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Article

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Managerial practices and the performance of small and medium-sized enterprises: Evidence from Burkina Faso

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Abstract: Organizational and managerial structure plays an important role in the productivity difference among firms. However, studies that assessed the quality of firm management and its link with their performance are still scanty. This paper provides empirical evidence on the relationship between managerial practices and firm performance using survey data collected over 577 small and medium-sized enterprises (SMEs) in Burkina Faso. Three dimensions of management practices that are monitoring, targets setting, and incentives are used to calculate a management score. The empirical regression with fixed effect is estimated and the results show a positive and significant association between managerial practices and firms' performance. Furthermore, the incentive and monitoring dimensions of management present a strong relationship with the levels of profit sale and value added of SMEs. The estimation by firms' size also provides evidence that the linkage between management score and performance is particularly stronger for larger firms. SMEs development policies in developing countries should then provide strong incentives and enabling environment for business owners to build their managerial abilities.

Sugrinoma Aristide Ouédraogo

ABOUT THE AUTHORS

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PUBLIC INTEREST STATEMENT

Small and medium-sized enterprises (SMEs) are recognized as an underpinning force driving industrial development and structural transformation of all economies, and an important contributor to private-sector employment and growth. But knowledge of how policymakers in developing countries may tap into the potential of SMEs is limited by a lack of research and data, particularly in sub-Saharan Africa. We fill these gaps by providing evidence on how improved management practices may boost productivity of firms. We also validate recent studies (Bloom & Van Reenen, 2010; Bloom et al., 2013), which used a similar approach to quantitatively measure management quality, with firm surveys in Burkina Faso. The study concludes with recommendations for policymakers to create enabling environment for entrepreneurs to build managerial abilities in order to reinforce the private sector contribution to economic growth and employment creation.

Subjects: Economics; Business, Management and Accounting; Industry & Industrial Studies;

Keywords: Small and medium-sized enterprises; managerial practices; firm performance; Burkina Faso

JEL classification: D22; L23; O14

1. Introduction

The universe of private enterprises in low-income countries is dominated by small and medium-sized enterprises (SMEs) which contribute to about 15.5% of Gross Domestic Product and 17.5% of total employment (Ayyagari et al., 2003). The sector is also characterized by a low survival rate, low levels of productivity and growth as well as a limited innovation in managerial and organizational practices. Differences in firm performance have long been explained by differences in access to physical and financial capitals and differences in idiosyncratic shocks (Aiello & Ricotta, 2016; Aiello et al., 2015; Yang & Huang, 2005). However, these factors alone are not sufficient to explain the observed high level of heterogeneity in firm performance within industries and across countries. The endogenous economic growth model, initially developed by Romer (1990) and (Lucas, 1993), recognizes the importance of knowledge and technological innovations such as investment in Research & Development, and information technologies as important factors of productivity growth.

Recent studies showed that differences in firms' performance persist even after controlling for the conventional factors namely physical and financial capitals or the idiosyncratic shocks (Atkin et al., 2017). Furthermore, they also showed that those differences cannot be reduced to measurement errors of innovation technology as it has often been assumed. This calls for a wider definition of technology that should encompass managerial and organizational systems. However, empirical studies that assess the extent to which management practices influence firms' performance are still limited. The existing work generally shows that better management practices can have both direct and indirect effects on firm productivity and growth (Bloom & Van Reenen, 2010; Bloom et al., 2013; Bruhn et al., 2010; Chong & Rundus, 2004).

Research on management as capital or technology highlight the direct effect of management practices on firm performance. As capital or a technology, good management practices can have a direct effect on production growth. For instance, Bloom et al. (2016) showed that, in developing countries, management practices account for about 30% of differences in total factor productivity across countries. Lemos et al. (2016) found a similar magnitude of influence of management on firm performance in Pakistan. Evidence in Indian textile firms using randomized control trial showed that increasing management scores by one standard deviation causes 10% increase in Total Factor Productivity (Bloom et al., 2013). Manufacturing firms that adopt better management practices are also associated with better performance in Australia (Agarwal et al., 2014).

Indirectly, better management raises firm performance by improving the marginal productivity of labor and the capital (Bruhn et al., 2010). They also found that technology is more efficient for firms with good managerial and organizational systems. In addition, managerial quality influences production by increasing firm ability to cope with worker productivity shocks. This prediction was tested by Adhvaryu et al. (2016) in the context of the Indian garment industry. The authors found that lines supervised by better managers are more likely to diagnose and mitigate the deleterious impact of worker productivity shocks.

The quality of firm management is not always found by empirical studies as a driver of firm performance. Bloom et al. (2016) showed that management may have differential effects depending on the environment in which firms are operating. Management may have more significant effect on firms evolving in highly competitive markets which require high efficiency to gain market share. Larger firms may also require more structural management systems to increase

productivity. Management practices also mediate the relationship between innovation and firm growth. In a study in developing countries including sub-Saharan African countries, Do et al. (2023) show that management practices have a positive effect on innovation activities. This is consistent with previous findings by Byukusenge et al. (2017) who also found a positive relationship between knowledge management and firms' innovation in Rwanda.

In many sub-Saharan African countries (SSA), several projects have been implemented to reduce unemployment rate and promote decent jobs for the youth and women. In Burkina Faso, for instance, various public initiatives provide financial support for the creation and expansion of SMEs. However, most SMEs are still characterized by low performance and low survival rate. A survey undertaken on private enterprises in Burkina Faso by the World Bank estimated that over 40% of firms identified financial constraints and tax rate as the main obstacles to growth (World Bank, 2009). However, in addition to limited access to finance, technology, energy and poor transportation conditions, SMEs operate under weak managerial and organizational systems. Despite the importance of management on firm performance, research on the relationship between management and performance of SMEs remains limited. In addition, most of the literature is focused on developed countries where economic environment is characterized by high competition and technological change. Therefore, understanding the barriers and drivers of growth of SMEs in SSA is important to guide policies and the promotion of private sector development. This study contributes to the literature on enterprise development by providing empirical investigation on the relationship between management practices and firms' performance in SSA.

