Entrepreneurial Orientation and Performance:

Mediating Effects of Technology and Marketing Action across Industry Types

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ABSTRACT

We contribute to the debate on the relationship between entrepreneurial orientation (EO) and firm performance. We theorize, firstly, that the relationship between EO and performance is mediated by the firm's technology and marketing action, and secondly, that these mediating effects will differ by industry. We test the model on 489 Korean SMEs. Results indicate both technology and marketing action mediate the effect of EO on performance. As expected, technology action has a stronger mediating effect than marketing action in manufacturing industries, while marketing action has a stronger mediating effect in service industries. We discuss implications for managers and policy makers.

Key words: Entrepreneurial orientation, technology action, marketing action, firm performance, SMEs, Korea

INTRODUCTION

Despite the attention paid to the entrepreneurial orientation (EO) construct in scholarly research, there have been mixed results in empirical studies. In early work, it was argued that EO can enable a firm to achieve its goals by creating new knowledge for building new capabilities and reenergizing existing capabilities over the long-term (Lumpkin and Dess, 1996; Zahra, 1991; Miller, 1983; Wiklund, 1999). However, some investigations of interrelations among multivariate scales of EO and performance detected no significant effect on performance (Covin and Slevin, 1989; Covin et al., 1994). Nevertheless, meta-analysis has concluded there is a broad positive link between EO and firm performance (Rauch, Wiklund, Lumpkin and Frese, 2009).

There have been calls for research to understand the role played by contingent factors such as the industry in which the firm competes (Rauch et al. 2009) as well as internal mediating factors (Wales, Gupta and Mousa, 2013). Indeed, studies have questioned the 'universal' main-effects model of EO on firm performance, claiming that direct-effects-only modeling will be an incomplete analysis (Wiklund and Shepherd, 2005). Wiklund and Shepherd (2005) proposed a configurational approach (a three-way interaction including EO, internal factors and external factors) for understanding the effects of EO on firm performance.

Our study addresses these calls by examining the fundamental role played by the nature of the industry in determining how EO drives firm performance. While scholars have examined the role of EO under different environmental conditions, such as turbulence and dynamism (Covin and Slevin, 1989; Wiklund and Shepherd, 2005) or hostility (Kreiser and Davis, 2010), the services-manufacturing distinction has mostly been ignored. Some studies use a single industry in the empirical design (e.g., Avlontis and Salavou, 2007; Anderson, Covin and Slevin, 2009), while others cast industry as a control variable. Scholars have only recently started to

examine the services-manufacturing distinction in analysis of the relationship between EO and performance outcomes (Rigtering, Kraus, Eggers and Jensen, 2014).

We believe the services – manufacturing distinction matters. While both manufactured goods and services are transactable (Hill, 1977), with services, the object that is transacted does not refer to the "transfer of ownership of a tangible commodity", and instead is seen in terms of "deeds" or "efforts" that are produced as they are consumed (Rathmell, 1966: 33). Services are distinct from manufacturing in terms of their intangible and heterogeneous nature of what is offered to the consumer (Gallouj and Weinstein (1997) use the expression "fuzzy"), the fact that production and consumption cannot be separated, and the perishability of services (Rathmell, 1966; Hill, 1977). These characteristics imply the provision of a service brings about a change or improvement in the condition of the consumer of the service (Hill, 1977; Gallouj and Weinstein, 1997). Differences between manufacturing and services should matter to our understanding of the EO – performance relationship, not least because they will determine how entrepreneurial and innovative capabilities need to be developed and deployed in the firm (e.g., Rigtering et al., 2014). We note that the role played by the nature of the industry in determining how EO drives firm performance has not been researched in the extant literature.

We address this deficit by drawing from the configurational approach (Hakala, 2011; Kreiser and Davis, 2010; Wiklund and Shepherd, 2005), as well as the model of entrepreneurial action proposed by McMullen and Shepherd (2006) and develop and test a mediation model of the EO – performance relationship that explicitly takes industry into account. Firstly, we examine mediating variables that we argue are stimulated by the firm's adoption of an EO. Mediating effects allow us to identify mechanisms underlying the EO – performance relationship. Drawing from research that finds knowledge creation processes to mediate the relationship between EO

and performance (Li, Huang and Tsai, 2009), we argue two sets of mediating effects for *technology action* and *marketing action* respectively; these representing two fundamental ways firms create new knowledge in the quest for superior performance. Secondly, we examine the nature of the industry, captured in terms of the services – manufacturing distinction. Here we depart from previous studies of EO that have utilized environmental factors such as dynamism, uncertainty, hostility (or munificence) to capture salience of the firm's external environment (e.g., Hakala, 2011; Kreiser and Davis, 2010). Our model hypothesizes that the relationship between EO and firm performance is mediated both by technology and marketing action, but that the *strength of these mediating effects varies according to industry*. In short, we theorize that the configuration of industry and specific types of entrepreneurially-oriented actions within the firm will determine how EO will influence performance.

We use a sample of 489 Korean small-medium sized enterprises (SMEs) in a range of industrial sectors to test our hypotheses. Analysis confirms that technology action has a stronger mediating role than marketing action on the relationship between EO and firm performance in manufacturing industries. Conversely, marketing action has a stronger mediating role than technology action on the relationship between EO and firm performance in service industries.

Our study makes a number of important contributions. Firstly, we structure the EO – firm performance relationship in a new way, theorizing that technology- and marketing actions that ensue as a result of EO need to be treated as mediators between EO and firm performance. Secondly, we show how the nature of the industry in terms of the services – manufacturing distinction will determine the relative strengths of these mediating effects. This is a new way of looking at the effects of EO within a configurational approach that explicitly accounts for industry. In addition, given our empirical setting in Korea, we advance knowledge of strategic

management in SMEs in an emerging, catch-up, economy. Bruton, Filatotchev, Si and Wright (2013) have called for research that accounts for local industry context among entrepreneurs in emerging economies. Our research suggests that EO in SMEs in an emerging economy does play an important role in building competitive advantage, but that this role needs to be considered more precisely than prior studies suggest in terms of its impact on technology and marketing actions within the context of the specific industry in which the firm competes.

