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Full Length Research Paper

Firm entrepreneurial orientation and knowledge/networking of agro-based enterprises in Malaysia: The role of technology and strategy

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Resurgence in agricultural-based sectors in Malaysia has recently prompted this study to explore the multi-dimensional entrepreneurial orientation (EO) relationship to knowledge and networking among the Malaysian Bumiputera small and medium agro-based enterprises (BSMAEs). The moderating role of technology and strategy on EO-knowledge-network relationship prompted some interesting findings. Based on 615 observations of BSMAEs, throughout Malaysia, factor analysis, multiple regression analysis and simple slope analysis were performed to substantiate the hypothesis. The findings suggested that EO explained both SMAEs' knowledge and network strategy, and subsequently, interaction of technology development, resources and strategic capability and visionary showed that they were more positively related to higher human capital, tacit knowledge, strategic alliance and social networking proficiency when specific EO dimension was higher than when it was low. The impact is crucial for country's agro-based strategic entrepreneurial policy development in the future. Besides enriching the emerging strategic entrepreneurship body of knowledge, the findings strengthened resource-based view (RBV) social capital and knowledge-based theories. Finally, the paper discusses recommendations to encourage more studies in EO under the purview of strategic entrepreneurship in the future.

Key words: Bumiputera small and medium agro-based enterprises (SMAEs), entrepreneurial orientation, knowledge, networking, technology, strategy, Malaysia.

INTRODUCTION

The paper aims to establish direct and contingent effects of intangible entrepreneurial orientation, knowledge, network, technological development and strategic capabilities inherent among small and medium agro-based enterprises in Malaysia. These intangible capabilities were part and parcel of firm internal resources of the resource-based view (RBV) (Barney, 1991), social network theory and knowledge-based view (Kogut and Zander, 1996).

The study capitalizes on the proposed Covin and Slevin(1991) model of entrepreneurship as firm behavior, the entrepreneurial orientation model of Lumpkin and Dess (1996) and the strategic and entrepreneurial actions wealth creation model of Ireland et al. (2001). The study also aims to benchmark some issues addressed in the emerging strategic entrepreneurship model (Hitt et al., 2002).

The study utilizes sample among SMAEs in eleven states of Malaysian Peninsular. There were about four thousand SMAEs in Malaysia operating in all sectors of the industry. Malaysian agro-based industry observed their fluctuating performance curve over the years, and now they search for avenues of improvisation. The call for the study was due to SMAEs roles to enhance their productivity and performance (Malaysia, 2006). The 8th and 9th Malaysia Plan is continuously committed to develop the human capital and entrepreneurial quality

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among the agro-based players and their business entities (Malaysia, 2006). This was due to the continuous disparities of wealth distribution between Bumiputera-owned and the non-Bumiputera owned enterprises as reported in Malaysia Plans since its inception five decades ago.

Among the aims of the latest Malaysia Plan is to reduce the economic disparity by developing competitive, autonomous and sustainable Bumiputera SMEs through the study's Bumiputera Commercial and Industrial Community (BCIC) program (Malaysia, 2006). The program needs a model that produces firm with knowledge and network capabilities. We propose that EO should contribute to strengthen firms' knowledge and networking, whereby technology and strategy would contribute as catalyst in enhancing the relationships (Morris and Kuratko, 2003). The model upholds the resource-based view (RBV) that intangible resources of entrepreneurial capabilities enhance firms' knowledge and network in the presence of appropriate technology and strategy (Barney, 1991; Hall, 1993; Wernerfelt, 1984).

The study observes the responses of the owner or manager of the SMAEs as the unit of analysis that operates in peninsular Malaysia. Self-reported survey method was used in data collection; prior to data collection, probability sampling was observed and the instruments were adopted from literatures. In the data analysis, interdependence technique of factor analysis and dependence technique of hierarchical multiple regression analysis (HMRA) were utilized. Furthermore, simple slope analysis was done for the interaction of effect verification.

This research was designed firstly to verify SMAEs EO dimensions that were distinct from each other, and secondly to establish the relationship between control, independent, moderator and interaction term variables. It was expected that EO dimensions were multidimensional, and that technology and strategy interacted on a EO-knowledge and network relationship. The paper concludes with discussions of the findings, implications and recommendation for policy and future studies.

LITERATURE REVIEW

This study aims to develop a framework that synthesizes some concepts and theories found in strategic management and entreprenuership literatures. First is the issue of EO dimensions that was claimed to be largely resolved (Covin et al., 2006), whereas Monsen and Boss (2009) noted that more in-depth analysis into finer grain of the variables should be essential. Secondly, the theory veryfies the under-researched relationships conjectured in Covin and Slevin (1991), Lumpkin and Dess (1996), Ireland et al. (2001) and Hitt et al. (2002). The gap remains wider and is becoming more complicated since most of the studies emphasize on firms' financial outcomes.

Entrepreneurial orientation (EO)

A school of thought in entrepreneurship theorized that EO is a multidimensional construct that is capable of measuring firm-level entrepreneurship (Lumpkin and Dess, 1996). The dimensions which comprised innovativeness, proactiveness, risk taking, competitive aggressiveness and autonomy were the result of previous studies (Mintzberg, 1973; Khandwalla, 1977; Miller and Friesen, 1982; Miller, 1983; Covin and Slevin, 1991). Innovativeness reflects firms' practices, processes and decision making towards novelty, experimentation, and creativity which help firms depart from established practices and technologies. Proactiveness refers to a posture of anticipating and acting on future wants and needs, thereby creating first-mover advantages in relation to competitors. With such forward-looking perspectives, firms capitalize on emerging opportunities. Risk taking reflects a firm's willingness to break away from the true-and-tried and venture into the unknown. Competitive aggressiveness refers to the intensity of a firm's effort to outperform their competitors and be ahead of them in every opportunity by taking strong posture and bold actions (Lumpkin and Dess, 1997). Autonomy refers to freedom granted to employees and team in exercising their creativity to bring forth an idea and follow it through to completion (Lumpkin and Dess, 1996).