The objective of this paper is to analyze the relationship between managerial practices and the performance of SMEs. Specifically, the study assesses the quality of managerial practices and examines the extent to which managerial practices explain differences in the level of production, value added and profit of SMEs in Burkina Faso. This investigation was undertaken using survey data collected in 2018 in the two largest cities of Burkina Faso: Ouagadougou and Bobo-Dioulasso. The structural questionnaire used is inspired by the Management and Organizational Practices Survey (MOPS) developed by the US Census Bureau (Buffington et al., 2017). Management practices encompass three components that are monitoring, setting targets and incentives. Based on these components, a score of management practices is computed for each enterprise and the empirical results indicate that better management practices are positively associated with the level of sale, profit and value added of SMEs. These relationships are stronger in larger enterprises where there is more hired labor.

The next section develops the theoretical framework. The third section describes the empirical strategy, including the data collection and sampling procedure and the econometric method of estimation. We present and discuss the results in the fourth section and provide a conclusion and policy implications in the fifth section.

2. Theoretical framework of the relationship between managerial practices and firms' productivity

Endogenous growth model present technological progress as a key driver of productivity growth across countries and industries (Romer, 1990). Innovation driven by the level of firms' investment in R&D is seen as a key explanatory factor of the observed heterogeneity in productivity. However, empirical investigation highlights that productivity differences persist after all measures of technology have been controlled for, and the effect of technology on productivity across firms and countries is heterogeneous (Syverson, 2004). The difference in managerial ability, considered as an unobservable fixed effect in panel data estimation, is seen as a plausible explanation of the heterogeneous effect of innovation on productivity (Lucas, 1978).

In this study, we present a theoretical framework where managerial practices appear as an explanatory factor of firm performance and a technology that can be adopted and improved by

entrepreneurs. Following Bloom et al. (2016), the relationship between management practices and firm performance can be expressed in the production function as:

$$Y = F(A, K, L, M) \tag{1}$$

Where Y represents the level of production, A is an efficiency term, L represents the labor, K is physical capital and M, the managerial technology.

Considering management as technology, it can be established a positive and direct relationship between management and performance. This means that higher quality of management practices is expected to yield higher level of performance. We consider a Cobb-Douglas production model, as in Bloom et al. (2016), and specify Equation 1 as follows:

$$Y_i = A_i K_i^{\alpha} L_i^{\beta} G(M_i) \tag{2}$$

Where $G(M_i)$ is a function that explains the change of management practices related to entrepreneurs' choice to adopt new or better management practices.

This model considers that firm performance is an increasing function of the level of management quality (Bloom & Van Reenen, 2006a; Bloom et al., 2016a). Since $G(M_i)$ is increasing in M_i, for simplicity, we can write

$$G(M_i) = M_i^c \tag{3}$$

Therefore, the function (2) can be re-written as follows:

$$Y_i = A_i K_i^{\alpha} L_i^{\beta} M_i^c \tag{4}$$

In this model, difference in management practices will simply be reflected in firm efficiency. The empirical investigation of this study on the relationship between managerial practices and firm performance allows us to highlight how in the context of sub-Saharan African, especially in Burkina Faso, management practices may foster firm contribution to economic growth.

3. Empirical methods

3.1. Estimation strategy

Based on the theoretical framework and following Bloom and Van Reenen (2007), we specify the empirical model as an augmented Cobb-Douglas production function. The trans-log specification is expressed as:

$$ln(Y_{it}) = \alpha ln(K_{it}) + \beta ln(L_{it}) + cM_{it} + \delta X_{it} + \omega_i + \varepsilon_{it} \tag{5}$$

Y_{it} measures the performance of enterprise i at time t. M is the score of management practices, L indicates the number of permanent workers, K the level of capital, X is a set of control variables that include the logarithm of the number of non-permanent workers, the logarithm of operating costs, the firm age, and the education level of non-managers employees. ω_i is the firms individual fixed effect and ε_{it} represents the error terms.

We measure firms 'performance in three ways: the value of sale, the value added and the amount of profit. However, due to the existence of negative profit for some enterprises, we compute the logarithm of the profit using the Inverse Hyperbolic Sine Transformation. The logarithm of the profit is calculated as follows:

$$\ln(Profit_{it}) = \ln(Profit_{it}) + (1 + profit_{it}^2)^{0.5} \tag{6}$$

Production functions relate productive factors (e.g. capital, labor) to outputs. The major econometric issue associated with the estimation of production functions is the possibility that there are

determinants of production that are unobserved by the econometrician but observed by the firm. If this is the case, and if the observed inputs are chosen as a function of these determinants (as will typically be the case for a profit-maximizing or cost-minimizing firm), then there is an endogeneity problem and Ordinary Least Square (OLS) estimates of the coefficients on the observed inputs will be biased.

In addition, the management is likely to be endogenous because of simultaneity and measurement errors. In fact, management can influence firm sales and level of profitability. It is also likely that firms with higher level of sales and profitability present more ability to upgrade their level of management (Bloom & Van Reenen, 2006b; Bloom et al., 2016a). Therefore, the pooled OLS may not provide unbiased estimates. In this context, we use the Fixed Effect (FE) estimator to assess the relationship between managerial practices and firms' production, value added and profit.

