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# The relationship of strategy, fit, productivity, and business performance in a services setting

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**Abstract**

In their review of the operations strategy literature, Anderson et al. [Anderson, J.C., Cleveland, G., Schroeder, R.G., 1989. Operations strategy: a literature review. J. Operations Manage., 8(2): 133-158] contend that the hypothesis that a company will perform better if it links its operations strategy to the business strategy is intuitively appealing, but lacks empirical verification. In light of this contention, this research attempts to: (1) define and measure the concept of fit as it applies to operations strategy; (2) show how fit leads to better performance; and (3) investigate the interrelationships between fit, business strategy, productivity, and performance. These objectives are investigated through field-based research within a wholesale distribution service setting. Utilizing the classificatory framework of Venkatraman [Venkatraman, N., 1989. The concept of fit in strategy research: toward verbal and statistical correspondence. Acad. Manage. Rev., 14(3): 423-444], fit is defined as the degree to which operational elements match the business strategy. This precise definition closely resembles the concept of 'external fit' that began with the work of Skinner [Skinner, W., 1969. Manufacturing–missing link in corporate strategy. Harvard Bus. Rev., 47(3): 136-145]. A conceptual model of business performance is used with productivity as a mediating variable between the independent variables of business strategy and external fit and the dependent variable of business performance. Path analysis is used to analyze the effect of external fit on performance and to investigate the interrelationships between fit, business strategy, productivity, and performance. The results show that external fit has a significant positive and direct effect on business performance. When coupled with the nonsignificant direct effects of the strategy variables, this suggests that the fit of the operational elements with the strategy is of greater importance than the particular choice of strategy. Although all three business strategies (low cost, a combination of low cost and high customer service, and high customer service) had no significant direct effects on performance, a high customer service strategy did have a significant positive effect on the intervening productivity variable. Finally, the particular design of the research and the findings suggest that much of the conceptual work in operations strategy may be applicable to service operations as well as manufacturing. 

*Keywords:* Empirical research; Measurement and methodology; Operation strategy; Productivity; Service operations; Statistical analysis

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## 1. Introduction

Most of the work in the field of operations strategy has been conceptual in nature and has dealt with the content of strategy. Skinner (1969, 1974) was the pioneer in this work, but others have refined the concepts into a model with which much agreement exists in the published works (Wheelwright, 1978, 1984; Hayes and Wheelwright, 1984). These authors divided strategy into three distinct levels: corporate strategy, business strategy, and functional strategies. The two important elements of this model for the functional strategy of operations are the decision areas that affect the ability of the firm to meet its objectives and the competitive priorities based on corporate and/or business unit goals. The concept of operations strategy is that the pattern of decisions and actions made in each key decision area over time must reflect the competitive priority established by the business unit.

Wheelwright (1984) provides several criteria for evaluating operations strategy. Among these criteria is the consistency between operations strategy and the overall business strategy. He states, ''...an effective manufacturing operation is not necessarily one that promises the maximum efficiency, or engineering perfection, but rather one that *fits* the needs of the business, that is, one that strives for consistency between its capabilities and policies and the business's competitive advantage.'' (emphasis added) Unfortunately, very little empirical work has attempted to use this criteria to validate the content model. In their review of the operations strategy literature, Anderson et al. (1989) conclude that research into operations strategies is disappointing and lacks validity. They contend that the hypothesis that a company will perform better if it links its operations strategy to the business strategy is intuitively appealing, but lacks empirical verification.

In a separate review of the operations strategy literature, Adam and Swamidass (1989) proposed seven 'missing themes.' One of these is the testing of operations strategy and its effect on operating and overall performance. The authors state, ''In our judgment, the greatest weakness in operations strategy research becomes evident when one searches for research that studies interrelationships among variables, particularly the effect of strategy content and process variables on performance.'' This view is echoed by Skinner (1988), Anderson et al. (1989), and Leong et al. (1990).

In light of these opportunities, the objectives for this research are threefold: (1) to define and measure more carefully the concept of fit as it applies to operations strategy; (2) to show how fit leads to better performance; and (3) to investigate the interrelationships between fit, business strategy, productivity, and performance. In addition to the lack of empirical research related to these three objectives, this study is unique in that the objectives are investigated within a service setting—the wholesale distribution industry.

## 2. Literature review and theory development

The concept of fit has received considerable attention in the general strategy field. Early works (Chandler, 1962; Lawrence and Lorsch, 1967; Thompson, 1967) differentiated this concept as the fit between the organizational structure, strategy, and/or the wider environment (external fit) and the fit among groups or units within the organization (internal fit). In their article proposing an integrative model for business performance, White and Hamermesh (1981) present a model in which the fit between the strategy and the structure affects performance, as does the internal consistency of the structural elements. Empirical evidence to support these claims have been reported by several studies (Porter, 1980; Hambrick, 1983; Miller, 1988; Hansen and Wernerfelt, 1989; Doty et al., 1993).

Although less advanced than the field of general strategy, researchers in operations strategy have also noted the distinction between external and internal fit. Works dealing with internal fit issues stem primarily from Skinner's work on the focused factory concept (Skinner, 1974). A 'good' internal fit is one in which basic manufacturing policies are structured so they are focused on, and consistent with, one explicit manufacturing task. Examples include the proper fit between the manufacturing task and production systems (Miller, 1981; Kim and Lee, 1993); planning and control systems (Van Dierdonck and Miller, 1980); process choice (Safizadeh et al., 1996); and product strategy (Stobaugh and Telesio, 1983).

One recent study has examined the fit between firm's manufacturing infrastructure practices and Just-in-Time manufacturing (Sakakibara et al., 1997).

The concept of external fit also began with the work of Skinner (1969). Skinner's seminal work on operations strategy describes the need for companies to have the proper external fit when developing and implementing a manufacturing strategy. He suggests that companies should tailor their production systems to perform the tasks which are vital to corporate success and consistent with the corporate strategy. A variety of authors claim that consistency between business strategies and manufacturing strategies, or a proper external fit, is an important component in the success of organizations (Buffa, 1984; Wheelwright, 1984; Fine and Hax, 1985; Schroeder et al., 1986; Kotha and Orne, 1989; McDougall et al., 1992; Miller and Roth, 1994). Unfortunately, the evidence to support this claim is tenuous at best (Anderson et al., 1989; Miller and Roth, 1994; Williams et al., 1995). The few studies that have examined this area have concentrated instead on either (a) providing a conceptual framework that links business strategy with operations strategy (Kotha and Orne, 1989; Williams et al., 1995; Kim and Arnold, 1996); (b) defining the link between business strategy and production operations (Cleveland et al., 1989; Vickery et al., 1993); or (c) explaining how operations strategy directly impacts business performance (Richardson and Gordon, 1980; Swamidass and Newell, 1987).

