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**COMBINING EFFICIENCY AND INNOVATION TO ENHANCE PERFORMANCE:
EVIDENCE FROM FIRMS IN EMERGING ECONOMIES**

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COMBINING EFFICIENCY AND INNOVATION TO ENHANCE PERFORMANCE: EVIDENCE FROM FIRMS IN EMERGING ECONOMIES

Abstract: This paper extends the resource-capability based view in strategic management, and discusses the capabilities firms need to stay competitive in emerging economies. Faced with low levels of efficiency, technology, and skills, firms in emerging economies need to implement best management practices to overcome operational inefficiency while engage in innovation processes to address new opportunities. They have to develop the capabilities to enhance efficiency, the capabilities to undertake innovation, and the synthesis capabilities to combine the two to keep rivals at bay. The paper tests hypotheses against a dataset of more than 20,000 firms from 36 emerging economies provided by the World Bank in 2012-2015, and finds strong evidence to support the arguments. The paper finds that the three sets of capabilities are positively related to productivity and, through it, financial performance.

Keywords: Efficiency; Innovation; Synthesis capabilities; Firm performance; Emerging economies.

INTRODUCTION

Firm performance has been an enduring topic in the management literature (Penrose, 1959; Barney, 1991; Sirmon, Hitt, Ireland & Gilbert, 2011; Teece, 2014a). Since the 1950s, management scholars have paid increasing attention to the importance of resources and capabilities to firm performance. Early discussion focused on how a firm acquires and develops valuable, rare, inimitable, and non-substitutable resources to differentiate themselves from rivals (Penrose, 1959; Barney, 1991, 2001). Recent research focused on how a firm builds up the capabilities to bundle, integrate, and reconfigure resources to outperform rivals (Teece, Pisano & Shuen, 1997; Eisenhardt & Martin, 2000; Peteraf & Barney, 2003; Helfat et al, 2007; Sirmon, Hitt, Arregle & Campbell, 2010; Sirmon, Hitt, Ireland & Gilbert, 2011; Teece, 2007, 2014a, 2014b). The discussion has made a significant contribution to our understanding of the subtle nuance of determinants of firm performance.

However, much of the discussion has centered on firms in advanced economies where competitive markets have been developed for centuries, where firms have established best management practices to efficiently compete in competitive market environments, and where cutting-edge innovation has become the key to business success (Teece, 2014a). Insufficient attention has been paid to firms in emerging economies which were recently integrated into the global market system, and which are faced with many challenges different from those encountered by their counterparts in advanced countries (Buckley, 2009, 2011; Buckley & Tian, 2017a, 2017b). What are the particular contexts in which emerging-economy firms operate? What are the specific challenges emerging-economy firms face in enhancing performance? What are the capabilities emerging-economy firms need to develop a sustained competitive advantage to keep rivals at bay? These questions need to be addressed in order to advance our knowledge of strategy and firm performance (Mackey, Barney & Dotson, 2017). Recent research contended that firms in emerging economies have a much lower level of operational efficiency than their counterparts in advanced

economies, and suggested that the key to the success of these firms is to implement efficiency management practices (Bloom, Sadun, & Van Reenen, 2012; Bloom, Eifert, Mahajan, McKenzie & Roberts, 2013). However, the research neglected the vital role of innovation to the performance of firms in emerging economies, and the need for these firms to combine efficiency and innovation to stay competitive.

In this paper, we extend the resource-capability perspective to address these questions. We argue that resources are extremely scarce in emerging economies as these economies are exposed to international competition. Confronted with low levels of efficiency, technology, and know-how, they have to implement best management practices to overcome operational inefficiency in resource utilization using existent technology and know-how while engaging in innovation processes to address new opportunities for resource utilization using novel technology and know-how. They have to develop efficiency capabilities, innovation capabilities, and the synthesis capabilities to combine the two to develop a competitive advantage over rivals.¹

The main contribution of the paper is to extend the resource-capability perspective, take into consideration the peculiar contexts in which firms compete in emerging economies, and develop a model to explain the challenges firms face in emerging economies and the coherent sets of capabilities they need to address these challenges. Differing from the efficiency framework proposed by Bloom and colleagues, our model suggests that firms in emerging economies need to develop the synthesis capabilities to combine efficiency and innovation to enhance performance (Bloom, Sadun, & Van Reenen, 2012; Bloom, Eifert, Mahajan, McKenzie & Roberts, 2013). The model, which was tested in this paper, has important implications for firm managers.

THEORETICAL DEVELOPMENT AND HYPOTHESES

¹ We thank two anonymous reviewers for comments on these points.

A Resource-capability Perspective

We draw on and extend the resource-capability based view (hereafter RBV for short) to form the theoretical base of the paper. According to the RBV, a firm consists of bundles of resources and capabilities it needs to produce and sell a good or service (Penrose, 1959; Barney, 1991; 2001). Resources are defined as “the tangible and intangible assets” (Barney, 2001: 54), and “they are stocks, not flows” (Teece, 2010a, 689). In contrast, capabilities are defined as the capacities “to utilize resources to perform a task or an activity against the opposition of circumstance” (Teece, 2014b, 14). As such, capabilities “flow from the astute bundling or orchestration of resources” (Teece, 2014a: 14). Capabilities are intrinsically intangible, and are undergirded by resource orchestration processes and practices. Recent development in the RBV emphasized the importance of capabilities to sustained competitive advantage, as does the present paper (Sirmon & Hitt, 2009; Sirmon, Hitt, Ireland & Gilbert, 2011; Teece, 2014a).

A competitive advantage is reflected in superior performance in capturing value, and is indicated by “high relative profitability” (Thomas, 1986: 3), “superior financial return” (Ghemawat & Rivkin (1999: 49), or “strictly positive differential profits in excess of opportunity costs” (Foss & Knudsen, 2003: 2). However, the RBV is not to “explain all types of profitability differentials” (Peteraf & Barney, 2003: 310). Instead, it is to explain only “long-lived differences in firm profitability” attributable to heterogeneity in the way in which value is created using resources available, i.e., heterogeneity in the productivity of all resources used in value creation (Peteraf & Barney, 2003; Sirmon, Hitt, Ireland & Gilbert, 2011; Teece, 2014a). According to the RBV, superior productivity in value creation leads to long-lived superior financial gains which represent a sustained competitive advantage (Peteraf & Barney, 2003; Teece, 2014a).