3.2. Data collection and sampling procedure

Small and medium-sized enterprises (SME) play an important role in both developed and developing countries. They are characterized by a high heterogeneity in terms of employment and growth rate and can be found in various sectors of activities. SMEs contribute to over the half of formal employment in the world and provide efficient solution in various sectors such as energy, water supply, industries, health and education (World Bank, 2009). However, there is no common definition of what SME is. The definition of SME varies by country and is usually based on the number of employees, the value of sales and/or value of assets. The most used variable to define SMEs is the number of employees. Thus, in European Union and in many OECD countries, SMEs are enterprises that do not employ more than 200 to 250 workers. In USA, this upper limit of employees for SMEs is set at 300.

In Burkina Faso, the statistical definition of SMEs is based on both the number of employees and the annual level of sale. Thus, SME is defined as a formal enterprise employing less than 100 permanent workers with a value of sale estimated at less than one billion CFA per year (which represent about two million dollars (2 000 000USD)).[1] This definition is therefore used throughout this study. Among the SMEs, there are micro-enterprises that are establishment with less than 10 permanent workers and an annual sale estimated at less than 15 million of FCFA. In this section, we describe the process of sample selection and the data collection.

3.2.1. Study areas and sampling procedure

The Management and Organizational Practices Survey was conducted from August to December 2018 in Ouagadougou and Bobo Dioulasso, which are the two biggest cities of Burkina Faso. The choice of these towns is motivated by their importance in the national economy and by the fact that headquarters of most enterprises can be found in these cities. In fact, among the 66 044 formal enterprises recorded by the chamber of Trade and Industry in 2010, about 80% are established in Ouagadougou, the capital of the country and only 11% are established in Bobo Dioulasso (Institut National des Statistiques de la Démographie [INSD], 2010). We therefore surveyed 800 enterprises whose 75% are chosen in Ouagadougou and 25% in Bobo Dioulasso. We purposely decided to over-sample the enterprises established in Bobo to increase their representativeness in the final sample. After the cleaning, the final data set contains 577 enterprises with 27% from Bobo and the remaining 73% from Ouagadougou (Table 1). The final sample retains enterprises that have sufficient information to compute our key variables of interest. The test for selection bias in the final dataset is conducted, and there is no evidence of systematic bias in the likelihood for being selected in the final sample (Table A1).

Within each city, the number of enterprises assigned has been randomly chosen based on a list obtained from the Direction of Small and Medium Enterprises. The enterprises surveyed were randomly selected within four sectors of activities that are 1) Manufacturing industry, 2) Buildings and Civil Engineering (B&CE), 3) Intellectual service providers, 4) General trade. The

Table 1. Distribution of the sample per activity branch

	Bobo-Dioulasso	Ouagadougou	Total
Manufacturing	20	50	70
Services	55	110	165
Building and CE	20	75	95
Trade	67	180	247
Total	162	415	577

survey was designed to consider the importance of each sector in the economy. The distribution of the sample per location and per sector of activities is showed in Table 1.

To observe the change in the variables over the years, the questionnaire is designed to collect data on the observed situation of the firms during the year 2017 and their situation in 5 years back that is in 2012. Therefore, we used recall questions to interview the respondents. Thus, only enterprises that are established before 2012 are retained in the sample. To reduce the recall bias, interviewers were asked to use 2014, that is, the period of the insurrection in Burkina as year of reference and to consider the situation before and after this event.[2]

We adopt an interview-based evaluation tool of the world management survey and used by Bloom et al. (2016b) based on 18 basic management practices. These practices are then scored from one ("worst practice") to five ("best practice") on a scoring grid. To obtain more reliable information and to reduce the interview bias, interviewers were advised to ask open questions. The open questions and the discussion engaged with the respondent help the interviewer identify the actual practices adopted within the firm. Interviewers also do not have prior information concerning the firms before the interview which minimizes the influence of their own opinions that interviewers may have on the management of the firms.

3.2.2. Management and Organizational Practices Survey (MOPS)

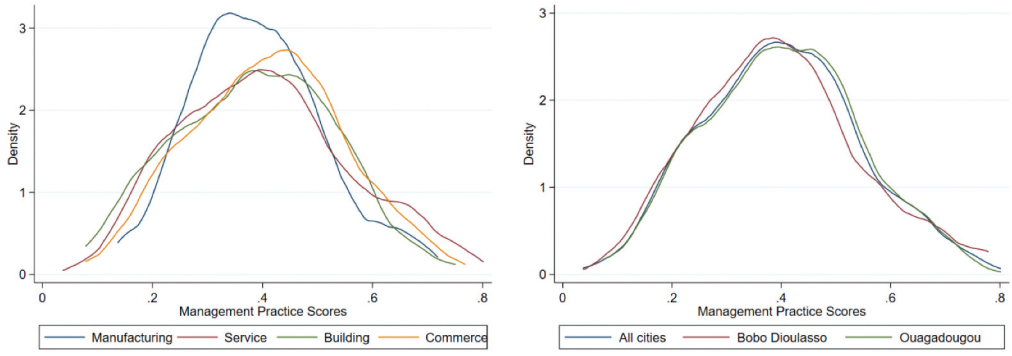
The MOPS that we conducted was inspired by the questionnaire developed in Buffington et al. (2017) and also used by Lemos et al. (2016) in Pakistan. Sixteen (16) questions are developed to assess three main aspects of management practices that are monitoring, target setting and incentives. The first five questions which concern the monitoring aspects, seek to understand how firms collect data to monitor and improve production processes. The following three questions concern the setting of targets. They assess the accuracy, the realism and the transparency of targets set by firms. Finally, the eight questions on incentives describe the practices of bonus, promotion, reassignment, and dismissal in the firms. The response of each management question is normalized to be on a scale of 0 and 1 and the results are then aggregated into a single measure of management practices. Therefore, the structural management score is computed as the average of the score of each of the 16 questions. The score is scaled from 0 to 1 with 0 representing the lowest quality of management practices of the firm in terms of monitoring, targets, and incentives and 1 representing the best practices. This means that a score closes to 1 indicates good quality of management practices of the firm.