ENTREPRENEURIAL ORIENTATION AND FIRM PERFORMANCE

According to the EO literature, any firm can be positioned and characterized on a continuum ranging from 'passive' (or conservative) to 'aggressive' (or entrepreneurial) (Lumpkin and Dess, 1996; Miller and Friesen, 1983). When a firm is 'aggressive', it inherently has the ingredients of innovation, pro-activeness and risk-taking present in its corporate strategy (Lumpkin and Dess, 1996; Wiklund, 1999). These three core ingredients of EO historically have been treated as principal sub-components of the EO construct (Kreiser, Marino and Weaver, 2002), although the literature also highlights two more: competitive aggressiveness and autonomy (Wales, Gupta and Mousa, 2013).

EO increases firm performance by creating new knowledge needed for building new capabilities and reenergizing existing capabilities, fostering an innovative mindset within the firm. This mindset will be essential if employees are to be mobilized in a way in which new opportunities can be identified and ultimately exploited by the firm (Miller and Friesen, 1983). EO helps the firm to perform by guiding its utilization of resources in response to environmental signals earlier than competitors (Williams and Lee, 2009). Reacting to industry challenges in this way involves ongoing identifying, evaluating and exploiting of new opportunities (Shane and

Venkataraman, 2000).

There have been various approaches - and mixed findings - in studies of the relationship between EO and firm performance. Some scholars show a direct or indirect effect of EO on performance (e.g., Wiklund and Shepherd, 2003). Some highlight the different effects of the sub-components of EO (Kreiser, Marino and Weaver, 2002; Kreiser and Davis, 2010). Kraus, Rigtering, Hughes and Hosman (2011) highlight the contingent nature of these sub-components of EO, finding, for instance, that firm proactivity contributes most to performance during an economic crisis. Others, however, detect no direct significant effect on performance (Covin and Slevin, 1989; Covin et al., 1994).

Despite these results, there is widespread consensus around a positive relationship between EO and firm performance, subject to contingent factors. In an influential meta-analysis of fifty-three samples comprising over fourteen thousand companies, Rauch, Wiklund, Lumpkin and Frese (2009) concluded that there is a positive correlation of EO with firm performance. However, Rauch et al. (2009) also highlighted the need to study indirect effects influencing this relationship. In a similar vein, Wales, Gupta and Mousa (2013) argued that the EO – performance relationship is one that is likely to be influenced by a range of factors in both internal and external environments of the firm (Wales, Gupta and Mousa, 2013). Indeed, some scholars have proposed a configurational approach, including both internal *and* external factors combined as moderators of the EO – performance relationship (Kreiser and Davis, 2010; Wiklund and Shepherd, 2005). Rauch et al. (2009) called for industry type to be used as a moderating variable in studies of the EO - performance relationship, while Wales et al., (2013) called for more studies to examine the mediation effects of variables within this relationship.

A CONFIGURATIONAL MODEL OF ENTREPRENEURIAL ACTION WITHIN INDUSTRY CONTEXT

We address these calls in our study by including both internal (entrepreneurial actions within the firm) *and* external (industry context) factors within a configurational model. The internal factors we consider relate to behaviors within the firm based on the firm's marketing and technology capabilities. We argue that these behaviors are stimulated by the EO of the firm and mediate the relationship between EO and performance. The external factor we consider relates to the fundamental nature of the industry within which the firm competes.

In theory of entrepreneurial action, a central theme relates to how an individual makes judgment under conditions of uncertainty (McMullen and Shepherd, 2006). Drawing on prior theories of the entrepreneur (Knight, 1921; Kirzner, 1973), McMullen and Shepherd (2006) described two factors that will impact this decision: motivation (the willingness of the individual to bear uncertainty) and knowledge (how uncertainty is perceived by the individual). It is argued that motivation under conditions of uncertainty can be a determinant of entrepreneurially-oriented action because the individual considers it desirable to pursue certain risk-taking or proactive activities. Similarly, possession of relevant knowledge under conditions of uncertainty will allow individuals to assess whether those actions are appropriate and feasible.

As noted above, EO indicates willingness among senior managers to take risks, guiding resources to be used innovatively and proactively (Dollinger, 1984; Stevenson and Jarillo, 1990). Nevertheless, an espoused willingness alone will not be enough to secure performance benefits for the firm. Indeed, a company's willingness, as indicated by the emphasis made by senior managers on *being* more entrepreneurial, will need to translate into specific actions among the wider body of employees of the firm such that the firm is *doing* more entrepreneurially-oriented

tasks, i.e., tasks aimed towards seeking and evaluating new opportunities, as well as developing new ways of exploiting the opportunities that are deemed the most promising.

Strategic orientations are helpful in distinguishing between the 'being' and the 'doing' aspects of EO. Commonly cited strategic orientations are technology orientation and market orientation (Hakala, 2011; Von Zedtwitz and Gassmann, 2002), these seen in the literature as constructs in their own right, albeit ones that correlate with EO (Hakala, 2011). Scholars of technology orientation argue that a firm can out-perform competitors by acting to develop and deploy strong technological capabilities (Cooper, 2000; Gatignon and Xuereb, 1997; Zahra and Bogner, 2000). Drawing on this, we define *technology action* as specific behaviors related to advanced product development, use of innovative technology, and investment in R&D (Gatignon and Xuereb, 1997; Hult et al., 2004). Market orientation "…creates the necessary behaviors for the creation of superior value for buyers…" (Narver and Slater, 1990:21). Here, we define the underlying *marketing action* in terms of generating and processing information on customers' demands, spreading this information to various departments in order to formulate an effective response (Kohli and Jaworski, 1990). Marketing action provides regular feedback on customers' preferences and expectations and allows the firm to satisfy customers' needs and retain customers (Farrell et al., 2008).

These two distinct types of action are arguably less concerned with an overall, cross-enterprise, corporate mindset and more concerned with specific, focused behaviors, i.e., how to respond to changes in the technological environment and how to respond to the needs of the customer respectively. It is noteworthy that, while there have been numerous and varied operationalizations of technology and market orientations (Hakala, 2011), a common theme among them has been sub-components that emphasize actions and behaviors within the firm in

these respective areas.

Baseline mediation hypothesis: EO as a motivator of functionally-relevant entrepreneurial action

EO will provide a motivating and legitimizing effect on individuals within the firm to act in entrepreneurial ways. EO fosters an innovative mindset within the firm. This mindset will legitimize employees to pursue actions in search of new opportunities (Miller and Friesen, 1983). In other words, EO will stimulate a set of exploration-oriented behaviors (March, 1991) – behaviors geared towards identifying new opportunities for growth - among firm members. These behaviors themselves create new knowledge for the firm as individuals identify entrepreneurial opportunities and evaluate them in order to decide whether – and how - to pursue them. This is essentially a knowledge creation process. Li, Huang and Tsai (2009) showed that a firm's EO influences its knowledge creation process, this process being captured in terms of socialization, externalization, combination and internalization of knowledge. These authors showed empirically that a firm's knowledge creation processes mediates the positive relationship between EO and performance (Li et al., 2009).

