

Resilience in Family and Nonfamily Firms: An Examination of the Relationships between Manufacturing Strategy, Competitive Strategy and Firm Performance

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Abstract:

Economic recessions that affect firms regardless of location, increased competition and changes in customer expectations, all contribute to disruptions that require firms to be resilient. Building resilience is a long-term strategic initiative that changes the way a firm operates by aligning linkages between functional strategies and competitive strategy. This article compares the relationship between manufacturing strategy and competitive strategy, and the relationship between manufacturing strategy and performance for family and nonfamily firms in the developing economy of Ghana. Using data from 122 manufacturing firms, the results indicate that delivery strategy is associated with the competitive strategy of cost leadership for family firms while flexibility is associated with cost leadership for nonfamily firms. Flexibility is related to the competitive strategy of differentiation for family firms but not for nonfamily firms. While delivery is associated with both sales growth and profitability for family firms, for nonfamily firms only flexibility is related to profitability. Our study suggests that family firms and nonfamily firms in Ghana use different manufacturing strategy components to build resilience. Implications of this pattern of results are discussed.

Keywords: resilience | family-owned firms | manufacturing strategy | competitive strategy | Ghana | firm performance

Article:

1. Introduction

The need to be resilient against disruptions is even more severe for family firms located in developing economies. First, developing economies who are trying to implement economic reforms are often faced with import competition from developed economies (Dangayach and Deshmukh 2001, Khanna and Palepu 2006). Firms in most developing countries produce at

higher costs than prices of imports. Second, few studies have examined the differences between family firms and nonfamily firms in their use of manufacturing strategies to develop resilience. Family firms are credited for fuelling the engine of entrepreneurship in several countries (Rogoff *et al.* 2003, Castillo and Wakefield 2006). Despite this important role, not much is known about how they build resilience capabilities. Family firms adopt a long-term focus, are cooperative with stakeholders and tend to hire long-term employees (Miller *et al.* 2009). However, family firms have a poor management pool, lack skilled employees and capital and face family conflicts in managing the business (Schulze *et al.* 2003, Miller 2006). Thus, economic downturns are likely to impact family and nonfamily firms differently.

Resilience is generally thought of as the ability of a firm to persist in the face of substantial changes in the business and economic environment and/or the ability to withstand disruptions and catastrophic events (Sheffi and Rice 2005, Beverly and Rodysill 2007). Resilience has also been conceptualised at the organisational level as the power of organisational units to resume, bounce back or positively adjust to untoward events, disruptions and external shocks (Sutcliffe and Vogus 2003, Gittell *et al.* 2006, Powley 2009). Disruptions result from increased global competition, customer expectations, complex supply chains, shorter product life cycles, natural disasters and catastrophic incidents.

We focus on examining the ability of family and nonfamily firms developing long-term resilience capabilities in dealing with global competition, and customer expectations as opposed to dealing with recovery from disruptions brought about by catastrophic incidents or natural disasters. In this article, resilient capabilities imply the ability of firms to align their manufacturing strategies to competitive strategy resulting in competitive advantage and superior performance. This is important because developing resilience should be conceived as a strategic initiative aimed at reducing the vulnerabilities brought about by the changes in the competitive environment (Sheffi and Rice 2005).

Researchers in the manufacturing area have argued and sometimes demonstrated that manufacturing strategy can have a significant impact on an organisation's ability to achieve competitive advantage and superior performance (Ahmad and Schroeder 2003). However, little attention has been devoted to the comparative analyses of how the impact of manufacturing strategy on competitive strategy, and the impact of manufacturing strategy on firm performance, differ between family and nonfamily firms.

Recent research from advanced economies has not only shown that family firms are different from nonfamily firms, but has also demonstrated that family-controlled firms outperform nonfamily-controlled firms (Anderson and Reeb 2003, Villalonga and Amit 2006). Given that family and nonfamily firms differ in terms of their entrepreneurial orientation, risk taking, innovation propensity, organisational structures and access to capital (Schulze *et al.* 2003, Naldi *et al.* 2007), their manufacturing and competitive strategies may also be different. Also, the relationship between manufacturing strategy and firm level performance is likely to be different for the two types of firms. This is likely to be true in developing economies where most family firms face huge obstacles in their business activities when compared with nonfamily firms. Developing economies are characterised by shortage of managerial and technical skills and expertise, funding sources, technology and the existence of high levels of market imperfections.

They also suffer from ‘institutional voids’ – the absence of market-supporting institutions, specialised intermediaries, contract-enforcing mechanisms and efficient transportation and communication networks (Khanna and Palepu 1997). As argued by Chang *et al.* (2008), ‘a family firm's formation and continued existence, as well as its scale and scope, are likely to be influenced by its external environment’.