Superior resource productivity can lead to long-lived superior financial gains for two reasons. First, superior productivity indicates that a firm can create more value with resources available, and thus has more opportunities to capture a portion of the value created (Peteraf & Barney, 2003). In a world of scarce resources, after all, it is the productivity of resources that ultimately determines the extent to which a firm captures the value it creates (Barney, 1991, 2001; Peteraf & Barney, 2003). Second, superior productivity flows from superior capabilities many of which are tacit and difficult to replicate (Sirmon & Hitt 2009; Sirmon, Hitt, Ireland & Gilbert, 2011). It is easy for rivals to imitate separate elements, but hard for them to replicate the interlocked, coherent and entire package. This is in line with the concept of causal ambiguity and social complexity (Barney, 1991).

In essence, the RBV implies a framework in which capability building enhance productivity which, in turn, enhances financial performance. In other words, the capabilities undergirded by resource orchestration process and practices generate an indirect effect on financial performance via productivity in addition to a direct effect on financial performance. A positive indirect effect indicates that capabilities contribute to long-lasting financial gains, while a positive direct effect indicates that these capabilities contribute to short-run financial gains contingent on “contextual factors” (Peteraf & Barney, 2003: 310). Firms should aim at long-lasting financial gains, and develop capabilities to enhance the productivity of all resources to this end.

How does a firm enhance productivity? Generally speaking, firms can take two approaches to enhance productivity (Nishimizu & Page, 1982; Färe, Grosskopf, Norris & Zhang, 1994; Coelli, Rao, O’Donnell & Battese, 2005). The two approaches can be elucidated in Figure 1 where all input resources are hypothetically divided into two bundles, and where the production frontier represents all possible resource combinations at which output is maximized at a given level of

technology. The first aims to improve efficiency with which input resources are utilized using existent technology and know-how. This is indicated by the movement from points A, B, and C toward the production frontier F1 (Nishimizu & Page, 1982). This portion of productivity increase was often called efficiency gains, and can be achieved by imitating best management practices. The second approach aims at innovation to address new opportunities for resource utilization using novel technology and know-how, and thereby push up the production frontier from F1 to F2 and then F3 (Färe, Grosskopf, Norris & Zhang, 1994; Ghemawat & Rivkin, 1999). This portion of productivity increase was often referred to as technological progress in economics, and cannot be achieved by simply imitating prevailing management practices (Coelli, Rao, O'Donnell & Battese, 2005). Accordingly, firms need to develop capabilities to orchestrate resources to enhance productivity in both ways. However, the specific capabilities firms need may differ depending on the context in which they operate (Mackey, Barney, Dotson, 2017).

(Insert Figure 1 about here)

In advanced economies, most firms have reached at a high level of operational efficiency and have to focus on the capabilities to engage in innovation to enhance productivity and, through it, profitability. In emerging economies, most firms face a notorious problem of operational inefficiency. In order to enhance productivity and, through it, profitability to attain a sustained competitive advantage in an increasingly competitive environment, they have to 1) implement best management practices to develop the capabilities to enhance operational efficiency in resource utilization using existent technology and know-how; 2) engage in innovation processes to develop the capabilities to embrace new opportunities for resource utilization using novel technology and know-how; and 3) develop the synthesis capabilities to do both well at the same time. We therefore draw on the RBV to propose a model in which efficiency capabilities, innovation capabilities, and

synthesis capabilities enhance productivity and, through it, financial gains. We illustrate our model in Figure 2. Differing from the efficiency framework of Bloom and colleagues, our model suggests that firms in emerging economies must develop the synthesis capabilities to combine efficiency and innovation to stay competitive (Bloom, Sadun, & Van Reenen, 2012; Bloom, Eifert, Mahajan, McKenzie & Roberts, 2013).

(Insert Figure 2 about here)

Efficiency and Firm Performance

In advanced economies of North America, Western Europe, and Japan, firms have been developing the capabilities to enhance efficiency in resource utilization in a highly competitive environment for centuries. Such capabilities are undergirded by efficiency management practices. Taylorism, Fordism, and Toyota lean production are among the well-known examples of such management practices (Bloom, Sadun & Van Reenen, 2012). Despite criticisms, core elements of these best management practices have been accepted in most, if not all, businesses across advanced economies. There is very little room for firms to outperform rivals by exploiting the capabilities to enhance operational efficiency further. Bob Lutz (2011), the former Vice Chairman of General Motors, made this point very clear for the automotive industry:

The operations portion of the automobile business has been thoroughly optimized over many decades, doesn't vary much from one automobile company to another, and can be managed with a focus on repetitive process. It is the 'hard' part of the car business and requires little in the way of creativity, vision or imagination. Almost all car companies do this very well, and there is little or no competitive advantage to be gained by 'trying even harder' in procurement, manufacturing or wholesale.

In order to keep rivals at bay, firms have to focus on innovation to address new opportunities for resource utilization using novel technology (Teece, 2014a, 2014b).

The picture looks quite different for firms based in emerging economies in Asia, Eastern Europe, Latin America, and Africa (Tian, 1996; Buckley, 2009, 2011). Due to decades of isolation from competition, firms suffer from a lack of basic efficiency management practices. Bloom and colleagues conducted, for instance, efficiency management practice surveys across countries, and found that emerging economies, such as Brazil, India, and China, had a large tail of very badly managed firms (Bloom, Genakos, Sadun & Van Reenen, 2012). In on-site visits to emerging economies, they found “firms without any formal maintenance programme, inventory or quality control system, or factory organization” (Bloom, Schweiger & Van Reene, 2012: 594). To stay competitive, firms in emerging economies need to implement best management practices to build up the capabilities to overcome operational inefficiency.

As exemplified by the experience of firms in advanced economies, efficiency capabilities are undergirded by four sets of practices to manage resources. The first is target-setting, which is related to the question of whether an organization supports long-term goals with tough but achievable short-term performance benchmarks. The second is monitoring, which is related to the question of whether an organization rigorously collects and analyzes operational performance data to identify areas in need of improvement. The third is problem-solving, which is related to the question of whether an organization promptly addresses problems in the value chain and makes sure that the problems will not happen again. The fourth is incentivizing, which is related to the question of whether an organization rewards high performers in operational efficiency with promotions and bonuses while retraining or removing underperformers. These practices are quite

in line with what Bloom and colleagues called best management practices for operational efficiency (Bloom, Genakos, Sadun & Van Reenen 2012; also Teece, 2014a).

Efficiency improvement implies that firms are able to produce more output with a given amount of input resources, and move further toward the production frontier. In firms based in emerging economies where efficiency management practices are lacking, the development of efficiency capabilities can foster productivity and, through it, financial gains, and may constitute an important source of sustained competitive advantage (Nishimizu & Page, 1982; Färe, Grosskopf, Norris & Zhang, 1994; Peteraf & Barney, 2003; Sirmon, Hitt, Ireland & Gilbert, 2011; Teece, 2014a). Indeed, Bloom and colleagues undertook a controlled experiment in India in which they provided free consultancy to 14 manufacturing plants on implementing these best management practices. After a year or so, the plants enhanced productivity by 17%, cut defects by more than 50%, reduced inventory by 20%, raised output by 10%, and increased profits to a different degree (Bloom, Sadun, & Van Reenen, 2012: 6; also Bloom, Eifert, Mahajan, McKenzie & Roberts, 2013). We thus propose the following hypotheses.