4. Results and discussion

4.1. Descriptive statistics

There is no significant difference in management quality between SMEs in Bobo Dioulasso and those established in Ouagadougou (Figure 1(b)). The average management score is estimated at 0.39 for enterprises surveyed in Ouagadougou and 0.38 for enterprise surveyed at Bobo Dioulasso. However, the management practice score is slightly higher in the sector of service (0.406) and commerce (0.409) than in the sector of building (0.38) and manufacturing (0.389) (Figure 1(a) and Table 2). As the enterprises in building, and manufacturing sectors are generally more oriented to

Figure 1. Average management score per city and sector.



(a) Average management score per industry (b) Average management score per city

public procurement, it is therefore likely that enterprises in these sectors invest more in networking than in improving management practices (Akouwerabou, 2016).

The incentive component of management practices remains the lowest among the three components of management (Figure 2). This is followed by monitoring and then target setting. This result suggests that more the adoption of management practices is costly, more enterprises are unwilling to adopt it. Thus, the incentive component captures the financial motivation such as bonus and promotion which is costlier than setting target to be achieved. In addition, monitoring the various activities necessitates also human and financial resources. This situation tends to be in line with the management as design model, where the adoption is seen as costly for many entrepreneurs. Thus, some components of management may be difficult to adopt by some SMEs as regard to the skills, education level and financial costs that it may involve.

The average management practice score (MPS) of the sample is estimated at 0.38 in 2012 and 0.41 in 2017. This corresponds to an increase of 0.03 points, that is, a growth of roughly 8% (Figure 2(b)). This management score is similar to the score found by Lemos et al. (2016) in a study on Pakistan's firms. They found that between 2005 and 2010, management score increases from 0.43 to 0.45 in Pakistan corresponding to an increase of 0.02 point (i.e. 4.65%). The lower level of management practices among SMEs in Burkina Faso can be explained by the low competition in the environment. Furthermore, adoption of management practices may be difficult for entrepreneurs with a low education level as it is the case in Burkina Faso.

The additional benefit of adopting better management practices may not sufficiently outweigh the costs to stimulate an upgrading of management systems in many SMEs (Schmidt, 1997). This may explain the low change in the management practice between 2012 and 2017. For instance, if a higher share of sale for some enterprises is from public procurement obtained through bribery, this practice distorts the market and lowers the market share of other firms regardless of their level of management.

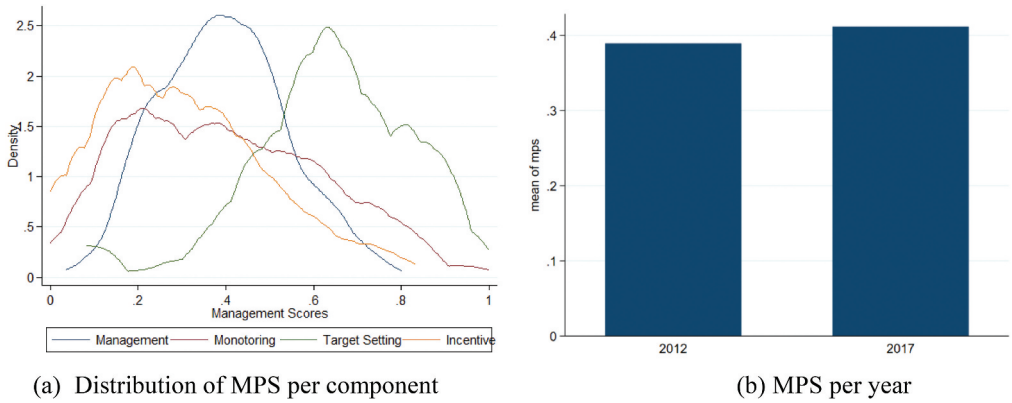
The descriptive statistics, reported in Table 2, show that the average experience of respondents is 9 years in the sample. This suggests that the respondents have sufficient knowledge about the enterprise to give accurate answers to the questions asked during the interview. The average number of full-time employers is about 15, and the average sale value is estimated at 425 million of FCFA. In addition, the average capital is evaluated at 91 million of FCFA on average. Manufacturing sector appears to have a higher level of full-time employees. They also have the higher value of sale, followed by firms in trade and in building and construction. However, education level of workers estimated at 7.3 years is very low. These represent the characteristics of business environment in Burkina Faso and in many developing countries that is still dominated by owners with limited education level. This situation may partly be a constraint to upgrade managerial skills in the SMEs. The descriptive statistics of all the variables are presented in table A2. The appendix also presents a T-test of the variables between 2012 and 2017 (Table A3).

