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Human Capital Availability, Competitive Intensity and Manufacturing Priorities in a Sub-Saharan African Economy

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Several studies have been done on the relationships between human resources management (HRM) practices and manufacturing activities. However, most of these studies have been confined to well-developed economies where the focus of HRM practices is mostly on the investment in human capital to facilitate the use of advanced manufacturing technology. In less developed economies, the primary HRM concern is attracting and retaining skilled, knowledgeable and experienced labor. In this study, we examine the relationships between human capital availability, competitive intensity and their interactive effects on manufacturing priorities in a Sub-Saharan African economy — Ghana. We found that competitive intensity is an important determinant of the emphasis firms plan to place on manufacturing priorities (low-cost, quality, flexibility, and delivery). However, human capital availability affects the emphasis firms plan to place on low-cost and delivery. Furthermore, competitive intensity moderates the relationship between human capital availability and the emphasis that firms plan to place on the manufacturing priorities of low-cost and quality.

INTRODUCTION

Researchers studying manufacturing issues have often focused on the link between business-level strategies and the key capabilities or competitive priorities, which define a firm's manufacturing performance. One aspect of this relationship that has been studied is the impact of human resource management (HRM) practices on manufacturing performance. HRM practices generally consist of a comprehensive set of employee recruitment and selection procedures; incentive compensation and performance management policies; and extensive employee training, participation and involvement in decision making (Becker and Gerhart, 1996). Arthur (1994), Corbett and Harrison (1992), and MacDuffie (1995) provide evidence to show that HRM practices improve manufacturing performance because they involve the upgrading of employee skills and knowledge bases to meet the changing demands of advanced manufacturing technology. However, this is for the most part appropriate in manufacturing environments where there is readily available human capital that firms can build upon through training and development initiatives (Lepak and Snell, 1999).

In most emerging economies, manufacturing firms do not have the requisite human capital and are struggling to attract and/or keep their skilled, knowledgeable and experienced employees for their productive activities. This makes the availability of human capital a more pressing issue in those areas of the world than the use of HRM practices. By human capital we mean the knowledge, skills and expertise embodied in the labor force that is available within a firm and/or the relevant labor market. This study seeks to understand how manufacturing managers' perceptions of human capital availability affect their manufacturing priorities. Manufacturing priorities refer to the emphasis that firms place on achieving low cost, producing high quality outputs, maintaining delivery dependability and ensuring flexibility in their manufacturing activities so as to achieve competitive advantage.

In Sub-Saharan Africa, many governments have introduced and embarked on the implementation of structural adjustment programs (with the assistance of the International Monetary Fund (IMF) and/or the World Bank). These programs are designed to promote manufacturing productivity growth, international competitiveness, and economic development. The backbone of the structural changes has been the privatization of state-owned enterprises and the liberalization of these economies through the removal of price controls, the removal of government subsidies to local manufacturers, the reduction of tariffs on imports, et cetera. While the privatization and economic liberalization programs have made it easier to obtain needed raw materials and inputs for production, it has also affected manufacturing activities more than other activities in these economies by influencing the level of competition, the availability of human capital, the level of wages, and the prices of local and imported inputs (Amoako-Gyampah & Boye, 2001; Steel & Webster, 1992). Thus, knowing the

human capital available to a firm and how it affects the firm's competitive priorities helps the firm develop appropriate strategies so as to obtain the maximum value from its manufacturing function. It enables a firm to understand the role that human capital can play as the firm develops manufacturing capabilities in the face of changing business environmental conditions.

This paper extends the existing research on the HRM-manufacturing function link by examining the effect of human capital availability, and competitive intensity on the manufacturing priorities of firms in Ghana. We also explore the extent to which competitive intensity moderates the relationship between human capital availability and manufacturing priorities. We argue that managerial perceptions about the human capital available to manufacturing firms and the intensity of competition in the environment in which they operate will influence their manufacturing priorities. Furthermore, the effect of human capital availability on manufacturing priorities will depend on the intensity of competition in the firm's environment. While several countries in Sub-Saharan Africa have adopted privatization and economic liberalization policies, Ghana's pace has been faster than most of them, making it an interesting laboratory in which to study the role of human capital and competition in the behavior of manufacturing firms (Leechor, 1994). Furthermore, Ghana may provide evidence of what to expect in Sub-Saharan African economies as they embrace market reforms and economic liberalization with regard to the effect that human capital and competition might have on manufacturing activities. The study will contribute to the literature by presenting evidence from an often-neglected region in management research. Findings from a different economic environment will enhance the generalizability of existing concepts and theories on the role of human capital in manufacturing activities.

THE MANUFACTURING ENVIRONMENT IN GHANA

Ghana, in 1957, became the first Sub-Saharan African country to achieve political independence from colonial rule. Compared to other Sub-Saharan African countries, Ghana was endowed with rich natural resources and skilled labor during independence. Immediately after independence, Ghana pursued an inward-oriented state-directed industrialization policy to modernize its economy. These policies were pursued because Ghana, at that time, lacked a strong domestic entrepreneurial know-how and did not want to depend on foreign investment for development (Appiah-Adu, 1998). However, inefficiencies in the management of the state-owned manufacturing enterprises led to huge excess capacity. Firms became dependent on the government for subsidies and/or protection to survive.