Covin et al. (2006) noted that the dimensionality issue of EO has largely been resolved referring to the extensiveness of studies in Stetz et al. (2000) and Kreiser et al. (2002). However, Monsen and Boss (2009) argued that with the emergence of strategic entrepreneurship concept, more investigation about the EO should be an option for further study. Refining EO shall be an essential move to gain the best understanding about the strategy. Hence, we posit:

H_1: Each EO dimensions are multidimensional.

Studies in EO continuously gain more attention from entrepreneurship and strategic management scholars as a reliable measure to gauge the degree of firm-level entrepreneurship in SMEs (Kuratko and Audrestch, 2009). Moreover, EO reflects strategizing activity related to dimensions of strategic management (Ireland et al., 2001; Covin et al., 2006). Even though most of the studies continually focus on establishing EO-performance relationship (Dean, 1993; Lumpkin and Dess, 1997; Wilklund, 1998), existing research falls short of examining the extent of EO-knowledge-network relationship, and technology and strategy impact on EO-knowledge and network relationship.

EO and knowledge relationship

Eisenhardt and Santos (2002) noted that the review of literature in knowledge-based was vast showing that RBV

affected firm-level studies to a great extent (Barney, 1991). Wilklund and Shepherd (2003) operationalized knowledge as express and implied, whereby EO moderated their relationship with performance. On the other hand, Gupta and Govindarajan (2000) observed that knowledge gain comprised knowledge acquisition and creation. Knowledge also relates to the human capital theory suggesting that individuals with more or higher human capital achieve higher performance when executing tasks (Becker, 1964). Human capital comprises the stock of knowledge and skills that reside within individuals. Specifically, human capital includes the unique insights, skills, cognitive characteristics and aptitudes of entrepreneurs (Ventakaraman, 1997). It also includes achieved attributes, accumulated work and habits that may have a positive or negative effect on productivity (Becker, 1964). Human capital represents a resource that is heterogeneously distributed across individuals and is thus central to understanding differences in opportunity identification and exploitation (Shane and Venkataraman, 2000). Furthermore, Lee and Sukoco (2007) noted that EO predicted firms' knowledge capability in Taiwan's top 1000 firms. Hence, we posit:

H_{2a}: The more SMAEs engage in autonomy, the more positive the relationship with knowledge capability.
H_{2b}: The more SMAEs engage in innovativeness, the more positive the relationship with knowledge capability.
H_{2c}: The more SMAEs engage in proactiveness, the more positive the relationship with knowledge capability.
H_{2d}: The more SMAEs engage in risk taking, the more positive the relationship with knowledge capability.
H_{2e}: The more SMAEs engage in competitive aggressiveness, the more positive the relationship with knowledge capability.

EO and network relationship

A study in business incubators in Korea proved that EO predicts some entrepreneurial network operationalized as market, financial and social network (Ban et al., 2009). Focusing on social network analysis, attention was turned to relationships between entrepreneurs and others that provide the resources that are important in establishing a business (Johannisson, 1988; Larson, 1991). Entrepreneurs have ideas to test, and some knowledge and competence to run the business, but they also need complementary resources to produce and deliver their goods or services (Teece, 1987). They get support, knowledge and access to distribution channels through their social networks. Entrepreneurs are also linked to people and organizations that interact among themselves, and these contacts can widen the availability of resources that sustain a new firm (Hansen, 1995).

Entrepreneurs require information, capital, skills, and labor to start business activities. While they hold some of these resources themselves, they often complement their resources by accessing their contacts (Aldrich and Zimmer, 1986; Aldrich et al., 1991; Cooper et al., 1995; Hansen, 1995). The contacts that lead to successful outcomes are their social capital and they are a key component of entrepreneurial networks (Burt, 1992).

Gabbay and Leenders (1999) define social capital as the set of tangible or virtual resources that accrue to actors through the social structure, facilitating the attainment ofthe actors' goals (Lin, 1999; Portes, 1999). By this, they include contacts that help them get things done. These are people the actor knows, or who are known by others that the actor knows. When the entrepreneurs' contacts contribute to their entrepreneurial goals, these social contacts are their social capital (Burt, 1992). The contacts are often informal work and non-work connections. These relations may extend across professional networks, reaching friends and colleagues from earlier jobs. Entrepreneurial networks span relations to organizations, clusters of firms, as well as to other people that help them set up the firm (Hansen, 1995). Networks have several useful properties for entrepreneurs.

The first is size. Entrepreneurs can enlarge their networks to get crucial information and other resources from knowledgeable others. Jarillo (1989) noted that efficient networking should be a priority for farm entrepreneurs where they may tap external resources from the relationship activities. Hence, we posit:

H_{3a}: The more SMAEs engage in autonomy, the more positive the relationship with network capability.
H_{3b}: The more SMAEs engage in innovativeness, the more positive the relationship with network capability.
H_{3c}: The more SMAEs engage in proactiveness, the more positive the relationship with network capability.
H_{3d}: The more SMAEs engage in risk taking, the more positive the relationship with network capability.
H_{3e}: The more SMAEs engage in competitive aggressiveness, the more positive the relationship with network capability.