We argue that this knowledge creation process will occur as the firm pursues both technology and marketing action. Firstly, we expect EO to stimulate *technology action* through its acceptance for a search for state-of-art technology by the firm. EO provides encouragement for breakthrough innovations as a strategic priority (Rauch et al., 2009). The resultant behaviors are all uncertain; as McMullen and Shepherd (2006) point out: "the future is unknowable" (McMullen and Shepherd, 2006: 132). Technology action within the firm is stimulated by EO as EO signals a firm's tolerance for experimentation and failure and a propensity take risks in new

product and service development. The firm and its members will create knowledge during this uncertain process, knowledge that will reduce uncertainty and enhance the chances of superior performance.

Similarly, actions supported by EO will include behaviors aimed at understanding customers' changing needs and communicating this intelligence internally within the firm. In the presence of EO, *marketing action* will be justified, and employees will not be hesitant to ensure that new demands from customers are understood within the firm such that they may be eventually met. Thus marketing action can be seen as a set of activities within the firm that will be stimulated by the firm's EO and that will create new market-oriented knowledge for the firm. Commitment by individuals to marketing action is achieved as a consequence of EO as individuals will be motivated to engage with customers and suppliers in new and uncertain areas. Matsuno, Mentzer and Özsomer (2002) provide support for this argument, finding firms' entrepreneurial proclivity to positively influence performance when mediated by market orientation.

Without technology and marketing action, a firm's EO will not be effective. Following Li et al. (2009), these actions are integral to the knowledge creation process within the firm. This knowledge will allow uncertainty to be reduced as new opportunities are identified and evaluated. It will allow the innovative mindset espoused by the firm's leaders to be galvanized and for new knowledge to be created that will enable new product and service offerings that ultimately underpin the performance of the firm. Hence,

Hypothesis 1. Technology and marketing action mediate the relationship between entrepreneurial orientation and firm performance.

EO and the relevance of industry

We know that EO will create new knowledge for a firm and enhance the firm's learning capability (Anderson et al., 2009). We also know that how entrepreneurs shape their new ventures is contingent on external factors such as the nature of the industry (Beckman, Eisenhardt, Kotha, Meyer and Rajagopalan, 2012; Rauch et al., 2009). In service industries, for example, entrepreneurs need to accommodate the fact that clients are more likely to actively participate in the production of the service (Gallouj and Weinstein, 1997).

We argue that the relatedness of knowledge generated by technology and marketing action will be influenced by the fundamental nature of the industry in which the firm competes, in particular, whether the firm competes primarily on the basis of services or manufacturing. The firm's dominant logic (which determines what is deemed relevant and irrelevant) is guided by industry dynamics (Bettis and Prahalad, 1995). Technology and marketing action act as a filtering process by which information about the industry is absorbed, evaluated and utilized. Scholars in the EO field have called for research on how industry influences the relationship between EO and performance (Rauch et al., 2009; Rigtering *et al*., 2014).

Commonly cited distinctions between services and manufacturing are: (1) intangibility, (2) heterogeneity, (3) inseparability of production and consumption, and (4) perishability (Goerzen and Makino, 2007; Parasuraman, Zeithaml and Berry, 1985; Rathmell, 1966). These distinctions matter to how the firm is able to filter information through technology and marketing action. Firstly, the interaction between producers and users is a central feature of services (Araujo and Spring, 2006) and this customer interface is often contextually embedded (Asakawa, et al., 2012). Managing this interaction is critical to customer satisfaction and involves

understanding complex behaviors of employees engaged in the service encounter (Bitner, Booms, and Tetreault, 1990). Unlike manufacturing managers, service industry managers, when not directly involved in the delivery of a service, have a more limited ability to create and transfer knowledge of the market. Since services are more intangible, it is often more difficult to codify or mechanize the knowledge needed for the execution of the service. Secondly, firms in service industries have a heightened potential for heterogeneity, which can lead to a high variability in knowledge of quality—"performance often varies from producer to producer, from customer to customer, and from day to day" (Parasuraman et al., 1985: 42). Rathmell (1966) noted that "standards cannot be precise" with services as "implementation will vary from buyer to buyer" (Rathmell, 1966: 35). Thirdly, in service industries, production and consumption often cannot be separated. This means services cannot be inventoried (Rathmell, 1966). Firms in manufacturing industries are able to separate the production of a product from the consumption of the product (Parasuraman et al., 1985) sometimes using a globally dispersed chain of production and distribution. Service industries are the opposite. Given that service know-how is tacit – embodied in individuals rather than embedded in technological equipment - there is a heightened risk of intellectual property loss through attrition (Ekeledo and Sivakumar, 2004). Service industry profitability is often highly dependent on managing knowledge assets and intellectual property (Ekeledo and Sivakumar, 2004). Fourthly, services are ultimately more perishable than manufactured goods – they cannot be produced ahead of time (Brentani, 1989). A pure service is either consumed or lost, and as a result, managing supply and demand can be more difficult for service industries than manufacturing. Moeller (2010) notes that perishability is often linked to the facilities possessed by the service provider. In sum, these differences mean that innovation processes will differ between services and manufacturing firms with innovation

in services being less-structured and less-technical (e.g., Rigtering et al., 2014).

These differences have implications for how the mediating roles of technology and marketing action will act within the firm. Because manufacturing industries have a greater emphasis on consistent, tangible, less-perishable goods, where the production and consumption of the product *can* be separated, we expect that the mediating role of technology action will be stronger than that of marketing action. Technology action in manufacturing will allow the firm to make effective decisions related to the development of consistent and tangible products that do not instantly 'perish' and that can ultimately be produced at significant distances from the end-customer (Parasuraman et al., 1985; Rathmell, 1966). Technology action will also emphasize a quest to utilize the most up-to-date production and production control technology; technology that can be used to make inseparability of production and consumption both possible and economically-viable. While marketing action will still have an important mediating effect because of its role in gathering and harnessing information related to customers in new market segments, we do not expect this to be as important as technology action in manufacturing industries. To illustrate this for technology action, one example is the technology used to keep shelf-stable food healthy and safe for long periods of time in the food industry. Such food is consumed in locations not physically co-located with the manufacturing plant and at a point in time that may be weeks after processing and packaging in the plant. This technology is considerably more advanced than that used to produce disposable coffee cups for coffee houses where the drink is consumed immediately and the cup is disposed of immediately.