Organisations are better able to develop resilience capabilities when they have business models that fit the needs of the competitive environment (Gittell *et al.* 2006). Therefore, one way of responding effectively to crises for businesses is the alignment of functional strategy with competitive strategy. We argue that manufacturing strategy and its relationship with both a firm's competitive strategy and performance represent ways to achieve resilience. This is because manufacturing strategy influences the structural and infrastructural decisions that build flexibility in resource acquisition and deployment that in turn reduce vulnerabilities against severe economic changes (Sheffi and Rice 2005).

The objective of this article is therefore to examine whether or not the relationship between manufacturing strategy and competitive strategy and the relationship between manufacturing strategy and firm performance differ between family firms and nonfamily firms. Specifically, our study uses data from Ghana to seek answers to the following questions: (1) Is the relationship between manufacturing strategy and competitive strategy different for family and nonfamily firms? and (2) Is the impact of manufacturing strategy on performance different for family and nonfamily firms?

This study will contribute to the literature on how manufacturing strategy helps firms to develop resiliency in their environments. The study introduces and examines this issue from both theoretical and practical lens. Specifically, the contribution of manufacturing strategy in developing resiliency capabilities across family and nonfamily firms that typically face disparate competitive strategic goals and performance will be addressed (Sharma *et al.* 1997). As suggested by Wu *et al.* (2007), a fruitful area of research on family businesses should be a focus on the strategic choices made by those firms rather than on the family involvement in the business. For instance, an understanding of how manufacturing strategy is developed in family firms helps one to understand resilience capabilities in difficult environments such as those in African countries.

2. Theoretical background and hypotheses

There is no single accepted definition of a family firm in the literature. In defining a family firm, most researchers have focused on characteristics such as motive to pursue family vision; family employment; family control for inter-generational sustainability; and family involvement in ownership and management (Shankar and Astrachan 1996, Chua *et al.* 1999, Anderson and Reeb 2003, Chrisman *et al.* 2004). The two main underlying characteristics of family firms are family ownership and control of the firm, and family members’ involvement in the decision-making process. These two characteristics of ownership and involvement significantly shape the formulation of manufacturing strategy. Thus, in this study, we define a family firm as a firm that is owned and controlled by a specific family, and where family members are involved in the firm's management and decision-making processes.

Agency theory precepts argue that the separation of ownership and control and the management of agency costs have been used to explain the differences between family and nonfamily firms (Jensen and Meckling 1976, Schulze *et al.* 2001). Jensen and Meckling (1976) argue that formal governance mechanisms are unnecessary in family firms because agency costs are nonexistent. In nonfamily firms, the interests of owners and managers are usually at odds with long-term performance objectives, and they are more likely to focus on short-term strategic initiatives. On the other hand, because ownership and management are in the same hands in family firms, managers have the freedom, opportunity and motivation to pursue bold strategic initiatives that are devised with long-term capabilities development, investment horizons, performance and reputation of the business in mind (Miller and Le Breton-Miller 2003).

Empirical studies have produced contradictory evidence with respect to the performance effects of family ownership and involvement. While some studies found no relationship between family ownership and firm performance (Castillo and Wakefield 2006, Westhead and Howorth 2006) others have shown that family-owned and controlled firms outperform nonfamily firms (Anderson and Reeb 2003, Villalonga and Amit 2006). Dyer (2006) has argued that the contradictory evidence is due to the absence of other intervening factors such as firm governance, strategy, quality of management and industry type. We address this shortcoming by investigating how the relationship between manufacturing strategy and competitive strategy and between manufacturing strategy and performance differ between family firms and nonfamily firms.

2.1 Alignment of manufacturing strategy and competitive strategy

Manufacturing strategy refers to the specific competencies in the areas of cost, quality, delivery and flexibility that are developed to achieve the competitive priorities in firms (Hayes and Wheelwright 1984). As developing resilience is a strategic initiative that is aimed at reducing the vulnerabilities brought about by the changes in the competitive environment, manufacturing firms' resilience is a function of their competitive position as a result of strategic manufacturing activities (Gittell *et al.* 2006). For a manufacturing firm, one way of achieving resilience is by linking the manufacturing strategy to competitive strategy thereby meeting customer expectations and achieving superior performance. As Neilson *et al.* (2005) note, resilient organisations are highly adaptable to external market shifts, yet focused on aligning their functional strategies to a coherent competitive strategy.

Research suggests that manufacturing strategy can shape a firm's competitive strategy (Gupta and Somers 1996, Ward and Duray 2000). We argue that family and nonfamily firms will have different abilities to align manufacturing strategy with competitive strategy so as to build resiliency. This is because they have different manufacturing resources and therefore capabilities to cope against disruptions in their business environment.