Moderating effect of technology and strategy on EO-knowledge relationship

Technological capability refers to the capacity of the firms to generate new knowledge through the integration of R&D strategy, project implementation, project management and R&D expenditure (Yam et al., 2004). It can be thought as a repository of knowledge and information which is continuously updated through experimentation and learning, contributing to the development of organizational core skills.

Viewed in this light, technological capability as a firm's stratey is expected to positively affect new venture innovation for two main reasons. First, by increasing the possibility of knowledge generation, technological capability reinforces heterogeneity in new venture problem-solving arsenal (Amabile, 1988), which in turn may

increase the venture possibility of producing new products or services. Although many innovations may be serendipitous in nature (Penner-Hahn and Shaver, 2005), exposure to different modes of problem formulation and solution may result in better, more innovative approaches to a given problem. In this light, technologically competent ventures may enjoy a comparative advantage in generating innovations as they "are more likely to put together the critical combination of a fertile mind, which is a challenging problem, and the will to solve it" (Scherer and Ross, 1990). Along those lines, using a sample of established firms, Ahuja and Lambert (2001) have pointed out that technological experimentation adds to the firms' solution-repertoire, constituting the basis for breakthrough inventions. Moreover, according to Deeds et al. (1999), firms with higher technical knowledge are better equipped to identify and judge the potential of competing solution alternatives and thus, are better able to direct their efforts toward the development of more new products. Secondly, by providing new ventures with a strong knowledge base, technological capability enhances the venture ability to assimilate and exploit external knowledge for innovation.

It actually serves as a link between external sources of opportunities and the capacity of the ventures to seize these opportunities in favour of new product or service development (Vega-Jurado et al., 2008). Indeed, as many researchers have pinpointed (Cohen and Levinthal, 1990; Harabi, 1995; Klevorick et al., 1995), only technologically competent firms that are in possession of a critical mass of knowledge are able to use externally available knowledge to expand their innovative capacity. This effect of technological capability on innovation is especially relevant in the case of new ventures, which, because they lack significant resources, may need to use external knowledge sources to achieve greater innovation.

The assimilation and exploitation of external knowledge can give technologically competent ventures quick access to multiple technologies (Dodgson, 1993), boosting their product or service development efforts (Zahra and Bogner, 1999). Technolological capability has been one of the phenomenon that evolved through periods of incremental change and finally halted due to the discovery of technological breakthroughs (Tushman and Anderson, 1986). Technological breakthroughs, emulated by Schumpeter as (the) major technological innovation, represent technical advances which are so significant that no increase in scale, efficiency, or design can make older technologies competitive with the new technology (Low and MacMillan, 1988).

Chen et al. (2007) verified technology capability as part and parcel of the organizational resources that predicted entrepreneurial orientation and organizational performance. Their study supported quite a number of previous studies, such as Bharadwaj (2000), Chandler and Hanks (1994), Hultink et al. (2000), Lerner and Almor (2002), Li and Ogunmokun (2001), Ursula and Celeste (1998), and Zahra and Nielsen (2002). However, specific attention given to technology and strategy capability as the moderator on entrepreneurial orientation and knowledge capability remained largely ignored. Hence, we posit:

H_{4a}-H_{4e}: The more SMAEs utilize technology, the more positive the relationship between the EO of (a) innovativeness, (b) autonomy, (c) proactiveness, (d) risk taking and (e) competitive aggressiveness, and knowledge capability.
H_{5a}-H_{5e}: The more SMAEs utilize technology, the more positive the relationship between the EO of (a) innovativeness, (b) autonomy, (c) proactiveness, (d) risk taking and (e) competitive aggressiveness, and network capability.

Moderating effect of technology and strategy on EO-network relationship

Research on the moderating effect of entrepreneurship was limited, in that this study explored the interaction effect of strategy and technology on EO-network relation. The literature survey found that most of the studies focused on lower order effect of the regression analyis that claimed the presence of the direct impact. Thus, the present knowledge in the relationship needs more information and structured research findings.

A venture's network structure can be related to its entrepreneurial orientation and support of technology and strategy, and could also be partly explained by the new venture's access to necessary resources, competencies and information. Networking was a common mean among all new ventures to acquire necessary and scarce resources resulting in competitive advantage.

However, different types of ventures needed different resources due to their contextual circumstances, and therefore, they searched for different contacts holding those specific resources. In this study, today's ventures often searched for cooperation with large, international partners to obtain access to legitimacy, expertise and competencies within methods or processes that were crucial for the ventures' competitiveness. Other ventures, on the other hand, had a tendency to cooperate with large customer firms in a nearby region, accessing other business-specific resources and management skills. These differences are a result of the ventures' degree of familiarity within its work methods and variety in work tasks (Abernathy and Brownell, 1997; Perrow, 1970), which would require different resources and competencies from their counterparts. As a result, the type of partners and the resources, competencies and information they possess affects new ventures' competitive performance. Another answer to the research question could be found within the strength of the network relationships. Analyses of the effects that tie strength and trust between the relationships of new ventures' competitive performance resulted in an additional explanation of improved competitiveness. The empirical results showed

that frequency in contact and level of trust between the new venture and its partners were significant for the ventures' competitive advantage.