Political instability and economic mismanagement from the mid 1960's to the early 1980's led to the deterioration of the economy, which adversely affected the manufacturing sector through the scarcity of foreign exchange to

obtain the needed raw materials and the exodus of skilled labor to foreign countries (Republic of Ghana, 1989). In order to turn around the economic crises, the government started implementing the International Monetary Fund (IMF) and the World Bank's led structural adjustment program (SAP) in 1983 so as to promote productivity growth, private sector development and economic growth. The contents of SAP include: monetary and banking reforms to improve access to capital; privatization of unprofitable state-owned enterprises; removal of import controls and foreign exchange restrictions; and removal of price controls and local production subsidies (Debrah, 2002).

The SAP also led to the emergence of a deregulated labor market in Ghana. This is because the flexibility in the labor markets of the United States and other Western advanced economies has been recognized as one of the major reasons for the high growth rates they have been enjoying (Michie & Sheehan-Quinn, 2001). The structural changes in the Ghanaian economy have ushered in a recovery, which has earned the country an emerging market economy status by the International Finance Corporation (IFC) (1999). Although the manufacturing sector grew by 3.7% in 2001, its share of real gross domestic product (GDP) has remained constant at about 9.1% since 1996 (Institute of Statistical Social and Economic Research (ISSER), 2002). Manufacturing firms are becoming more customer- and competitor-focused by improving quality, relationships with customers and suppliers, and distribution and delivery of their products. These strategic initiatives are being undertaken so as to reduce operating cost, increase demand, and to deal with heightened competition from the domestic market and imports from abroad.

The economic liberalization policies have made it easier for manufacturing firms to obtain raw materials and inputs for productive activities, but it has also promoted increased competition both in the business environment and the skilled labor market. The on-going removal of the labor market rigidities has further increased the competition for human capital in the manufacturing sector. This has made it difficult for most manufacturing firms to recruit the needed technically-skilled employees. In addition, skilled employee turnover has increased to the point where employment-hopping to obtain better remuneration has become common. An examination of the skill level of registered employment seekers in the manufacturing sector in Ghana indicates that "the best source of employment opportunity for them is the micro and small industrial enterprises" (ISSER, 2002, p. 125). The above analysis of the manufacturing environment in Ghana implies that the structural changes in the Ghanaian economy have affected manufacturing activities by intensifying the nature of competition in the business environment and the ability to obtain and retain the necessary human capital needed for production.

THEORY AND HYPOTHESES

Theoretical Background

Organizational researchers have long contended that human capital is a critical capability that is used for value creation in most firms (e.g., Pfeffer, 1994; Snell and Dean, 1992). Human capital theory is predicated on the fact that employees possess skills, expertise, and knowledge that can be used to create economic value for the firm. A firm's human capital base can be expressed in terms of the stock of knowledge, skills and experiences (especially, the level of education and training) embodied in its employees (Becker, 1993). It can also be expressed through the flow of knowledge, skills and experiences that are acquired when firms implement HRM practices (Snell & Dean, 1992; Delaney & Huselid, 1996). Firms therefore build their human capital base by designing programs to attract and retain talented and high-skilled employees who would enable them to fulfill their strategic needs. For instance, Pfeffer (1994) has argued that firms who want to be successful in the present global business environment must make the appropriate human resource investments to acquire and develop employees who possess higher quality skills and capabilities than their rivals. Furthermore, firms invest in human capital building activities that allow them to increase productivity and future returns (Youndt, Snell, Dean & Lepak, 1996). The human capital of a firm is therefore the knowledge, skills and expertise embodied in its employees that can be used to manufacture products of superior value to customers, and thus improve the overall performance of the firm. In this paper we focus on how the human capital available within a firm and in the labor market affects the ability of Ghanaian firms to implement manufacturing priorities and thus achieve competitive advantage.

Empirically, most of the studies that have been conducted to examine the effect of human capital on organizational outcomes have focused on the role of HRM practices. These HRM practices, which involve the investment and development of human capital, have been found to significantly affect both firm performance (e.g., Applebaum, Bailey, Berg & Kalleberg, 2000; Batt, 2002; Delaney & Huselid, 1996; Huselid, Jackson & Schuler, 1997; Koch & McGrath, 1996; Youndt *et al.*, 1996); and manufacturing performance (e.g., Arthur, 1992, 1994; Corbett & Harrison, 1992; Ichniowski, Kochan, Levine, Olson & Strauss, 1996; MacDuffie, 1995). However, most of these studies have been conducted in advanced western economies, especially the United States.

Recent studies focusing on the stock of human capital have shown that human capital significantly impacts firm outcomes. Pennings, Lee and Van Witteloostuijn (1998) demonstrated that the firm-specific knowledge, skills and experiences embodied in the pool of Dutch professional accountants had a negative effect on firm dissolution. Focusing on law firms in the United States, Hitt, Bierman, Shimizu and Kochhar (2001), found that the knowledge base

(and experiences) embodied in the partners of law firms is negatively related to the return on sales initially, but turns positive with higher levels of human capital. They also found that human capital enabled the firms to implement service and geographic diversification strategies that led to an increase in performance. These studies indicate that the human capital available to a firm does not only create value but can also be used to facilitate the development and implementation of strategies that generate competitive advantages. Similarly, we argue that human capital availability will influence the manufacturing priorities that firms develop.