Few studies have sought to explain the differences between the strength of the relationship between manufacturing strategy and competitive strategy across family and nonfamily firms. In most developing countries, family firms have the potential to contribute significantly to the economic growth (Walter *et al.* 2003, Wu *et al.* 2007). This is because of the transfer of wealth

and inimitable capabilities within the family firm as a result of succession decisions and the desired objective of maintaining control over the business. Family firms are expected to be more agile in adapting to changes and making decisions quickly. Thus, family firms are expected to make strategic choices that take advantage of such strengths, which are important requirements for building resiliency. Based on this argument, one would expect to find a stronger relationship between the manufacturing strategy of flexibility and competitive strategy of differentiation for family firms than nonfamily firms (Boyer and Lewis 2002). This is also consistent with Sheffi and Rice's (2005) argument that a firm can bolster its resilience by building in flexibility in its resources.

Another mechanism for a firm to achieve resilience is to build redundancies in resources, such as unused capacity and multiple suppliers (Sheffi and Rice 2005). Specifically, nonfamily firms can build redundancies because of their ability to negotiate for better prices from suppliers and use multiple suppliers. Family firms on the other hand are expected to possess the disadvantages of inadequate technological capabilities, lack of financial strength and can suffer disproportionately from lack of appropriate infrastructure in their operating environments (Dangayach and Deshmukh 2001). Thus, one cannot expect strong relationships between manufacturing strategy and cost leadership strategy for family firms compared to nonfamily firms.

An additional argument can be borrowed from the literature on organisational routines. One would expect that organisational routines are more embedded in nonfamily firms and thus, nonfamily firms are likely to enjoy a stronger alignment between manufacturing strategy and competitive strategy because of their ability to routinise the decisions linking manufacturing strategy with competitive strategy (Nelson and Winter 1982). As Paiva *et al.* (2008) point out that 'know-what' (where to find the needed information) and 'know-how' (how to run operations smoothly) are key components of organisational knowledge which could be embedded in routines in a firm and thus help in manufacturing strategy formulation, and build resilience in the organisation. In particular, when a firm is facing economic disruptions, know-what and know-how strategies are even more pertinent in making timely decisions to cope with these disruptive events thereby enhancing the firm's resiliency profile. However, an alternative view can be that informality, as present in family firms, makes them more adaptive to changes in competitive landscapes making the alignment of manufacturing strategy with competitive strategy stronger in family firms than in nonfamily firms.

The above arguments show that there is no consistent pattern of explanations that might favour one group of firms over the other with regard to how manufacturing strategy might contribute to competitive strategy formulation and the building of resilience. A competitive strategy that emphasises leanness so as to achieve cost leadership might strip the organisation of resources needed to achieve volume flexibility to respond to changes in customer demands (Weick and Sutcliffe 2001). The changing competitive environment in Ghana has led to an influx of new product offerings, undercutting of prices and an increase in alliances or mergers that has eroded the competitiveness of both family and nonfamily firms. Firms can counter and minimise the impact of these changes by building resilience through the development of new strategies and business models (Hamel and Valikangas 2003, Neilson *et al.* 2005). For example, nonfamily firms can build resilience through a manufacturing strategy that takes advantage of their bargaining strength and stronger relationships with suppliers to drive material costs down and

thus attain cost leadership advantages. Family firms, on the other hand, can achieve resilience from their closer relationships with customers to pursue delivery strategies that lead to the attainment of a differentiation competitive advantage.

Resilient organisations are usually agile in responding quickly and effectively to changes in the business environment. Family firms can enhance their resilience capabilities through their internal social connections which help them to rapidly cope with and respond to changes in the business environment. Resilient organisations have a knack for leveraging the collective know-how in their employees to help them out in times of need (Lengnick-Hall and Beck 2005). To the degree that interpersonal ties are ingrained habits in family firms, those habits lead the firm to open communication channels that seek multiple sources of information when uncertainty increases. These characteristics will help family firms with regard to attaining manufacturing flexibility in the drive to achieve differentiation strategy.

Nonfamily firms, however, tend to have a corporate culture that boosts their commitment to knowledge management so as to leverage their collective know-how in building resilience capacity (Lengnick-Hall and Beck 2005). Sutcliffe and Vogus (2003) argue that a resilient response includes broader information processing, loosening of control and utilisation of slack capabilities. These mechanisms provide the firm with the decision-making ability to respond quickly to changing customer demands and preferences that lead to the achievement of manufacturing flexibility and therefore support a differentiation strategy.

Thus, we expect that the strength of the relationship between manufacturing strategy and competitive strategy for family and nonfamily firms will depend on the specific nature of the manufacturing and competitive strategies pursued by the firm in the drive towards achieving resilience in their operations. Accordingly, we propose that:

H_{1a}: The association between manufacturing strategy and cost leadership strategy will be different for nonfamily and family firms.

H_{1b}: The association between manufacturing strategy and differentiation strategy will be different for nonfamily and family firms.