H1. Efficiency capabilities are positively related to productivity which, in turn, is positively related to financial performance of firms in emerging economies.

Innovation and Firm Performance

Generally speaking, innovation is related to the introduction of new ideas, methods, or things. Teece (2010a: 692-694) noted that the capabilities to innovate primarily consist of three key components: “1) identification and assessment of an opportunity (sensing), 2) mobilization of resources to address an opportunity and capture value from doing so (seizing), and 3) continued renewal (transforming). Innovation capabilities refer to the ability of a firm to engage in sensing,

seizing, and transforming to address new opportunities (Teece, 2010b; Chesbrough, 2010; Teece, 2014a, 2014b).

Firms based in different economies all need innovation capabilities, but for different reasons. Firms in advanced economies have taken the lead in innovation for centuries, and have developed a high level of technology and know-how. They are now in a position to rely on R&D functions and professionals to focus on innovation in cutting-edge technology and breakthrough product designs, leaving most other parts of the value chain to firms in emerging economies through outsourcing, licensing, contract manufacturing, and other forms of strategic alliances (Buckley, 2009, 2011). As latecomers, in contrast, firms in emerging economies lag behind in innovation and have a low level of technology and know-how in almost all functional areas, and need to engage in innovation in every part of the value chain to stay competitive in the global production networks (Williamson, 2010; Buckley, 2011; Williamson & Yin, 2014).

Therefore, firms in emerging economies have to develop innovation capabilities undergirded by innovation processes in all parts of the value chain. These innovation processes may involve 1) product innovation to offer products, which are often revised versions of breakthrough new products invented in advanced economies, to meet local customer needs; 2) process innovation to enhance product or service quality; 3) organizational innovation to enable a firm to respond to internal requirements and external pressures in an agile way;² 4) marketing

² When firms operate globally, for instance, they need to develop an organizational structure that enables them to leverage resources globally for high productivity. A global matrix structure is currently considered as “best organizational practice” which, though very effective sometimes, may lead to problems of coordination between regional and product managers. Organizational innovation to adjust the global matrix structure in line with firm-specific and context-specific circumstances will allow firms to push the production frontier determined by the best organizational practice further upward, and result in productivity gains and, through it, profit gains (Hill, 2017; Tian, 2016). We thank an anonymous reviewer for suggestions on this point.

innovation to enable a firm to package its products, promote them, distribute them, and price them in ways that can address market needs or even create new markets; 5) logistics innovation to enable a firm to leverage ‘make-or-buy’ options as environments change; 6) externally contracted R&D in addition to in-house R&D in order to leverage knowledge sources unavailable within an organization; and, most importantly, 7) opportunities for all employees to develop and try out new ideas and approaches in any functional areas.

Buttressed by such processes, innovation capabilities enable a firm to engage in sensing, seizing, and transforming in different functional areas, and generate novel technology and know-how to address new opportunities for resource utilization in the entire value chain. As shown in Figure 1, the novel technology and know-how allow a firm to push the production frontier upwards. Innovation capabilities thus help improve productivity and, through it, financial performance (Nishimizu & Page, 1982; Färe, Grosskopf, Norris & Zhang, 1994; Peteraf & Barney, 2003; Teece, 2010a, 2010b, 2014a). We propose the following hypotheses.

H2. Innovation capabilities are positively related to productivity which, in turn, is positively related to financial performance of firms in emerging economies.

Synthesis Capability and Firm Performance

Synthesis capabilities refer to the capabilities to do two things simultaneously. A type of synthesis capabilities has been extensively discussed in the organization literature, that is, the ambidexterity to engage in exploitative and explorative innovation simultaneously (O’Reilly & Tushman, 2004; Gupta, Smith & Shalley, 2006; Andriopoulos & Lewis, 2009; Gulati & Puranam, 2009; Junni, Sarala, Taras & Tarba, 2013; Parida, Lahti & Wincent, 2016). Here we focus on the type of synthesis capabilities that firms in emerging economies need. We contend that faced with the dual pressures of efficiency and innovation, firms in emerging economies need to implement efficiency

management practices while engaging in innovation, and build the synthesis capabilities to do the two things equally well to enhance performance (O'Reilly, & Tushman, 2013; Birkinshaw & Gupta, 2013; Fu, Flood & Morris, 2016). Synthesis capabilities of efficiency and innovation could be built up in a combined way or a specialized way depending on how efficiency capabilities and innovation capabilities are developed in a firm (He & Wong, 2004; Cao, Gedajlovic & Zhang, 2009). The two approaches to synthesis capabilities may vary in influencing productivity and, through it, financial performance.

A combined approach to synthesis capabilities involves a firm's effort to increase the combined magnitude of both efficiency capabilities and innovation capabilities, and focuses on their "absolute magnitude" (Cao, Gedajlovic & Zhang, 2009: 782). This approach implies that the two sets of capabilities are complementary to one another. The development of one set of capabilities can enhance the performance impact of the other. In contrast, a specialized approach to synthesis capabilities involves a firm's effort to match the magnitude of efficiency capabilities with that of innovation capabilities and *vice versa*, and focuses on "their relative magnitude" (Cao, Gedajlovic & Zhang, 2009: 782-783). This approach assumes that efficiency capabilities and innovation capabilities are "in opposition to each other" and "orient the organization in the pursuit of different goals" (Cao, Gedajlovic & Zhang, 2009: 784; March, 1991). The two sides must be closely matched to enhance firm performance. Clearly, which of the two approaches to synthesis capabilities helps enhance firm performance is dependent on whether efficiency capabilities and innovation capabilities are complementary or conflicting.

We believe that efficiency capabilities and innovation capabilities are complementary, rather than conflicting (Cao, Gedajlovic & Zhang, 2009). To build efficiency capabilities, for instance, a firm needs innovation capabilities to identify the opportunities and benefits which may

flow from the development of such capabilities, and creatively leverage these opportunities to reap the benefits. That is, they need to make sure that they do “the right things” (Teece, 2014a: 331). To turn the outcomes from innovation capabilities into productivity gains and financial benefits, similarly, a firm needs efficiency capabilities to set targets for capitalizing innovation outcomes in both the short-term and the long-term, to monitor the performance in innovation capitalization, and reward high performers and punish poor performers in the innovation capitalization process. That is, they need to “do things right” (Teece, 2014a: 331). Otherwise, innovation outcomes cannot translate into value to be created and captured by the firm due to operational inefficiency. Accordingly, synthesis capabilities are referred to as the combination of efficiency capabilities and innovation capabilities hereafter unless noted otherwise. If efficiency capabilities and innovation capabilities are complementary rather than contradictory, then a combined approach to synthesis capabilities is more likely to enhance productivity and, through it, financial performance than a specialized approach to synthesis capabilities (Birknshaw & Gupta, 2013). We propose the following hypotheses.