In emerging economies, researchers conducting empirical studies on human capital have also focused on the effects of HRM practices on firm performance. However, the empirical studies are few and they have been limited to the newly industrialized countries of Southeastern Asia (e.g., Bae & Lawler, 2000; Fields, Chan & Akhtar, 2000; Huang, 1998; Lee & Chee, 1996; Lee & Miller, 1999; Khatri, 2000) and Eastern Europe (e.g., Fey, Bjorkman & Pavlovskaya, 2000). In general, these studies have also shown that HRM practices designed to develop the skill and knowledge bases of employees have value to firms. Our study extends current literature by focusing on a Sub-Sahara African country and also by examining the effects of human capital availability on manufacturing priorities as opposed to the impact of HRM practices on firm performance.

Hypotheses

In Ghana and other Sub-Saharan African countries manufacturing firms face two types of problems with regard to human capital availability. Firms often lack employees with the necessary technical expertise, knowledge base and other skills needed to achieve manufacturing excellence. In addition, most firms find it difficult to attract and retain skilled, knowledgeable and experienced employees for their manufacturing activities. Unless manufacturing firms are able to retain such employees, they would not be able to effectively implement HRM practices so as to build on the human capital available within their companies. The ability to retain human capital is particularly important in Ghana and other Sub-Saharan African countries because of the serious shortage of a skilled, knowledgeable and experienced workforce despite the large pool of unemployed labor (ISSER, 2002). As a result, having the requisite human capital for productive activities would enable manufacturing firms to emphasize manufacturing priorities such as increasing efficiency, improving quality, increasing delivery speed and reliability and creating flexible production processes.

Hayes, Wheelwright, and Clark (1988) have espoused the importance of human capital in improving manufacturing performance. According to Hayes et al. (1988), superior manufacturing performance is dependent on the capabilities embedded in a firm's human capital. Good management principles, manufac-

turing systems, and technology play an essential role in manufacturing firms, but the capabilities that create a competitive advantage come from a firm's human capital. When employees possess the skills, expertise and knowledge required for the manufacturing function, they are more likely to help the firm increase its productivity and performance. Snell and Dean (1992) have shown that the successful implementation of integrated manufacturing practices (i.e., advanced manufacturing technologies, just-in-time inventory control, and total quality management) depends on the level of skill and knowledge of employees. Schroeder, Bates and Junttila (2002), have also shown that the embedded skills and expertise in manufacturing employees drive a firm's proprietary processes and equipment to improve manufacturing performance.

The availability of human capital in the labor market will also influence the manufacturing priorities that firms emphasize or plan to emphasize. This is because the ability to attract and retain human capital will be affected by the availability of human capital in the labor market. When human capital is in relatively short supply individuals who have the needed skills will possess some monopoly power (Becker & Murphy, 1992). Thus, in developing priorities around the manufacturing function, a firm will be expected to consider among other things, the available human capital. A firm is not likely to emphasize a priority that is heavily dependent on human capital if it is not assured of the availability of that human capital. We hypothesize that within the Ghanaian manufacturing environment:

Hypothesis 1: *Human capital availability will be positively related to the emphasis that firms plan to place on manufacturing priorities.*

The competitive environment created by market reforms and economic liberalization can also affect the strategic priorities of manufacturing firms. Firms will need to adapt to the changes in their competitive environment in order to achieve and maintain competitive advantage. The economic transformation in Ghana and other developing countries brought about by the privatization of state-owned enterprises and economic liberalization leads to an increase in competition in one's own industry (Corbett & Harrison, 1992; ISSER, 2002; Toulan, 2002). The increase in competition is due to several forces, which include an increase in the size and number of firms operating within an industry, an increase in the rate of technological change and its diffusion throughout that industry, and changes in government regulations or policy (such as tariff reductions, ease of exchange rate restrictions, quality standards, etc.) (Mia and Clarke, 1999).

The increase in market competition in Ghana creates the need for firms to adopt proactive strategies to increase manufacturing efficiency, flexibility and the delivery of consistent high quality products. This is because the lack of competition generated a situation where firms which had been operating without any market-imposed discipline developed a level of comfortable inefficien-

cy (Foster, 1992) in their manufacturing operations. Grosse and Yanes (1998) further argue that because of lack of effective competition in less developed economies, even firms that are privately owned continue to behave like monopolies, which stifles management effort and creativity. Consequently, if a firm faces increasing competition in its industry and the firm does not craft and implement strategies that would enable it to embrace technological change, or monitor issues relating to costs, or develop delivery and customer service capabilities, its performance is likely to deteriorate. Thus, the greater the competition in a firm's industry, the more a firm must be sensitive to both technological developments and the needs of customers.