Although it is clear that the concept of fit is central to both the theoretical and empirical research in operations strategy, the extensive use of this concept for a variety of applications has led to some confusion and may have retarded some of the research in this area (Drazin and Van de Ven, 1985; Venkatraman, 1989). As Venkatraman points out, ''the role of fit in strategy research has been severely handicapped by the absence of appropriate links between the concept and theory testing.'' He goes on to state that a leading cause for this has been the lack of a precise definition and operationalization of the fit variable.

Some recent studies have begun to address this concern. In trying to develop a model of fit that is consistent with the fit assertions of configurational theories, Doty et al. (1993) utilize a systems approach to fit described by Drazin and Van de Ven (1985). This approach defines fit in terms of consistency across multiple dimensions of organizational design and context. Bozarth and Berry (1997) utilize the classificatory framework of Venkatraman (1989) to evaluate the strategic fit between manufacturing and marketing in support of the overall business strategy. The strength of the strategic fit is conceptualized as the degree of adherence for a specific unit of analysis with a multidimensional, ideal profile. Utilizing a different perspective from the classificatory framework of Venkatraman (1989), this research also attempts to address this problem by precisely defining fit as the degree to which operational elements *match* the business strategy. Once defined and operationalized, this study also attempts to examine how this external fit affects both productivity and performance.

This research also deals with two of the major weaknesses in operations strategy research as pointed out by Adam and Swamidass (1989). The first shortcoming is the use of productivity as the exclusive measure of performance. Several recent empirical studies in operations have focused on productivity and the factors that have led to higher productivity (Hayes and Clark, 1985; Chew et al., 1989; Lieberman et al., 1990; Schmenner, 1991; Istvan, 1992; Ittner, 1994). While these studies support the notion that productivity gains are a function of several factors, both within and outside the control of management, they also caution that productivity was used as a surrogate measure due to the limited access to other performance measures. Skinner (1986) also points out that improvement efforts focused exclusively on productivity may well end up with disappointing results if they are not consistent with the overall business and operations strategy. Several recent empirical studies have begun to alleviate this situation by using a variety of financial and market measures to test the effectiveness of operations strategy (Swamidass and Newell, 1987; Cleveland et al., 1989; Vickery et al., 1993; Williams et al., 1995; Gupta and Somers, 1996; Ahmed et al., 1996). The second shortcoming deals with the lack of research that studies the interrelationship among variables, particularly the effect of strategy on performance. With the exception of the works by Swamidass and Newell, and Gupta and Somers, the studies men-

tioned above focus only on the *direct* relationship between strategy and performance. With these two deficiencies in mind, this research utilizes financial measures to indicate business performance *and* attempts to investigate both the direct effect of productivity on performance, as well as its *indirect* effect (James and Brett, 1984) with business strategy and external fit.

From the above discussion, it can be inferred that productivity, business strategy, and external fit are major determinants of business performance. What is not as clear is the interrelationships among these three variables and in what manner these variables affect performance. Fig. 1 shows the conceptual model that represents the basic premises of this study. Business performance is directly affected by business strategy, external fit, and productivity; and indirectly affected by business strategy and external fit through productivity. The specific research hypotheses are as follows:

H1: Productivity has a direct and significant effect on business performance.

H2: Business strategy has a direct and significant effect on business performance.

H3: Business strategy has an indirect and significant effect on business performance through its direct effect on productivity.

H4: A proper match between the business strategy and the operational elements (external fit) has a direct and significant effect on business performance.

H5: A proper match between the business strategy and the operational elements (external fit) has an indirect and significant effect on business performance through its direct effect on productivity.

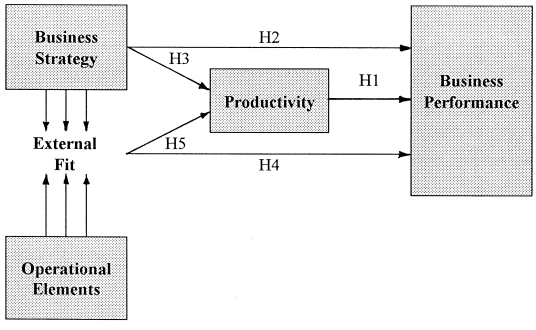


Fig. 1. Conceptual model of business performance.

## 3. Review of methodology

### 3.1. Population and sampling

Lanc, (the company name and the division name have been disguised at the request of the participating company) is a corporation consisting of six independent operating divisions. One of these divisions, Specialty Insulation and Acoustics (SIA), consists of 30 independent branches involved in the distribution of insulation and acoustical products to industrial and commercial markets. The unit of analysis is the individual branch operation. This includes all activities required to purchase, receive, store, sell, and ship material; process and service orders; and manage the operation. Certain support activities such as financial report preparation, credit checks on customers, MIS operations, and legal services are handled at corporate headquarters for all the branches and are therefore not included in this study.

All observations were performed by the same field researcher for each of the 30 branches. A pilot site, as well as extensive interviews with SIA management, were used prior to any field work to refine the data collection plans in terms of both the content and the procedures to be followed. Because of its geographic proximity to the researcher, Branch 489 served as the pilot site. The researcher spent approximately two weeks in this branch gaining a working knowledge of a typical branch operation.