2.2 Manufacturing strategy and firm performance

It has been suggested in the literature that building resilience can be an effective mechanism for achieving superior performance (Beverly and Rodysill 2007). Therefore, we are interested in knowing the extent to which manufacturing strategy contributes to firm performance and thereby build resilience. The manufacturing strategy literature suggests that manufacturing strategy can have a significant impact on firm performance (Vickery *et al.* 1993, Gupta and Lonial 1998). In a meta-analysis of manufacturing strategy, White (1996) proposed a model that shows direct linkages between low-cost manufacturing strategy and business performance. Manufacturing's influence on firm performance is *via* decision-making processes, the proactiveness of the manufacturing function and investment in manufacturing assets (Hill 1994, Schroeder *et al.* 2002). Gittel *et al.* (2006) found that a viable business model contributes to building resilience and being able to recover quickly from crisis. Manufacturing strategy's impact on

performance is influenced by a manager's ability to make appropriate decisions on the components of manufacturing strategy that lead to the attainment of competitive capabilities and subsequent performance.

The literature that could help explain differences in the strength of relationship between manufacturing strategy and firm performance between family and nonfamily firms is sparse. Yet one can surmise the role of manufacturing strategy on firm performance between family and nonfamily firms. The ability to develop resilience from investments in policies, processes, technology and infrastructure that accompany manufacturing strategy will depend on the absorptive capacity of the firm. Absorptive capacity is the ability to acquire, assimilate, transform and exploit innovative techniques (Cohen and Levinthal 1990, Zahra and George 2002). An organisation's absorptive capacity is dependent on the collective absorptive capacity of the members which is a function of prior investments in the technical abilities of employees. Given the limited financial reserves available to family firms to invest in their employees, family firms are likely to have less absorptive capacity than nonfamily firms.

Another theory that might help provide insight on the differences in the relationships between manufacturing strategy and firm performance for family and nonfamily firms is the resource-based theory. The resource-based theory posits that firms possessing valuable, rare and inimitable resources can use those resources to create competitive advantage. An organisation's manufacturing resources arising from its manufacturing strategy decisions must possess high uniqueness and low substitutability in order to provide benefits to the firm. Family firms are more likely to have low turnover in their employee base because of the culture of developing strong positive interpersonal relationships (Naldi *et al.* 2007). Thus, they are more likely to gain the advantage of company-specific skills and experiences that are unique and not easily imitable. Gittell *et al.* (2006) have found that positive interpersonal relationships tend to produce lower costs making it easier to sustain external shocks without breaking commitments, thus further strengthening the relationship between manufacturing strategy and performance. They note that relationships built on shared goals, shared knowledge and mutual respect lead to high coordination among employees which improves quality and efficiency, and thus overall firm performance. Moreover, in a developing economy, because infrastructure is limited, the firm-specific skills and experiences of long-serving employees can be translated into organisational knowledge that will lead to improved delivery practices and better customer satisfaction, and therefore lead to superior performance. On the other hand, nonfamily firms are more likely to have the means to acquire scarce resources that provide the potency to achieve competitive benefits. A key mechanism for achieving resiliency is building flexible financial reserves that enable the firm to cope with unanticipated events (Meyer 1982, Wildavsky 1988). For example, the ability to invest in new manufacturing technology can lead to improvements in processes that lead to resilience capability development such as the attainment of high design and conformance quality as well as cost efficiencies and thus contribute to high performance.

Based on the above arguments that indicate that family and nonfamily firms develop resilience to cope with disruptions in the competitive environment differently, we suggest that it is difficult to specify *a priori* the strength of the impact of manufacturing strategy on performance for family and nonfamily firms. Thus, we propose that:

H₂: The impact of manufacturing strategy on performance will be different for nonfamily and family firms.

3. Method

3.1 Sample and data collection

This study was part of a larger study in which questionnaires were hand-delivered to 250 manufacturing and service organisations in Ghana. The sample consisted primarily of small, medium and large firms drawn from a list of companies that are part of the Association of Ghana Industries. We contacted the operations, human resources and marketing managers in the companies, explained the purpose of the study, gave the questionnaires and obtained promissory dates when we would receive the completed questionnaires. The entire data collection process took 3 weeks.

A total of 192 completed surveys were obtained representing a response rate of 76.8%. 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. We checked for nonresponse bias by testing the size, industry type and ownership structure and found no statistical differences between early and late respondents (Lambert and Harrington 1990). We took several steps to check for common method variance (CMV). First, the functional strategy items were interspersed with competitive strategy, performance and demographic measures. Second, some of the scales were reversed, so one end of the responses did not always correspond to a larger effect. Third, the respondents were assured of the anonymity of their responses and companies in any published results. These techniques have been used in published management research to minimise CMV (Podsakoff *et al.* 2003).

