Manufacturing strategy, competitive strategy and firm performance: An empirical study in a developing economy environment

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Abstract:

This paper examines the relationship between manufacturing strategy and competitive strategy and their influence on firm performance. We test how competitive strategy influences manufacturing strategy and also examine the impact that manufacturing strategy and competitive strategy have on firm performance among Ghanaian manufacturing firms. We found significant and positive relationships between competitive strategy and the manufacturing strategies of cost, delivery, flexibility, and quality. The findings also indicate that quality is the only manufacturing strategy component that influences performance. Our results further show that although competitive strategy does not directly affect firm performance, it does so indirectly through quality. Thus, whether a firm chooses to pursue a cost leadership or a differentiation strategy an emphasis on quality provides the most benefits with regard to firm performance. An emphasis on quality appears to provide a means by which companies can mitigate the effects of increased competition resulting from the economic reforms within the Ghanaian manufacturing environment.

Keywords: Manufacturing strategy | Competitive strategy | Firm performance | Developing economy | Path analysis

Article:

1. Introduction

About 25 years ago, Skinner (1969) argued that managers needed to give serious thought to the role that manufacturing strategy could have on a firm's competitive abilities and the resulting effect on the firm's performance. Ever since that time, several papers have been written either testing the assertions of Skinner or refining the conceptualizations of Skinner's arguments (e.g. Swamidass and Newell, 1987; Gupta and Somers, 1996; Ward and Duray, 2000; Dangayach and Deshmukh, 2001a). However, one of the core underpinnings of Skinner's work, the examination of interrelationships among manufacturing strategy and competitive strategy has not received as much attention as it deserves in the manufacturing strategy literature. Skinner's argument was that while a company's competitive strategy places specific demands on the manufacturing function, at the same time the company's manufacturing strategy should be

specifically designed to accomplish the goals of the company's competitive strategy. A firm's competitive strategy drives its manufacturing strategy leading to operations decisions that result in some desired performance. For the competitive goals to be accomplished the manufacturing strategy should be aligned with the firm's competitive strategy. Therefore, the goal of this research is to examine the relationships between competitive strategy and manufacturing strategy, and their effect on firm performance. Specifically, we examine the impact of cost leadership and differentiation strategies on delivery, flexibility, low cost, and quality manufacturing strategies. Additionally, we investigate the influence of cost leadership and differentiation strategies on firm performance, the impact of manufacturing strategy on firm performance, and further whether the alignment of competitive strategy with manufacturing strategy improves firm performance.

This paper contributes to the existing knowledge on manufacturing strategy in several ways. We examine the alignment between manufacturing strategy and competitive strategy thus helping to understand how manufacturing capabilities should be adjusted to achieve corporate (or firm) objectives (Skinner, 1969; Anderson et al., 1989). There have been many studies linking operations strategy to business performance (Swamidass and Newell, 1987; Ward et al., 1994; Williams et al., 1995; Bozarth and Edwards, 1997; Vickery et al., 1997). However, with few exceptions (e.g. Badiri et al., 2000; Amoako-Gyampah and Boye, 2001; Dangayach and Deshmukh, 2001b; Zhao et al., 2006) most manufacturing strategy research has been confined to contexts involving developed economies where strategy implementation is perhaps well understood and practiced.

In this study we examine the relationships between manufacturing strategy and competitive strategy in the developing economy of Ghana and their impact on firm performance. It is important to find out if Skinner's paradigm, which has been argued to be valid in developed economies, is also valid in the context of the developing economy of Ghana. If we can establish that existing theories on manufacturing strategy are also applicable in such an environment, it will enhance the robustness of those theories. In Ghana, most companies are now operating in an environment of western style management involving free market principles as opposed to government dominated policies of price controls, subsidies, and setting fixed exchange rates. At the same time, market-supporting institutions, access to capital, logistical infrastructure, the enforcement of contractual agreements between customers and suppliers, and managerial talent are all very limited. Therefore one cannot be sure if firms in Ghana have the means and know-how to effectively formulate and implement competitive and manufacturing strategies. We note that although our study is carried out in the same environment as that of Amoako-Gyampah and Boye (2001), it is different in that they studied the impact of business environment factors on operations strategy while in this paper we focus on how competitive strategy impacts manufacturing strategy and their subsequent effect on firm performance. Also, we hope to ascertain if the alignment of specific competitive strategies with a given manufacturing strategy (e.g. the combination of cost leadership and quality) appear to offer performance benefits over a pure competitive strategy and thus provide guidance to managers in Ghana and similar environments on ways to enhance their competitive abilities. Although the importance of aligning competitive strategy with manufacturing strategy has been verified in several studies (e.g. Ward and Duray, 2000), we are unaware of any study that specifically examines the relationship and its impact on performance in a developing economy environment.

Although Ghana is a relatively small country its economic environment is similar to several other developing countries in Africa, Latin America, the Caribbean, and parts of Asia where former agrarian-based economies are now shifting to industrial and service-based economies. Most firms in these economies in the past operated in environments of limited competition, fixed currency exchange rates, price controls and government subsidies (Amoako-Gyampah and Boye, 1998). As firms in these countries integrate themselves into the world economy they find that multinationals and firms from larger emerging economies (e.g. India, China, Brazil) are also moving into their local economies and increasing the competition in the domestic market (Khanna and Palepu, 2006). Interestingly, these same conditions were faced by firms in India, as an example, in the early 1990s. The introduction of economic reforms in India resulted in increased competition from imports and from the multinationals in the domestic market (Dangayach and Deshmukh, 2001b). Thus, the increased competition brought about by market and economic reforms requires that companies in Ghana and similar environments not only have to develop appropriate strategies but they also need to understand how those strategies affect performance. In environments that are undergoing several changes, Hayes (1985) argued that building operations competence can be a means by which corporate strategy can be developed and leveraged to enhance performance. Thus, additional studies in developing economies are important and offer the potential to enhance our understanding of manufacturing strategy (Frohlich and Dixon, 2001; Zhao et al., 2006).

The rest of the paper is structured as follows. First, we describe the economic environment in Ghana. Second, we review briefly our conceptualizations of competitive strategy and manufacturing strategy and the theoretical background for the study. Next, we present our hypotheses, followed by the research method. We then present the results and discussion of the results. The paper ends with our conclusions and suggestions for future research.