An increase in competition forces manufacturing firms to develop manufacturing capabilities that enable them to embrace changes in manufacturing systems to increase efficiency, productivity, and offer superior value to the customer. Anecdotal evidence from Australia indicated that as competition increased in many industries as a result of the privatization of state-owned enterprises and deregulation of the economy, the performance of many companies in these industries increased (Mia and Clarke, 1999). Thus, we hypothesize that:

Hypothesis 2: *Competitive intensity will be positively related to the emphasis firms plan to place on manufacturing priorities.*

The intensity of competition created as a result of structural and economic liberalization policies would also influence the impact of human capital availability on manufacturing priorities of firms. The more a firm perceives that an increase in competition from other firms is a threat to attracting and/or retaining human capital, the lesser the value it may place on the contribution of human capital in facilitating the implementation of its manufacturing priorities. For instance, Buchholtz, Ribbens, and Houle (2003), state that the value of human capital to a firm is related to its availability in the relevant labor market. Moreover, Miller and Shamsie (1996) argue that knowledge-based resources (e.g., human capital) are very critical in achieving competitive advantage in uncertain environments. Due to the shortage of human capital in the manufacturing sector, an increase in competition creates uncertainty about the level of commitment of the available human capital to a firm. The deregulation of the labor market creates an environment which allows human capital to shop around, making it easier to obtain higher salaries from other firms. Thus, in this research we argue that an increase in competition in the business environment would negatively impact the human capital of a firm by increasing the probability of turnover as rival firms vie for the limited number of available human capital. Although, some of the human capital who leave the firm could be replaced, the cost of replacement in the form of developing their firm-specific skills can be enormous and outside the reach of many firms. Thus, when the level of competition is high firms are likely to de-emphasize the role that

human capital plays when deciding on manufacturing priorities. We state our hypothesis formally as:

Hypothesis 3: *Competitive intensity will negatively moderate the relationship between human capital availability and the emphasis that firms plan to place on manufacturing priorities.*

METHODOLOGY

Data for the study are from a personally administered questionnaire survey of manufacturing firms in Ghana. We used the membership directory of the Association of Ghana Industries (AGI) in identifying potential firms for the study. AGI maintains a directory of the most significant manufacturing firms in the country. At the time of the study, the directory had about 100 companies. After initial screening some of the firms were found to be inappropriate for the current study and the list was pared down to 78 firms. Surveys were then given to these 78 manufacturing firms. The target respondent was the production manager or its equivalent in the company. A production manager is a high level official within a manufacturing firm in Ghana. The equivalent role in a manufacturing firm in the United States would be the vice president of manufacturing or operations. After several follow-up visits spanning a period of three months, we received a total of 61 surveys yielding a useable response of 58 fully completed surveys. The useable response rate of 74% is highly favorable compared to previous research in the area (for example, 37% for Appiah-Adu, (1998)). The sample size of 58 also compares favorably with sample sizes used in previous studies on manufacturing strategy (Swamidass and Newell, 1987; Ward, Leong & Boyer, 1994). The sample comprised of firms operating in six industries broadly classified as building and wood products, chemicals and allied products, food and kindred products, metals and allied products, printing, and textiles and allied products.

Measurement of Variables

The variables in the research are operationalized using multi-item scales that are intended to capture the underlying theoretical constructs. All the scale items were adapted from the previously validated instrument developed by Ward, Duray, Leong and Sum (1995) and subsequently used by others (e.g. Badri, Davis & Davis, 2000). Our measures for manufacturing priorities and competitive intensity are the same as those used by other researchers (e.g., Amoako-Gympah & Boye, 2001; Kathuria, 2000; Schroeder, Bates & Juntilla, 2002). Five point Likert-type scales were used for all the measures in the study. These measures were chosen because they are among the most commonly used items for assessing manufacturing priorities and competitive intensity in the manufacturing literature. The measures are attached as Appendix 1. For each variable, we present the reliability estimate calculated using Cronbach's alpha

and describe how it was measured. The reliability estimates are shown in parentheses.

Human Capital Availability ($\alpha = 0.82$). Five items were used to measure perceptions about human capital availability within the firm and its industry. These items deal with the extent to which they were concerned with the shortage of technicians, skilled production and other related workers, managerial and administrative staff, clerical and related workers.

Competitive Intensity ($\alpha = 0.52$). Competitive intensity was assessed using seven items, which are intended to measure the impact of competition on the business environment of a firm. The items deal with the extent to which they were concerned with increasing competition in local and foreign markets, declining demand in local and foreign markets, declining profits margins, increasing quality standards, and finding reliable suppliers. Although the Cronbach alpha for this measure appears to be relatively low, the 0.52 is considered acceptable for exploratory research (Nunnally & Bernstein, 1994).

Manufacturing Priorities. Manufacturing priorities describe the capabilities that firms develop around the manufacturing function so as to accomplish their competitive objectives. The production managers were asked to assess the extent to which their firms plan to emphasize the four manufacturing priorities of low-cost, quality, flexibility, and delivery[1]. Measuring manufacturing priorities in this manner is consistent with practice in the operations management literature (e.g. Kathuria 2000; Hayes & Wheelwright, 1984; Ward *et al.*, 1995). *Low-cost* ($\alpha = 0.69$) captures the importance of efficiency and cost minimization and was measured using four items dealing with minimizing unit costs, material costs, overhead costs, and inventory levels. *Quality* ($\alpha = 0.61$) was measured using five items dealing with reducing defect rates, improving product performance and reliability, improving vendor quality, implementing quality control circles, and obtaining ISO 9000 certification. *Flexibility* ($\alpha = 0.79$) was measured using four items dealing with reducing manufacturing lead-time, procurement lead-time, new product development cycle, and setup and/or changeover time. *Delivery* ($\alpha = 0.72$) was measured using four items, which assesses increasing delivery reliability and delivery speed, and improving pre-sale service and technical support, and after sales service.