3.2 Operational definitions of variables

Our assessment of competitive strategy has its foundation in Porter's (1980) typology. The main components of competitive strategy that were examined are cost leadership and differentiation. Competitive strategy was assessed using 14 items derived from the literature (Dess and Davis 1984, Kotha and Vadlamani 1995). From the factor analysis of the competitive strategy items, 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 strategy* using four items that asked the respondents to indicate the importance of competitive pricing, procurement of raw materials, reduction of production costs and minimisation of operations costs to the firm. *Differentiation strategy* was assessed with six items that asked about the importance of advertising, developing innovative marketing techniques, influencing/controlling channels of distribution, utilising highly skilled sales force/agents, customer service and product quality. The scale for both cost leadership and differentiation strategies was a 7-point Likert-type ranging from 1 (not important) to 7 (extremely important).

Table 1. Means, standard deviations, correlations and reliability coefficients.

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Differentiation	5.53	0.96	0.69									
2. Cost leadership	6.29	0.63	0.37**	0.58								
3. Delivery	6.23	0.94	0.29**	0.42**	0.73							
4. Flexibility	5.61	0.86	0.36**	0.50**	0.44**	0.64						
5. Low cost	6.23	0.93	0.26**	0.57**	0.49**	0.49**	0.77					
6. Quality	5.27	1.06	0.31**	0.38**	0.49**	0.50**	0.45**	0.69				
7. Ownership structure	0.35	0.48	-0.02	-0.08	-0.13	-0.04	0.03	0.00				
8. Firm size ^a	0.26	0.44	0.12	0.11	-0.14	0.13	0.12	0.08	0.27**			
9. Family firms ^b	0.46	0.50	-0.03	-0.10	0.05	0.09	-0.01	0.09	-0.26**	0.18*		
10. Profitability	3.94	1.60	0.19*	0.23*	0.09	0.26*	0.04	0.03	-0.05	0.19*	-0.09	
11. Sales growth	4.18	1.70	0.19*	0.16+	0.07	0.15	0.01	0.11	0.08	0.16+	0.20**	0.75**

Notes: Alpha value for reliability test is shown at the intersection.

^aFirm size is coded 0 if number of employees is <100, 1 otherwise.

^bFamily firms coded 1 and nonfamily firms coded 0.

**Correlation is significant at the 0.01 level (two-tailed).

*Correlation is significant at the 0.05 level (two-tailed).

+Correlation is significant at the 0.10 level (two-tailed).

Bold, statistical significance at $p < 0.05$.

Table 2. Impact of manufacturing strategy on competitive strategy (Neter *et al.* 1993).^a

Variables	Cost leadership strategy					Differentiation strategy				
	Model 1a		Model 2a		t-Test	Model 1b		Model 2b		t-Test
	Family firms	Nonfamily firms	Family firms	Nonfamily firms		Family firms	Nonfamily firms	Family firms	Nonfamily firms	
Controls										
Firm size	0.130	0.133	0.072	0.100		0.221	0.038	0.072	0.100	
Ownership structure	-0.025	-0.143	-0.013	-0.248*		-0.144	0.009	-0.013	-0.248*	
Manufacturing strategy										
Delivery			0.312*	0.043	1.85+			0.252	0.032	1.28
Flexibility			0.102	0.250+	-1.02			0.377*	0.043	1.95*
Cost			0.332*	0.367**	-0.24			-0.197	0.111	-1.79+
Quality			0.149	-0.025	1.20			0.214	0.070	0.83
R ²	0.017	0.026	0.570	0.325		0.061	0.002	0.375	0.010	
Change in R ²			0.554	0.299				0.314	0.008	
Model F	0.403	0.795	9.925***	4.094**		1.613	0.051	4.493***	0.428	
N	50	61	51	57		52	62	51	58	

Notes: aCoefficients are standardised variables.

bThe formula for the t-test which was conducted to examine the difference between the betas of the Family firms and Nonfamily firms' subgroups is as follows. The t-test is a two-tailed test for the manufacturing hypotheses.

$$t = \frac{\beta_1 - \beta_2}{\sqrt{\frac{SSE_1 + SSE_2}{N_1 + N_2 - 4} X \frac{\sum X_1^2 + \sum X_2^2}{(\sum X_1^2)(\sum X_2^2)}}$$

$$df = N_1 + N_2 - 4$$

where β is the beta or standardised coefficient, SSE the sum of squared errors, X the manufacturing strategy variables, N subgroup sample size and 1 and 2 the family and nonfamily firms' subgroups, respectively.

+p < 0.10; *p < 0.05; **p < 0.01; and ***p < 0.001.

Bold, statistical significance at p < 0.05.