2. The economic and manufacturing environment in Ghana

Ghana is a relatively small sub-Saharan African emerging economy. The country pursued a state-oriented industrialization policy to modernize its economy after independence from colonial rule in 1957. Thus, several state-owned manufacturing enterprises, which depended on the government for huge subsidies and protection from the global economy, were established throughout the country. However, in the 1970s to the 1980s, Ghana experienced severe economic decline due to political instability and mismanagement of the economy. The economic decline led to huge excess capacity and inefficiencies in the manufacturing sector which adversely affected the manufacturing activities of firms. Manufacturing companies struggled because they could not obtain the needed raw materials for their productive activities due to scarce foreign exchange reserves and the huge exodus of skilled labor to foreign countries (Republic of Ghana, 1989). The development of privately owned manufacturing enterprises was also stifled because of the inability to obtain resources through arms-length transactions (Acquaah, 2005).

In order to turn around the economic crises, the government in the mid 1980s started implementing IMF/World Bank led structural adjustment programs (SAP). These programs were initiated to promote the liberalization of the domestic economy, operations efficiency, productivity growth, privately owned enterprises development, economic growth, and trade and

investment. The economic liberalization policies have nurtured an open economy and have minimized the hurdles that the manufacturing companies need to clear in order to obtain raw materials and inputs, and other resources for productive activities. However, it has created an unprecedented change in their business environment through increased competition both in the domestic market and from imports into the country. Thus, manufacturing companies need to develop and implement a well-conceived strategic plan in order to be competitive in the business environment. Manufacturing companies therefore need to become more customer- and competitor-focused by developing strategies to enhance product quality, build relationships with customers and suppliers, and enhance distribution and delivery of their products. These strategies should be pursued in order to reduce operating cost, increase demand, and deal with the heightened competition in the domestic market and increased imports from abroad. At the same time, the government has been implementing policies targeted at the development of entrepreneurs and the promotion of small- and medium-sized businesses (Government of Ghana, 1997; Yusuf and Saffu, 2005).

3. Theoretical background

This section provides a brief review of the literature and theoretical background on the two main constructs underlying the models tested in this study: manufacturing strategy and competitive strategy, and the presentation of our conceptual model.

3.1. Manufacturing strategy

Manufacturing strategy refers to the competencies that a firm develops around the operations function. Manufacturing strategy is also expected to be one of the components of a firm's business strategy or strongly integrated with a firm's business strategies (Anderson et al., 1989). The concept of manufacturing strategy began to gain the attention of researchers following the seminal work of Skinner in 1969 who at that time noted that manufacturing was not being accorded the proper role in corporate strategy development and that instead of manufacturing becoming an important tool of corporate strategy, it had become a liability.

Skinner's (1969) initial arguments led to a number of research papers on manufacturing strategy. Some of the initial studies sought to develop further the need to recognize the competitive advantage that manufacturing strategy provides (Buffa, 1984; Hayes and Wheelwright, 1984; Prahalad and Hamel, 1990). Along these lines, there have been empirical studies aimed at providing support that indeed manufacturing strategy can contribute to a firm's competitive strength (Swamidass and Newell, 1987; Williams et al., 1995; Gupta and Somers, 1996; Ward and Duray, 2000). Further studies have been carried out to identify, understand and/or clarify the content of manufacturing (and the broader operations) strategy (Leong et al., 1990; Roth and van der Velde, 1991; Vickery et al., 1993; Ward et al., 1994, Ward et al., 1996; Miller and Roth, 1994; Dangayach and Deshmukh, 2001a; Frohlich and Dixon, 2001).

Skinner (1974) described common competitive performance criteria for manufacturing strategy such as short delivery cycles, superior quality and reliability, dependable deliveries, fast new product developments, flexibility in volume changes and low cost. Wheelwright (1978) identified efficiency, dependability, quality and flexibility as the most important general

criteria for evaluating manufacturing strategy. Later, Hayes and Wheelwright (1984) delineated four basic competitive priorities: cost, quality, dependability and flexibility. Krajewski and Ritzman (1987) further identified five operations competitive priorities: cost, high performance design, consistent quality, on-time delivery, and product and volume flexibility. In a comprehensive review of the literature on manufacturing competitive priorities, Leong et al. (1990) contended that five priorities are the most critical: quality, delivery, cost, flexibility and innovativeness. Many studies strongly suggest the inclusion of criteria such as cost, delivery, flexibility, and quality as the key components of manufacturing strategy. Thus, we will define manufacturing strategy to include cost, delivery, flexibility, and quality.

3.2. Competitive strategy

The strategy field presents various typologies to describe the generic competitive strategies of firms—how firms compete in specific businesses or industries by exploiting their competitive advantage in order to realize their goals (e.g., Hambrick, 1983; Miles and Snow, 1978; Porter, 1980). The typologies all focus on a firm's relative emphasis on operational efficiency and low cost or uniqueness in the market. We focus on Porter's (1980) typology of generic competitive strategies which is made up of overall cost leadership, differentiation and focus (cost or differentiation in a narrow market segment) for a couple of reasons. First, Porter's typology overlaps with other competitive strategy typologies. For example, Porter's strategy of cost leadership resembles Miles and Snow's (1978) defender strategy and Hambrick's (1983) efficiency strategy. Porter's differentiation strategy is also similar to Miles and Snow's prospector strategy. Second, Porter's typology has been linked to many organizational, environmental, and performance-related variables (Campbell-Hunt, 2000; Dess and Davis, 1984; Kotha and Vadlamani, 1995; Ward and Duray, 2000). Porter's framework proposes that firms that pursue any of these competitive strategies would develop a competitive advantage that would enable them to outperform competitors in their industry. However, for a firm to earn superior profits and outperform its competitors, it must make a clear choice between a cost leadership and differentiation strategy in order to avoid "the inherent contradictions of different strategies" (Porter, 1996, p. 67).

Many authors have refined and conceptualized Porter's differentiation strategy along several dimensions such as product differentiation, marketing differentiation, quality differentiation, image differentiation, service differentiation, and innovation differentiation strategies (Miller, 1988; Mintzberg, 1988; Kotha and Vadlamani, 1995; Beal and Yasai-Ardekani, 2000). In this study we use cost leadership and differentiation strategies, because they are the commonly used strategy dimensions in the literature (Dess and Davis, 1984; Nayyar, 1993). Furthermore, firms in most developing economies implementing the differentiation strategy do not focus on a single dimension but emphasize several dimensions such as image, gaining customer loyalty, quality, innovation and level of service, at the same time (Kim et al., 2004). Thus, a differentiation strategy in a developing economy environment may be based on simultaneously creating customer loyalty by generating differences in product image through intensive marketing and image management (Miller, 1988), creating products that are innovative, dependable, durable, and serviceable (Beal and Yasai-Ardekani, 2000). The cost leadership strategy represents attempts by firms to generate competitive advantage by achieving the lowest cost in the industry.