Table 2. Descriptive statistics

	Manufacturing	Services	B&CE	Commerce &Others	Total
Managers	4.722	3.211	3.782	2.786	3.306
	(4.836)	(3.388)	(2.581)	(3.533)	(3.599)
Full time Employees	24.51	7.920	16.17	16.91	15.11
	(37.78)	(13.72)	(22.49)	(85.42)	(58.69)
Capital	213.3	30.28	171.4	67.53	91.20
	(855.1)	(98.46)	(483.8)	(377.6)	(440.5)
Sales	622.1	151.1	498.1	528.2	425.3
	(1396.6)	(405.5)	(1724.5)	(2570.9)	(1899.3)
Education level of employees	6.237	8.260	7.056	7.240	7.384
	(3.694)	(4.671)	(4.121)	(4.103)	(4.275)
Profit	400.3	119.1	409.6	390.5	315.9
	(1211.7)	(365.7)	(1693.3)	(2250.4)	(1687.7)
Value added	427.9	136.8	448.2	429.1	347.1
	(1232.8)	(381.9)	(1718.0)	(2369.7)	(1763.2)
Firm Age	9.897	9.064	8.994	10.51	9.772
	(9.299)	(7.421)	(7.753)	(10.28)	(9.030)
Experience of Respondent	8.905	9.411	8.109	9.205	9.052
	(5.756)	(6.305)	(4.974)	(6.163)	(5.990)
Management Scores	0.389	0.406	0.380	0.409	0.401
	(0.115)	(0.154)	(0.140)	(0.138)	(0.141)

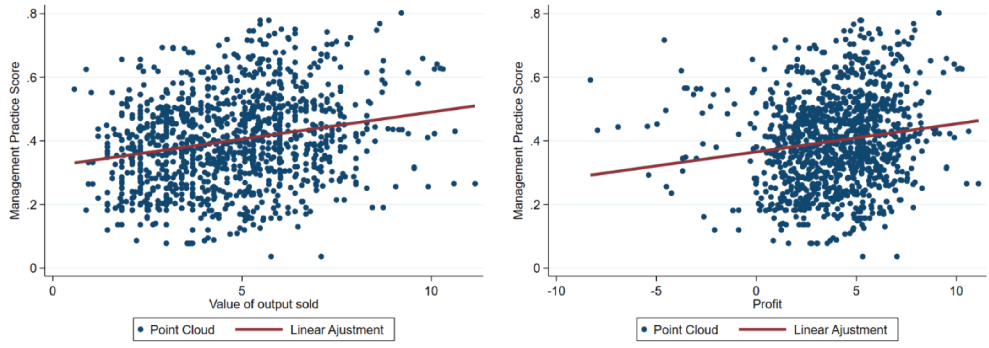
Notes: Standard deviations are in parentheses. Capital, sale value, profit and value added are in millions of FCFA.

Figure 2. Distribution of management practice score.



(a) Distribution of MPS per component (b) MPS per year

Figure 3. Management score and Performances.



Management score and Production Management score and Profit

Figure 3 shows the relationship between the score of management practices and the indicators of firms' performances. It apears a positive link between management and the value of sale, and the profit. The extent of these relationships is explored further in the next sub-section on econometric analysis.

4.2. Empirical analysis of the relationship between managerial practices and firms' performance

This section presents the empirical results of the relationship between management and firm performance. The sale, profit and value added are used as indicators of performance. For each dependent variable, we successively estimate the model without control variables and with control variables. As discussed in the previous section, the fixed effect estimation removes the time-invariant individual characteristics and provides more robust estimates. For robustness check, the section also presents how each component of management influences the performance of SMEs and the relationship per enterprises' size.

4.2.1. Management practices and performance

The estimation results show a positive and significant relationship between management and performance (profit, sale and value added) (Table 3). Although including additional explanatory variables in the regression reduces the magnitude of the coefficients, the relationships are still significant at 5%. The coefficient associated with the management practice score in the profit equation is 2.1 meaning that a one standard deviation increase in the management practices results in 35.34% increase in the level of profit.[3] Similarly, one standard deviation change in management score is associated with 21.07% increase in the level of sale. One standard-deviation increase in management score is associated with 37% in the value added.

Table 3. Management practices and firms' performance

VARIABLES	(1) Profit	(2) Profit	(3) Sales	(4) Sales	(5) Value added	(6) Value added
Management Scores	3.2962***	2.1616**	2.5054***	1.3659**	3.0221***	2.2491**
	(1.246)	(1.070)	(0.816)	(0.689)	(1.042)	(1.037)
Capital		0.6282***		0.4484***		0.5264***
		(0.135)		(0.084)		(0.100)
Full time Employees		0.3703**		0.3046***		0.5188**
		(0.166)		(0.085)		(0.228)
Constant	2.0211***	0.4329	3.0654***	1.2733***	2.5094***	0.5894
	(0.455)	(0.565)	(0.292)	(0.368)	(0.382)	(0.748)
Control variables	NO	YES	NO	YES	NO	YES
Observations	1,134	1,134	1,134	1,134	1,134	1,134
R-squared	0.068	0.154	0.184	0.438	0.091	0.191
Number of id	577	577	577	577	577	577

Notes : ***indicates significance at the 1% level; **significance at 5%, *significance at 10%. Standard errors in brackets are clustered at the firm level. Control variables include firm age, operating costs, number of part-time employees and education level of non-managers employees.

These positive relationships may be explained by increase in market share that good management may provide to enterprises. Well-managed firms are more likely to gain higher market shares, realize more profit and add more value to the economy. This added value is important for economic growth and job creation. Therefore, these results suggest that good management practices are key drivers of firms' contribution to the overall economic growth. Enterprises that set targets at beginning of each year and develop tools to frequently evaluate the evolution of the indicators are more likely to experience higher level of sale, profit and value added. The combination of managerial efforts has therefore the potential to strengthen the growth of SMEs in Burkina Faso and to increase their contribution to overall economic growth.