Manufacturing strategy was assessed through the four commonly accepted dimensions of cost, delivery, flexibility and quality. A 14-item scale adapted from the work of Ward and Duray (2000) was used to assess the manufacturing strategy. *Cost strategy* was assessed with two items measuring the amount of emphasis placed on reducing material costs and overhead costs. *Delivery strategy* was measured with two items that assessed the emphasis placed on meeting delivery promises and providing faster deliveries. We measured *flexibility strategy* by asking respondents to indicate 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 strategy* was measured using six items that assess conformance quality. The items were 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 7-point Likert-type scale ranging from 1 (no emphasis) to 7 (extreme emphasis).

Similar to Youndt *et al.* (1996), we chose to use self-reported performance measures. Firms in Ghana are not often called upon to provide financial data to researchers and as such, gaining access to objective data from company sources is extremely difficult. The use of self-reported perceptual performance measures is quite common in operations management research (Gupta and Somers 1996, Youndt *et al.* 1996, Ward and Duray 2000). Two measures of firm performance were used in this study – sales growth and profitability. For each measure, the respondent was asked to indicate the extent to which the actual performance of his/her firm compared to the firm's competitors over the past 3 years. A 7-point Likert-type scale ranging from 1 (much smaller) to 7 (much larger) was used.

3.3 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. The use of the constructs in several past research studies provides evidence of the validity of the scales (Anand and Ward 2004, Swink *et al.* 2005). The reliability coefficients of the measures which range from 0.58–0.77 are shown in the diagonal in Table 1. We used factor analyses to examine convergent and discriminant validities. 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 convergent validity. Discriminant validity was assessed by examining whether each item loaded higher on the respective factor than on other constructs. The overall results signified that reasonable discriminant validity has been achieved.

3.4 Analytical approach

Our preliminary analysis consisted of running correlation analysis among the variables. The results are given in Table 1. There are several significant relationships between the manufacturing strategy and competitive strategy variables. To test the hypothesised relationships, we conducted hierarchical regression analyses. We examined the relationships between manufacturing strategy and competitive strategy by running two separate regressions; one with

cost leadership as the dependent variable and the other with differentiation as the dependent variable. Similar regressions were run to test the relationships between manufacturing strategy and firm performance. We used a *t*-test to check for statistical differences between the beta coefficients obtained for family and nonfamily firms (Cohen and Cohen 1983; Table 2).

4. Results

4.1 Manufacturing and competitive strategy

Table 2 shows the results of the hierarchical regression analysis of the relationship between the manufacturing strategy and the competitive strategies of cost leadership and differentiation for family and nonfamily firms. We first tested for the impact of the two control variables of firm size and ownership structure (Models 1a and 1b, Table 2). Since nonfamily firms tend to be larger than family firms and also since nonfamily firms are more likely to have foreign ownership than family firms, we controlled for such effects. For both family and nonfamily firms, the two controls were not significant for both the cost leadership and differentiation models. We then added the manufacturing strategy to the control variables to test for hypotheses H_{1a} and H_{1b}.

Model 2a in Table 2 shows that delivery strategy has a significant relationship with cost leadership strategy for family firms ($\beta = 0.312, p < 0.05$) but an insignificant relationship for nonfamily firms ($\beta = 0.043$). The *t*-test shows that the difference between the two is statistically significant ($t = 1.85, p < 0.10$). For flexibility, the relationship is significant for nonfamily firms ($\beta = 0.250, p < 0.10$) but insignificant for family firms ($\beta = 0.102$); however, there was no difference between family and nonfamily firms. Cost strategy is significantly related to a cost leadership strategy for both family ($\beta = 0.332, p < 0.05$) and nonfamily ($\beta = 0.367, p < 0.05$) firms but the difference between the two types of firms is not significant. The relationship between quality strategy and cost leadership is not significant for both groups of firms. Given that delivery strategy has a significant relationship with cost leadership strategy for family firms but not for nonfamily firms and that the difference between the two betas is significant, H_{1a} which states that the association between manufacturing strategy and cost leadership strategy will be different for nonfamily and family firms cannot be rejected.

Model 2b in Table 2 shows the results of the relationship between manufacturing strategy and differentiation strategy. Delivery and quality strategies have no significant relationship with differentiation for both family and nonfamily firms. There is no significant relationship between cost manufacturing strategy and differentiation strategy for both family ($\beta = -0.197$) and nonfamily firms ($\beta = 0.111$). However, the difference between the two betas is significant ($t = -1.79; p < 0.10$). This means that it appears that differences exist in the relationships between cost strategy and differentiation strategy for family and nonfamily firms. For family firms, flexibility strategy is significantly related to differentiation ($\beta = 0.377, p < 0.05$), while for nonfamily firms, the relationship is not significant. The difference between the two betas is statistically significant ($t = 1.95, p < 0.05$). Overall, the manufacturing strategy results mean that H_{1b} cannot be rejected.