On the other hand, marketing action will have a more prominent effect than technology action within service industries. Individuals contemplating engaging in entrepreneurially-oriented marketing action in service industries will generate knowledge relatively quickly in

terms of the feasibility of any proposed service innovation. This will support service responsiveness and will allow adaptations to be made promptly in the case of negative consumer feedback. Thus marketing action will help the firm deal with heterogeneity in services (Rathmell, 1966). Social connections and good communication channels with the consumer base will help overcome issues of intangibility in services (Asakawa et al., 2012; Ekeledo and Sivakumar, 2004; Gallouj and Weinstein, 1997; Parasuraman et al., 1985) and lead to rapid feedback on how any proposed new service innovation might be received by the market. Marketing action will therefore be better targeted, allowing the firm at large to understand the nature of the customer experience, and to develop shared insight into how the service encounter can be optimized to yield customer satisfaction. As Parasuraman et al. (1985) noted: "…quality in services is not engineered at the manufacturing plant" (Parasuraman et al., 1985: 42). Hence,

Hypothesis 2a. In manufacturing industries, technology action has a stronger mediating effect on the relationship between entrepreneurial orientation and firm performance than marketing action.

Hypothesis 2b. In service industries, marketing action has a stronger mediating effect on the relationship between entrepreneurial orientation and firm performance than technology action.

Figure 1 shows our conceptual model.

Figure 1 Here

METHODOLOGY

Empirical context

We tested these hypotheses using data from a questionnaire survey of SMEs in South Korea. Due to the pre-existing industrial policy that favored large firms in Korea, little real growth in SMEs occurred throughout the 1960s and 1970s (SMBA, 2000, 2002). At the beginning of the 1980s, the government implemented various programs to support and promote SMEs. These included alterations to SME-related laws, the liberalization of trade policies, changes to technology licensing and changes in development policy for SMEs that placed emphasis on technology creation (SMBA, 2002, 2011a). Following the financial crisis in 1997, policy designed to promote the technological development of SMEs was further enhanced. The government developed a Special Act for Promotion of Venture Business in 1997 (SMBA, 2002, 2011b). This act was passed in order to encourage firms to develop business ventures within high-tech industries and to encourage firms to more actively utilize advanced technologies within various aspects of their business. By the late 1990s, the government began to recognize the contribution of SMEs to the development of the country's economy (Alam et al., 2009). SMEs became increasingly regarded within Korean society as being a significant contributor to the employment opportunities in both manufacturing and service sectors (SMBA, 2011b).

Sample and measures

The target frame was drawn from the South Korean Small and Medium Business Administration (SMBA) and cross-checked against a list of SMEs provided by the Small & medium Business Corporation (SBC). Both institutions are non-profit, government-funded organizations established to implement government policies and programs for the sound growth and

development of Korean SMEs. For instance, SMBA and SBC operate financial and non-financial programs for SMEs. Through financial programs, SBC provides financing for SMEs to expand operations, develop new products and convert their business structures. With advisory programs including consulting, training, marketing and global cooperation programs, they support SMEs to enhance their global competitiveness. We used a random-sampling method and an initial target of 1,000 firms. In order to enhance the response rate, we made personal, face-to-face contact with CEOs or senior managers of the firms to whom we sent questionnaires. Interest in participating in the survey was received from 655 firms. From these, 519 responded. After removing 30 observations due to missing values, our final sample was 489 (a response rate of 48.9%). Characteristics of the sample across industries are shown in Table 1a and 1b.

Tables 1a and 1b Here

The questionnaire items used for each scale are shown in Table 2 along with their standardized loadings. We used 5-point Likert scales, ranging from 1 (strongly disagree) to 5 (strongly agree). We followed Akgun et al. (2007) for our dependent variable, *firm performance* (FP), capturing the performance of the firm relative to major competitors over the previous three years. We used three aspects of performance: market share, growth rate, and profitability (Akgun et al., 2007). Our scale for e*ntrepreneurial orientation* (EO) used components established in prior research: risk taking, innovativeness, and proactiveness (Miller, 1983; Covin and Slevin, 1990; Keisler and Davis, 2010). We captured EO in terms of the willingness to accept risk-taking and engage in proactiveness, and innovativeness. Consistent with our theory, we built a scale for *technology action* (TA) using action-specific items from the established scale developed in Gatignon and Xuereb's (1997) study of technology orientation. This captures the actions within

the firm in terms of utilizing the latest technology, investing in advanced technologies during new product development, emphasizing technological forecasting, and recruiting well-trained R&D personnel. Similarly, for *marketing action* (MA) we drew action-oriented items from scales of customer orientation, competitor orientation, and inter-functional coordination to satisfy customer needs (Jaworski and Kohli, 1993; Ruekert, 1992), and from the established scale developed by Narver and Slater (1990). As *control variables* we used firm age (in years) and size (number of full-time employees, log transformed). We also controlled for the founder's age as research has showed age to be associated with entrepreneurial mindset (Tihanyi, Ellstrand, Daily and Dalton, 2000). Finally, we controlled for R&D intensity within the firm using the percentage of employees engaged in R&D activities.

Table 2 Here

Data quality and robustness

We conducted a number of steps to evaluate data quality and robustness. Firstly, we tested for sample selection bias using the key parameters of firm age, firm size and firm sales. There were no significant differences between the means of the used sample and the target population. Comparing sample and non-sample firms revealed the two samples to be statistically similar (firm age: p=0.395, firm size: p=0.411, firm sales: p=0.850). This suggests that sample selection bias is not likely to be a concern.