H3. A combined approach, rather than a specialized approach, to synthesis capabilities is positively related to productivity which, in turn, is positively related to financial performance of firms in emerging economies.

METHODOLOGY

Data source

We drew the sample from the raw data of the Enterprise Survey conducted by the World Bank together with the European Bank for Reconstruction and Development and the European Investment Bank for 36 emerging economies in Eastern Europe, Central Asia, Middle East, and Northern Africa in 2013-2015. These economies include Albania, Armenia, Azerbaijan, Belarus,

Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, FYR Macedonia, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Tajikistan, Turkey, Ukraine, Uzbekistan, Egypt, Jordan, Lebanon, Morocco, Tunisia, and Yemen.

The World Bank conducted the Enterprise Survey for other emerging economies as well over the period. The Enterprise Survey for the 36 countries was chosen because it included an Innovation Module which contained the information on innovation processes and management practices required to construct key variables in this paper. The Enterprise Survey for the 36 emerging economies started from Russia in 2012, followed by other economies over the 2012-2015 period. The Enterprise Survey was administered for each country once only, so it is a cross-section dataset. The dataset contained 20975 firms with no less than 20 employees. These firms were distributed in 14 industrial sectors, including food, wood, publishing and recorded media, chemicals, plastics and rubber, nonmetallic mineral products, fabricated metal products, machinery and equipment, electronics, precision instruments, furniture, other manufacturing, retail, and other services.

Measurement

Efficiency capabilities were proxied by four groups of efficiency management practices: target-setting, performance-monitoring, problem-solving, and incentivizing. As mentioned earlier, these management practices undergirded efficiency capabilities (Teece, 2014a, 2014b). The Innovation Module of the Enterprise Survey included a section on management practices which contained eight questions related to these management practices. As shown in Appendix 1, questions 1-3 were related to target-setting; question 4 was related to performance-monitoring; question 5 was related to problem-solving; and questions 6-8 were related to incentivizing. We first averaged the

scores of questions 1-3 to construct a variable of target-setting, and questions 6-8 to construct a variable of incentivizing. We then followed prior studies to average the scores of the four component variables to construct the variable of efficiency capabilities (Bloom, Genakos, Sadun & Van Reenen, 2012). A higher value represented a greater development of efficiency capabilities.

Innovation capabilities were undergirded by innovation processes in different functional areas, and were measured on the basis of the questions in the Innovation Module of the Enterprise Survey regarding whether the firm in the last three years 1) introduced new or significantly improved products or services; 2) introduced any new or significantly improved methods for production; 3) introduced any new or significantly improved organizational structures; 4) introduced new or significantly improved marketing methods; 5) spent on R&D activities, either in-house or contracted with other companies; 6) introduced any new or significantly improved logistical or business support processes; and 7) gave employees some time to develop or try out a new approach or new idea about products or services, business process, firm management, or marketing. We constructed a dichotomous variable for each answer to each of the seven questions, with one denoting Yes and zero denoting No. We then added the seven dichotomous variables together to construct a variable of innovation capabilities. A higher value represented a greater development of innovation capabilities.

Combined approach to synthesis capabilities was operationalized by multiplying efficiency capabilities and innovation capabilities (Cao, Gedajlovic & Zhang, 2009). This measure reflects the combined magnitude of the two components (He & Wong, 2004; Gibson & Birkinshaw, 2004; Cao, Gedajlovic & Zhang, 2009). A higher value represented a higher level of the combined approach to synthesis capabilities. *Specialized approach to synthesis capabilities* was

operationalized using the absolute difference between efficiency capabilities and innovation capabilities (He & Wong, 2004; Cao, Gedajlovic & Zhang, 2009).³

Productivity was not directly observable. However, it could be measured using a production function proposed by Robert Solow (1956) – a Laureate of Nobel Prize in economics. The production function was illustrated in equation 1:

$$G_i = P_i S_i^{\beta_1} A_i^{\beta_2} \quad (1)$$

where i represents firm. G represents the value of total sales revenues, S represents the number of total staff, and A represents the value of total assets. β_1 and β_2 represent marginal productivity of workforce and assets, respectively. Both are constants determined by available technology. P represents productivity (Solow, 1956).

Taking the natural logarithm of Equation 1 produced Equation 2:

$$LgG_i = a + \beta_1 LgS_i + \beta_2 LgA_i + \epsilon_i \quad (2)$$

The constant a and the error term ϵ_i represent productivity (P_i), which was calculated using Equation 3:

$$P_i = LgG_i - \beta_1 LgS_i - \beta_2 LgA_i \quad (3)$$

It is necessary to address the simultaneity bias and the selection bias in estimating labour coefficient (β_1) and capital coefficient (β_2) in Equation 2 (Yasar and Baciborski 2008). Olley and Pakes (1996) and Levinsohn and Petrin (2003), henceforth OP and LP, have developed two similar semi-parametric estimation procedures to overcome these biases using, respectively, investment

³ We thank an anonymous reviewer for suggestions on the use of the term of specialized approach and on the way the variable is calculated.

and material costs as instruments for the unobservable productivity shocks. As data on investment were not available, we followed the LP procedure to use material costs as the instrument for the unobservable productivity shock in calculating productivity.

Financial performance was estimated using the accounting data provided in the Enterprise Survey. Specifically, profit was calculated as the difference between sales revenues and the costs of making a product or providing a service, including the cost of labor (salary, bonuses, and social security payments), the cost of raw materials and intermediate goods used in production, the cost of fuel and electricity, the cost of machinery, vehicles and equipment, the cost of land and buildings, and other cost of production not included above. This is similar to the concept of gross profit in accounting. We divided profit by sales revenues to construct an estimate of returns on sales (ROS) as a measure of financial performance. I also divided profit by assets to construct an estimate of returns on asset (ROA) as an alternative measure of financial performance, and used the variable in robustness test.