### 3.2. Choice of research method

According to Yin (1989), there are three conditions that determine the applicability of certain research strategies. The three conditions consist of (1) the type of research question posed, (2) the extent of control an investigator has over actual behavioral events, and (3) the degree of focus on contemporary as opposed to historical events. Yin suggests that various strategies are not mutually exclusive, but that certain situations exist in which a specific strategy has a distinct advantage. For the case-study approach to have a distinct advantage, a 'how' or 'why' question should be asked about a contemporary set of events over which the investigator has little or no control. Meredith et al. (1989) reiterate this criterion

in their article on alternative research paradigms in operations. The particulars of this study, in terms of the conditions suggested by Yin and in the explanatory nature of the objectives, strongly suggest the case study as the most appropriate research methodology. In addition, the testing of hypotheses within the service setting of this study involves demonstrating a theory's applicability under circumstances not previously investigated (McCutcheon and Meredith, 1993).

Given the selection of the case-study methodology and the objective of theory verification, the design characteristic of single or multiple case studies needs to be determined. The logic underlying the use of multiple case studies is similar to the use of multiple experiments, that is, the use of 'replication' logic. Each case is selected so that it either predicts similar results (a literal replication), produces contrary results but for predictable reasons (a theoretical replication), or produces results that simply do not support the theory. However, if there are enough cases, some forms of inferential statistical analysis are possible (Flynn et al., 1990). Therefore, for this study, a modest application of inferential statistics is feasible based on the number of cases that are used (thirty branches).

### *3.3. Data collection methods*

All observations and branch interviews were performed by the first author. Financial and operating data collection was done by SIA personnel and verified by the first author. A case study protocol is used for increasing the reliability of research. The major components of the protocol are the field procedures and the case-study questions. The two topics for the field procedures—access to interviewees and the schedule of data collection activities—were accomplished through meetings and correspondence in July 1992 with SIA management. The thirty branch visits were conducted from August through November of 1992.

The heart of the protocol is the specific set of questions used for actual inquiry. These questions are geared toward understanding the individual data items representing the study's four main constructs. Since a major source of data is through unstructured interviews, the questions provide a general plan of inquiry, but not a precise set of questions that must be asked in specific words or in a particular order. A list of these questions is provided in Appendix A.

Yin (1989) lists six sources of evidence that can be the focus of data collection for case studies. These sources are documentation, archival records, interviews, direct observations, participant observation, and physical artifacts. Three of these sources are used in this study for direct access to information as well as a means to corroborate information gathered from other sources. Archival records in the form of financial reports, budgets, and operating reports are used for all four variables. Unstructured interviews of a majority of the employees at each branch are used for the three predictor variables. Finally, direct observation is used for the three predictor variables, primarily to corroborate and validate the findings from the first two sources. The use of multiple sources helps with both the validity and reliability of the study. In addition, a database containing the various field notes, documents, and narratives collected over the course of the study was maintained to improve reliability. The particular framework for empirical research described in the preceding pages is proposed by Flynn et al. (1990). Fig. 2 represents a summary of the research methodology used for this study according to their framework.

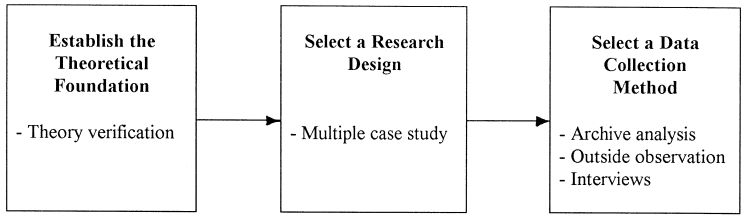


Fig. 2. Summary of the research methodology used for this study.

### 3.4. Definition and operationalization of variables

The four constructs found in Fig. 1 are discussed in the following section. *Business Strategy* is defined as the basis upon which an organization achieves and maintains a competitive advantage (Wheelwright, 1984). The generic strategies of cost leadership and differentiation of Porter (1980) are used to polarize the business strategies employed at each branch. The other generic strategy proposed by Porter of focusing on a particular strategic target was not applicable in this setting and was therefore not considered. For the distribution branches observed in this study, a differentiation strategy takes the form of superior customer service.

The four stages of service firm competitiveness—available for service, journeyman, distinctive competence achieved, world class service delivery—found in Chase and Hayes (1991) are also used to further structure the distinction between the two extreme strategies of low cost and high customer service. Branches that best fit the description of available for service were employing a low cost strategy and branches that best fit the description of distinctive competence achieved or world class service delivery were employing a differentiation strategy. A combination strategy of both low cost and differentiation, or firms Porter (1980) dubs as 'stuck in the middle', most closely resembled a journeyman description. Therefore, three distinct strategies—low cost, moderate cost and moderate service (combination), and high customer service—describe the business strategy employed in the marketplace at each individual branch. As a result, the hypotheses regarding business strategy (H2 and H3) are redefined into the following six hypotheses:

H2a: A business strategy of low cost has a direct and significant effect on business performance.

H2b: A business strategy of moderate cost and moderate service (combination) has a direct and significant effect on business performance.

H2c: A business strategy of customer service has a direct and significant effect on business performance.

H3a: A business strategy of low cost has an indirect and significant effect on business performance through its direct effect on productivity.

H3b: A business strategy of moderate cost and moderate service (combination) has an indirect and significant effect on business performance through its direct effect on productivity.

H3c: A business strategy of customer service has an indirect and significant effect on business performance through its direct effect on productivity.

Two data items (S1 and S2) are used to generate a business strategy index (SIndex) and to categorize the business strategy for each branch. (All data items are summarized in Table 1.) The first data item (S1) is based on both the stated strategy of the branch employees as well as the observed strategic behavior within the marketplace. For example, each branch employee was interviewed and each branch was observed on the specific approaches and tactics employed in trying to secure new customers. This data item is computed on a three-point scale. Each branch was given a subjective rating upon completion of the branch visit and interviews based on the criteria established by Chase and Hayes (1991). A value of 1 was given for low cost branches; a value of 2 for combination branches; and a value of 3 for high customer service branches.

In this particular industry, branches providing higher customer service (differentiation strategy) should be able to receive a higher price. Therefore, the second data item (S2) is a three-point scale that attempts to measure the price premium received at each branch. A value of 1 was given for branches whose premium was greater than one standard deviation below the mean price premium received at all branches. A value of 3 was given for branches whose premium was greater than one standard deviation above the mean price premium received at all branches. The rest of the branches received a value of 2. This data item is then used to validate, and if applicable, adjust S1. If no adjustment is made, the business strategy index (SIndex) is then simply the S1 data item. An adjustment is made if the absolute difference between the S1 and S2 data items is greater than one. Thus, the business strategy construct is operationalized into three variables—*Low Cost Strategy*, *Combination Strategy*, and *Customer Service Strategy*. The SIndex is found in Appendix B.