The focus of firms implementing a cost leadership strategy is on stringent cost controls and efficiency in all areas of operation (Porter, 1980).

Our conceptual model is presented in Fig. 1. The model suggests that firm performance is directly affected by competitive strategy (cost leadership and differentiation) and manufacturing strategy (cost, delivery, flexibility, and quality). Firm performance is also affected indirectly by competitive strategy through manufacturing strategy. Thus manufacturing strategy may mediate the relationship between competitive strategy and firm performance. This relationship is proposed because it has been argued that for manufacturing firms to be successful in improving their performance there must be a consistency between competitive strategy and manufacturing strategy, with the former driving the latter (Miller and Roth, 1994; Ward and Duray, 2000). And last, the model proposes that competitive strategy has an influence on manufacturing strategy.

Fig. 1. General research model.

4. Hypotheses

4.1. Manufacturing strategy and competitive strategy

Manufacturing strategy, as one of the functional strategies, is a means by which competitive strategy is implemented. In other words, manufacturing strategy adds detail to competitive strategy. The type of manufacturing strategy that a firm chooses to emphasize will be dependent on its chosen competitive strategy. The strategic role of operations has been emphasized as being important in the light of increasing fierce global competition, short product life cycles and supply chains that are geographically dispersed in different regions of the world. Initial studies such as the work of Adam and Swamidass (1987), Roth et al. (1989) and De Meyer et al. (1989), have emphasized competitive priorities such as cost, delivery, flexibility, and quality that a firm's manufacturing function should support in accordance with the overall business unit strategy.

The manufacturing function is expected to implement structural and infrastructural decisions that are embedded with the capabilities of low cost, quick delivery, flexible designs and superior quality. These capabilities in turn permit companies to compete at the business unit level through differentiation or through cost leadership. A major portion of a product's cost is committed, controlled or dictated by the manufacturing function. For example, it is generally accepted that for most products the cost of materials account for more than 60% of total product cost. As a consequence, the ability of the firm to compete on cost leadership at the business unit level is heavily dependent on the effectiveness with which cost reduction initiatives (e.g. supply chain initiatives such as vendor managed inventory, collaborative planning, forecasting and replenishment, and strategic sourcing) are pursued by the manufacturing function. Also, if for

example, a firm reduces its set-up time as part of its emphasis on flexibility, small batch production can result in cost benefits that normally accrue to large-scale production and hence the firm can adjust its competitive strategy from one emphasizing purely economies of scale to one that includes an emphasis on economies of scope (Gupta and Somers, 1996). Thus, the theoretical expectation is that the alignment of the manufacturing function with the competitive strategy of the firm will lead to enhanced benefits for the firm.

Deane et al. (1992) found a strong relationship between cost leadership and manufacturing strategy for high performing new venture organizations. Using data from 85 firms in the broadwoven fabric industry, Williams et al. (1995) found a strong relationship between business strategy and manufacturing strategy. Specifically, they observed that business units that choose higher levels of differentiation (as part of the business strategy) would also tend to emphasize innovative manufacturing processes, product quality and variety of product offerings to prevent misalignment of strategies. The above arguments and the existing body of literature on manufacturing strategy show that a strong relationship exists between manufacturing strategy and competitive strategy (e.g., Kim and Arnold, 1992; Vickery et al., 1993; Williams et al., 1995; Gupta and Somers, 1996; Ward et al., 1998; Ward and Duray, 2000; Yen and Sheu, 2004). We thus state the following hypotheses:

> **H1.** Competitive strategy influences manufacturing strategy.

4.2. Manufacturing strategy and firm performance

The manufacturing strategy literature has also proposed a direct link between manufacturing strategy and firm performance. The idea that manufacturing strategy supports firm performance has been the focus of several studies (Swamidass and Newell, 1987; Kim and Arnold, 1992; Vickery et al., 1993; Williams et al., 1995; Prajogo and Sohal, 2006). Some of the studies have examined several individual dimensions of manufacturing strategy on firm performance (e.g. Kekre and Srinivasan, 1990; Wood, 1991; Sluti, 1992; Gupta and Somers, 1996; White, 1996). A quality strategy that allows a firm to achieve both high design and conformance quality will lead to the attainment of a higher reputation in the market place, cost reduction, and higher productivity that can translate into higher sales growth and increased market share. A low cost strategy leads to improvements in efficiencies that a firm can use to reduce its price and all things being equal achieve an increase in sales growth and market share. A firm that develops a strategy that allows it to achieve volume and mix flexibility while keeping costs low and quality high will be able to respond faster to market changes and thus achieve higher performance. And finally, a firm with reliable and on-time deliveries can expect greater customer satisfaction that can potentially lead to increased sales growth and market share. Accordingly, we hypothesize that:

> **H2.** Manufacturing strategy has a positive influence on firm performance.

4.3. Competitive strategy and performance

Porter's cost leadership and differentiation strategies have been linked to the achievement of superior performance by many studies (see the meta-analysis by Campbell-Hunt, 2000; Dess and

Davis, 1984). A firm that successfully pursues a cost leadership strategy emphasizes "aggressive construction of efficient-scale facilities, vigorous pursuit of cost reductions from experience, tight cost and overhead control, avoidance of marginal customer accounts, and cost minimization in areas like R&D, service, sales force, advertising, and so on" (Porter, 1980, p. 35). A firm can, therefore, gain a competitive advantage over its rivals by having significantly lower cost structures in an industry without ignoring other areas such as product and service quality. Thus, the maintenance of a strong competitive position for an organization pursuing a cost leadership strategy places a premium on efficiency of operations and scale economies that enable them to achieve and sustain their performance for a considerable period of time.