These findings corroborate the results of recent empirical studies on management practices. For instance, Bloom and Van Reenen (2010) estimated at 21.3% the magnitude of one standard deviation change of management score on productivity of enterprises in developed countries. Lemos et al. (2016) have also found 21.8% increase in productivity among enterprises in Pakistan resulting from one standard deviation increase in management score. Moreover, in India garment industry, management investment has been found to be positively related to firm performance (Bloom et al., 2013). These findings provide evidence that despite the structural difference in terms of technological gaps of firms in sub-Sahara Africa compared to firms operating in other regions, the management remains an important factor of performance. SMES of developing countries are generally operating in inefficient conditions due to market imperfections and asymmetric access to information. Better management practices can help overcome these constraints and increase the ability and the incentive to adopt good technology which improve efficiency and market shares. Thus, the evidence shows a strong positive relationship between management and performance, even if the extent of the relationship may vary across countries. This positive relationship is in line with the model of management as technology discussed in Bloom et al. (2016).

In addition, the results show that capital and labor positively influence the level of sale, profit and value added confirming the traditional determinants of growth. This is also in line with studies that identify the difficult access to finance as a major constraint on the growth of SMEs in Burkina and in Sub-Africa in general. A survey of the World Bank showed that entrepreneurs in Burkina Faso identify the financial constraints as the main barriers of their performance (World Bank, 2009).

4.2.2. Sub-components of management score and performance

In this section, we successively estimate the relationship between each sub-component of management score (Target, monitoring, and incentive) and the indicators of performance to examine the link between performance and each sub-component of management. Considering the targeting score, the results indicate a positive but not significant relationship with performance (Table 4). Similar results are also found for the monitoring score when we control for other explanatory variables (Table 5). This suggests that setting a target in terms of objective to achieve is not sufficient to induce a positive change in the performance of the SMEs. In addition, frequent monitoring of the enterprises activities does not alone yield a significant change in firms' sale and profit, all things being all.

However, the estimation conducted with the incentive score of management practices shows a positive and significant relationship with all the indicators of firms' performance (Table 6). Thus, the incentive component of management practices appears to be the most important factors to fuel enterprise expansion. This means that providing bonus and other forms of incentives may stimulate workers and ensure their full participation in the achievement of the goals of SMEs. These findings reveal that even if all components of managerial practices are jointly influencing the performance indicators, some components taken individually may not show strong correlation. Combining a set of management strategies is more likely to yield a positive result for SMEs than adopting a unique action.

4.2.3. Management and performance: Estimation by firm size

The relationship between management and performance may vary with firm size. To assess this assumption, we split the sample into two: the smaller firms as SMEs whose number of employees is less than the median value of the sample and the larger firms constituted with SMEs with a number of employees above the median.

Table 4. Management and targeting scores

VARIABLES	(1) Profit	(2) Profit	(3) Sales	(4) Sales	(5) Value added	(6) Value added
Targeting Scores	0.2208	0.0885	0.4738	0.2618	0.8338	0.7790
	(0.504)	(0.474)	(0.336)	(0.282)	(0.562)	(0.548)
Capital		0.6251***		0.4491***		0.5320***
		(0.138)		(0.085)		(0.100)
Full time Employees		0.4080**		0.3255***		0.5481**
		(0.168)		(0.084)		(0.230)
Constant	3.0848***	1.0753*	3.6990***	1.5658***	3.1238***	0.8794
	(0.306)	(0.559)	(0.211)	(0.338)	(0.349)	(0.756)
Control variables	NO	YES	NO	YES	NO	YES
Observations	1,134	1,134	1,134	1,134	1,134	1,134
R-squared	0.054	0.148	0.160	0.431	0.079	0.186
Number of id	577	577	577	577	577	577

Notes : ***indicates significance at the 1% level; **significance at 5%, *significance at 10%. Standard errors in brackets are clustered at the firm level. Control variables include firm age, operating costs, number of part-time employees and education level of non-managers employees.

Table 5. Monitoring scores and management

VARIABLES	(1) Profit	(2) Profit	(3) Sales	(4) Sales	(5) Value added	(6) Value added
Monitoring Scores	1.5094*	0.5461	1.0922**	0.2519	1.2127**	0.4351
	(0.856)	(0.720)	(0.537)	(0.422)	(0.613)	(0.601)
Capital		0.6229***		0.4452***		0.5211***
		(0.137)		(0.085)		(0.100)
Full time Employees		0.3904**		0.3206***		0.5444**
		(0.170)		(0.087)		(0.234)
Constant	2.6807***	0.9700**	3.5861***	1.6389***	3.1743***	1.1857*
	(0.314)	(0.486)	(0.189)	(0.322)	(0.219)	(0.624)
Control variables	NO	YES	NO	YES	NO	YES
Observations	1,134	1,134	1,134	1,134	1,134	1,134
R-squared	0.061	0.149	0.168	0.431	0.081	0.184
Number of id	577	577	577	577	577	577

Notes: ***indicates significance at the 1% level; **significance at 5%, *significance at 10%. Standard errors in brackets are clustered at the firm level. Control variables include firm age, operating costs, number of part-time employees and education level of non-managers employees.

Table 6. Incentives and performance

VARIABLES	(1) Profit	(2) Profit	(3) Sales	(4) Sales	(5) Value added	(6) Value added
Incentives Scores	2.4098**	1.9219*	1.6633**	1.1451*	1.9100**	1.6265**
	(1.078)	(0.985)	(0.709)	(0.623)	(0.822)	(0.768)
Capital		0.6246***		0.4460***		0.5225***
		(0.136)		(0.085)		(0.100)
Full time Employees		0.3918**		0.3188***		0.5446**
		(0.166)		(0.083)		(0.232)
Constant	2.5170***	0.6308	3.4908***	1.4162***	3.0503***	0.8911
	(0.328)	(0.547)	(0.208)	(0.344)	(0.252)	(0.654)
Control variables	NO	YES	NO	YES	NO	YES
Observations	1,134	1,134	1,134	1,134	1,134	1,134
R-squared	0.067	0.156	0.177	0.440	0.086	0.191
Number of id	577	577	577	577	577	577

Notes: ***indicates significance at the 1% level; **significance at 5%, *significance at 10%. Standard errors in brackets are clustered at the firm level. Control variables include firm age, operating costs, number of part-time employees and education level of non-managers employees.