We took into account currency difference by transforming local currencies into U.S. dollars. Following Bloom and colleagues, moreover, I transformed the dependent and independent variables into z-scores by normalizing each variable to mean zero and standard deviation one using the formula (Bloom, Schweiger & Van Reenen, 2012):

$$z_{v_i} = \frac{v_i - \bar{v}_i}{\sigma_{m_i}} \quad (4)$$

where z_{v_i} is the z-score of the variable v_i in firm i , \bar{v}_i is the unweighted average of the variable v_i across all observations in all countries, and σ_{m_i} is the standard deviation of the variable v_i across all observations in all countries. This transformation has two advantages. First, it helps minimize multicollinearity in using interaction terms in regressions. Secondly, it facilitates interpretation of

the results as variables were measured in relative terms (Sirmon, Hitt, Arregle & Campbell, 2010: 1387).

We included several control variables which have been considered to influence organizational ambidexterity and firm performance (He & Wong, 2004; Cao, Gedjlovic & Zhang, 2009; Andriopoulos & Lewis, 2009; Parida, Lahti & Wincent, 2016). We followed the Enterprise Survey to construct a dummy variable of *firm size*: one denoted large firms with more than 100 employees, and zero denoted small firms with less than 100 employees. We constructed a variable of *firm age* using the natural logarithm of the number of years since the firm was established. We constructed a variable of *manager experience* using the logarithm of the years in which the general manager had served on the position in any firms or companies. We constructed a dummy variable of *foreign ownership*: one denoted foreign firms with more than 20 per cent of foreign share, and zero denoted domestic firms with less than 20 per cent of foreign share. We constructed a variable of *employee education* using the logarithm of the average number of years of education of full-time employees. We constructed a dummy variable of *employee training* based on the survey question regarding whether the firm had formal training programs for its permanent, full-time employees in the last year. One denoted firms with an employee training program, and zero denoted firms without such a program. We constructed a variable of *product diversification* using the percentage in the total sales revenues represented by the main product. We reversed the percentage so that a higher value indicated a higher level of product diversification. In addition, we constructed *country dummies* to control for variation in location, and *industry dummies* to control for variation in industrial affiliation. These control variables were included in all path analyses. The descriptive statistics and correlation of these variables are reported in Table 1.

(Insert Table 1 about here).

Before running path analysis, we need to address the problem of endogeneity. Theoretically, endogeneity is unlikely a problem for the variable of efficiency management practices because implementation of these practices, which did not require much financial resource, should be an antecedent rather than an outcome of an increase in productivity and profitability. It did present a problem for the variable of innovation processes since high-performing firms were likely to have more financial resource to engage in innovation. However, as the variable was calculated as an average over the previous three years, the problem of endogeneity was minimized. Indeed, Hausman test rejected the possibility of endogeneity for both efficiency management practices and innovation processes, with the coefficients of the estimated residuals from the reduced form regression being statistically insignificant from zero at the 0.10 significant level.

RESULTS

Table 1 contains the descriptive statistics of major variables in the model. In empirical test, we took the maximum likelihood method of path analysis using AMOS 24. Four established model fit statistics were used to examine the viability of the structural equation models (Kline, 2005). They are chi-square (χ^2), the comparative fit index (CFI), the root-mean-square error approximation (RMSEA), and the standardized root-mean-square residual (SRMR). Meanwhile, we took the bootstrapping approach to test for the statistical significance of the indirect effect of the independent variables.

(Insert Table 1 about here)

The fit for the hypothesized linkage model (Figure 2) was acceptable ($\chi^2 [9] = 137.33$, CFI = .99, RMSEA = .03, SRMR = .04). All the relationships proposed for the model were significant and consistent with predictions. To see whether the mediation effect of productivity is partial or full, we added the direct path from the independent variables to financial performance. The adding

of the direct paths did not change the model fit very much ($\chi^2 [6] = 108.03$, CFI = .99, RMSEA = .03, SRMR = .04), and did not change the sign and significance of the coefficients in the path analysis. The results of the path analysis are presented in Figure 3.

(Insert Figure 3 about here)

Hypothesis 1 posits that efficiency capabilities are positively related to productivity which, in turn, is positively related to financial performance. The coefficient of efficiency capabilities on productivity was positive and statistically significant ($\beta = .06$, $p < .05$), as was the coefficient of productivity on financial performance ($\beta = .46$, $p < .05$). The results supported hypothesis 1, indicating that a one standard-deviation increase in efficiency capabilities would lead to a .06 standard-deviation increase in productivity while a one standard-deviation increase in productivity would lead to a .46 standard-deviation increase in financial performance. Hypothesis 1 implies that productivity mediates the relationship between efficiency capabilities and financial performance. Indeed, the indirect effect of efficiency capabilities on financial performance via productivity was positive and statistically significant ($\lambda = .03$, $p < .01$), indicating that a one standard-deviation increase in efficiency capabilities would lead to a .03 standard-deviation increase in financial performance via productivity. As the direct effect of efficiency capabilities on financial performance was positive but statistically insignificant ($\theta = .02$, $p > .10$), the results suggested that productivity fully mediated the relationship between efficiency capabilities and financial performance.

Hypothesis 2 posits that innovation capabilities are positively related to productivity which, in turn, is positively related to financial performance. The coefficient of innovation capabilities on productivity was positive and statistically significant ($\beta = .08$, $p < .01$), as was the coefficient of productivity on financial performance ($\beta = .46$, $p < .05$). The results fully supported hypothesis 2,

indicating that a one standard-deviation increase in innovation capabilities would lead to a .08 standard-deviation increase in productivity while a one standard-deviation increase in productivity would lead to a .46 standard-deviation increase in financial performance. Hypothesis 1 implies that productivity mediates the relationship between innovation capabilities and financial performance. Indeed, the indirect effect of innovation capabilities on financial performance via productivity was positive and statistically significant ($\lambda = .04, p < .01$), indicating that a one standard-deviation increase in innovation capabilities would lead to a .04 standard-deviation increase in financial performance via productivity. However, as the direct effect of innovation capabilities on financial performance was negative and statistically significant ($\theta = -.06, p < .01$), the results suggested that productivity partially mediated the relationship between innovation capabilities and financial performance.

Hypothesis 3 states that a combined approach to synthesis capabilities is positively related to productivity which, in turn, is positively related to financial performance. The coefficient of the combined approach to synthesis capabilities on productivity was positive and statistically significant ($\beta = .09, p < .01$), as was the coefficient of productivity on financial performance ($\beta = .46, p < .05$). Meanwhile, the coefficient of the specialized approach to synthesis capabilities on productivity was negative though statistically insignificant ($\beta = -.01, p > .10$). The results fully supported hypothesis 3, indicating that a one standard-deviation increase in the combined approach to synthesis capabilities would lead to a .09 standard-deviation increase in productivity while a one standard-deviation increase in productivity would lead to a .46 standard-deviation increase in financial performance. Hypothesis 3 implies that productivity mediates the relationship between the combined approach to synthesis capabilities and financial performance. Indeed, the indirect effect of the combined approach to synthesis capabilities on financial performance via productivity

was positive and statistically significant ($\lambda = .04, p < .01$), indicating that a one standard-deviation increase in the combined approach to synthesis capabilities would lead to a .04 standard-deviation increase in financial performance via productivity. However, as the direct effect of the combined approach to synthesis capabilities on financial performance was positive and statistically significant ($\theta = .06, p < .01$), the results suggested that productivity partially mediated the relationship between the combined approach to synthesis capabilities and financial performance.