The concept of fit is a useful building block for theory construction, but the term has been used inconsistently within the strategic management litera-

Table 1
Individual data items for the four model variables

| | | | | |
|---|---|---|---|---|
| *Business Strategy* Data Items | | | | |
| | | Customer service | | Low cost |
| S1 | Stated and observed organizational strategy. (use of classification scheme) | 3 | 2 | 1 |
| S2 | Price premium received. (higher premium = higher score) | 3 | 2 | 1 |
| *External Fit* Data Items | | | | |
| | | Good fit | | Poor fit |
| Fit1 | Location of order processing activities. (outside branch = low cost; inside branch = customer service) | 3 | 2 | 1 |
| Fit2 | Breadth of employee activities/responsibilities. (highly focused = low cost; highly flexible = customer service) | 3 | 2 | 1 |
| Fit3 | Basis for customer selection. (many and unclear = low cost; few and service = customer service) | 3 | 2 | 1 |
| Fit4 | Management of receivables. (not high priority = low cost; high priority = customer service) | 3 | 2 | 1 |
| Fit5 | Location of branch management. (outside branch = low cost; inside branch = customer service) | 3 | 2 | 1 |
| Fit6 | Expertise level of employees. (lower = low cost; higher = customer service) | 3 | 2 | 1 |
| Fit7 | Salary level of employees. (lower = low cost; higher = customer service) | 3 | 2 | 1 |
| Fit8 | Management style. (autocratic = low cost; democratic = customer service) | 3 | 2 | 1 |
| *Productivity* Data Items | | | | |
| Pro1 | Avg. monthly sales documents ÷ number of employees. (higher ratio = higher score) | calculated ratio | | |
| Pro2 | Avg. monthly sales line items ÷ number of employees. (higher ratio = higher score) | calculated ratio | | |
| Pro3 | Yearly $ sales volume ÷ warehouse square footage. (higher ratio = higher score) | calculated ratio | | |
| *Business Performance* Data Item | | | | |
| Bp1 | Adjusted profit after tax percentage. (higher % = higher stakeholder satisfaction) | calculated value | | |

ture (Drazin and Van de Ven, 1985; Venkatraman, 1989). Venkatraman (1989) develops a useful conceptual framework and identifies six perspectives of fit. Corresponding to one of these perspectives, and within the context of this study, fit is viewed as a matching concept—a match between two related variables without reference to a criterion variable. In this study, the measure of fit between the two variables (business strategy and operational elements) is developed independent of any performance anchor. The distinction between business strategy and external fit lies in where they are implemented and/or observed. Business strategy describes behavior in the marketplace and how a branch attempts to attract and retain customers. The operational elements describe characteristics and particular decisions made within the branch; the external fit then describes how well these characteristics complement the marketplace strategy. Therefore, *External Fit* is defined as the consistency between the business strategy and the decision categories (operational elements) that constitute the overall operations of the branch.

The major decision categories that comprise these distribution branches include warehousing, materials management (purchasing and inventory), order processing, organization structure and control, and sales management (Lambert and Stock, 1982). These decision categories are roughly akin to the infrastructure decisions of workforce management, inventory and logistics systems, and organization proposed by Wheelwright (1978) and expanded by Hayes and Wheelwright (1984) and Fine and Hax (1985).

In keeping with the typology of operational decisions suggested by Hayes and Wheelwright (1984), eight data items are used to operationalize the external fit variable. The data items are found in Table 1. Of the eight data items, three pertain to inventory and logistics decisions (Fit1, Fit3, and Fit4), three pertain to workforce issues (Fit2, Fit6, and Fit7), and two pertain to organization (Fit5 and Fit8). These particular operating elements are chosen because they are under the direct control of the branch manager and there are differences in the elements among the branches. For example, the vendor selection decision is an important one for fit considerations. But, because the branch managers in several locations did not have control over this decision, this particular data item was not included in the index. Other items considered but not included for the reasons stated above are the sophistication of reports, ease of customer and employee inventory inquiry, inventory replenishment policy, location of purchasing activities, and the tracking of backorders.

Each data item is converted to a three-point scale, but the conversion process involves two steps. The first step requires the identification of a branch operating characteristic for each of the eight operational elements; the second step involves the determination of how well this operating characteristic matches the intended business strategy. A proper match for each data item is hypothesized subsequent to the pilot study but prior to the branch visits. To illustrate, locating the order processing activities outside of the branch in a centralized location is hypothesized to support a low cost strategy; locating these activities inside the branch is hypothesized to support a customer service strategy. A literature review of the hypothesized matches in these infrastructure decision areas provided little direction, especially in a service firm setting. For example, the work by Hayes and Wheelwright (1984) concentrates on long-term structural decisions, while the infrastructure decisions investigated by Van Dierdonck and Miller (1980) and Cleveland et al. (1987) are more applicable to a manufacturing setting. Therefore, the hypothesized match for each of the fit data items is primarily the result of interviews with experts in the distribution field, discussions with the SIA management team, and the researchers' knowledge. The hypothesized proper fit for each data item is provided in Table 1.

Operating and financial data provided by SIA was used to identify the operating characteristic for Fit3 and Fit7. The operating characteristic for the remaining six fit data items (Fit1, Fit2, Fit4, Fit5, Fit6, and Fit8) was identified by the researcher through direct observation. The operating characteristic for each of the eight operational elements was rated on a three-point scale. A characteristic supporting a low cost strategy was given a score of 1; a characteristic supporting a customer service strategy was given a score of 3; and a characteristic that supported both strategies, but to a lesser degree, was given a score of 2.

Once identified and scored, the operating characteristic score was compared to the value for the branch's business strategy. A 'poor' fit (value = 1)

was given if the absolute difference between the two measures was greater than one; an 'average' fit (value = 2) was given if the absolute difference between the two measures was equal to one; and a 'good' fit (value = 3) was given if the absolute difference between the two measures was zero. For example, Branch 411 performs its order processing activities outside the branch. This operating characteristic is hypothesized to support a low cost strategy and therefore receives a score of 1. Since the business strategy for Branch 411 is a combination strategy (SIndex = 2), the order processing activities for Branch 411 receives an 'average' fit value (Fit1 = 2).