The relationship between management score and performance is positive but not significant for smaller firms (Table 7). Smaller firms usually operate in a subsistence basis and generally use more family labor which may require less structural management.

However, the results indicate a positive and significant association between management score and performance for the larger firms (Table 8). Larger firms employ more labor from the market

Table 7. Management practices and performance of smaller firms

VARIABLES	(1) Profit	(2) Profit	(3) Sales	(4) Sales	(5) Value added	(6) Value added
Management Scores	0.9059	0.4505	1.4707	1.0554	1.4981	1.0075
	(2.345)	(2.289)	(1.614)	(1.468)	(1.776)	(1.716)
Capital		0.6070**		0.5385***		0.5314***
		(0.240)		(0.140)		(0.178)
Full time Employees		0.3003		0.2416		0.4206*
		(0.290)		(0.187)		(0.245)
Constant	1.6723**	0.8485	2.3858***	0.8177	2.0484***	1.1701
	(0.755)	(1.077)	(0.521)	(0.565)	(0.573)	(0.840)
Control variables	NO	YES	NO	YES	NO	YES
Observations	536	536	536	536	536	536
R-squared	0.113	0.206	0.199	0.475	0.163	0.298
Number of id	314	314	314	314	314	314

Notes: ***indicates significance at the 1% level; **significance at 5%, *significance at 10%. Standard errors in brackets are clustered at the firm level. Control variables include firm age, operating costs, number of part-time employees and education level of non-managers employees.

Table 8. Management practices and performance of smaller firms

VARIABLES	(1) Profit	(2) Profit	(3) Sales	(4) Sales	(5) Value added	(6) Value added
Management Scores	4.9042***	3.4344**	3.0843***	1.7883**	3.0388***	2.1757*
	(1.788)	(1.335)	(0.981)	(0.782)	(1.141)	(1.167)
Capital		0.4873**		0.2517*		0.3828**
		(0.230)		(0.148)		(0.159)
Full time Employees		0.4729		0.3196***		0.7573
		(0.343)		(0.110)		(0.534)
Constant	2.6468***	0.9860	4.0293***	2.3328***	3.6103***	0.9793
	(0.720)	(1.101)	(0.394)	(0.652)	(0.446)	(1.639)
Control variables	NO	YES	NO	YES	NO	YES
Observations	515	515	515	515	515	515
R-squared	0.050	0.096	0.185	0.320	0.054	0.126
Number of id	263	263	263	263	263	263

Notes: ***indicates significance at the 1% level; **significance at 5%, *significance at 10%. Standard errors in brackets are clustered at the firm level. Control variables include firm age, operating costs, number of part-time employees and education level of non-managers employees.

which requires a more structural management process to improve efficiency. As found by Adhvaryu et al. (2016), lines supervised by better managers are more likely to cope with productivity shocks. In addition, these firms are also competing in some formal market such as public procurement which require good management to be efficient. In this case, the better managed firms may be able to provide a cost-effective offer and have a higher market share. For instance, Alemayehu et al. (2021) found that improved management practices increase efficiency in the hospitality sector. Kawasaki

et al. (2023) also showed a positive linkage between management practices and performance in the bus sector in Japan, where public companies experience higher labor and better management score.

5. Conclusion

Managerial skills play an important role in growth and survival of business. In economic literature, although management ability is seen as a driver of difference in productivity among firms, it has been generally treated as unobserved heterogeneity. Recent empirical studies that attempt to assess the level of management practices of enterprises and the extent to which they affect productivity, consider management as a form of capital or technology that can be adopted and accumulated. However, most of the empirical research was conducted on enterprises in developed countries where the environment is highly competitive. In sub-Saharan African, adoption of new technology is sometime costly, exacerbated by lack of information and the low education level of many SMEs managers. Environment is also less competitive which impedes the innovation and adoption of better management practices. Therefore, this study contributes to the existing literature by analyzing the relationship between management practices and SMEs in Burkina Faso, considering management practices as a form of technology that the entrepreneurs can adopt.

The study uses survey data collected in 2018 over a sample of 577 SMEs selected in two cities of the country that are Ouagadougou and Bobo-Dioulasso. The results of the empirical estimation showed a positive and significant relationship between management practices and the level of profit, sale and value added. Thus, management practices are key factors of firm expansion in developing countries. This relationship is particularly stronger for larger SMEs where there is more hired labor employed. In addition, results showed that the incentive component of management is particularly important to increase firms' performance.

These empirical findings provide important policy implications for promoting a dynamic private sector in sub-Saharan Africa. The various initiatives supporting enterprises (including start-ups) should go beyond financial grants and support entrepreneurs to improve managerial skills. This has the benefit of raising the performance of enterprises and, therefore, their contribution to the reduction of unemployment. Public institutions that support the promotion and the creation of SMEs should provide adequate training on various aspects of management to the SMEs owners.

Although low quality of management hinders firms' growth in sub-Saharan African countries, SMEs also experience a low level of innovation which reduces the ability to survive in a highly competitive environment. Even if management can be seen as a soft technology, it may have a crucial influence on the adoption of hard technology. Therefore, further research should focus on how the quality of management can affect innovation and increase the benefit of new technology among SMEs.