We calculated the squared multiple correlations (i.e., R^2 s) for structural equations predicting productivity (.24) and financial performance (.35). The results indicated that the final model explained a moderate amount of variance in these variables. To check the robustness of the findings, we used returns on assets as an alternative measure of financial performance to rerun the path analyses. The results remained virtually unchanged. The results are available from the author upon request.

DISCUSSION

Theoretical contribution

Extant research focused on resource and capabilities that determine the performance of firms in advanced economies where efficiency capabilities have been well developed in a competitive market environment for long, and where there is very little room for firms to enhance operational efficiency further (Lutz, 2011). Firms in advanced economies have to focus on cutting-edge innovation to compete with rivals in novel technology and know-how, and develop innovation capabilities to this end (Teece, 2014a, 2014b). Application of this theoretical approach to firms in emerging economies would miss the most prominent capability challenge they face.

The study suggests that many firms in emerging economies suffer from a notorious problem of operational inefficiency. To stay competitive, they must implement best management

practices to overcome inefficiency in resource utilization using existent technology and know-how on the one hand, and engage in innovation to embrace new opportunities for resource utilization using novel technology and know-how on the other. They need to develop efficiency capabilities, innovation capabilities, and the synthesis capabilities to skillfully combine the two to enhance performance. This is a significant contribution the study makes to the literature.

Managerial implication

The study suggests that firms in emerging economies differ from their counterparts in advanced economies in the environments in which they operate, and need to develop capabilities to enhance performance in the light of the particular challenges they face. Specifically, they need to develop the capabilities to enhance operational efficiency, the capabilities to undertake innovation, and the synthesis capabilities to enhance efficiency and innovation simultaneously to keep rivals at bay. It is important for managers of firms in emerging economies to focus on the three sets of capabilities to enhance firm performance.

Importantly, the study suggests that a combined approach to synthesis capabilities enhances firm performance, whereas a specialized approach to synthesis capabilities fails to do so. In developing synthesis capabilities, therefore, firms in emerging economies do not need to match the relative magnitude of efficiency capabilities with that of innovation capabilities or *vice versa*, and should not focus on balancing of one against the other (Cao, Gedjlovic, & Zhang, 2009). Instead, they need to take efficiency capabilities and innovation capabilities as complementary, focus on the increase in the absolute magnitude of both, and skillfully combine one with the other to enhance performance.

Limitation and future research direction

It should be noted that empirical findings of the study are based on statistical likelihood analysis and are reflective of a general trend. As such, they cannot be extended to argue that all firms in emerging economies have benefited from the development of efficiency capabilities, innovation capabilities, and synthesis capabilities to combine the two. There are certainly outliers. Future research may examine these outliers, and the particular contingency circumstances in which these outliers emerge.

Moreover, there might be biases related to the sample and data. The sample included firms from 36 emerging economies in Eastern Europe, Asia, and North Africa. It did not include firms in other emerging economies such as those in Latin America and South Africa. It is questionable whether findings of the study apply to firms in all emerging economies. Future research may extend the study to include samples from other emerging economies. Moreover, factor analysis were not used because the variables were all constructed using survey questions from the World Bank dataset and some of the variables were constructed using dichotomous variables which were not suitable for factor analysis. Similarly, the construct validity may be a problem, but that is always a problem by using secondary data, because the constructs are created.⁴ Future research may address the sample and data issues when primary data are available.

Conclusion

Firms in emerging economies face challenges different from those facing their counterparts in advanced economies, and have to develop the capabilities they need to deal with these challenges. Specifically, they need to build the capabilities to enhance efficiency in resource utilization in the entire value chain, the capabilities to involve all employees in innovation processes to address new

⁴ We thank two anonymous reviewers for comments on these points.

opportunities for resource utilization, and the synthesis capabilities to enhance efficiency and innovation simultaneously in order to stay competitive.

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Appendix: Questions on Efficiency capabilities in the Survey

Q1. Over the last complete fiscal year, what best describes the time frame of production targets at this establishment? Examples of production targets are: production, quality, efficiency, waste, on-time delivery.

1. No production targets
2. Main focus was on short-term (less than one year) production targets
3. Main focus was on long-term (more than one year) production targets
4. Combination of short term and long term production targets

Q2. Over the last complete fiscal year, how easy or difficult was it for this establishment to achieve its production targets?

1. Possible to achieve without much effort
2. Possible to achieve with some effort
3. Possible to achieve with normal amount of effort
4. Possible to achieve with more than normal effort
5. Only possible to achieve with extraordinary effort

Q3. Over the last complete fiscal year, who was aware of the production targets at this establishment?

1. Only senior managers
2. Most managers and some production workers
3. Most managers and most production workers
4. All managers and most production workers

Q4. Over the last complete fiscal year, how many production performance indicators were monitored at this establishment?

1. No production performance indicators
2. 1-2 production performance indicators
3. 3-9 production performance indicators
4. 10 or more production performance indicators

Q5. Over the last complete fiscal year, what best describes what happened at this establishment when a problem in the production process arose?

1. No action was taken
2. We fixed it but did not take further action
3. We fixed it and took action to make sure it did not happen again
4. We fixed it and took action to make sure that it did not happen again, and had a continuous improvement process to anticipate problems like these in advance

Q6. Over the last complete fiscal year, what were managers' performance bonuses usually based on?