The stronger the ties were, and the more trust the relationships contained, the better the competitive advantages the new venture obtained from the contacts. Moreover, achieving competitive advantages through strong ties was also shown to increase the ventures' networking, especially their strategic alliance and social network. These results are in contrast to prior network-based research, where Granovetter (1973) and Oviatt and McDougall (2005) amongst others argue that it is the sporadic contacts with weak ties that result in more innovativeness and competitive advantages due to the new and dissimilar information they possess. On the other hand, strong ties often provide comfort and reliability in uncertain settings, facilitating the share of crucial and confidential information, as well as trustworthy cooperation based on solidarity and mutual influence (Nicolaou and Birley, 2003b; Adler and Kwon, 2002; Aldrich, 1999; Krackhardt, 1992). These advantages from strong ties are crucial for new ventures developing new and/or innovative products/services in uncertain surroundings and for preventing competitors from imitating their products/services too early.

Finally, the environmental conditions also affected the new ventures' access to competitive advantages through network relationships. Strong ties seemed to facilitate competitive advantages in hostile environments, that is, when the competitiveness is severe in the market, weak ties were facilitative in highly dynamic environments. This might be due to the fact that in a highly changeable environment, companies need to be alert and keep up with the changes, and new information from weak ties, which facilitates new ideas, resulting in competitive advantage (Granovetter, 1973). Strong ties, on the other hand, are based on trust (Krackhardt, 1992) and they facilitate sharing of crucial and confidential information (Nicolaou and Birley, 2003). This is critical in the joint development of competitive advantage in a highly competitive market for outperforming competitors. However, confirmation of this suggested finding requires further research.

H_{6a}-H_{6e}: The more SMAEs utilize strategic capability, the more positive the relationship between the EO of (a) innovativeness, (b) autonomy, (c) proactiveness, (d) risk taking and (e) competitive aggressiveness, and knowledge capability.

H_{7a}-H_{7e}: The more SMAEs utilize strategic capability, the more positive the relationship between the EO of (a) Innovativeness, (b) autonomy, (c) proactiveness, (d) risk taking and (e) competitive aggressiveness, and network capability.

Hypothesis explanation

All hypotheses capitalized on EO measures as proposed by Lumpkin and Dess (1996), namely: (a) innovativeness, (b) autonomy, (c) proactiveness, (d) risk taking and (e) competitive aggressiveness. On the other hand, other variables were conjectured as single dimension.

METHODOLOGY

Sampling and unit of analysis

The study observes the response of owner or manager who represents one BSMAEs in Peninsular Malaysia where each BSMAEs were the unit of analysis. The list and particulars of BSMAEs were supplied by Malaysian Agriculture Department, Muda Development Authority (MADA), Kemubu Development Authority (KADA), Federal Agricultural Marketing Authority (FAMA), Agro Bank and Farmers Association Organizations (FAOs). The lists supplied comprised 3876 SMAEs, but after scrutinizing the details of the firms, we managed to mail a questionnaire to each of the 2000 BSMAEs selected. The selection was done according to non-proportionate random sampling technique.

A total of 615 questionnaires were returned and the usable ones comprised 135 BSMAEs in southern region representing 22%, 349 BSMAEs from the northern region representing 57% and 131 BSMAEs from the eastern region representing 21%. Therefore, the response rate was about 3%.

Demographic of the response of firms' owners or managers to questionnaires was 95.3 and 4.7%, respectively. Females were represented by 59% more than males. The age brackets, which were dominated by respondents who are more than 40 years old were represented by more than 70%, whereas those who are 40 years or younger were represented by 30%. Education background showed that more than 85% represented those that finished lower level education, while 15% were for college graduates.

Firms' demographics were divided into five categories. First, BSMAEs type of business were mainly manufacturers and processsors of agro-based product represented by 70%, while other types, such as the producers in livestock, fishery and service sectors were between 3 and 15%. Secondly, firms' legal registration status was mainly the sole proprietor represented by 78.9%, while other forms were private limited company and partnership represented by 10.4%, and public limited companies represented by less than 1%. Thirdly, firms' size according to number of employees showed that 77.9% were mainly for very small firms that employed less than 5 workers, 22% were for those firms that employed between 6 and 50 employees, and firms that employed more than 50 employees were represented by less than 1%. Fourthly, firms' cycle influence showed that 71% were those influenced by the cycle and only 22% were those firms free from cyclical influence. Fifthly, agriculture dependence showed that BSMAEs relying totally on the agriculture sector as their source of survival was represented by 48.3% and 51.7% were those dependent on agriculture and any other sector.

Intsrument and measurement

The control variables were utilized to ensure those other variables such as the firms' demographic that should affect the model under study (Covin et al., 2006; Wilklund and Shepherd, 2003). Since all control variables were originally dichotomous, Hair et al. (2006) suggested that they were dummy-coded. Thus, the non-metric variable was transformed into metric variable by assigning "1" or "0" to a subject. Those assigned "0" were the reference category. The control variables in the study comprised the type of business where service SMAEs were the reference variable, and others were the controls. Consequently, the registration status observed the limited companies as the reference. However, firms' size was controlled for

smaller-sized SMAEs, and the cyclical effect considered those SMAEs not affected as the reference group. Thus, dependency measures were controlled for SMAEs that solely depend on the agriculture sectors.