Secondly, we used a number of techniques to address common method variance. We structured measurement items on the questionnaire in non-sequential and random order to minimize consistency bias. We assured respondents of confidentiality in order to overcome social desirability bias (Podsakoff et al., 2003: 888). We also collected the dependent variable 10

weeks after obtaining independent variables. Following the recommendation of Podsakoff, Mackenxie and Podsakoff (2003), we used Harman (1967)'s one-factor test for the presence of common method bias. In a factor analysis, one factor should not explain the variance across all items. If it does, common method bias is present in the data. Of four factors identified, the principal factor explained 27.5% of the variance. Because no single factor explained more than 50% of the variance, common method bias is likely not an issue in this data set (Podsakoff and Organ, 1986). We also ran a marker variable test, considered more robust that the one-factor test (Lindell and Whitney, 2001). We report the results of this in Appendix 1a (manufacturing firms) and Appendix 1b (service firms). We used founder's age as the marker variable; identified a priori as being theoretically unrelated to firm performance. Appendices 1a and 1b confirm that the three theoretically relevant predictors have statistically significant correlations with the dependent variable, while the theoretically irrelevant predictor has a nonsignificant correlation. Also, following Lindell and Whitney (2001), we note there are low correlations between the marker variable and other predictor variables. Appendix 1a (for manufacturing firms) shows that the correlations for three predictors (EO, TA, MA) with dependent variable (FP) are significant even before the common method variance adjustment is applied. We controlled for common method variance by using $r_{FP4} = .05$ as the estimate of rs (See Lindell and Whitney, 2001: 116). The results indicate that the correlations of all three predictors (*EO, TA, MA*) with the dependent variable (FP) remain statistically significant even when CMV is controlled. Appendix 1b shows a similar result for service firms.

Thirdly, we tested for multicollinearity by examining variance inflation factor (VIF) values. Multicollinearity is present when tolerance values are < 0.1 and variation inflation factors (VIF) > 10 (Hair et al., 2006). In our analysis, the lowest tolerance was 0.346 and VIF values

ranged between 1.826 and 2.892. We do not expect multicollinearity to affect our interpretation of the results. Fourthly, to confirm the overall adequacy of our measures, we performed a confirmatory factor analysis with AMOS 21 statistical package, using maximum likelihood estimation. We assessed their reliability and validity with an overall confirmatory measurement model, in which each questionnaire item loads only on its respective latent construct and all latent constructs correlate (Close et al., 2006). We found that most of the model goodness-of-fit indices indexes demonstrate satisfactory model fit: χ^2=144.666, d.f. = 83, p= 0.000, GFI=0.941, AGFI 0.904, NFI=0.959, CFI=0.982, RMR=0.022. We tested the properties of the measurement model for internal consistency and convergent and discriminant validity (Anderson and Gerbing, 1988). In terms of internal reliability, Cronbach's α ranged from 0.813 to 0.895, greater than the 0.7 recommended (Nunnally, 1967). The properties of the measurement model are shown in Table 2. Since items load highly on their intended constructs and average variance explained (AVE) values are greater than 0.5, we are satisfied that the model has adequate convergent validity (Hair et al., 2006). As indicated in Table 2, all standardized estimations were statistically significant ($p<0.05$) within acceptable range (from 0.664 to 0.983). Fornell and Larcker (1981) assert that the AVE values need to be greater than 0.50 to obtain convergent validity. As shown in Table 2, AVE values were greater than 0.50 for all constructs. We also tested discriminant validity by checking whether the square root of the AVE score for each variable is greater than the variance shared between the variable and other variables in the model. All AVE estimates in our result were greater than the squared correlations between all constructs. Thus, both convergent validity and discriminant validity were established. Tables 3a and 3b shows means, standard deviations, and inter-variable correlations across industries providing support for the discriminant validity of these scales. These tables also show that, in our sample, EO is higher in

service firms than in manufacturing firms (M= 4.19, SE = .55(services) > M= 4.09, SE= .57(manufacturing), t= -2.085, $p \leq .05$). This statistically significant difference is totally in line with Rigtering et al.'s (2014) comparative analysis of EO between service and manufacturing firms and provides further support to the validity of our data.

Tables 3a and 3b Here

RESULTS

Hypothesis 1 predicted that technology action (TA) and marketing action (MA) mediate the relationship between entrepreneurial orientation (EO) and firm performance. To test mediation, we used the criteria established by Baron and Kenny (1986). First, EO must be related to TA (or MA); second, EO must be related to firm performance; third, when controlling the TA (or MA) as the mediating variable, the relationship between EO as the independent variable and firm performance as the dependent variable must be much smaller than it is when EO is the sole predictor. In addition the Baron and Kenny (1986) procedure, we used a Sobel test to confirm each mediation effect (Sobel, 1982). The Sobel test is an established mechanism for evaluating the significance of a mediation effect. For manufacturing firms, Table 4a shows that EO was positively associated with TA (β = .500, p< .01) and MA (β = .560, p< .01). As shown model 3 (and 4 for MA) of Table 4b, TA become the stronger predictor of firm performance (ΔR^2 = .059, β = .286, p< .01 for TA; ΔR^2 = .020, β = .170, p< .01 for MA). The coefficient of EO, on the other hand, is smaller than it is as sole predictor in the relationship with firm performance. The regression analyses show that TA (and MA) partially mediates the relationship between EO and firm performance. The Sobel test for TA mediation between EO and firm performance was

significant (B=4.32; SE=.04; p< .001). The Sobel test was also significant for MA mediating the relationship between EO and firm performance (B=2.63; SE=.04; p< .001).

These results provide support for Hypothesis 1 for manufacturing firms. These results also show that TA has a stronger mediating effect on the relationship between EO and firm performance than MA in SMEs in manufacturing industries, supporting Hypothesis 2a.

Tables 4a and 4b Here

By following the same steps, we tested Hypothesis 1 and 2b with service firms. Table 5a shows that EO was positively associated with TA (β = .593, p< .01) and MA (β = .426, p< .01). As shown model 4 of Table 5b, MA becomes the stronger predictor of firm performance (ΔR^2 = .013, β = .163, p< .05). The coefficient of EO, however, is smaller than it is as sole predictor in the relationship with firm performance. The regression analyses show that MA partially mediates the relationship between EO and firm performance. However, the regression analyses seen in model 3 of Table 5b, shows TA become the insignificant predictor of firm performance and was not mediated the relationship between EO and firm performance. The Sobel test for TA mediation between EO and firm performance was also insignificant (B=1.18; SE=.06; p=0.234). However, the Sobel test for MA mediating the relationship between EO and firm performance was significant (B=2.04; SE=.04; p< .05).

These results provide partial support for Hypothesis 1 for service firms. They also show that MA has a stronger mediating effect on the relationship between EO and firm performance than TA in SMEs in service industries, supporting Hypothesis 2b.