Finally, after the scores have been computed, the eight individual fit data items for each branch are standardized and used to calculate an index for each individual branch (FitIndex). This index is simply the standardized average of the eight data items. An equal weighting scheme is used because there is no prior knowledge as to the relative importance of each data item. Interviews with SIA management provided insufficient reasons to change this weighting scheme. The external fit construct is thus operationalized as the variable called *Operational Fit*. The FitIndex is found in Appendix B.

*Productivity* is defined as the ratio of real output produced to real resources consumed (Kearney, 1978). Inherent in this definition are two elements of productivity: the efficiency of the transforming resources and the utilization of transforming resources. In this study, the productivity variable considers both aspects. For this particular industry, the primary inputs used in the transformation process of wholesale distribution are human resources and physical space. Therefore, this variable will consider the efficiency of the human resources and the utilization of warehouse space.

Three data items (Pro1 to Pro3) are used to generate the productivity index (ProIndex). The data items are listed in Table 1. The first two data items (Pro1 and Pro2) are selected because they provide meaningful measures on the efficient use of the most significant (in terms of monetary expenditures) input —human resources. The third data item (Pro3) is a measure of the utilization of the warehouse space.

Operating and financial data provided by SIA was used to calculate the three productivity data items. Each of the three individual productivity data items are standardized after they have been calculated. The productivity index (ProIndex) for an individual branch is then simply the standardized average of the three data items. An equal weighting scheme is used because there is no prior knowledge as to the relative importance of each data item and interviews with SIA management provided no additional insight. In addition, it accurately reflects the proportion of the branch expenses devoted to human resources and warehouse space. The productivity construct is thus operationalized as the variable called *Productivity of Operations*. The ProIndex is found in Appendix B.

*Business Performance* is defined as the ability of the operations to satisfy the desires of the company's major stakeholders. The major stakeholders in this study are shareholders, employees, and customers. The shareholders of this company are limited to employees of the company and range from top corporate management to salaried branch personnel. Therefore, to a large extent the desires of the shareholders mirror those of the employees.

Two different measures of *business performance* were initially conceived: return on capital employed (ROCE) and two-year growth rate in sales. ROCE is a proxy measure for how well the shareholders are being satisfied. This measure is appropriate in this study for two reasons: (1) it is the measure upon which branch management is evaluated, and (2) since each branch has leased warehouse space and equipment, no distortion arises from depreciation of noncurrent assets. The two-year growth rate in sales is used as a surrogate measure of customer satisfaction. This measure is appropriate in light of the presence of competitors and the frequency of repeat purchases, as well as the nonexistence of internal or external customer satisfaction measures.

As a result of the pilot study and in a further review of the factors within the control of branch management, several problems arose in the use of these business performance measures. First, information regarding the age of the 30 branches reveals the range to be 6 months to 15 years. Eight branches have been in operation less than two years. The sales growth rate experienced by these 'younger' branches far exceeds those of the larger and more established branches. Therefore, due to the wide variation in the age of the branches and with several branches having started within the past two years, two-year sales

growth rate is an inappropriate and unreliable measure of relative business performance among the 30 branches.

Second, ROCE is a good measure of relative branch performance if ROCE is *positive* for all 30 branches, because it properly reflects positive gains in both profit margin and capital turnover (ROCE = profit margin × capital turnover). However, if ROCE is *negative* for more than one branch, then ROCE is a poor measure of relative branch performance. In fact, ROCE is an unsuitable measure of relative performance any time the profit margin is negative. Since 13 of the 30 branches had a negative profit margin in 1992, ROCE is not a good choice for the relative performance comparisons needed in this study.

The decision of how many distribution branches to operate and where to locate them is made by corporate management. The most obvious result of this decision, in terms of branch performance, is the difference in the cost per square foot of warehouse space at the different branches. The average rental cost per square foot of warehouse space for the 30 branches is US$0.31. The cost ranges from a high of US$0.50 per square foot to a low of US$0.13 per square foot. Since this analysis is focused on branch management and branch operations, some adjustment is necessary to account for the differences resulting from the location decision. Consequently, the profit/loss statement for each branch is adjusted to reflect the company-wide average cost per square foot. The resulting analysis explores the question, ''How well do branches perform and what determines this performance given that a certain location to operate has been established and the rental cost per square foot of warehouse space has been equalized across all branches?'' This adjustment facilitates making the distinction between the economic performance of the branch and the managerial performance of the manager.

Therefore, the business performance measure (Bp1) chosen as the dependent variable is defined as adjusted profit after tax percentage (Adj PAT%). This variable is simply a branch's profit after tax percentage calculated from the profit/loss statement after it has been adjusted to equalize the cost per square foot of warehouse space across all branches. Fig. 3 illustrates the Adj PAT% for all 30 branches