Table 3. Regression analysis of manufacturing strategy on sales growth and profitability.^a

Variables	Sales growth					Profitability				
	Model 1a		Model 2a		<i>t</i> -Test	Model 1b		Model 2b		
	Family firms	Nonfamily firms	Family firms	Nonfamily firms		Family firms	Nonfamily firms	Family firms	Nonfamily firms	
Controls										
Firm size	0.221	0.003	0.056	-0.054		0.216	0.114	0.080	0.069	
Ownership structure	0.031	-0.016	0.072	0.034		-0.048	-0.173	-0.016	-0.126	
Manufacturing strategy										
Delivery			0.404*	-0.077	2.58**			0.351+	-0.015	2.00*
Flexibility			0.081	0.254	-0.93			0.185	0.468**	-1.55+
Cost			-0.316	-0.019	-1.59+			-0.199	-0.178	-0.11
Quality			0.116	0.009	0.57			-0.010	-0.218	1.14
<i>R</i> ²	0.051	0.000	0.164	0.055		0.047	0.030	0.157	0.202	
Change in <i>R</i> ²			0.113	0.055				0.110	0.172	
Model <i>F</i>	1.288	0.007	1.403	0.473		1.170	0.890	1.308	2.068+	
<i>N</i>	50	59	49	58		49	59	48	55	

Notes: ^aCoefficients are standardised variables.

+*p* < 0.10; **p* < 0.05; and ***p* < 0.01.

Bold, statistical significant at *p* < 0.05.

4.2 Manufacturing strategy and firm performance

The results from the analysis of the relationships between manufacturing strategy and firm performance are presented in Table 3 for sales growth (Models 1a and 2a) and profitability (Models 1b and 2b).

In H₂, we postulated that the relationship between manufacturing strategy and firm performance will be different for nonfamily and family firms. Both flexibility and quality strategies have no significant relationships with sales growth for family and nonfamily firms. Delivery strategy, is significantly related to sales growth for family firms ($\beta = 0.404, p < 0.05$) but not significant for nonfamily firms ($\beta = -0.077$). The difference between the delivery strategy betas is statistically significant ($t = 2.58, p < 0.05$) indicating that the relationship is stronger for family than nonfamily firms. The effect of cost strategy on sales growth is negative and insignificant for both family and nonfamily firms.

Delivery strategy has a significant relationship with profitability for family firms ($\beta = 0.351, p < 0.10$) while insignificant for nonfamily firms ($\beta = -0.015$). The difference between the two betas is significant ($t = 2.00, p < 0.05$) and shows that the relationship is stronger for family than nonfamily firms. Flexibility strategy is significantly related to profitability for nonfamily firms ($\beta = 0.468, p < 0.01$) while insignificant for family firms ($\beta = 0.185$). The difference between the two betas is not significant. Based on the overall results of the relationship between manufacturing strategy and performance for both family and nonfamily firms, the findings provide some support for H₂.

5. Discussion

The manufacturing strategy literature points out that manufacturing strategy is a mechanism through which a firm makes strategic competitive choices. Thus, strong relationships are expected to exist between manufacturing strategy choices and the competitive strategies that firms develop and implement. Under this logic, the firm makes structural and infrastructural decisions that provide the capabilities that the firm needs to develop resiliency and achieve competitive goals. Firms are better able to build resilience when they have models that fit the needs of the existing competitive environment. One such effective model is the alignment of functional strategy with competitive strategy (Gittell *et al.* 2006). We compared the association between manufacturing strategy and competitive strategy, and between manufacturing strategy and performance for family and nonfamily firms. Because family and nonfamily firms have different resources, capabilities, different absorptive capacities, and might build resiliency differently in response to the business environmental conditions, we posited that the relationships between manufacturing strategy and competitive strategy will be different for family and nonfamily firms.

Our study found that family firms are more likely than nonfamily firms to emphasise delivery strategy when pursuing cost leadership strategy. There is no such relationship when the competitive strategy is differentiation. It appears that family firms see meeting delivery promises and providing faster deliveries as mechanisms for achieving cost leadership strategy when faced with increased competition and changing customer preferences. The positive networking

relationships established with customers through these delivery mechanisms tend to produce lower costs over time, allowing the firms to adjust easily to external shocks, thus further strengthening the relationships (Powley 2009). A possible explanation for not observing the same relationship between delivery and differentiation strategy is perhaps attributable to the many logistics and infrastructural challenges that manufacturers face in the Ghanaian environment.