A differentiation strategy can be based on many dimensions such as brand image, innovativeness and design features, product quality, reliability, durability, customer service and firm reputation. But a successful differentiation strategy must be based on features that are difficult for rivals to imitate. A firm that pursues a differentiation strategy may attempt to create a unique image in the minds of customers that the firm or its products are superior to those of its competitors (Miller, 1988). A firm creates these perceptions through advertising programs, marketing techniques and methods, and charging premium prices. Moreover, a firm may pursue a differentiation strategy by creating a perception in the minds of customers that its products possess characteristics that are unique from those of its competitors in terms of differences in design, physical attributes/features, and durability. A firm focusing on these characteristics performs innovative activities to constantly improve upon the design and physical attributes and performance of its products. A firm may also offer superior customer service or create the perception that it pays attention to and empathizes with customers' needs and desires so as to differentiate itself from competitors. This enables a firm implementing a differentiation strategy to create a positive reputation, brand image and customer loyalty. Thus, the pursuit of a differentiation strategy helps firms to avoid potentially severe price competition because of their ability to offer products with greater reliability, greater durability, greater features and aesthetics, superior performance (Mintzberg, 1988; Dean and Evans, 1994), creating customer and brand loyalty (Porter, 1980). Differentiators are thus able to generate competitive advantage over their rivals and achieve superior performance. Hence we propose the following hypothesis:

H3. Competitive strategy has a direct positive influence on firm performance.

Earlier, we referred to Skinner's (1969) arguments on the need for congruence between an organization's competitive strategy and its manufacturing strategy. A competitive strategy that is properly supported with manufacturing strategy is expected to lead to improved performance. This is because the structural and infrastructural decisions made by the manufacturing function will be tailored toward the attainment of the competitive strategic goals (Boyer and Lewis, 2002; Leong et al., 1990). A firm is expected to choose an appropriate competitive strategy in order to achieve superior performance. However, Porter (1980) argued that the choice of a strategy by itself does not guarantee superior performance. The way the strategy is implemented plays an important role in performance achievement. In a manufacturing environment, the implementation of a competitive strategy should be linked to market requirements through the order-qualifying and order-winning criteria that allow the firm to be considered and win orders from customers and thus enable the firm to achieve superior performance (Brown and Blackmon, 2005; Hill, 1994). Given our earlier arguments on manufacturing strategy being one of the ways

in which competitive strategy is implemented, we postulate that the impact of competitive strategy on performance will be greater in the presence of manufacturing strategy than without. Several authors have argued and sometimes demonstrated that a manufacturing strategy that is consistent with the firm's competitive strategy is important if the firm is going to achieve its goals (McDougall et al., 1992; Williams et al., 1995; Swamidass and Newell, 1987; Miller and Roth 1994). If a firm fails to recognize the important relationship between competitive strategy and manufacturing strategy, it may be saddled with long-lasting inefficient production systems that hinder its ability to achieve strategic goals (Dangayach and Deshmukh, 2001a). We therefore hypothesize that:

> **H4.** The total impact of competitive strategy on performance through manufacturing strategy will be greater than the direct impact of competitive strategy on performance.

5. Method

5.1. Sample and data collection

Questionnaires were hand delivered to 250 manufacturing and service organizations in Ghana. The sample consisted primarily of 250 large and medium sized firms drawn from a list of companies that are part of the Association of Ghana Industries and/or were listed in the Ghana Business Directory. Five graduate students in the School of Administration (the business school) at the University of Ghana were given 50 questionnaires each and assigned to a specific locality where a cluster of firms were located. The students went to these companies, contacted the operation managers or their equivalent in the companies. They explained the purpose of the study, gave the questionnaires to the respondents and obtained promissory dates when they could go back for the completed questionnaires. Sometimes, the students made two or three follow-up visits to the respondents before receiving the completed surveys. One of the authors of the study also made random visits to some of the firms to follow-up on the completed surveys as well as to check on uncompleted surveys. The entire data collection process took three weeks.

A total of 192 completed surveys were obtained representing a response rate of 76.8%. Reasons given for the non-responses include the unavailability of the individuals most qualified to complete the survey and lack of interest in participating in the study. Surveys from 12 firms were discarded for incomplete information resulting in a final usable sample size of 180. This study is confined to the 122 manufacturing firms that participated in the study to facilitate comparisons with previous studies. The unit of analysis is the firm (or company). Most firms in Ghana do not have multiplant operations or different strategic business units. Thus, a firm level analysis in this study is equivalent to a plant level analysis.

We checked for non-response bias by testing the size, industry type, and ownership structure and found no statistical differences between respondents and non-respondents. To check for common method variance, we used Harman's (1967) one-factor test. We factor-analyzed all the performance, manufacturing strategy and competitive strategy variables and found multiple factors to be present indicating that common method variance may not be causing the relationships among the variables. In addition to collecting data on the main study variables, we also collected demographic data on the firms including industry type, size, fixed assets and

ownership structure. Products manufactured by the metals group include aluminum containers, cooking utensils, and other appliances. The chemicals group is mostly manufacturers of pharmaceuticals while building materials include iron rods, roofing sheets, and concrete products. The wood products industry is mostly furniture while plastics includes manufacturers of water tanks and plastic containers. The small sample size in some of the groups did not permit comparison across the different sectors with regard to the stated objectives of the research. The demographic and other characteristics of the sample are shown in Table 1.

Table 1. Demographics

Industry	# of respondents	Percent
Textiles	10	7.9
Building materials	22	17.5
Wood products	16	12.7
Chemicals	22	17.5
Metals	34	27.0
Plastics	10	7.9
Others	12	9.5
Total	126	100.0
Number of employees	Frequency	Percent
Less than 50	63	50.0
50–99	30	23.8
100–199	16	12.7
200–499	15	11.9
500–1000	2	1.6
Total	126	100.0

5.2. Operational definitions of variables

As we discussed earlier, our assessment of competitive strategy has its foundation in Porter's typology. The main components of competitive strategy that formed the basis of this strategy are cost leadership and differentiation. Most of the items used in measuring the two constructs have their origins in the work of Dess and Davis (1984) who developed these measures to assess Porter's (1980) generic competitive strategies. They have since been modified and adapted by researchers studying the relations between competitive strategy and manufacturing strategy (e.g. Ward and Duray 2000). Our assessment of competitive strategy was based on 14 items derived from the literature (Dess and Davis, 1984; Campbell-Hunt, 2000; Kotha and Vadlamani, 1995). From the factor analysis of the competitive strategy items, two clear factors were identified. Four items loaded on cost leadership, six on differentiation, and four cross-loaded. The cross-loaded items were dropped from the subsequent analysis.

We assessed cost leadership using four items that asked the respondents to indicate the importance of competitive pricing, procurement of raw materials, reduction of production costs and minimization of operation costs to the firm. Differentiation was assessed with six items that asked about the importance of advertising, developing innovative marketing techniques, influencing/controlling channels of distribution, utilizing highly skilled sales force/agents, customer service and product quality. The scale for both cost leadership and differentiation was a seven point Likert-type ranging from 1 (not important) to 7 (extremely important).