Table 5a and 5b Here

DISCUSSION

The relationship between EO and firm performance has puzzled researchers for over three decades. There has been great variety in approaches to studying this relationship (Hakala, 2011; Wales et al., 2013) and often mixed or contradictory findings. Nevertheless, meta-analysis has revealed a broadly positive relationship between EO and performance (Rauch et al., 2009). However, even these extensive reviews have called for more work on indirect effects, particularly the role played by industry type (Rauch et al., 2009; Wales el al., 2013). Scholars have recently offered the configurational approach as a fruitful way of understanding this relationship (Hakala, 2011; Kreiser and Davis, 2010; Wiklund and Shepherd, 2005).

Our study builds on this approach in a new way, developing a model that combines specific functional actions carried out by individuals within the firm (technology action vs. marketing action) - as mediating variables - with the underlying nature of the industry (services vs. manufacturing). As ways for firms to create new knowledge, these mediating variables take on extra importance given recent insight that knowledge creation processes mediate the relationship between EO and performance (Li, Huang and Tsai, 2009). Our focus on entrepreneurial action is more precise than the broader strategic orientation concept in the literature, and is consistent with theory of entrepreneurial action within the firm (McMullen and Shepherd, 2006). We believe that this approach, when combined with characteristics of the aforementioned industry context, can shed new light on the EO – firm performance relationship.

Theoretical and practical implications

The present study contributes to the literature on EO and performance in a number of ways. Firstly, we show how EO can be seen as an initial condition that stimulates a set of actions within the firm, which, in turn, guides how the firm develops and deploys explorative resources. Prior

research indicates that EO allows the firm to control its resources in an innovative and proactive manner and that it is willing to take risks with those resources (Dollinger, 1984; Stevenson and Jarillo, 1990). Our study extends this to look at resultant actions and how they relate EO to performance. This addresses calls for understanding mediating effects in the EO – performance relationship (Wales et al., 2013). Building on previous studies that have used mediating effects (Baker and Sinkula, 2009; Li et al., 2009; Slater and Narver, 1995), we argue that EO should be treated as an enabler of action, stimulating the deployment of technology and market intelligence capabilities that generate new knowledge for the firm and help the firm deal with uncertainty. Without EO in place, these technology and marketing actions become less viable, less likely to succeed because the individuals that undertake them will lack direction, motivation or legitimacy. We believe that the motivational angle to theory of entrepreneurial action (McMullen and Shepherd, 2006) has a key role to play in understanding mediating variables in the relationship between EO and firm performance.

Secondly, we show how the mediating effects of technology and marketing action are themselves influenced by the nature of the industry in which the firm competes. By distinguishing between manufacturing and service industries (Rathmell, 1966; Hill, 1977; Parasuraman et al., 1985) – rather than by generic environmental properties such as turbulence, dynamism or hostility that may be applicable across different sectors (Covin and Slevin, 1989; Kreiser and Davis, 2010; Wiklund and Shepherd, 2005) – we demonstrate that properties of the competitive environment related to how the firm's offering is fulfilled, underpins the effectiveness of entrepreneurially-oriented actions that have been stimulated by EO. Here we draw attention to the knowledge-relatedness angle to theory of entrepreneurial action (McMullen and Shepherd, 2006; Shane and Venkataraman, 2000) and how this can help our understanding of

mediation in the EO – performance relationship.

Overall, the results provide new insight into how EO influences firm performance. While technology and marketing action provide firms with potential to create superior products than competitors within the industry, these provide no guarantee to outperform. Our results may go some way to explaining why prior research has led to somewhat mixed results. EO provides an impetus that activates both technology and marketing action in the quest for competitive advantage. This involves transforming knowledge generated through these different areas into superior offerings that will be consumed by the market. EO enhances the viability of both technology and marketing action - with the innovativeness, proactiveness and risk taking mentalities that are needed not only to tolerate new technology and market intelligence as it comes into the firm, but also to combine it in ways which are relevant to the nature of the industry.

Given that our empirical setting was South Korea, the present study also has implications for policy and SME management in emerging economies. Governments in emerging economies have launched various measures to strengthen SME competitiveness in both manufacturing and service industries. In terms of manufacturing industries in Korea, policy has included: establishment of a “Plan for Promotion of SMEs’ Technological Innovation” and a “Committee for Promotion of Technological Innovation” in participation with related government ministries; establishment of a system for consistent technological support in each stage of the growth process; promotion of strategic projects through “selection and concentration”; development of programs linking technology with investment to promote startup and commercialization of new technologies; establishment of a cooperative system between public and private sectors through consortia consisting of industrial, academic and research

institutions and technology study group (SMBA, 2002, 2011a, 2011b, 2012). These types of government-led programs are not uncommon in other emerging economies.

However, with the growth in IT-related industries and the changes in industrial structure towards knowledge-based economies, service industries have begun to play an equally important role in the national economy (SMBA, 2011b). Policies in Korea that have supported services include: credit guarantee programs to achieve more effective lending service by launching Korea Credit Guarantee Act; launching a supporting system for overseas market research activities; support for participating in international exhibitions and conferences; legal advice services for exploring overseas market entry; and training programs to develop skills for workers in design and marketing departments. While many of these policies do have a tangible product component, there has been an increasing attention paid to promoting competence development in the delivery of services.

Our study partly addresses the call made by Bruton, Filatotchev, Si and Wright (2013) for more work to understand strategy and entrepreneurship in emerging economies. In particular, findings suggest that for policies to be effective, policy makers and managers need to be sensitive to how individual firms develop and encourage technology and marketing action in search of competitive advantage. In particular, the nature of the industry will matter to how effective particular actions will be. As policy encourages industrial shifts from traditional manufacturing bases towards services in many emerging economies, firm capabilities that underpin technology and marketing action will need to be re-assessed and adjusted where necessary. We believe there is an important policy aspect to this. To assist SMEs affected by this shift, governments can implement focused policies in training and organizational development for SME managers. Our results suggest that the design of such training programs should be

dependent on two key dimensions: (1) the nature of the industry in which the SME competes, and (2) pre-existing levels of EO, technology and marketing action in the firm. SME managers will also need to have a clear insight into their own levels for each of the three areas considered in the present study and, importantly, how they compare to competitors. For managers in entrepreneurial SMEs that intend to alter the strategic direction of the firm by diversifying into industries that are fundamentally different in terms of the service component, an appropriate shift in technology and marketing actions will be necessary.