Nonfamily firms emphasise flexibility through adjustments in capacity, product mix and product design as a means of pursuing cost leadership strategy. These changes have the potential to reduce overall costs in the long-term which allows them to build financial reserves and thus contribute to achieving resilience in their competitive environments (Gittell *et al.* 2006). However, family firms are more likely than nonfamily firms to align manufacturing flexibility with differentiation strategy. This is perhaps because family firms have the ability to respond to short-term changes in demand and thus are able to respond quickly to their customers' needs. Moreover, because family firms have less span of control, they will be more agile and likely to gain cooperation from their employees to recognise the ability to change volumes quickly and adapt to demand changes as important aspects of a differentiation strategy in their drive to achieve resilience.

Both family and nonfamily firms emphasise cost manufacturing strategy when the intention is to pursue cost leadership competitive strategy. Both firm types recognise the need to reduce material and overhead costs if they are to achieve cost leadership and become resilient in their manufacturing environments. However, nonfamily firms are more likely than family firms to emphasise a cost strategy when the competitive strategy goal is differentiation. Quality is not emphasised by family and nonfamily firms when pursuing either cost leadership or differentiation strategies. This is because quality has become a qualifier in the business environment in Ghana (as in most other environments) and is thus perhaps not recognised as providing firms with the ability to develop resilience and achieve competitive advantage (Amoako-Gyampah and Meredith 2007).

A key mechanism for achieving resiliency is building flexible financial reserves that enable the firm to cope with unanticipated events (Wildavsky 1988). Our findings show that the relationship between delivery strategy and both sales growth and profitability is stronger for family firms than nonfamily firms. It is possible that family firms, which are often located closer to their customers, are able to use meeting delivery promises and providing faster deliveries to their customers to increase their sales and gain additional profits while nonfamily firms may not have such advantages. No relationship was found between flexibility and sales growth for both family and nonfamily firms. However, nonfamily firms, perhaps because of the ability to make long-term additions to their production capacities with resultant redundant resources are more flexible. This flexibility manifests itself in the form of a stronger relationship between flexibility and profitability for nonfamily than family firms. No relationships exist between quality and sales growth for both types of firms. These results are not surprising given the linkage between manufacturing strategy and market-based performance has not been observed consistently in the literature (Ward and Duray 2000, Amoako-Gyampah and Acquah 2008).

An interesting observation from our data is that the relationship between cost strategy and sales growth is more negative for family firms than nonfamily firms. This may be due to the fact that family firms have difficulty in achieving significant cost savings from their operations and feel the pressure of being squeezed by both their suppliers and customers, more so than nonfamily firms. It is perhaps very difficult for family firms to achieve resilience in the Ghanaian manufacturing environment when facing several cost pressures. Building resilience in an environment characterised by ever increasing competition and customer expectations requires firms to develop niche capabilities. Family firms perhaps are unable to compete on the basis of low cost, but can develop niche capabilities through effective delivery mechanisms that allow them to become resilient.

There are some limitations in this study that can offer opportunities for future studies. When we partitioned our data into family and nonfamily firms, it reduced the power of the analyses and thus it is possible that our inability to detect differences in some of the tests might have been due to the limited sample size. This study did not delve into the specific ownership structure and level of involvement within family firms and how they impact the types of strategies pursued in the pursuit of resilience. Also, we studied strategy formulation at the manufacturing strategy and competitive strategy level and not at the specific decision variables level that go into strategy implementation. Examples of such variables include cross-functional integration, technology and strategic action programmes (like JIT, etc.), which may provide further insights on achieving resilience. Last, our focus on resilience was based on adapting to disruptions brought about by severe economic changes in the form of increasing competition from global firms and increasing expectations from consumers. We did not consider disruptions brought about by natural disasters, acts of terrorism or disruptions from everyday operations. Future studies should include such considerations. However, for an initial study, a focus on strategy formulation and its potential influence on building resilience is a good start and can therefore pave the way for future studies especially in developing economies.

6. Conclusion

The effectiveness with which a firm aligns its manufacturing strategy to competitive strategy contributes to building defense against economic disruptions thereby enhancing resilience. Our findings indicate that family firms are more likely than nonfamily firms to align their delivery strategy with cost leadership strategy. We observed that family firms use manufacturing flexibility to achieve differentiation while nonfamily firms use flexibility to achieve a cost leadership strategy. Cost strategy is related to cost leadership strategy for both family and nonfamily firms. In addition, delivery strategy is strongly associated with both sales growth and profitability for family firms, but not for nonfamily firms indicating that family firms are more likely to benefit from delivery strategy than nonfamily firms. On the other hand, flexibility strategy is associated with profitability for nonfamily firms but not for family firms.

Collectively, our results suggest that in order to build resilience in Ghana, family firms should emphasise delivery strategy while nonfamily firms should emphasise flexibility. Also, there was no consistent pattern with regard to the relationships between manufacturing strategy and competitive strategy, and between manufacturing strategy and performance, for family and nonfamily firms. Thus, additional studies are needed in this area; specifically those using data

from other developing countries to understand how firms in those countries can use manufacturing strategy to build resilient capabilities.

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