Control Variables. To facilitate the generalizability of our findings across different industries and firm sizes as well as other environmental effects several variables were included as controls. The control variables were the number of employees, investment in fixed assets, ownership structure, business costs, and industry characteristics. The number of employees and the investments in fixed assets were used to control for the effect of size. Larger firms are often assumed to have more resources and possess the ability to better deal with increased competition and uncertainties in the marketplace. Firms with 100 or more employees were considered large (coded = 1) while firms with less than

100 employees were considered small (coded = 0). Investment in fixed assets was measured in millions of Ghanaian Cedis (at the time of the study one US dollar was equivalent to 2300 Ghanaian Cedis). Firm ownership was defined as a dummy variable to distinguish the effect of joint venture firms (coded = 1) from wholly owned local firms (coded = 0). A business cost variable ($\alpha = 0.71$) was included to assess the cost of doing business in Ghana. It was measured with eight items dealing with the extent to which the respondents were concerned about the rising costs of labor, materials, transportation, telecommunications, utilities, health care, rental costs, and the strength of the local currency. Industry characteristics were included to control for the potential industry effects such as the level of technology usage, demand cycles, etc. in the six industries.

Analytical Approach

Our basic hypotheses posit that the emphasis on manufacturing priorities will be a function of the availability of human capital, the competitive intensity and the interaction between human capital availability and competitive intensity. To tests these hypotheses, a hierarchical multiple regression model with an interaction term was used to better depict the variance explained by the different sets of predictor variables. The general model that was used to examine the hypotheses is as follows:

Manufacturing Priorities (Low-cost, Quality, Flexibility, Delivery) = +β_0 +β_1Business Costs +β_2Number of Employees +β_3Fixed Assets +β_4Ownership +β_5Industry +β_6Human Capital Availability +β_7Competitive Intensity +β_8Human Capital Availability x Competitive Intensity + Error

To minimize the potential problem of multicollinearity between the interaction term and its constituent variables (human capital availability and competitive intensity), we created the interaction terms by centering the competitive intensity and human capital availability variables. The centering was done by taking away the respective mean from each value as suggested by Aiken and West (1991), and Neter, Kutner, Nachtsheim and Wasserman (1996). Table 1 presents the descriptive statistics and the correlation matrix of the main variables in our study. The correlations among the variables in Table 1 are generally low indicating the absence of multicollinearity. The only exception is the correlation between the two variables, which were used to measure firm size (number of employees and fixed assets) with a correlation coefficient of 0.57. Further diagnostics of the collinearity among the variables using variance inflation factors (VIF's) indicated very low VIF's for all the variables. Because each of the VIF's is less than 10, there is little reason to suspect multicollinearity in the model (Frees, 1996; Neter *et al*., 1996).

TABLE 1
Descriptive Statistics and Correlations [a]

Variables	Mean[b]	S.D.	1	2	3	4	5	6	7	8	9
1. Cost	3.88	0.78	**0.69**								
2. Quality	3.83	0.69	0.48	**0.61**							
3. Flexibility	3.51	0.90	0.34	0.52	**0.79**						
4. Delivery	4.05	0.79	0.56	0.38	0.26	**0.72**					
5. Human Capital Availability c	2.44 (0.00)	0.79 (0.79)	0.18	0.12	0.15	0.33	**0.82**				
6. Competitive Intensity c	3.16 (0.00)	0.60 (0.60)	0.47	0.44	0.48	0.25	0.18	**0.52**			
7. Business Cost	3.98	0.53	0.42	0.13	-0.10	0.32	0.16	0.18	**0.71**		
8. Number of Employees	0.60	0.49	0.10	-0.11	-0.07	-0.16	-0.08	0.03	-0.17		
9. Fixed Assets	3.38	0.83	-0.11	-0.02	-0.01	-0.11	0.13	0.01	-0.09	0.63	
10. Ownership	0.45	0.50	0.26	0.29	-0.01	0.02	0.14	0.28	0.29	0.31	0.34

[a] n = 58; $p < 0.05$ for all $r > 0.24$ and $p < 0.01$ for all $r > 0.32$. Values in diagonals are Cronbach's alpha
Note: OWNERSHIP: Dummy variable (1 if Joint Venture, 0 if wholly owned); NUMBER OF EMPLOYEES: Dummy variable (1 if number of employees $\geq$ 100, 0 if number of employees < 100).
[b] The responses ranged from 1 to 5, where 1 represents the lowest response and 5 is the highest response.
[c] Values in parentheses are the mean and standard deviation of the centered variables that were used for the analysis.

RESULTS

The results of our regressions analyses are presented in Tables 2 and 3. Table 2 shows the results for plans to emphasize *low-cost* and *quality*, while Table 3 shows the results for *flexibility* and *delivery*. In each of the estimations, Model 1 represents the baseline model that tests the relationship between the control variables and manufacturing priority. This was done so as to eliminate any confounding effects that those control variables might have on the hypothesized variables. In Model 2, we include the human capital availability variable to test for Hypothesis 1. Model 3 adds the competitive intensity variable to the baseline model to test Hypothesis 2, while Model 4 adds human capital availability, competitive intensity and the interaction term to the baseline model to test Hypothesis 3.