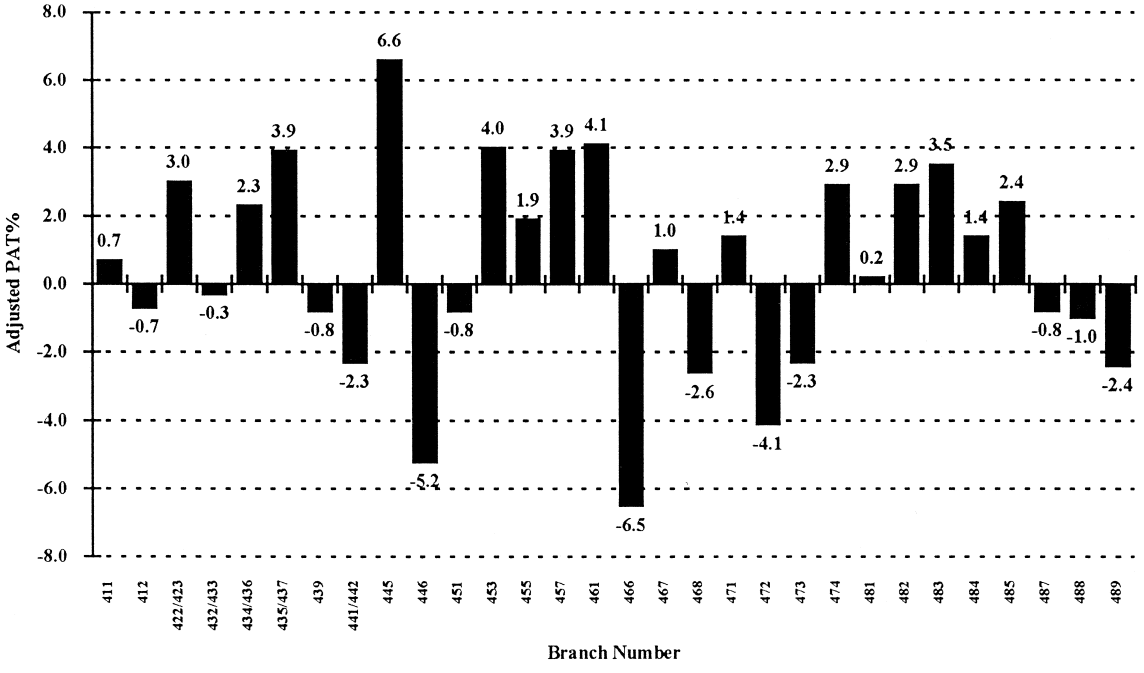


Fig. 3. Adjusted profit after tax percentage by branch, 1992.

during the year 1992. The values for this variable are also provided in Appendix B.

### 3.5. Data analysis methods

According to Asher (1983), the technique of path analysis is basically concerned with estimating the magnitude of the linkages between variables and using these estimates to provide information about the underlying causal processes. It also enables one to measure the direct and indirect effects that one variable has on another and to decompose the correlation between any two variables into a sum of simple and compound paths; some of which may be meaningful and others which may not. Given these advantages, path analysis is the technique used in this study to explore the hypothesized relationships among the four variables. Fig. 4 is the conceptual model of business performance using path analysis conventions.

As was previously stated in Section 3.4, business strategy is operationalized into three variables—*Low Cost Strategy*, *Combination Strategy*, and *Customer Service Strategy*, and external fit is operationalized as the variable called *Operational Fit*. As shown in Fig. 4, and according to path analysis conventions, these four variables are exogenous variables. It is presumed that these four variables cause variation in the endogenous variables (*Productivity of Operations*, *Business Performance*), but variations in the exogenous variables are not to be explained by the model.

Further, in the path analytic model shown in Fig. 4, *D1* and *D2* are disturbance terms associated with the two endogenous variables. These disturbance terms are used to account for the variations in the two endogenous variables that are attributable to causes not included in the formal structural model. Two injunctions were adhered to in using a path analytic model. First, the number of variables included in the model were kept to a minimum. Second, only those relationships that had theoretical support were included in the model. The arrows in Fig. 4 indicate the causal order assumptions deduced from the literature.

Missing data is not a major problem in this study, but all the information for each data item for each branch is not available. Data is missing either because it is not currently tracked at a particular branch, the information cannot be separated in a meaningful way, or not enough data points are available to construct the measure. In total, 27 out of 30 branches have complete data available. Missing data is handled in a *pairwise* fashion. This technique computes

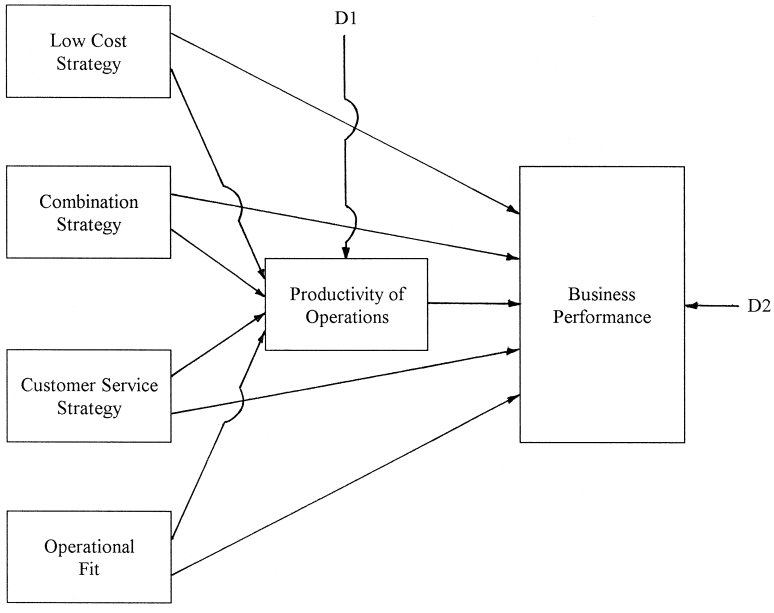


Fig. 4. Model of business performance using path analysis conventions.

each correlation coefficient by using cases with complete data for the pair of variables correlated. Because of the relatively small sample size, this approach is used because it utilizes the maximum amount of data available without inferring data or dropping entire cases if some data is missing.

## 4. Interpretation of results

### 4.1. Results

In order to obtain estimates of the main path coefficients, one simply regresses each endogenous variable on those variables that directly affect it (Asher, 1983). No constant terms were included in the regressions since all three strategy variables were included in the regression runs. Table 2 reports the standardized Beta coefficient, the *t*-ratio, and the *p*-value resulting from the regression analyses for each of the arrows (relationships) depicted in Fig. 4. Fig. 5 then shows the path coefficients (standardized regression coefficients) and the residual path coefficients within the path analytic model. The residual path coefficient is simply the square root of the unexplained variation in the dependent variable in question. It is calculated as the square root of $1 - R^2$, where $R^2$ is the square of the appropriate multiple correlation coefficient.

Table 3 shows the direct and indirect effects of the four exogenous variables and the one intervening variable on business performance. To calculate the indirect effect of the exogenous variable on the final dependent variable, one multiplies the path coefficient obtained for the exogenous variable when regressed on the intervening variable times the path coefficient obtained from regressing the intervening variable on the final dependent variable. For example, the indirect effect of a low cost strategy on business performance is obtained by multiplying the path coefficient for low cost strategy obtained from the regression equation using productivity as the dependent variable with the path coefficient for productivity from regressing on business performance ($-0.12 \times 0.54 = -0.07$). The total effect is equal to the addition of the direct and indirect effects. Unfortunately, since the direct effect of the three strategy variables are nonsignificant and the indirect effect of the operational fit variable is nonsignificant, the total effect numbers presented in the table provide little meaning. On the other hand, other results provided by the path analysis do allow for some meaningful interpretation and potential contribution.