EO dimensions were adopted from earlier studies such as the dimension of innovativeness, proactiveness and risk taking used in Miller (1983) and refined by Covin and Slevin (1989, 1991). Competitive aggressiveness was used in Lumpkin and Dess (2001), and autonomy was adopted from Shane et al. (1985). Knowledge was adopted from Wilklund and Shepherd (2003), while network was adopted from Zhou et al. (2006). However, technology and strategy were adopted from Zahra and Bogner (1999) and Miller (1983), respectively. Growth was adopted from Dess and Robinson (1984), efficiency was from Murphy et al. (1996) and effectiveness was from Mahoney and Weitzel (1976). A total of 29 items for EO, 12 items for knowledge, 11 items for network, 7 items for technology, 12 items for strategy, 5 items for firms' growth and efficiency and 5 items for effectiveness were recorded. All items were measured using a 5-point Likert scale response to statements ranging from "1" – strongly disagree to "5" – strongly agree.

Ensuring that the variable used should be free from measurement error, we formulate all items that are loaded in a factor into a summated mean score to represent specific variable (Hair et al., 2006). This is done after all items have satisfy factor analysis and reliability runs.

Data analysis strategy

Data analysis strategy capitalizes on item analysis prior to exploratory factor analysis (EFA) of the BSMAEs' EO dimensions based in the region where they operate. Item analysis was the first step to verify the content validity (Schriesheim et al.,1993). Furthermore, Hinkin (1995) cited that any measure should be judged and must adequately capture specific domain of interest without any extraneous content. EFA produced loading matri× after some reduction to the items analyzed. The reduced items were due to two reasons. First, when they failed to score at least 0.50 of the measures of sampling adequacy shown in the anti-image matri× table; secondly, when they were found cross-loaded in the factor loading table. After data were reduced, the analysis was rerun whereby the final output was produced.

HMRA was done in four stages, in controlling the type of business, form of registred entity, firm size, business cycle and agro dependency in the first stage. All control variables were dummy-coded by assigning value '1' to the observed control and '0' to the others. The independent and moderator variables were standardized scales where '0' was assigned as the arbitrary point. In the second, third and fourth stages, changes were observed in the model when independent, moderator and interaction terms (IV × MV) variables were entered respectively. Model significance was shown in adjusted *R* square and F-value at $p < 0.05$, while direct effect of the independent, moderator and interaction terms was observed in standardized coefficient beta at $p<0.05$ respectively (Hair et al., 2006). Consequently, statistically significant beta coefficient of the interaction was treated further with a split sample of simple slope analysis due to the issue of interpreting the interactions, referring to the idea of conditional effect in multiple regression interactions (Cohen et al., 2003). Both the IV and MV were divided into two sample, while the high and low scores were segregated based on one point to, or away from the standard deviation value (Aiken and West, 1991; Cohen et al., 2003). The scores were computed into new variables and entered into a two-by-two line graph where IV was entered on the x-axis, DV on the y-axis and MV appeared in the high and low curves. This curve was also called the simple regression line. The steeper the curve, the higher the interaction effect. As a result, the parallel curve showed no interaction. The curve representing any moderator of high technology and strategy was found to be steeper than their lower one, which was the basis to substantiate the interaction effect of the hypotheses (Cohen et al., 2003).

Assumptions of multiple regression analysis

Assumptions, before data were entered into multiple regression analysis, were ascertained as normally distributed, linear, free from multicollinearity, free from error term, homoscedastic and free from outlier or infuential data. Normal distribution was shown in skewness value of less than ± 2.0, and normal distribution curve was shown in the graph after HMRA was done. Linearity was shown in P-P residual plot where the IV-DV points fell just about the regression line. Multicollinearity was ascertained in correlation coefficients $r < 0.70$. Error term-free was observed in durbin-watson (dw) indicator in the MRA that showed dw between 1.5 and 2.5. Homoscedasticity was observed in residual scatter plot where IV and DV point was scattered fairly about the arbitrary 0 point. The influentials were observed by detecting the calculated threshold value less than 0.9707318 and more than 1.0292682. The test for influential IV using covariance ratio's (COVRATIO) diagnostic test formula for influential observation was $1\pm3(k+1)/n$ (Hair et al., 1998). In MRA predicting human capital, tacit knowledge, strategic alliance and social network, there were 213, 198, 221 and 103 influential observations detected respectively.

Common method variance

Bias in the common method variance (CMV) was found as minimal threat to the data proved in factor analysis and ANOVA outcomes. Each factor extracted proved their distinctiveness shown in the communality scores of more than 0.50 in each item and the substantial percentages of variance explained (Podsakoff and Organ, 1986). Bias on self reported instruments that influenced respondents' self perception towards firm analysis shown in ANOVA between individual data and firm responses proved no significance difference (Dess et al., 2006).

RESULTS

Factor analysis, correlation and reliability

In ensuring that the data should be free from measurement error as well as to verify the goodness of measures, factor analysis was conducted to segregate independent and moderating instruments. The independent and moderating variables' items were analysed separately since those variables represent distinct concepts. KMO and Bartlett test showed significant result of the principal component analysis on all variables under study.

Factor analysis on EO presented in Table 1, KMO measures of sampling adequacy = 0.77 explained by 55.76% of the variance loaded with si× factors labeled as proactive risk taking (4 items, $\alpha = 0.70$), autonomy (4 items, $\alpha = 0.68$), competitive aggressiveness (4 items, $\alpha = 0.68$), innovativeness (4 items, $\alpha = 0.61$), product innovativeness (2 items, $\alpha = 0.64$) and proactiveness (3 items, $\alpha = 0.55$). The results lend support to H_1 which showed that each EO dimension was multidimensional. The result in factor analysis of EO dimensions modified

Table 1. Factor analysis of entrepreneurial orientation.