As shown in Table 2, the control variables that significantly impact on low-cost are business cost, and firm size (both the number of employees and investments in fixed assets). The business cost ($p < 0.01$) and the number of employees ($p < 0.05$) variables are positively related to low-cost, while investments in fixed assets ($p < 0.05$) is negatively related to low-cost. Human capital availability is positive and significantly ($p < 0.10$) related to low-cost as predicted by Hypothesis 1 (Models 2 and 4)[2]. The F-test for the change in adjusted R^2 in Model 2 further indicates that the inclusion of the human capital variable improves the fit of the model by increasing the variance explained by 3% ($p < 0.10$). Competitive intensity is positive and significantly ($p < 0.01$) related to low-cost as predicted by Hypothesis 2. The F-test for the change in adjusted R^2 further indicates that competitive intensity explains 14% of the variability ($p < 0.01$) in low-cost. The interaction between human capital availability and competitive intensity is negative and significantly ($p < 0.10$) related to low-cost. Thus, the impact of human capital availability on low-cost is retarded by competitive intensity.

Of the control variables, ownership ($p < 0.05$) and the food and allied industry ($p < 0.10$) are positively and significantly related to *quality*. The results indicate that joint venture firms plan to place more emphasis on quality in their manufacturing activities than wholly owned local firms. Furthermore the food industry plans to place more emphasis on quality than other industries in our sample. Human capital availability does not have any impact on quality and thus we did not find support for Hypothesis 1 when quality is used as the priority measure. Competitive intensity is positive and significantly related to quality ($p < 0.01$), as predicted by Hypothesis 2. The *F-test* for the change in adjusted R^2 indicates that competitive intensity explains 10% of the variation in quality ($p < 0.01$). The interaction between human capital availability and competitive intensity is negative and significantly related to quality ($p < 0.05$). This implies that the higher the competitive intensity in the business environment, the lower the impact of human capital availability on quality. The result provides support for Hypothesis 3.

TABLE 2:
Results of Regression Analysis for Cost and Quality Measures of Manufacturing Priorities [1]

Variables	COST				QUALITY			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Business cost	0.380**	0.361**	0.353**	0.337*	-0.025	-0.031	-0.050	-0.154
Number of Employees	0.311*	0.361*	0.296*	0.385*	-0.269	-0.254	-0.282	-0.206
Fixed Assets	-0.348*	-0.409*	-0.302*	-0.364*	0.012	-0.006	0.054	0.029
Ownership	0.172	0.155	0.053	0.053	0.343*	0.338*	0.237+	0.244+
Building & Wood Products	-0.042	-0027	-0.074	-0.094	0.090	0.095	0.062	0.016
Chemicals & Allied Products	0.065	0.083	0.016	0.008	0.161	0.166	0.117	0.084
Food	0.153	0.173	0.114	0.096	0.314+	0.320+	0.279+	0.230
Metals & Allied Products	0.005	0.008	0.013	-0.010	0.017	0.018	0.024	-0.010
Printing	0.076	0.102	0.053	0.027	-0.075	-0.068	-0.096	-0.161
Textiles & Allied Products	0.052	0.039	-0.043	-0.009	0.155	0.151	0.070	0.125
Human Capital Availability		0.197+		0.187+		0.059		0.072
Competitive Intensity			0.395**	0.326**			0.353**	0.285*
Human Capital Availability x Competitive Intensity			-0.193+				-0.279*	
Adjusted R^2	0.17	0.20	0.31	0.35	0.09	0.10	0.19	0.26
Δ Adjusted R^2		0.03	0.14			0.01	0.10	
F-test for Δ Adjusted R^2		1.76+	9.52***			0.53	11.05***	

[1] n = 58. Reported coefficients are standardized coefficients. In conducting the F-test for adjusted R2, both models 2 and 3 were compared to model 1.
Note: OWNERSHIP: Dummy variable (1 if Joint Venture, 0 if wholly owned); NUMBER OF EMPLOYEES: Dummy variable (1 if number of employees ≥ 100, 0 if number of employees < 100); INDUSTRY PROXIES: Dummy variables (1 if the respective industry such as Building & Allied products, Chemicals & Allied Products, Food, etc., 0 otherwise).
+ $p < 0.10$;   * $p < 0.05$;   ** $p < 0.01$;   *** $p < 0.001$

TABLE 3:
Results of Regression Analysis for Cost and Quality Measures of Manufacturing Priorities

Variables	FLEXIBILITY				DELIVERY			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Business cost	-0.164	-0.181	-0.198	-0.174	0.389**	0.356**	0.371**	0.324*
Number of Employees	-0.269	-0.127	-0.185	-0.176	-0.133	-0.049	-0.143	-0.050
Fixed Assets	-0.044	-0.103	0.017	-0.015	0.047	-0.057	0.078	-0.026
Ownership	0.027	0.011	-0.127	-0.134	-0.072	-0.100	-0.150	-0.160
Building & Allied Products	0.171	0.186	0.130	0.157	0.236	0.262	0.215	0.233
Chemicals & Allied Products	0.214	0.232	0.151	0.176	0.131	0.163	0.100	0.127
Food	0.169	0.188	0.119	0.149	0.349*	0.383**	0.323*	0.349*
Metals & Allied Products	-0.232	-0.229	-0.222	-0.209	0.206	0.211	0.211	0.208
Printing	-0.048	-0.023	-0.078	-0.039	-0.026	0.017	-0.041	-0.011
Textiles & Allied Products	0.044	0.032	-0.081	-0.102	-0.039	-0.061	-0.102	-0.100
Human Capital Availability		0.191		0.098		0.335**		0.316*
Competitive Intensity			0.514***	0.518***			0.259*	0.213+
Human Capital Availability x Competitive Intensity		0.093			-0.054			
Adjusted R²	0.01	0.03	0.25	0.26	0.09	0.19	0.14	0.22
Δ Adjusted R²		0.02	0.24			0.10	0.05	
F-test for Δ Adjusted R²		0.95	14.55***			11.05***	2.78**	