### 4.2. Analysis of results

Productivity has a direct and significant effect on business performance in light of the standardized regression coefficient of 0.54 and a *p*-value of 0.003 (see Table 2). This result is neither unexpected or remarkable, but it does lend some credence to the data collection and measurement methods. This finding also adds some degree of confidence to those studies that use productivity as a surrogate measure for business performance.

Of the six hypothesized relationships between the business strategy variables and business performance (H2a–H3c), only one (H3c) was significant. A customer service strategy indirectly affects business performance through its significant effect on productiv-

Table 2
Standardized regression coefficients and their significance

| Variable | *Productivity* as the dependent variable | | | *Performance* as the dependent variable | | |
|---|---|---|---|---|---|---|
| | Beta coefficient | *t*-ratio | *p*-value | Beta coefficient | *t*-ratio | *p*-value |
| Low cost strategy | −0.12 | −0.63 | 0.532 | 0.13 | 0.84 | 0.408 |
| Combination strategy | −0.19 | −1.02 | 0.320 | 0.20 | 1.35 | 0.190 |
| Customer service strategy | 0.37[a] | 1.96 | 0.062 | −0.04 | −0.28 | 0.782 |
| Operational fit | 0.13 | 0.65 | 0.525 | 0.45[b] | 2.96 | 0.007 |
| Productivity of operations | n/a | n/a | n/a | 0.54[b] | 3.37 | 0.003 |
| | $R^2 = 0.228$ | | | $R^2 = 0.563$ | | |

[a] Significant at the 0.10 level.
[b] Significant at the 0.01 level.

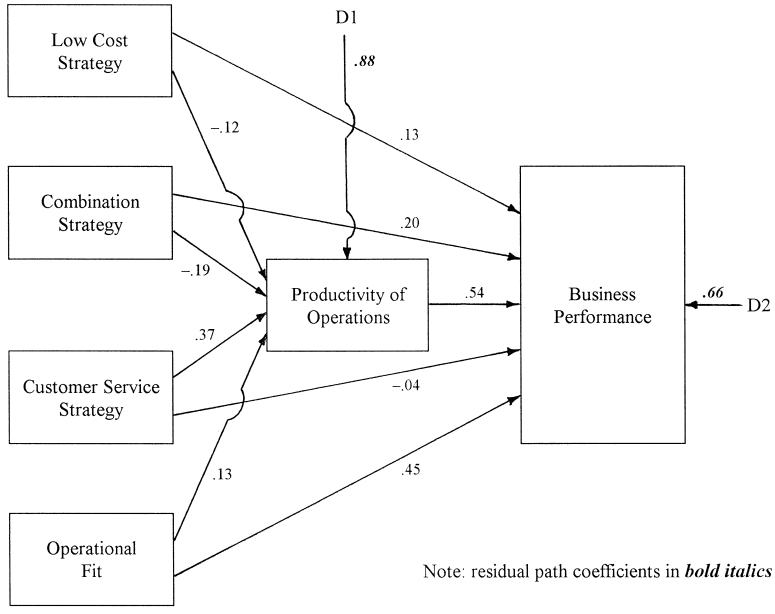


Fig. 5. Results of path analysis.

ity. As shown in Table 2, the standardized regression coefficient is 0.37 and the *p*-value is 0.062. All other coefficients involving the strategy variables are not significant. In trying to understand the significantly positive coefficient, it is helpful to explore the correlations between the individual data items that make up these two variables and those of the operational fit variable. The productivity variable has a high positive correlation (significant at the 0.05 level) with two operating characteristics—the breadth of employee activities/responsibilities and the expertise level of employees.

The first correlation is interesting because it suggests that higher productivity may result from a more flexible workforce as opposed to a more specialized one. But, even though it was hypothesized that a customer service strategy should employ a flexible workforce, the low cost strategy branches in this study were just as likely to have a flexible workforce as the customer service strategy branch. Therefore, this does not provide an explanation for the significant indirect effect of a customer service strategy. Nevertheless, this positive correlation is an intriguing finding in that it goes against the traditional wisdom that greater specialization leads to higher productivity.

On the other hand, the second significant correlation does provide a reasonable explanation, albeit not a full one, for the indirect effect of a customer service strategy. Eight out of the ten customer service branches have employees of high expertise level. This high expertise level seems to lead to higher productivity, which in turn leads to higher performance. This phenomenon is also consistent with observations performed during the branch visits. This would suggest that the higher salaries paid to these employees with high expertise are justifiable in terms of bottom line improvements.

The operational fit variable has a significant direct effect on business performance. As shown in Table

Table 3
The direct and indirect effects of the four exogenous variables and the intervening variable on business performance

| Variable | Effect | | |
|---|---|---|---|
| | Direct | Indirect | Total |
| Low cost strategy | 0.13 | −0.07 | 0.06 |
| Combination strategy | 0.20 | −0.10 | 0.10 |
| Customer service strategy | −0.04 | 0.20 | 0.16 |
| Operational fit | 0.45 | 0.07 | 0.52 |
| Productivity of operations | 0.54 | – | 0.54 |

2, the standardized regression coefficient is 0.45 and the *p*-value is 0.007. Coupling the strong significant direct relationship with the nonsignificant direct effects of the strategy variables seems to imply that choosing operating characteristics that fit a particular strategy is a far more important determinant of business performance than choosing the 'right' strategy. In other words, there were both successful and unsuccessful low cost branches, combination branches, and customer service branches. But, one of the main distinguishing factors of the successful branches was that the operating characteristics fit the branch's particular strategy, *regardless* of the type of strategy they employed.

Finally, based on the $R^2$ for the entire model, 56 percent of the variation in business performance is explained by the three strategy variables, the operational fit variable, and the productivity of operations variable. This is an interesting finding given the model used for the study was fairly simple and the objective was to understand interrelationships as opposed to trying to 'explain' business performance.