1. No performance bonuses
2. Their own performance as measured by targets
3. Their team or shift performance as measured by targets
4. Their establishment's performance as measured by targets
5. Their company's performance as measured by targets

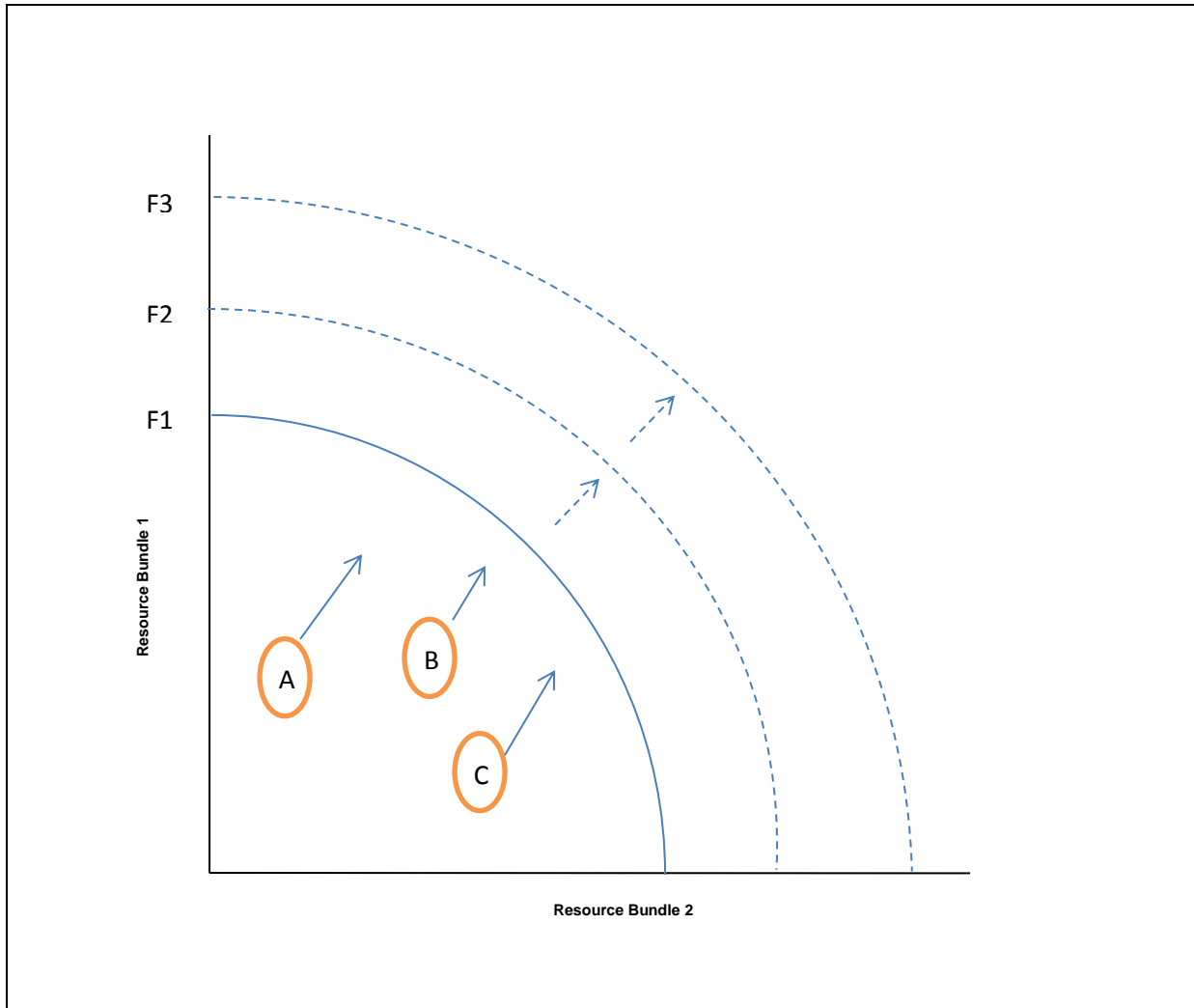
Q7. Over the last complete fiscal year, what was the primary way non-managers were promoted at this establishment?

1. Non-managers are normally not promoted
2. Promotions were based mainly on factors other than performance and ability (for example, tenure or family connections)
3. Promotions were based partly on performance and ability, and partly on other factors (for example, tenure or family connections)
4. Promotions were based solely on performance and ability

Q8. Over the last complete fiscal year, when was an underperforming non-manager reassigned or dismissed?

1. Rarely or never
2. After 6 months of identifying non-manager under-performance
3. Within 6 months of identifying non-manager under-performance

FIGURE 1. Two Sets of Firm Actions to Enhance Productivity



Note: All input resources are hypothetically divided into two bundles. The production frontier, F1, represents all possible resource combinations at which output is maximized at a given level of technology. One set of firm actions to enhance productivity is to improve efficiency in resource utilization using existent technology and know-how. This is often achieved by imitating best practices, and indicated by the movement from points A, B, and C toward the production frontier F1 (solid arrows). The second set of firm actions to enhance productivity is to innovate to address new opportunities for resource utilization using novel technology and know-how, and thereby push up the production frontier. This is indicated by the movement from F1 to F2 and then F3 (dotted arrows).