1 n = 58. Reported coefficients are standardized coefficients. In conducting the F-test for adjusted R2, both models 2 and 3 were compared to model 1.
Note: OWNERSHIP: Dummy variable (1 if Joint Venture, 0 if wholly owned); NUMBER OF EMPLOYEES: Dummy variable (1 if number of employees ≥ 100, 0 if number of employees < 100); INDUSTRY PROXIES: Dummy variables (1 if the respective industry such as Building & Allied products, Chemicals & Allied Products, Food, etc., 0 otherwise).
+ $p < 0.10$;   * $p < 0.05$;   ** $p < 0.01$;   *** $p < 0.001$

None of the control variables has a significant relationship with *flexibility*. Human capital availability is not significantly related to flexibility. Hypothesis 1 is therefore not supported for flexibility. Competitive intensity is positive and significantly related to flexibility ($p < 0.01$) as predicted for Hypothesis 2. The *F-test* for the change in R^2 indicates that competitive intensity explains 22% of the variability in flexibility ($p < 0.01$). The impact of human capital availability on flexibility is not dependent on the level of competitive intensity. Hypothesis 3 is therefore not supported for flexibility.

Among the control variables, business cost ($p < 0.01$) and the food industry ($p < 0.05$) are positively and significantly related to *delivery*. Human capital availability is positive and significantly related to delivery ($p < 0.01$) as predicted by Hypothesis 1. The F-test for the change in adjusted R^2 indicates that human capital availability explains 10% of the variation in delivery ($p < 0.01$). Competitive intensity is positive and significantly related ($p < 0.05$) to delivery, providing support for Hypothesis 2. The *F-test* for the change in adjusted R^2 further shows that competitive intensity explains 5% of the variability in delivery ($p < 0.05$). The impact of human capital availability on delivery is not dependent on the level of competitive intensity. Hypothesis 3 is therefore not supported for delivery.

DISCUSSION

We sought to explain the relationship between human capital availability, competitive intensity and the emphasis that firms plan to place on manufacturing priorities in an environment characterized by the implementation of IMF/World Bank reforms. To our knowledge, this study is one of the few that examines the relationship between human capital availability and the emphasis firms plan to place on manufacturing priorities in an emerging economy environment. We found that human capital availability has significant effects on the emphasis firms plan to place on delivery and low-cost priorities. We were unable to find support for the argument that human capital availability affects the emphasis firms plan to place on achieving flexibility and quality.

The reforms taking place in Ghana have exposed manufacturing firms that had operated in an economy dominated by price controls, subsidies and government protection to a new environment characterized by increased competition for both the inputs and outputs of their manufacturing activities. In such a situation one would expect that concerns about human capital availability will have an impact on the emphasis that firms plan to place on achieving low-cost. The results confirm our expectations that concerns about the availability of human capital leads to a strategy where the firm seeks other means of achieving low cost objectives such as reduction of material, overhead and inventory costs.

In Ghana, if a firm is concerned about the availability of human capital

then that firm is likely to emphasize a strategy that is less dependent on skilled, knowledgeable and experienced employees. Human capital is needed to operate computers, set up databases and other information technology that facilitate the achievement of reliable and dependable deliveries. The use of bar codes, radio-frequency technology, Electronic Data Interchange (EDI) and other information technology applications is almost non-existent in the Ghanaian manufacturing environment. Reliable and dependable deliveries are more easily achieved through the use of unskilled labor. Thus, it is not surprising that we found that human capital availability has a strong effect on the emphasis firms plan to place on delivery.

Measures that lead to improvements in manufacturing flexibility and quality are typically multi-faceted. These measures include investments in new technology such as machine tools and new tooling; changes in organizational processes such as the use of work cells and teams; and even organizational culture such as reward systems and the responsibility for quality. The impact of human capital availability alone might be minimal and this might explain why we did not find support for our proposition that human capital availability has a significant impact on plans to emphasize quality and flexibility.

In our second hypothesis, we proposed that an increase in competitive intensity will lead to an increase in the emphasis that firms plan to place on manufacturing priorities. We found strong support for Hypothesis 2. Competitive intensity had a significant impact on the emphasis that firms plan to place on all four manufacturing priorities: low-cost, quality, flexibility and delivery. When a manufacturing environment is dominated by price controls, exchange rate restrictions, governmental controls and subsidies, the firms in that environment tend to operate without any market-dominated discipline. This leads to inefficiencies and ineffectiveness in manufacturing operations (Foster, 1992). With structural and economic reforms in the marketplace, firms are forced to embrace and undertake changes that lead to enhanced performance (Mia & Clarke, 1999) and we have confirmed this for the Ghanaian environment.