Manufacturing strategy was assessed through the four commonly accepted competitive priorities of cost, delivery, flexibility, and quality. A 14-item scale adapted from the work of Ward and Duray (2000) was used to assess manufacturing strategy. Cost was assessed with two items measuring the amount of emphasis placed on reducing material costs and overhead costs. Delivery was measured with two items that assessed the emphasis placed on meeting delivery promises and providing faster deliveries. We measured flexibility by asking respondents on the amount of emphasis that their firms placed on handling changes in product mix, reducing lead time, handling variations in customer orders, making changes in product design as desired by customers, and ability to adjust capacity rapidly within a short time period. Quality was measured using items that assess conformance quality. These include using statistical process control methods, updating process equipment and technology, reducing defect rates, developing new processes for products, and obtaining quality certifications. Each of the items was measured on a seven point Likert-type scale ranging from 1 (no emphasis) to 7 (extreme emphasis).

Two measures of firm performance were used in this study. The first measure was an assessment of the market share of the firm's #1 largest volume product line while the second measure was sales growth. For each measure, the respondent was asked to indicate the extent to which the actual performance of his/her firm compares to the firm's planned performance over the past three years. A seven point Likert-type scale ranging from 1 ("smaller than planned") to 7 ("larger than planned") was used. We limited our performance measures to sales growth and market share and omitted other measures such as profitability because of our desire to obtain a large response rate. Firms in Ghana are often reluctant to provide information on their performance, especially those that deal with profitability even if the data requested were subjective. Most firms in Ghana are not publicly traded and thus are not required to provide financial performance data to government regulators. Also, although some of the past studies have asked firms to compare their performance to the performance of their competitors, we chose to use planned performance because firms in Ghana are less likely to have the ability to assess the performance of their competitors given the same reasons stated earlier.

5.3. Reliability and validity analyses

The reliability and validity of the measures were assessed through the determination of the Cronbach alpha coefficients, content validity and the use of factor analyses. Our previous description on the various constructs and their use in several past research studies provide evidence of the validity of the scales (Anand and Ward, 2004; Swink et al., 2005). The items used were all from previous studies and did not represent new scales. The reliability coefficients (Cronbach alpha) of each measure are shown on the diagonal in Table 2. The reliability coefficients range from 0.58 to 0.77. Although one of them is slightly below 0.60, several researchers have noted that alphas of between 0.50 and 0.60 are generally acceptable for exploratory research (Srinivasan, 1985; Nunnaly and Bernstein, 1994; Gupta and Somers, 1996). Last, Gupta and Somers (1996) argued that since alpha is a function of the number of items in the composite, it tends to be conservative and thus our alpha values indicate acceptable levels of reliability.

Table 2. Means, standard deviations, correlations and reliability coefficients

Variable	Mean	s.d.	1	2	3	4	5	6	7
1. Differentiation	5.19	1.03	0.69						
2. Cost leadership	6.29	0.63	0.327**	0.58					
3. Delivery	6.23	0.94	0.272**	0.421**	0.73				
4. Flexibility	5.61	0.86	0.443**	0.497**	0.444**	0.64			
5. Low cost	6.23	0.93	0.279**	0.569**	0.489**	0.489**	0.77		
6. Quality	5.32	1.03	0.449**	0.403**	0.547**	0.572**	0.527**	0.69	
7. Market share	4.24	1.79	0.114	0.095	0.097	0.073	0.014	0.193*	
8. Sales growth	4.04	1.77	0.122	0.175***	0.031	0.127	0.080	0.217*	0.700**

Alpha value for reliability test is shown at the intersection.

** Correlation is significant at the .01 level (2-tailed).

* Correlation is significant at the .05 level (2-tailed).

*** Correlation is significant at the .10 level (2-tailed).

We used factor analyses to examine measurement convergent and discriminant validity. Convergent validity is typically considered to be satisfactory when items load high on their respective factors. All items had high loadings (greater than 0.40) on their respective factors, signifying desirable measurement convergent validity. Discriminant validity was assessed by examining whether each item loaded higher on the respective factor than on other constructs. The overall results indicated minimal cross-loadings signifying that reasonable discriminant validity has been achieved.

5.4. Analytical approach

Preliminary analyses included assessing the correlations among the variables. The results are shown in Table 2. We observed significant positive correlations between the competitive strategy variables and the manufacturing strategy variables. We also observed significant positive correlations between cost leadership and sales growth, between delivery and sales growth, and between quality and the two performance measures (market share and sales growth). The correlations among the variables in Table 2 are generally less than 0.6 (with the exception of that between market share and sales growth) indicating the absence of multicollinearity. Further diagnostics of the collinearity among the variables using variance inflation factors (VIFs) indicated very low VIFs for all the variables. Because each of the VIFs is substantially less than 10, there is little reason to suspect multicollinearity among the variables (Frees, 1996; Neter et al., 1996).

To test the hypothesized relationships in our models we used a path analytic approach. Path analysis allows us to assess the magnitude and significance of the underlying causal relationships between our study variables (Asher, 1983). We used path analysis rather than structural equation modeling (SEM) because our sample size was relatively small. Typically, SEM is more appropriate when the sample size is above 200. In addition, our model was relatively simple and Grapentine (2000) has argued that for less complex models SEM and path analysis will produce identical results with regard to the impact of the most important independent variables on the dependent variable. Specifically, path analysis allows us to test the direct and indirect effects of the competitive strategy variables on firm performance. This approach has been used by other researchers to test relationships between manufacturing strategy and business performance (Smith and Reece, 1999). The path analytic modeling involves using regression

analysis to estimate the main path coefficients from the independent variables to the dependent variables. To test our hypotheses we run a series of regression analyses for each of the performance measures. The first set of regression has the performance measures (market share and sales growth) as the dependent variable with differentiation, delivery, flexibility, low cost, and quality as the independent variables. The second set of regression has each of the manufacturing strategy variables as the dependent variable with differentiation as the independent variable. The next set of regression analyses was similar to the ones above except that differentiation was replaced with cost leadership.