Variable	Component					
	1	2	3	4	5	6
Proactive risk taking						
Our firm explore bravely and open minded to achieve goal	0.76	0.01	0.08	-0.01	0.06	0.04
Our environment requires boldness to achieve objectives	0.76	-0.07	0.09	0.14	-0.01	-0.01
We act promptly in reducing risks	0.64	-0.01	-0.05	0.07	0.11	0.18
We practice 'undo the competitor' strategy	0.62	-0.10	0.08	0.14	0.13	0.23
Autonomy						
Our firm always encourages new ideas from employees	-0.01	0.76	0.08	-0.02	-0.02	-0.06
Our employees are given the freedom to make decision	-0.06	0.75	0.10	0.02	0.05	-0.15
Our firm support new ideas from employees even if they are against the rules and procedures	-0.06	0.60	0.04	0.28	0.12	0.25
Our employees are allowed to participate in new idea implementation	-0.06	0.60	0.15	-0.07	0.13	0.23
Competitive aggressiveness						
Our firm spends heavily in producing new product	-0.02	0.05	0.73	-0.03	0.28	0.06
Our firm spends heavily in marketing	0.11	0.12	0.70	0.12	-0.08	0.10
Our firm spends heavily for R & D	-0.03	-0.00	0.67	0.25	0.30	0.09
Our firm invests in high cost projects	0.15	0.24	0.63	-0.14	-0.09	0.11
Innovativeness						
Our firm encourages new ideas from all employees at any level	0.10	0.06	-0.06	0.72	-0.07	0.14
Our firm encourages employees to participate in firm's planning	-0.04	0.27	0.03	0.66	-0.10	0.02
Our firms give special attention to R & D	0.14	-0.15	0.19	0.65	0.20	0.09
Our firms consider newness in the firm as very important	0.29	-0.14	0.03	0.56	0.30	0.03
Product innovativeness						
Our firm markets variety of products	0.10	0.10	0.08	0.06	0.81	0.03
Our firm changes the product line frequently	0.14	0.12	0.13	0.03	0.76	0.07
Proactiveness						
Our firm is always the first in selling new products	0.10	0.03	-0.01	0.12	0.13	0.76
Our firm always venture into unrelated opportunities	0.12	0.04	0.19	-0.01	-0.08	0.63
Our firm is always the first in using new technology	0.27	0.05	0.20	0.31	0.10	0.56
Eigenvalue	3.95	2.47	1.61	1.36	1.27	1.04
Percent of variance	10.65	10.01	9.89	9.68	7.92	7.61
Accumulated percent of variance	10.65	20.67	30.55	40.23	48.15	55.76

Kaiser-Meyer-Olkin (KMO), Measure of Sampling Adequacy = 0.77, Bartlett's Test of Sphericity: Approx. Chi-Square = 2649.12; df = 210; Sig. = 0.00.

the remaining hypotheses. Hair et al. (2006: 152) suggested that changes in factor analysis require the researcher to rename the dimensions according to the rotated factor in attempt to give meaning to the factors. Therefore, five EO dimensions stated in the original hypothesis were renamed into si× dimensions as follows: (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness. Consequently, the hypothesis testing for H_2 to H_{21} was based on the modified hypothesis.

Knowledge variables shown in Table 2 were explained by 56.38% of the variance loaded with two factors, namely human capital development (6 items, α = 0.80) and tacit knowledge (2 items, α = 0.61). Network variables shown in Table 3 were capitalized with 66.35% of the variance loaded by two factors labeled strategic alliance (3 items, α = 0.87) and social network (4 items,

Table 2. Factor analysis of knowledge.

Variable	Component	
	1	2
Human capital		
Our firm produce employees with high skill level	0.81	0.13
Our firm always provide most advance training to all employees	0.73	0.14
Our firm provides wide business opportunity to all employees	0.70	0.08
Our firm provides useful knowledge for future of all employees	0.70	0.05
Our firm provides training in new business opportunity to all employees	0.64	0.18
Our firm considers employees as the most important asset	0.57	0.36
Tacit knowledge		
Our firm gives utmost priority to experience employees as a job qualification	0.11	0.83
Our firm gives priority to employees who work with hand or motion skills	0.15	0.82
Eigenvalue	3.33	1.18
Percent of variance	36.69	19.69
Accumulated percent variance	36.69	56.38

Kaiser-Meyer-Olkin (KMO); Measure of sampling adequacy = 0.83; Bartlett's test of sphericity: Approx. Chi-square= 1246.17; df = 28; Sig. = 0.00.

Table 3. Factor analysis of network.

Variable	Component	
	1	2
Strategic alliance		
Our firm involves in the establishment of a franchisee	0.89	0.21
Our firm involves in the establishment of a franchisor	0.89	0.25
Our firm involves in smart partnership with international firm(s)	0.78	0.31
Social network		
Our firm participates in association at district level	0.12	0.86
Our firm participates in association at state level	0.23	0.83
Our firm plans to cooperate strategically with other firms	0.32	0.58
Our firm involves in smart partnership with other Bumiputera firms	0.28	0.50
Eigenvalue	3.59	1.05
Percent of variance	34.54	31.82
Accumulated percent of variance	34.54	66.35

Kaiser-Meyer-Olkin (KMO); Measure of Sampling Adequacy = 0.79; Bartlett's Test of Sphericity: Approx. Chi-Square = 1908.36; df = 21; Sig.= 0.00.

