	2.5000	*	1.000	70.0000	2.0000	4.0
148	6.2667	30.0	1.000	80.0000	1.7241	1.0
149	*	42.9	20.000	50.0000	0.4000	3.0
150	2.5000	45.0	2.000	80.0000	0.8000	6.0
151	2.4000	*	1.000	*	2.7000	7.0
152	1.4533	47.9	10.000	*	1.2500	3.0
153	0.2240	*	*	*	0.4360	3.0
154	0.5000	20.0	1.000	96.6667	0.7273	30.0
155	*	20.0	0.500	98.3333	1.3333	3.5
156	*	55.6	10.000	90.0000	0.4000	7.0
157	2.9412	30.0	5.000	70.0000	0.6667	7.0
158	0.1167	14.0	3.000	80.0000	0.1471	6.0
159	1.6667	26.4	1.000	85.0000	0.8889	2.0
160	*	132.8	4.000	91.0000	0.7778	2.0
161	0.5000	20.0	1.300	50.0000	0.5833	20.0
162	*	*	5.000	80.9259	2.4540	5.0
163	*	1.0	2.000	95.0000	5.0000	10.0
164	*	31.4	5.000	72.9167	0.7500	4.0
165	*	46.9	30.000	65.0000	0.3333	5.0
166	0.2500	51.6	2.000	91.1111	1.1765	3.0
167	4.0000	131.7	1.000	80.0000	5.0000	17.0
168	*	*	20.000	*	0.4000	5.0
169	*	*	*	*	0.1250	3.5
170	*	14.0	1.000	*	0.2273	3.0
171	5.0000	192.3	8.000	92.0000	0.8750	7.0
172	2.0073	200.0	1.000	75.0000	0.6667	2.0
173	*	104.4	0.020	90.0990	5.2632	1.0
174	*	*	12.000	80.0000	0.6000	9.0
175	*	20.4	2.000	60.0000	0.4242	5.0
176	*	*	*	*	0.4400	10.0
177	*	*	5.000	*	0.0050	7.0
178	0.8333	34.7	3.000	90.0000	1.7143	14.0
179	0.3000	31.2	2.000	66.6667	1.5385	2.0
180	*	13.9	5.000	*	3.0000	7.0
181	*	*	1.000	80.0000	2.0000	0.0

Ratio

Respondent	R1	R2	R3	R4	R6	R7
182	*	*	1.000	*	0.6061	7.5
183	1.3333	208.3	4.000	75.0000	0.9583	17.0
184	3.6538	33.3	3.000	55.5556	0.6186	15.0
185	*	40.0	1.000	*	0.7857	5.0
186	1.1667	*	5.000	88.6154	0.9569	10.0
187	1.2414	17.5	1.000	80.0000	0.9167	5.0
188	*	200.0	1.000	98.0000	8.0000	21.0
189	*	83.3	5.000	90.0000	1.3333	6.0
190	1.5789	31.7	1.000	95.0000	0.0480	28.0
191	1.6000	66.7	1.000	90.0000	1.2500	3.0
192	*	9.5	2.000	83.3333	0.7692	3.0
193	*	*	*	*	*	*
194	*	*	10.000	*	2.0000	2.0
195	2.0000	*	*	*	1.0667	3.5
196	*	*	1.000	50.0000	5.0000	14.0
197	*	*	3.000	92.0000	1.9048	2.0
198	5.0000	90.0	2.000	87.0000	0.6757	3.0
199	*	339.6	5.000	75.0000	0.4167	10.0
200	1.0000	1.0	0.300	96.0000	1.0000	1.0
201	*	14.3	5.000	80.0000	2.3810	1.0
202	*	*	1.000	*	1.0000	2.5
203	*	*	1.500	80.0000	2.5000	2.0
204	*	*	2.000	*	0.3333	2.0
205	0.7000	32.7	1.000	92.5000	1.9231	2.0
206	2.6000	1176.5	3.000	*	1.7778	1.5
207	*	1206.0	1.000	98.9969	1.1111	30.0
208	*	31.2	1.000	80.0000	1.2000	5.0
209	*	*	*	*	*	*
210	1.5000	*	1.000	98.0000	0.5625	3.0
211	*	42.9	10.000	93.3333	4.1860	5.0
212	*	*	2.000	75.0000	0.2857	17.5
213	1.2500	10.2	2.000	95.0000	0.8000	3.0
214	*	1625.0	2.000	90.0000	0.5000	10.0
215	2.8571	9.2	1.000	90.0000	0.1150	3.0
216	*	150.0	5.000	90.0000	0.8333	4.0
217	*	16.7	5.000	75.0000	0.8333	8.0
218	*	4333.3	5.000	80.0000	2.2500	30.0
219	*	400.0	2.500	95.0000	1.2432	2.5

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