## 5. Contributions and conclusions

This study provides several contributions to the field of operations strategy. First, by utilizing the classificatory framework of Venkatraman (1989), this study more precisely defines the concept of external fit first proposed by Skinner (1969). Fit is defined as the degree to which operational elements match the business strategy. This is the first study to examine this critical concept utilizing empirical methods within a field-based setting.

Second, by utilizing the infrastructure decision categories proposed by Wheelwright (1978), this study operationalizes the concept of fit according to the previous definition. Infrastructure decisions that provide a good fit with a particular business strategy are hypothesized prior to data collection. This is the first study to operationalize this concept. In doing so, others can begin to build, challenge, and improve upon the definition and the conception of this variable. The operationalization of the fit concept requires additional perspectives and the consideration of additional operating characteristics. For example, the characteristics examined in this study were convenient, but not necessarily the most appropriate. In addition, the hypothesis that it is the underlying superiority of the operating characteristic, and not its match with the business strategy, that yields superior performance is a possibility that requires further attention.

Third, this study demonstrates that external fit has a significant positive and direct effect on business performance. This finding is the first to lend support to the intuitively appealing claims of Skinner (1969) and Wheelwright (1984) and comes at a time when many are beginning to question the effectiveness and usefulness of the traditional manufacturing strategy paradigm (Clark, 1996; Hayes and Pisano, 1996). Coupled with the nonsignificant direct effects of the strategy variables, it suggests that the fit of the operational elements with the strategy is of greater importance than the particular choice of strategy. As with all studies in which many of the key extraneous variables are controlled for gathering data for one particular industry, and for one company in this case, the generalizable nature of these findings must be tempered to a certain extent. However, the strong statistically significant results for this relationship suggest that the findings are quite reliable. Once again, these findings provide evidence and support for others to build upon in trying to ascertain emerging patterns within this field.

The fourth contribution involves understanding the effects of strategy on performance. It appears that certain types of strategies influence performance in an indirect manner. In a simplistic model, one may jump to the conclusion that a customer service strategy has very little effect on performance or that other strategies (low cost or combination) have a relatively greater positive effect. But, the significant effect of customer service on the intervening variable of productivity produces the result that customer service has a significant indirect effect on performance. This result may lend support to Deming's notion that improvements focused on customer satisfaction, though often hard to quantify, are ultimately beneficial to the long-term health of the organization (Deming, 1986).

Finally, this study has utilized empirical methods of analysis and field-based research to examine concepts that seem reasonable, yet lack empirical verification. The particular design of the research and the

findings suggest that much of the conceptual work in operations strategy may be applicable to service operations as well as manufacturing.

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## Appendix A. General list of questions used during interviews

What activities do you perform?
Approximate time per week for each activity?
Activities performed outside branch?
What triggers purchase of material?
How does a purchase order flow through the system?
How is accuracy in (a) receiver to actual, (b) purchase order to actual, and (c) bills to actual maintained?
What types of reports are used for transportation, warehousing, purchasing, inventory, and order processing?
How do you know when, what, and how much to order?
How does a sales order flow through the system?
How is accuracy in (a) sales orders to actual shipment and (b) sales orders to customer orders maintained?
Who are your major suppliers?
Why did you choose them as suppliers?
How often do you receive shipments from the suppliers?
What is your customer breakout?
How often do they use your service?
Do you prioritize customers? On what basis?
Who are your major competitors? What do they compete on?
Who are their major customers? Why?
What makes customers choose your company?
What major things have changed in the past two years?
What is the education level of your employees?
How much do you pay your employees?

## Appendix B. Scores for the composite indices on the four model variables

| Branch | SIndex | FitIndex | ProIndex | Adj PAT% |
|---|---|---|---|---|
| 411 | 2 | −0.30 | −0.12 | 0.7 |
| 412 | 1 | −0.79 | −0.01 | −0.7 |
| 422/423 | 1 | −0.87 | 1.36 | 3.0 |
| 432/433 | 3 | 0.28 | 1.07 | −0.3 |
| 434/436 | 2 | 0.16 | 0.03 | 2.3 |
| 435/437 | 2 | 0.13 | 0.62 | 3.9 |
| 439 | 3 | 0.38 | −0.12 | −0.8 |
| 441/442 | 1 | −1.27 | 0.61 | −2.3 |
| 445 | 3 | 0.80 | n/a | 6.6 |
| 446 | 3 | −2.28 | n/a | −5.2 |
| 451 | 2 | 0.30 | 0.51 | −0.8 |
| 453 | 3 | 1.29 | 2.42 | 4.0 |
| 455 | 3 | 1.27 | n/a | 1.9 |
| 457 | 2 | 0.11 | −0.15 | 3.9 |
| 461 | 3 | 0.79 | 1.92 | 4.1 |
| 466 | 1 | −0.70 | −0.95 | −6.5 |
| 467 | 2 | 0.67 | −0.09 | 1.0 |
| 468 | 1 | −2.48 | −0.86 | −2.6 |
| 471 | 2 | 0.17 | −0.85 | 1.4 |
| 472 | 2 | 0.18 | −1.25 | −4.1 |
| 473 | 1 | −1.27 | −0.28 | −2.3 |
| 474 | 3 | 1.31 | 0.99 | 2.9 |
| 481 | 1 | −1.28 | −0.85 | 0.2 |
| 482 | 1 | 0.35 | 0.68 | 2.9 |
| 483 | 3 | −0.43 | 0.10 | 3.5 |
| 484 | 1 | 0.86 | 0.16 | 1.4 |
| 485 | 1 | 1.37 | −1.19 | 2.4 |
| 487 | 1 | 0.77 | −1.38 | −0.8 |
| 488 | 2 | 0.15 | −1.37 | −1.0 |
| 489 | 3 | 0.35 | −1.01 | −2.4 |
| Mean | 1.97 | 0.00 | 0.00 | 0.54 |
| Std. Dev. | 0.85 | 1.00 | 1.00 | 3.04 |
| Min | 1 | −2.48 | −1.38 | −6.5 |
| Max | 3 | 1.37 | 2.42 | 6.6 |
| Valid N | 30 | 30 | 27 | 30 |

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