6. Results

The results of the path analytic model for testing H1–3 are presented in Table 3. Hypothesis 1 (H1) states that competitive strategy of a firm is positively associated with manufacturing strategy. For this hypothesis to be supported, at least one significant path from the competitive strategy components to the manufacturing strategy dimensions should exist. The results from Table 3 show that the path coefficients from both cost leadership strategy and differentiation strategy to all the dimensions of manufacturing strategy (delivery, flexibility, low cost, and quality) are positive and significant at the 0.01 level. This finding provides support for H1. Similarly, H2 which states that manufacturing strategy has a positive influence on performance, requires that at least one significant path exists between the manufacturing strategy dimensions and firm performance. Quality is positively linked to market share and sales growth in both the differentiation and cost leadership models. These results indicate that H2 cannot be rejected. H3 requires that a positive and significant path exist between at least one of the competitive strategy components and firm performance. The results indicate that all the paths (i.e. from cost leadership and differentiation to market share, and sales growth) were not significant. These results indicate that H3, which states that competitive strategy has a direct positive influence on firm performance, is not supported. The results are summarized in Fig. 2, Fig. 3, which show significant paths from both cost leadership and differentiation to delivery, flexibility, low cost, and quality; and significant paths from quality to market share and sales growth.

To test H4, we use the path coefficients to examine the total effect of competitive strategy on firm performance through the four manufacturing strategy dimensions and then compare them with the direct effect of competitive strategy on performance. The indirect effect is calculated by multiplying the contributing path coefficients. For example, the indirect effect of differentiation on market share through quality (0.116) is obtained by multiplying the coefficient from differentiation to quality (0.449) by the coefficient from quality to market to share (0.258). The total effect (0.133) is the sum of the direct (0.017) and indirect effects (0.116). Table 4 shows the direct, indirect, and total effects of the competitive strategy components of cost leadership and differentiation on firm performance.

For H4 to be rejected, the total effect of the competitive strategy on performance through manufacturing strategy should be less than the direct effect of each competitive strategy on performance. The total effects of cost leadership and differentiation on market share through quality are greater than the direct effect of cost leadership and differentiation on market share. Similarly, the total effects of both cost leadership and differentiation on sales growth through

quality are greater than the direct effects of those competitive strategy components on sales growth. These results imply that H4 cannot be rejected.

Table 3. Path coefficients for the model

Impact of	Cost leadership model		Differentiation model	
	Path coefficient	*t*-value	Path coefficient	*t*-value
Delivery on				
Market share	0.010	0.083	0.019	0.160
Sales growth	−0.140	−1.208	−0.115	−0.994
Flexibility on				
Market share	−0.022	−0.177	−0.029	−0.237
Sales growth	0.013	0.106	0.026	0.222
Low cost on				
Market share	−0.160	−1.249	−0.124	−1.049
Sales growth	−0.089	−0.722	−0.023	−0.195
Quality on				
Market share	0.271	2.147*	0.258	1.967*
Sales growth	0.275	2.240*	0.261	2.033*
Cost leadership on				
Market share	0.068	0.565		
Sales growth	0.159	1.366		
Delivery	0.421	5.046**		
Flexibility	0.497	6.228**		
Low cost	0.569	7.522**		
Quality	0.403	4.781**		
Differentiation on				
Market share			0.017	0.156
Sales growth			0.025	0.238
Delivery			0.272	3.085**
Flexibility			0.443	5.387**
Low cost			0.279	3.168**
Quality			0.449	5.477**

* *p*< 0.05.
** *p*<0.01.

Table 4. Total effects of competitive strategy on performance

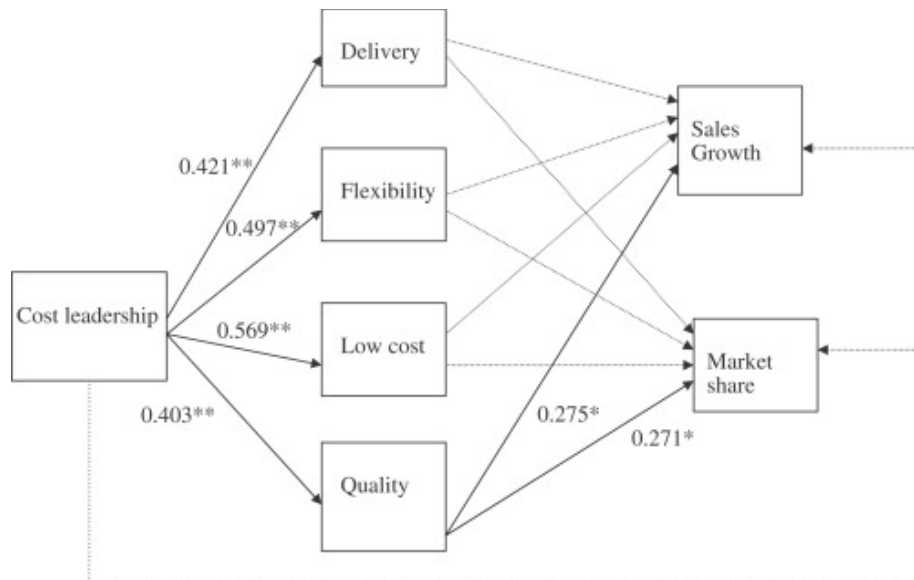| Impact of	Effect								
	Direct	Delivery		Flexibility		Low cost		Quality	
		Indirect	Total	Indirect	Total	Indirect	Total	Indirect	Total
Cost leadership on									
Market share	0.068	0.004	0.072	−0.011	0.057	−0.091	−0.023	0.109	0.177
Sales growth	0.159	−0.059	0.100	0.006	0.165	−0.051	0.108	0.111	0.270
Differentiation on									
Market share	0.017	0.005	0.022	−0.013	0.004	−0.035	−0.018	0.116	0.133
Sales growth	0.025	−0.031	−0.006	0.012	0.037	−0.006	0.019	0.117	0.142