Limitations and avenues for future research

The present study has a number of limitations while also raising fresh research questions. Firstly, fieldwork was conducted using Korean SMEs. We are cautious about generalizing the findings to other type of firms or firms in different countries. Secondly, we did not consider alternative strategic orientations, such as learning orientation (Zhou et al., 2005). Thirdly, we did not conduct analysis at a finer level of granularity in terms of sector, distinguishing industrial context in terms of tangibility, perishability and complexity of product offering. Future research could address these issues and explore new research questions, such as: comparing our model of strategic orientations and firm performance across specific manufacturing and services business; including additional orientations, such as learning orientation; assessing the inter-relationships amongst components of these orientations. We hope researchers can build on the results of the present study to further develop our understanding of how the relationship between EO and performance is mediated by a configuration of actions within the firm and within the specific industrial setting.

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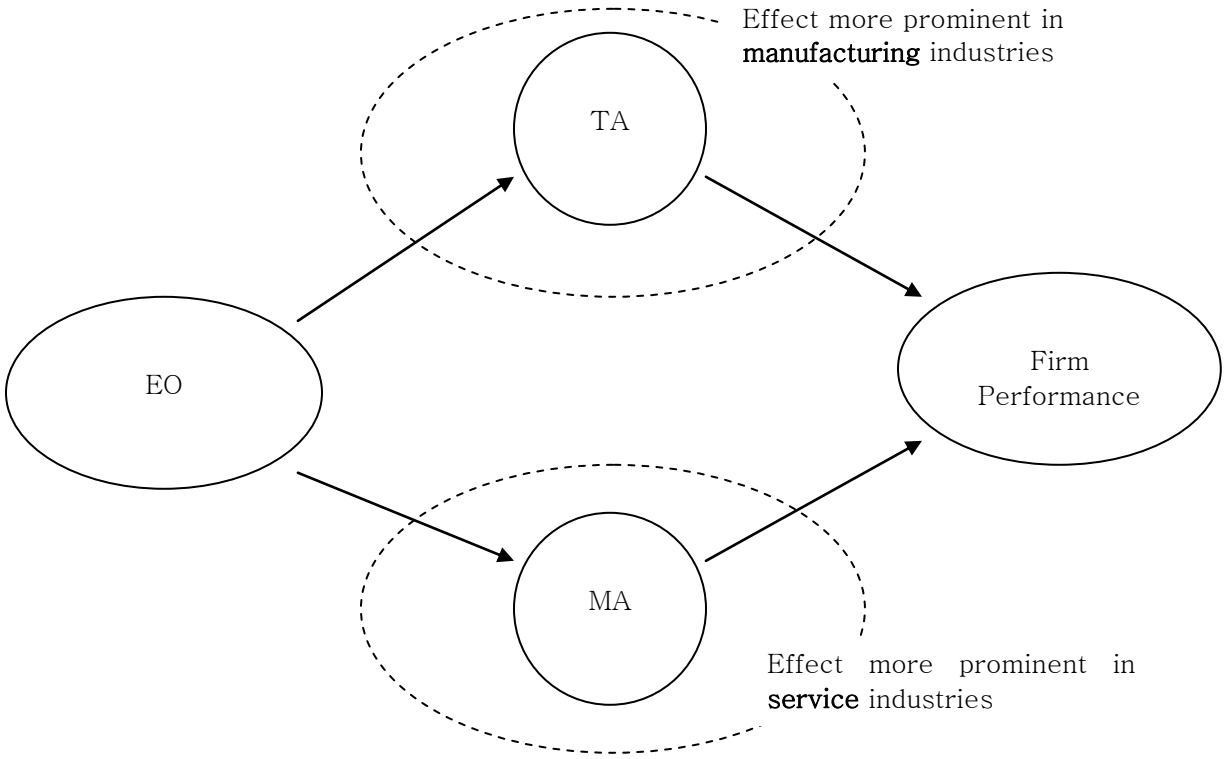
FIGURES AND TABLES



EO: Entrepreneurial orientation
TA: Technology action
MA: Marketing action

Figure 1. Conceptual framework: EO – Action - Performance

Table 1a. Distribution of manufacturing firms in the sample

Sector	Frequency	Percentage
Machine/Machine parts	128	45.07
Automobile/Car parts	83	29.23
Electricity/Electronics	43	15.14
Textile /Leather	30	10.56
Total	284	100.00

Table 1b. Distribution of service firms in the sample

Sector	Frequency	Percentage
Computer / IT / telecommunications	87	42.44
Wholesale and retail trade	57	27.80
Transport	32	15.61
Financial services (banking /insurance)	29	14.15
Total	205	100.00

Table 2 Final measurement model

Scale	Estimate	*t* value	Cronbach's α	AVE
Entrepreneurial Orientation (EO)				
Innovation is readily accepted in program/project management in our company	0.786	-	0.844	0.760
Innovation in our organization is encouraged.	0.672	10.564		
We have a strong proclivity for high-risk projects.	0.823	13.457		
We are bold in our efforts to maximize the probability of exploiting opportunities.	0.754	12.352		
Technology Action (TA)				
We spend more than most firms in our industry on new product development.	0.960	-	0.813	0.938
We devote extra resources to technological forecasting.	0.983	19.981		
We are actively engaged in a campaign to recruit the best qualified R&D personnel available.	0.761	18.445		
Marketing Action (MA)				
Our salespeople regularly share information concerning competitors' strategies.	0.962	-	0.888	0.747
Top management regularly discusses competitors' strengths and strategies.	0.802	19.684		
We measure customer satisfaction systematically and frequently.	0.791	18.867		
All of our business functions are integrated in serving the needs of our target markets.	0.816	20.477		
Our top managers from every function regularly visit our current and prospective customers	0.731	16.290		
We communicate information about customer experiences across all business functions	0.664	15.117		
Firm Performance (FP)				
In comparison with your major competitors over the past three years, your company has more market share.	0.779	-	0.895	0.949
In comparison with your major competitors over the past three years, your company has more growth rate.	0.915	15.912		
In comparison with your major competitors over the past three years, your company has more profitability.	0.825	14.721		

AVE: Average Variance Extracted; CR: Composite Reliability

Table 3a. Descriptives and correlations (manufacturing firms)

Scale	Mean	S.D	1	2	3	4	5	6	7
1. Firm age	16.02	8.79	1						
2. Firm size	1.38	0.38	.37**	1					
3.Founder age	37.76	6.74	-.34**	.00	1				
4. R&D personnel (%)	0.20	.16	-.29**	-.50**	-.02	1			
5. EO	4.09	.57	-.05	-.01	-.03	.13*	1		
6. TA	4.28	.47	-.10	-.10	.01	.21**	.50**	1	
7. MA	4.07	.60	.01	.02	-.00	.08	.55**	39**	1
8. FP	4.05	.69	-.07	.08	.05	.07	.46**	.43**	.37**

Notes: *p < 0.05, **p < 0.01 (two-tailed); firm size log transformed.