α = 0.73). Similarly, both knowledge and network dimensions were loaded into the two dimensions modifying the original single dimensions. The findings modified H_{2a}-H_{2e} into H_{2a}-H_{2f} for H_{3a}-H_{3f} predicting two knowledge dimensions, and H_{4a}-H_{4f} and H_{5a}-H_{5f} predicting two network dimensions.

Technology and strategy shown in Table 4 explained 65.2% of the variance loaded with four factors labeled as technology capability (8 items, α = 0.92), strategic resources (4 items, α = 0.77), strategic capability (3 items, α = 0.66) and strategic change (2 items, α = 0.58). The result of the factor analysis retained technology as a single dimension. However, strategy dimension was loaded on three dimensions. The result modified H_{3a}-H_{3e} into H_{6a}-H_{6f} and H_{7a}-H_{7f} for technology interaction on EO relationship with two knowledge dimensions, and H_{4a}-H_{4e} into H_{8a}-H_{8f} and H_{9a}-H_{9f} for technology interaction on EO relationship with two network dimensions. On the other hand, the result also modified H_{5a}-H_{5e} into H_{10ai}-H_{10fi}, H_{11aii}-H_{11fii} and H_{12aiii}-H_{12fiii} for three strategy dimensions

Table 4. Factor analysis of technology and strategy.

Variable	Component			
	1	2	3	4
Technological development				
Firm competitiveness influenced by development in management technology	0.83	0.20	0.07	0.15
Firm competitivenes influenced by development in information technology	0.82	0.17	0.12	0.12
Firm competitiveness influenced by combination of various technologies	0.81	0.12	0.23	0.12
Firm competitiveness influenced by development in marketing technology	0.81	0.29	0.02	0.11
Firm competitiveness influenced by development in new technology	0.79	0.20	0.05	0.02
Firm competitiveness influenced by development in agriculture technology	0.77	0.05	0.20	0.03
Firm competitiveness influenced by combination of many types of human resources	0.61	0.20	0.31	0.25
Firm competitiveness influenced by development in existing production technology	0.57	0.34	0.14	0.18
Strategic capability				
Firm competitiveness influenced by quality supplies	0.14	0.84	0.07	0.02
Firm competitiveness influenced by long term planning	0.24	0.74	0.10	0.20
Firm competitiveness influenced by clear vision	0.27	0.69	0.06	0.24
Firm competitiveness influenced by changes in industry environment	0.18	0.55	0.34	0.04
Strategic resource				
Firm competitiveness influenced by changes in energy price	0.09	0.23	0.77	0.03
Firm competitiveness influenced by utilizing human resources beyond normal capacity	0.17	-0.09	0.76	0.30
Firm competitiveness influenced by new opportunity in the industry	0.25	0.39	0.58	-0.01
Strategic change				
Firm competitiveness influenced by short term planning	0.08	0.22	0.12	0.79
Firm competitiveness influenced by vision that changes according to situation	0.24	0.10	0.11	0.78
Eigenvalue	6.98	1.73	1.31	1.08
Percent of variance	29.12	15.60	11.18	9.33
Accumulated percent of variance	29.12	44.72	55.90	65.23

Kaiser-Meyer-Olkin (KMO); Measure of Sampling Adequacy = 0.92; Bartlett's Test of Sphericity: Approx. Chi-Square = 5122.69; df= 360; Sig.= 0.00.

that were interacted on EO-knowledge relationship. Followed by H_{13ai}-H_{13fi}, H_{14aii}-H_{14fii} and H_{15aiii}-H_{15fiii} for the three strategy dimensions interacted on EO-network relationship. The original hypothesis of H_{6a}-H_{6f} was modified into H_{16ai}-H_{16fi}, H_{17aii}-H_{17fii} and H_{18aiii}-H_{18fiii} testing for the three strategy dimensions that interacted on EO knowledge relationship, and finally H_{19ai}-H_{19fi}, H_{20aii}-H_{20fii} and H_{21aiii}-H_{21fiii} for interaction of the three strategy dimensions on EO-network relationship. Correlation coefficient between each EO dimensions was relatively high except proactive risk taking and autonomy that proved not significant. The coefficients were between the lowest r = 0.12 (proactiveness and innovativeness) and the highest r = 0.38 (autonomy and proactiveness). Moreover, the relationship between each EO and the predicted variables showed that only one correlation was not significant, whereby the autonomy was not correlated to human capital. The range of correlation between variables were shown in the lowest r = 0.10 (autonomy and tacit knowledge) and highest coefficients r = 0.49 (proactive risk taking and human capital; innovativeness and human capital), respectively as shown in Table 5.

Restatement of hypothesis

The result of factor analysis for the studied variables modified the hypotheses shown in Table 6.

Control variables, EO, technology, strategy and knowledge/network direct relationship

In direct relation between variables and human capital development in Table 7, both cyclical effects (1 and 3 months) and period were related (Beta = 24, $p<0.01$; and Beta = 0.31, $p<0.01$) respectively. Four EO dimensions, that is, proactive risk taking, innovativeness, product innovativeness and proactiveness, were significant at $p<0.01$. All moderators were found not to be related to human capital. The results are in support of H_{2a}, H_{2d}, H_{2e}