Fig. 2. Results of path analysis for cost leadership model. Significant paths are indicated with bold lines. *p<0.05. **p<0.01.
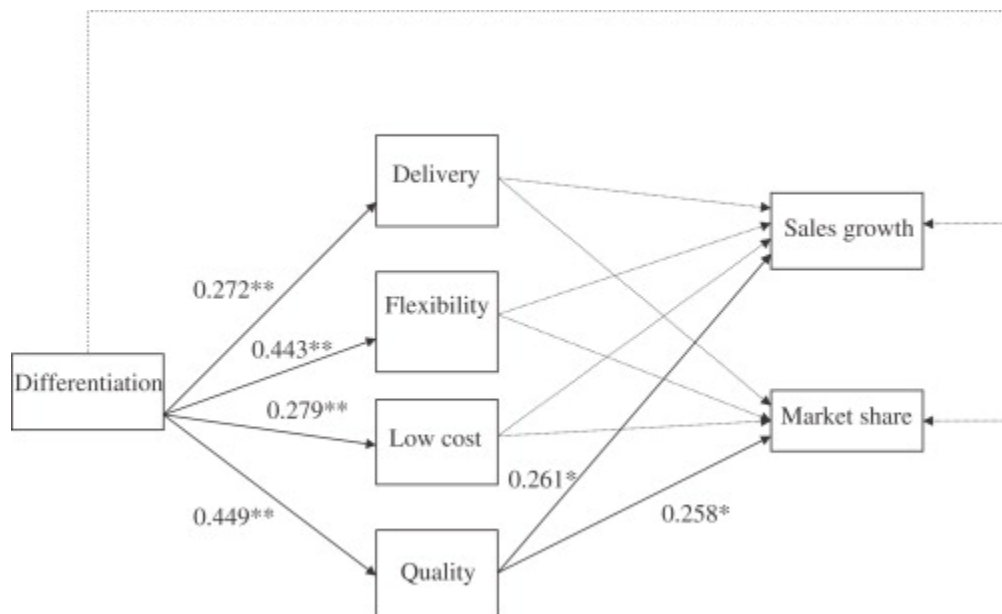

Fig. 3. Results of path analysis for differentiation model. Significant paths are indicated with bold lines. *p<0.05. **p<0.01.

7. Discussion and managerial implications

7.1. Discussion

The goal of this study was to examine the relationships between manufacturing strategy and competitive strategy, and their impact on firm performance. Several notable findings are evident from our results. The literature has noted that manufacturing strategy (as one of the functional strategies) adds detail to the implementation of competitive strategy. The expectation is that if a firm chooses to implement a cost leadership strategy then it must place an emphasis on low cost

manufacturing strategy to avoid misalignment (see Fig. 2). This appears to be happening in the Ghanaian manufacturing environment. Among the four manufacturing strategy components, a low cost manufacturing strategy provides the strongest link with cost leadership strategy. Given that materials and overhead costs make up a large portion of manufacturing costs, it is not surprising that several manufacturers are looking at low cost sourcing and production alternatives in order to reduce their manufacturing costs. This finding is consistent with previous findings (Ward and Duray, 2000; Ward et al., 1996). Although the cost of direct labor is relatively cheap in Ghana, over 50% of the materials used by manufacturing firms are imported (Wolf, 2004), and thus manufacturers emphasizing a cost leadership strategy will not be successful without implementing a low cost manufacturing strategy.

At the same time, it is equally important not to ignore the other manufacturing strategy components. An emphasis on quality is equally important. For example, providing products with minimal defects and using statistical control methods that allow early detection of quality problems will allow the firm to reduce the cost of its operations and achieve its cost leadership goals. In the same manner, providing reliable deliveries will reduce any expediting costs associated with the inability to meet delivery promises and also reduce any inventory related costs. And lastly, a firm's ability to adjust capacity rapidly as part of its flexibility efforts will lead to less need for excess capacity and thus a reduction in production costs that can translate to price reductions and the attainment of a cost leadership position.

A competitive strategy based on differentiation requires the provision of unique products and services as well as the development of brand loyalty and image management. Although all four manufacturing strategy components are strongly related to differentiation, the strongest links are with quality and flexibility (see Fig. 3). Thus, an emphasis on quality and flexibility appear to be the most important strategies for accomplishing a firm's differentiation objectives. For example, obtaining quality certifications such as ISO 9000 allow firms to assure their customers of the consistent quality of their product offerings and thus enable them to differentiate themselves from other manufacturers who have not attained such certification. It is a well-known fact that several manufacturers in the US seek ISO certification in order to compete in the European market. In Ghana, because of the country's closer ties with Europe (partly because of the colonial history and also partly due to proximity), exporting products to Europe is highly sought after and ISO 9000 certification is a means to accomplish that goal. In addition, high quality products will lead to the attainment of brand loyalty. A firm's ability to handle changes in product mix and adjust its capacity quickly will enhance its ability to offer customized products and thus gain the ability to differentiate itself from other competitors in the market place. We observed that firms in Ghana also recognize reliable deliveries as important ways of achieving a differentiation strategy. Reliable deliveries will enhance a firm's reputation and create customer loyalty.

These results collectively indicate that, as expected from theory, strong relationships exist between competitive strategy and manufacturing strategy. Although the findings are not new, they come from an environment that traditionally has not been widely studied in manufacturing research. It appears that in Ghana as in other more advanced economies, successful differentiators pursue a portfolio of manufacturing strategies to make their offerings distinctive in the market place and that while a firm may choose multiple ways to differentiate itself, its

manufacturing resources may be used to selectively enhance some of its strategic thrusts (Williams et al., 1995; Ward and Duray, 2000).

We found strong, direct and significant relationships between quality and sales growth and between quality and market share. An emphasis on quality appears to influence both sales growth and market share performance of firms in Ghana. However, we did not find significant relationships between delivery, cost, and flexibility, and firm performance. Several previous studies have found minimal significant direct relationships between manufacturing strategy and firm performance at the business unit level (Williams et al., 1995; Ward and Duray, 2000). The reason for the weak relationships between manufacturing strategy and firm level performance can be attributed to the fact that business level performance is the result of the contributions of several functional areas and the impact of one area such as manufacturing might be difficult to isolate. Thus, combining manufacturing strategy with other functional strategies such as marketing and human resources in the analysis might yield improved results (Williams et al., 1995). Furthermore, the relationships among functional strategies, competitive strategy and firm performance are more complex than existing theory suggests and more studies, especially those in non-traditional environments, are needed to shed more light on the nature of these relationships.

Our results show that for some instances the total impact of competitive strategy on performance was greater in the presence of manufacturing strategy although for some of them the increase was not statistically significant. For example, the alignment of competitive strategy with delivery increases market share while the alignment of competitive strategy with flexibility increase sales growth, although for both instances the total impacts are not statistically significant. However, in the case of quality, the alignment with competitive strategy leads to significant increases in market share and sales growth. A close examination of Fig. 2, Fig. 3 indicates that quality mediates the relationship between competitive strategy and both market share and sales growth. This lends support to Porter's (1980) argument that strategy selection by itself does not necessarily lead to improved firm performance. Strategy implementation plays a critical role. In this study we have shown that implementing a competitive strategy in combination with a quality manufacturing strategy has a positive impact on performance. A quality strategy not only enhances a firm's reputation but also leads to improvements in cost efficiencies, speed and reliability and the ability to meet delivery promises.