EO: Entrepreneurial orientation; TA: Technology Action; MA: Marketing action; FP: Firm Performance.

Table 3b. Descriptives and correlations (service firms)

Scale	Mean	S.D	1	2	3	4	5	6	7
1. Firm age	16.57	9.05	1						
2. Firm size	1.40	0.39	.21**	1					
3.Founder age	37.82	6.68	-.39**	-.04	1				
4. R&D personnel (%)	0.19	.15	-.29**	-.36**	.01	1			
5. EO	4.19	.55	-.09	.13	-.00	.10	1		
6. TA	4.27	.59	-.12*	.05	-.01	.21**	.61**	1	
7. MA	4.41	.34	-.09	.22**	.06	.07	.46**	.36**	1
8. FP	4.10	.75	-.02	.18**	-.02	-.00	.46**	.33**	.23**

Notes: *p < 0.05, **p < 0.01 (two-tailed); firm size log transformed.

EO: Entrepreneurial orientation; TA: Technology Action; MA: Marketing action; FP: Firm Performance.

Table 4a. Regression Analyses for TA and MA (manufacturing firms)

Variables		Dependent variable: TA		Dependent variable: MA	
		Model 1	Model 2	Model 3	Model 4
Step 1	Age	-.073	-.033	-.007	.038
	Size	-.126**	-.133	-.003	-.011
	Founder age	.002	.035	.005	.042
	R&D personnel %	.114*	.109*	.130**	.059
Step 2	EO		**.500*** **		**.560*** **
	R^2	.043	.274	.017	.316
	ΔR^2 change		.231***		.299***
	F	3.158***	21.000***	2.335*	25.657***

Note: *N=284*; *p < 0.1, **p < 0.05, ***p < 0.01 (two-tailed tests); standardized coefficients are reported.
EO: Entrepreneurial orientation; TA: Technology Action; MA: Marketing action; FP: Firm Performance.

Table 4b. Regression Analysis of Mediation Effects (manufacturing firms)

Variables		Firm Performance			
		Model 1	Model 2	Model 3 (mediation 1: TA)	Model 4 (mediation 2: MA)
Step 1	Age	-.100	-.083	-.074	-.090
	Size	.197**	.123**	.161***	.125**
	Founder age	.024	.046	.036	.038
	R&D personnel %	.142**	.002	-.029	-.008
Step 2	EO		**.462*** **	**.319*** **	**.367*** **
Step 3	TA			**.286*** **	
	MA				**.170*** **
	R^2	.037	.234	.293	.254
	ΔR^2 change		.197***	.059***	.020***
	F	2.657**	17.001***	19.170***	15.715***

Note: *N=284*; *p < 0.1, **p < 0.05, ***p < 0.01 (two-tailed tests); standardized coefficients are reported.
EO: Entrepreneurial orientation; TA: Technology Action; MA: Marketing action; FP: Firm Performance.

Table 5a. Regression Analyses for TA and MA (service firms)

Variables		Dependent variable: TA		Dependent variable: MA	
		Model 1	Model 2	Model 3	Model 4
Step 1	Age	-.111	-.023	-.106	-.042
	Size	.160**	.033	.302***	.210***
	Founder age	-.050	.015	.035	.082
	R&D personnel %	.236***	.154**	.152**	.093
Step 2	EO		**.593*** **		**.426*** **
	R^2	.072	.401	.091	.261
	ΔR^2 change		.329***		.170***
	F	3.901***	26.683***	5.019***	14.055***

Note: *N=205*; *p < 0.1, **p < 0.05, ***p < 0.01 (two-tailed tests); standardized coefficients are reported.
EO: Entrepreneurial orientation; TA: Technology Action; MA: Marketing action; FP: Firm Performance.

Table 5b. Regression Analysis of Mediation Effects (service firms)

Variables		Firm Performance			
		Model 1	Model 2	Model 3 (mediation 1:TA)	Model 4 (mediation 2:MA)
Step 1	Age	-.074	-.008	-.006	-.006
	Size	.222***	.127*	.124*	.100
	Founder age	-.047	.002	.001	-.009
	R&D personnel %	.056	-.005	-.020	-.020
Step 2	EO		**.444*** **	**.385*** **	**.372*** **
Step 3	TA			**.097**	
	MA				**.163** **
	R^2	.044	.228	.233	.241
	ΔR^2 change		0.184***	0.005***	0.013***
	F	2.323*	11.730***	10.037***	10.451***

Note: *N=205*; *p < 0.1, **p < 0.05, ***p < 0.01 (two-tailed tests); standardized coefficients are reported.
EO: Entrepreneurial orientation; TA: Technology Action; MA: Marketing action; FP: Firm Performance.

Appendix 1a. Hypothetical Correlations among Variables (manufacturing firms)

Scale	**1**	**2**	**3**	**4**	**5**
1. EO	.84				
2. TA	.50**	.81			
3. MA	.55**	39**	.88		
4. MV	-.03	.01	.003	1	
5. FP	.46**	.43**	.37**	.05	.89
$r_{FPi \cdot M}$	.43**	.40**	.34**	.00	
$r\wedge_{FPi \cdot M}$	.52	.50	.39	.00	

Notes: *p < 0.05, **p < 0.01 (two-tailed); Values on the diagonal are estimates of scale reliability;

EO: Entrepreneurial orientation; TA: Technology Action; MA: Marketing action; FP: Firm Performance. MV: Marker Variable (Founder age)

Appendix 1b. Hypothetical Correlations among Variables (service firms)

Scale	**1**	**2**	**3**	**4**	**5**
1. EO	.84				
2. TA	.61**	.81			
3. MA	.46**	36**	.88		
4. MV	-.05	.01	.06	1	
5. FP	.46**	.33**	.23**	-.02	.89
$r_{FPi \cdot M}$	.47**	.34**	.25**	.00	
$r\wedge_{FPi \cdot M}$	.56	.42	.28	.00	

Notes: *p < 0.05, **p < 0.01 (two-tailed); Values on the diagonal are estimates of scale reliability;

EO: Entrepreneurial orientation; TA: Technology Action; MA: Marketing action; FP: Firm Performance. MV: Marker Variable (Founder age)