Figure 2. A Theoretical Model of Firm Capabilities and Performance

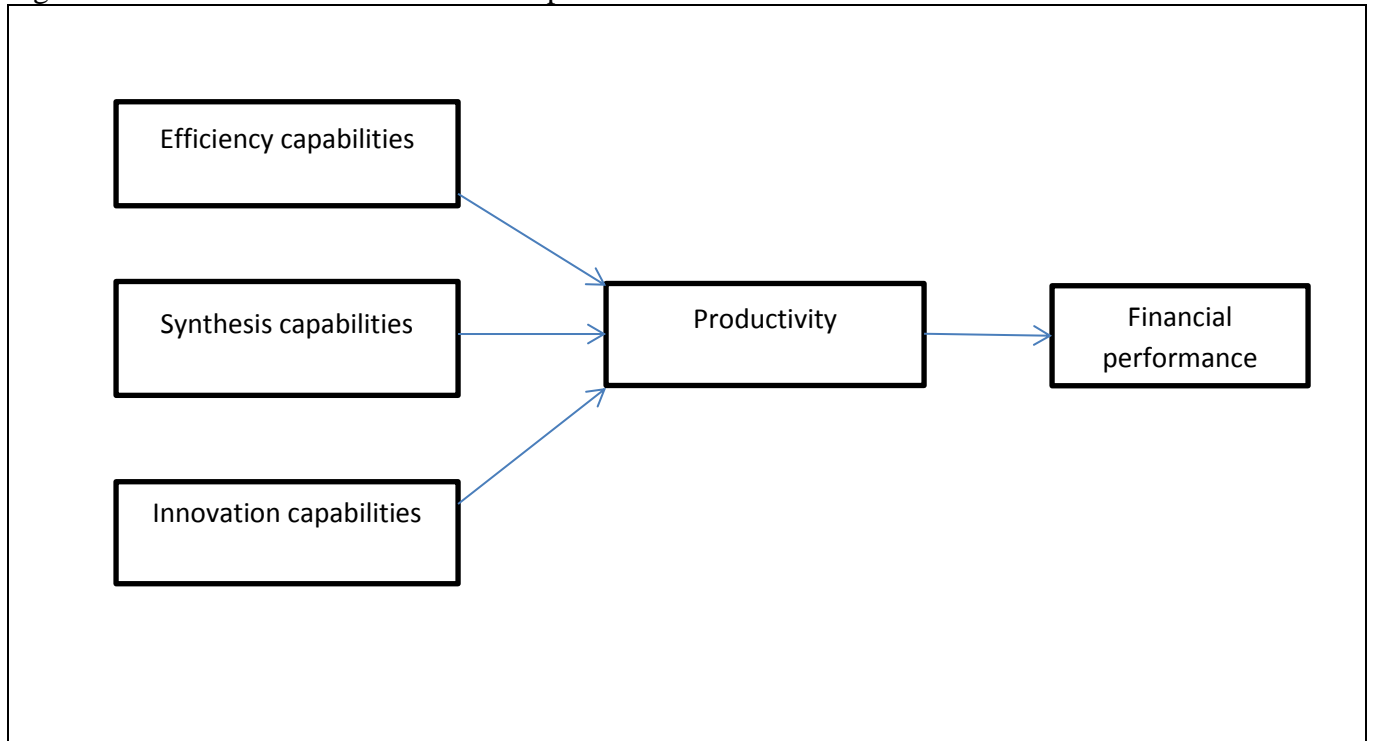
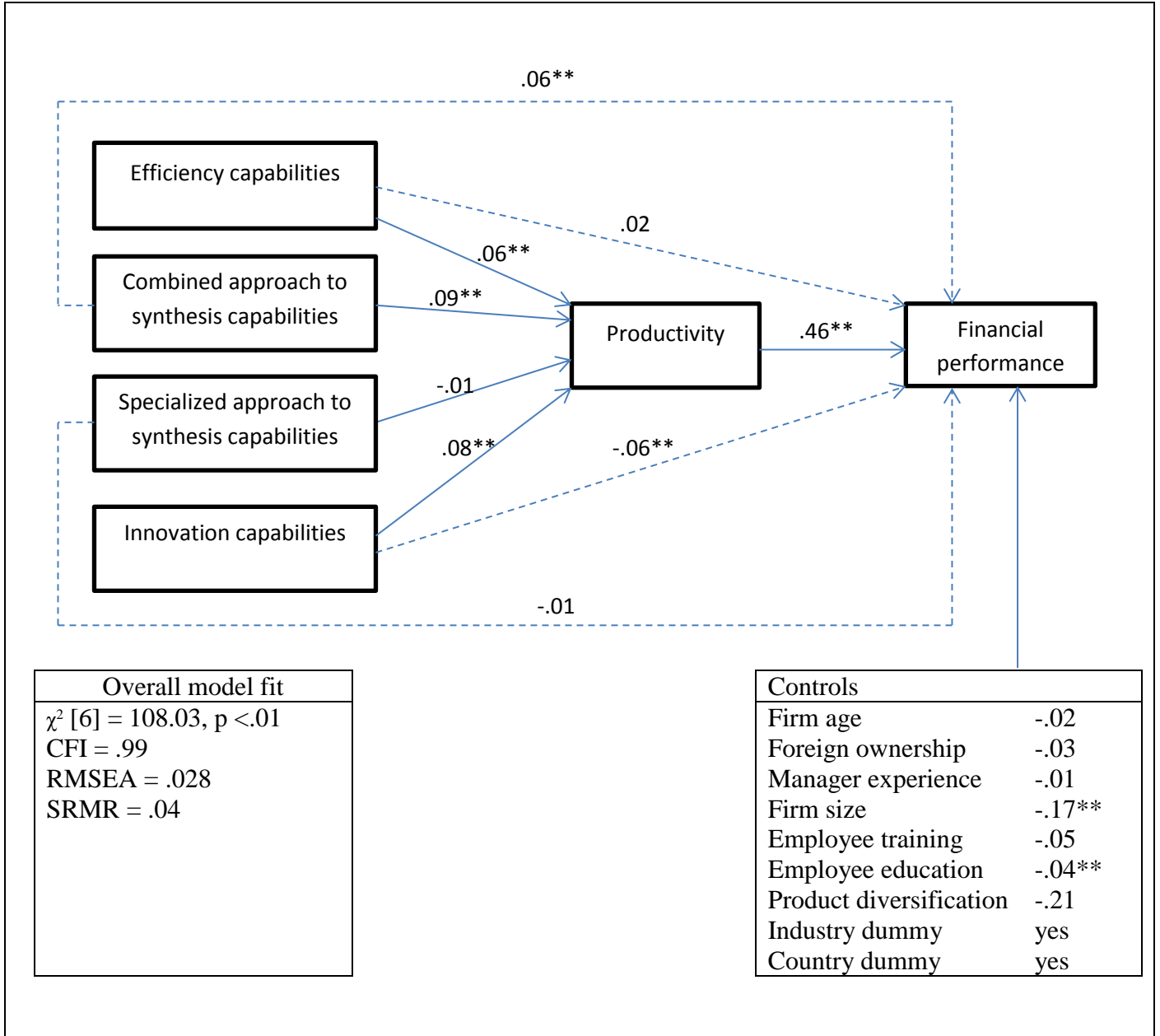


Figure 3. Path Analysis Results ^a



^a ** p-value < 0.01; * p-value < 0.05.

Table 1. Mean, Standard Deviation, and Correlation of Variables ^a

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Efficiency capabilities	2.66	.49												
2. Innovation capabilities	1.30	1.80	.24*											
3. Combined approach to synthesis capabilities	.28	1.19	.25**	.25**										
4. Specialized approach to synthesis capabilities	-3.29	1.36	.47**	-.45**	-.22**									
5. Productivity	6.68	1.10	.07**	.11**	.06**	.00								
6. Financial performance	-2.26	48.45	-.01	-.00	.02	-.01	.14**							
7. Firm size	.14	.35	.18**	.11**	.08**	.04**	.13**	-.02*						
8. Firm age	2.63	.68	.07**	.09**	.01	-.02*	.05**	-.00	.18**					
9. Foreign ownership	.07	.26	.10**	.12**	.08**	-.02**	.07**	.00	.14**	-.01				
10. Manager experience	2.68	.74	.05**	.06**	-.04*	-.02*	.05**	.00	.07**	.42**	-.02**			
11. Employee education	10.62	3.88	.12**	.06**	-.01	-.02	.10**	.01	-.00	-.01	.00	-.03**		
12. Employee training	.31	.46	.20**	.32**	.15**	-.15**	.13**	.00	.13**	.04**	.09**	.02*	.11**	
13. Product diversification	.15	.22	.05**	.14**	.06**	-.07**	.00	-.00	-.03**	.05**	.00	.04**	.01	.07**

^a ** <0.01; * <0.05.