For Hypothesis 3, we argued that the effect of human capital availability on the emphasis firms plan to place on manufacturing priorities will be moderated by the competitive intensity. We found partial support for Hypothesis 3. The increased competition and the deregulation of the labor market have made skilled, experienced and knowledgeable labor difficult to find. In addition, it is relatively easy for such labor to move from one employer to another. These make it difficult for firms to attract and retain the requisite human capital for their manufacturing activities. We found that as the competitive intensity increases, the impact that human capital availability has on low-cost and quality decreases. The moderating effect of competitive intensity on the impact of human capital availability on flexibility and delivery was not significant.

We also found some significant relationships between some of our control variables and the emphasis on manufacturing priorities. Both the number of employees and investment in fixed assets have a significant relationship with the emphasis firms plan to place on low cost. The results indicate that the larger the firm (in terms of the number of employees), the higher the degree of emphasis they plan to place on low cost as a manufacturing priority. Larger firms appear to have the means and know-how to reduce manufacturing cost. At the same time, the higher the fixed assets of a firm, the less the emphasis they plan to place on low cost. It appears that firms which have made investments in fixed assets obtain a cost advantage and thus do not plan to place any more emphasis on low cost. Joint venture firms plan to place more emphasis on quality than locally owned firms. A possible explanation is the resources available to joint venture firms and also the fact that these firms are more likely to sell their products in global markets than the locally owned firms. Rising business costs have an impact on the emphasis firms plan to place on low cost and delivery. When business costs are rising, firms are more likely to implement strategies that reduce manufacturing costs and increase the reliability and dependability of their deliveries.

CONCLUSION

Many studies have investigated the impact of HRM practices on manufacturing activities (e.g., Arthur, 1994; Corbett & Harrison, 1992; MacDuffie, 1995). The context of these practices has been the provision and improvement of skills and knowledge bases needed to efficiently and effectively use advanced manufacturing technology. However, in emerging economies the concerns of human resources personnel might be more fundamental, such as the ability to attract and retain the human capital needed to meet production needs. In this paper we have provided evidence on how human capital availability and competitive intensity affect the emphasis that firms plan to place on manufacturing priorities. Human capital availability has significant effects on low-cost and delivery priorities among manufacturing firms in Ghana. Competitive intensity has a significant impact on low cost, quality, flexibility and delivery. Lastly, the effect of human capital availability on the emphasis that firms plan to place on low cost and quality is affected by the level of competitive intensity in the environment. An implication of our findings is that firms should find ways of attracting and retaining their human capital. Specifically, they can implement aspects of some of the recommended HRM practices such as linking compensation to employee productivity and performance, implementing work teams, and instituting training and skill development programs.

This study has some potential limitations. Like most cross-sectional studies, this one establishes associations between the hypothesized variables, but not causality. Second, the sample size was small, although it was comparable to sample sizes that have been used in similar studies on manufacturing strategy

and other management research (e.g., Appiah-Adu, 1998; Ward, et al., 1994; Lindman et al., 2001; Sawyerr, 1993). Despite the fact that it is very difficult to obtain data in most Sub-Saharan African countries, future research designs should make an effort to increase the sample size so as to strengthen the relationships that might exist among the study variables.

This paper contributes to the existing knowledge base on the relationship between human capital availability and manufacturing priorities by presenting results from a Sub-Saharan emerging economy. This should help strengthen existing theories of human capital and its impact on the manufacturing function. Although the study was confined to Ghana, the business environmental conditions such as increasing competition, deregulation, and privatization of governmental enterprises are prevalent in many countries in Sub-Saharan Africa, Latin America, the Caribbean, and countries in Asia that are implementing structural and economic reforms. Thus, one would expect that the results obtained in Ghana could also be replicated elsewhere and thus lend support to the generalizability of the findings and their contribution to the knowledge base on human capital and manufacturing.

ENDNOTES

1   Henceforth, reference to the manufacturing priorities of low cost, quality, flexibility and delivery imply plans to emphasize those priorities.

2   Although p values of .05 or less are generally considered the appropriate level of significance, reporting p values of .10 is not uncommon in management research.

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APPENDIX:
LIST OF ITEMS FOR THE VARIOUS MEASURES

Business Costs (α=0.71)
Rising labor cost
Rising material cost
Rising transport cost
Rising telecommunication cost
Rising utilities cost
Rising rental cost
Rising health care cost
Weak cedi value

Human Capital Availability (α=0.82)
Shortage of managerial and administrative staff
Shortage of technicians
Shortage of clerical and related workers
Shortage of skilled workers
Shortage of production workers

Competitive Intensity (α=0.52)
Keen competition in local markets
Keen competition in foreign markets
Low profit margins
Declining demand in local market
Declining demand in foreign market
Producing to the required quality standards
Unreliable vendor quality

Manufacturing Priorities

Low Cost (α=0.69)
Reduce unit costs
Reduce material costs
Reduce overhead costs
Reduce inventory level

Quality (α=0.61)
Reduce defective rates
Improve products performance and reliability
Improve vendor's quality
Implement quality control circles
Obtaining ISO 9000 certification

Flexibility (α=0.79)
Reduce manufacturing lead-time
Reduce procurement lead-time
Reduce new product develop cycle
Reducing setup/changeover time
Delivery (α=0.72)
Increase delivery reliability
Increase delivery speed
Improve pre-sales service and technical support
Improve after sales service