We offer the following as possible explanations why quality appears to offer significant benefits while the others do not offer enhanced benefits. The Ghanaian manufacturing environment is characterized by raw material shortages, outdated equipment and unused capacity. The smuggling of inexpensive goods together with the influx of used goods (such as used clothing) affect the price competitiveness of local firms and thus minimize any benefits that can be gained from a low cost operations strategy. For example, the International Trade Center (based in Geneva) reports that the country imports over $43 million of used clothing every year compared with a local of production of $4 million (Crawley, 2004). A flexibility strategy is very appropriate if a manufacturer is trying to shape the market in which it competes. Manufacturers in Ghana, in the current economic environment that we have described, are not in a position to shape the market. And, the logistics and transportation infrastructure in Ghana is not well developed. Most people are used to long delays of goods at ports or waiting long periods of time

for receipt of goods. It is estimated that there are only 43,000 km of roadways in the entire country and less than 10% of these are paved (The World Factbook, 2005). Thus, an emphasis on delivery is not likely to provide the same benefits as would be expected from a quality emphasis.

7.2. Managerial implications

Ghana, since the 1980s, has been implementing economic reforms that include the removal of price controls, subsidies and other protective mechanisms, and free trade policies. Manufacturing firms are finding it difficult to compete both locally and globally because of the resultant trade reforms. For example, whereas at one time Ghana had as many as 25,000 people employed in the textiles industry, the current number is less than 3000 (Crawley, 2004). So, the question is how can firms "compete with manufacturing"? Our results show that perhaps given where the firms are and the environments that they operate in, a manufacturing strategy that places an emphasis on quality moreso than delivery, cost or flexibility, is likely to lead to enhanced performance. Lack of talent, access to capital (compared to companies in the US and Europe), often make it difficult for firms in developing countries to build global brands or invest in R&D to achieve flexibility in their operations (Khanna and Palepu, 2006). Emphasizing reliable and dependable delivery is not easy to achieve because of inadequate infrastructure and delivery systems. Despite the relatively low cost of labor, most manufacturers are unable to produce items cheaper than the landed price of equivalent imports. For example, the price of garden furniture imported from China into Ghana is 40% less than the price of equivalent furniture manufactured in Ghana (United States International Trade Commission, 2004). So, although the immediate pressure might be a need to emphasize low cost manufacturing strategy, our results indicate that managers in these environments might realize greater benefits if they place more emphasis on quality. Specifically, they need to develop ways to achieve consistent quality through the implementation of such programs as statistical quality control, obtaining ISO 9000 certifications and reducing defect rates.

8. Conclusion

An important aspect of strategy development is the translation of firm level competitive strategies into functional strategies. We have demonstrated that even in less developed economies manufacturing strategy represents one of the means through which firm level strategic objectives can be achieved. We found significant relationships between competitive strategy and manufacturing strategy. Our findings confirm that all four manufacturing strategies (cost, delivery, flexibility, and quality) are means through which a firm can implement its competitive strategies. Of the four manufacturing strategy components, our findings indicate that only quality appears to influence firm performance.

We did not find any direct relationship between competitive strategy and firm performance. However, competitive strategy influences firm performance through quality. Quality improves firm performance significantly regardless of which competitive strategy a firm chooses to emphasize. This is perhaps true because of the impact quality has on the other manufacturing strategy components. For example, improving quality can reduce manufacturing lead time, reduce amount of time spent on rework, the quantity of materials rejected, and thus contribute to improvements in flexibility, delivery times, and unit cost efficiencies. The literature on

manufacturing strategy has noted that lasting improvements in performance is likely to be attained when those improvements are built on a solid quality foundation (Ferdows and De Meyer, 1990). In addition, it appears that the current economic environment favors an emphasis on quality compared to the other manufacturing strategy components. For example, the flood of imports into the Ghanaian market has made cost (or price) an order qualifier. In order to win orders quality must be emphasized. This is unlike advanced economies where quality is now considered to be an order qualifier. There is often the perception in Ghana that imports are of higher quality than locally produced goods. Therefore, a firm that emphasizes quality as part of the implementation of its competitive strategy is more likely to build a reputation (by changing those perceptions) and therefore able to gain market share and sales growth.

The data collection for this study was confined to firms in Ghana, a developing country. However, the findings are consistent with those that have been obtained in more developed economies (e.g., Ward and Duray, 2000). In that sense the results are not only interesting but also unexpected. Firms in Ghana are relatively small. Most of them are wholly locally owned and over 45% of firms in our sample are family owned. Yet, our results suggest that manufacturing strategy is recognized as being important in the implementation of competitive strategy even in such environments. The expectation in the manufacturing literature is that aligning manufacturing strategy with competitive strategy will lead to enhanced performance. Based on our findings, we cannot refute those expectations. Although the alignment of competitive strategy with flexibility, delivery or cost did not lead to significant improvements in performance, the alignment of competitive strategy with quality leads to significant improvements in performance. Thus, it appears that firms in developing economies who are faced with increased competition brought about by trade liberalization and other reforms will benefit greatly from an emphasis on a quality strategy in combination with their selected competitive strategy. This is consistent with recent observations by Khanna and Palepu (2006) who noted that if domestic firms in emerging-markets improve the quality of their products, they are better able to compete successfully with multinationals.

There are some limitations in this research. First, as indicated earlier, firms in Ghana are relatively small compared to firms in advanced economies. Thus, it is possible that these firms do not have the human capital to implement the different types of strategies discussed in this paper and limit their ability to achieve the intended benefits. We could not account for the potential impact of firm size on our results because about 75% of the firms have less than 100 employees. Second, we confined our study to manufacturing firms. It might be useful to include firms from the service industry in future studies to see if industry plays a role in the implementation of operations strategy and the realization of subsequent benefits. Even within manufacturing the limited number of firms in each sector did not allow us to ascertain differences between the different sectors. It might be interesting to know if different results exist depending on the industrial sector. Third, we studied only two performance measures, market share and sales growth. Although there is an expected correlation between our performance measures and profitability, including specific assessment of profitability in future studies will be useful.

It is hoped that future research would seek to include other developing economy environments in Africa, Asia, Latin America and the Caribbean so as to strengthen our understanding of

manufacturing (or the broader operations) strategy. If existing findings on manufacturing strategy can be replicated in other environments, it will strengthen the theories underlying those findings and enhance our understanding of manufacturing strategy and its impact on firm performance. Future research should include other functional strategies such as marketing and human resources and assess the joint contributions of these strategies to competitive strategy and firm performance.

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