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Notes

1. Exchange rate 1 USD = 500 FCFA (Approximation).

2. The use of this method to collect recall data gives a reference to the respondents making easier the comparison between the past and the current situations. Lemos et al. (2016) adopted similar method in their study in Pakistan.
3. As the standard deviation is 0.14, the marginal effect is computed as $exp(coef * sd) - 1 = exp(2.162 * 0.14) - 1 = 0.3534$.

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Appendix

Table A1. Test of selection bias

VARIABLES	Coefficients
Firm Age	−0.020
	(0.079)
Age of the respondent	0.006
	(0.037)
Year dummy (1 = 2017)	0.114
	(0.145)
Location Dummy (1= Ouagadougou)	−0.022
	(0.414)
Gender of the respondent (1= Woman)	0.141
	(0.192)
Juridical status (reference=SA)	
juridical status = 2, SARL	−0.285
	(0.249)
Juridical status = 3, Individual enterprises	−0.102
	(0.267)
Juridical status = 4, other	−0.076
	(0.414)
Interviewer dummy (reference = interviewer 1)	
Interviewer = 2	0.006
	(0.356)
Interviewer = 3	−0.009
	(0.346)
Interviewer = 5	0.180
	(0.356)
Interviewer = 6,	−0.265
	(0.523)
Interviewer = 7	−0.682
	(0.552)
Interviewer = 8	−0.736
	(0.536)
Interviewer = 9	−0.782
	(0.575)
Interviewer = 10	0.565
	(0.613)
Interviewer = 11	−0.199
	(0.540)
Interviewer = 12	0.295
	(0.523)
Interviewer = 13	−0.392
	(0.553)
Interviewer = 14	0.118
	(0.572)

(*Continued*)

VARIABLES	Coefficients
Interviewer = 16	0.112
	(0.539)
Interviewer = 17	0.232
	(0.562)
Interviewer = 19	0.138
	(0.524)
Interviewer = 20	−0.318
	(0.571)
Constant	1.755***
	(0.400)
Observations	1,054

Notes: These results are probit regression of the likelihood of SMEs surveyed to participate in the final sample. The dependent variable takes the value 1 if the enterprise interviewed contains enough information to be included in the empirical analysis and 0 otherwise. ***indicates significance at 1% level, **significance at 5%, *for significance at 10%.

Table A2. Descriptive statistics of all the variables used

	Manufacturing	Services	B\&CE	Commerce \&Others	Total
Managers	4.722	3.211	3.782	2.786	3.306
	(4.836)	(3.388)	(2.581)	(3.533)	(3.599)
Full time Employees	24.51	7.920	16.17	16.91	15.11
	(37.78)	(13.72)	(22.49)	(85.42)	(58.69)
Part-time Employees	15.47	5.816	18.67	6.688	9.431
	(18.30)	(14.01)	(24.42)	(32.81)	(26.01)
Capital	213.3	30.28	171.4	67.53	91.20
	(855.1)	(98.46)	(483.8)	(377.6)	(440.5)
Sales	622.1	151.1	498.1	528.2	425.3
	(1396.6)	(405.5)	(1724.5)	(2570.9)	(1899.3)
Wage	27.54	17.66	38.61	38.58	31.15
	(56.97)	(33.91)	(126.5)	(189.6)	(136.7)
Education level of employees	6.237	8.260	7.056	7.240	7.384
	(3.694)	(4.671)	(4.121)	(4.103)	(4.275)
Profit	400.3	119.1	409.6	390.5	315.9
	(1211.7)	(365.7)	(1693.3)	(2250.4)	(1687.7)
Value added	427.9	136.8	448.2	429.1	347.1
	(1232.8)	(381.9)	(1718.0)	(2369.7)	(1763.2)
Operating costs	194.2	14.27	49.92	99.12	78.22
	(771.0)	(33.91)	(196.4)	(693.1)	(535.3)
Applied for credit (YES/NO)	0.444	0.445	0.461	0.462	0.455
	(0.499)	(0.498)	(0.500)	(0.499)	(0.498)

(*Continued*)

Table A2. (*Continued*)

	Manufacturing	Services	B\&CE	Commerce \&Others	Total
Number of Competitors	54.06	72.70	76.52	72.91	71.12
	(45.19)	(41.00)	(37.28)	(49.28)	(45.10)
Firm Age	9.897	9.064	8.994	10.51	9.772
	(9.299)	(7.421)	(7.753)	(10.28)	(9.030)
Proportion of female employees	0.269	0.215	0.514	0.280	0.297
	(0.496)	(0.217)	(3.572)	(0.274)	(1.456)
Experience of Respondent	8.905	9.411	8.109	9.205	9.052
	(5.756)	(6.305)	(4.974)	(6.163)	(5.990)
Management Scores	0.389	0.406	0.380	0.409	0.401
	(0.115)	(0.154)	(0.140)	(0.138)	(0.141)

Notes: Standard deviations are in parentheses. Capital, sale value, labor costs, operating costs, profit, value added, and credit received are in millions of FCFA.

Table A3. T-Test on the characteristics of SMEs in 2017 and 2012

	2012	2017	Diff. (2012–2017)	S.E.	Obs.
Full time Employees	2.510	2.753	−0.243***	(0.057)	1134
Capital	2.898	3.321	−0.423***	(0.102)	1134
Sales	4.464	4.884	−0.421***	(0.112)	1134
Operating costs	2.092	2.334	−0.242**	(0.105)	1134
Wage	24.571	34.590	−10.019	(7.737)	1134
Education level of employees	7.351	7.362	−0.011	(0.253)	1134
proportion of permanent female employees	0.337	0.249	0.088	(0.083)	1134
Management Scores	0.389	0.412	−0.022***	(0.008)	1134