Table 5. Intercorrelation among variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Growth															
Efficiency	0.72**														
Effectiveness	0.51**	0.59**													
Manufacturer[a]	0.00	0.07	-0.02												
Producer[b]	-0.04	-0.05	0.01	-0.65**											
Fishery[c]	0.03	0.01	0.05	-0.27**	-0.07										
Livestock[d]	0.01	-0.04	-0.01	-0.45**	-0.12**	-0.05									
Sole proprietor[e]	0.03	-0.02	-0.02	-0.02	0.03	0.02	-0.01								
Partnership[f]	-0.04	-0.03	0.01	0.06	-0.07	0.00	-0.00	-0.66**							
Private Ltd Co.[g]	0.01	0.07	0.03	-0.03	0.04	-0.03	0.02	-0.66**	-0.12**						
Firm size[h]	0.06	0.01	-0.03	0.04	-0.06	0.02	0.04	0.17**	0.04	-0.27**					
Cycle (1 mo)[i]	0.03	0.03	-0.03	0.09*	-0.04	-0.08*	-0.01*	-0.09*	0.04	0.08	0.02				
Cycle (3 mos)[j]	-0.04	-0.07	-0.09*	-0.30**	0.13**	0.16**	0.26**	-0.06	0.06	0.03	-0.07	-0.55**			
Agro dependence[k]	-0.03	-0.06	0.03	-0.24**	0.21**	0.06	0.16**	0.09*	-0.08*	-0.04	-0.05	-0.09*	0.09*		
Proact. risk taking	0.07	0.11**	0.09*	-0.13**	0.07	0.06	0.10*	-0.03	0.02	0.04	-0.04	-0.02	0.13**	0.01	
Autonomy	0.07	0.04	0.04	-0.01	0.02	-0.09*	0.01	-0.08*	0.04	0.05	0.02	0.03	-0.04	0.02	-0.07
Competitiv aggres.	0.11**	0.10*	0.11**	-0.02	-0.03	0.02	0.09*	-0.07	0.05	0.05	-0.04	0.10*	0.00	0.07	0.17**
Innovative	0.08*	0.11**	-0.02	-0.04	0.03	-0.02	0.07	-0.13**	0.07	0.09*	-0.07	0.04	0.07	-0.06	0.27**
Product Innovative	0.07	0.08*	-0.02	o.02	0.01	-0.06	-0.02	-0.02	-0.04	0.07	-0.05	0.07	0.02	-0.05	0.22**
Proactive	0.10**	0.12**	0.06	-0.10*	0.03	0.01	0.14**	-0.09*	0.02	0.10*	-0.06	-0.01	0.16**	-0.01	0.38**
Human capital	0.06	0.12**	-0.01	-0.07	0.02	-0.04	0.13**	-0.15**	0.07	0.13**	-0.04	0.09*	0.11**	0.00	0.49**
Tacit knowledge	0.02	0.02	0.01	-0.02	0.10*	-0.07	-0.03	0.00	0.03	-0.03	-0.02	-0.05	0.08*	0.04	0.17**
Strategic alliance	0.12**	0.09*	0.07	-0.12**	0.09*	0.02	0.07	-0.15**	-0.01	0.20**	0.02	0.04	0.09*	0.04	0.17**
Social network	0.20**	0.19**	0.12**	-0.12**	0.09*	0.03	0.07	-0.14**	0.03	0.16**	-0.02	0.03	0.06	-0.03	0.21**
Technology dev.	0.22**	0.25**	0.20**	-0.10*	0.02	0.02	0.08*	-0.14**	0.03	0.14**	-0.08*	0.02	0.04	0.00	0.26**
Strategic capable	0.16**	0.24**	0.20**	-0.05	0.01	0.02	0.04	-0.09*	0.03	0.09*	-0.04	-0.03	0.01	-0.00	0.29**
Strategic resource	0.17**	0.14**	0.10*	-0.05	0.04	-0.05	0.08	-0.03	-0.03	0.06	-0.03	0.04	0.03	0.03	0.20**
Strategic change	0.07	0.08*	0.07	-0.02	0.06	-0.10*	0.04	0.00	0.01	-0.02	-0.01	0.00	-0.05	0.04	0.08*

	16	17	18	19	20	21	22	23	24	25	26	27	28
Growth													
Efficiency													
Effectiveness													

Table 5. Contd.

Manufacture[a]													
Producer[b]													
Fishery[c]													
Livestock[d]													
Sole proprietor[e]													
Partenrship[f]													
Private Ltd Co.[g]													
Firm size (small)[h]													
Cycle (1 mo) [i]													
Cycle (3 mo) [j]													
Agro dependence [k]													
Proact risk taking													
Autonomy													
Competitive aggre	0.27**												
Innovative	0.12**	0.18**											
Prd Innovative	0.17**	0.29**	0.19**										
Proactive	0.16**	0.31**	0.34**	0.19**									
Human capital	0.07	0.28**	0.49**	0.24**	0.40**								
Tacit knowledge	0.10*	0.18**	0.15**	0.13**	0.11**	0.36**							
Strategic alliance	0.16**	0.19**	0.16**	0.14**	0.27**	0.29**	0.07						
Social network	0.13**	0.21**	0.25**	0.17**	0.34**	0.31**	0.12**	0.58**					
Technology dev.	0.10*	0.18**	0.18**	0.21**	0.17**	0.30**	0.06	0.47**	0.49**				
Strategic capable	-0.11**	0.04	0.06	0.13**	0.11**	0.22**	0.11**	0.18**	0.32**	0.53**			
Strategic resource	0.06	0.23**	0.13**	0.22**	0.18**	0.26**	0.14**	0.22**	0.31**	0.44**	0.44**		
Strategic change	0.08*	0.06	0.04	0.13**	0.07	0.10*	0.13**	0.10*	0.16**	0.39**	0.39**	0.34**	

**p<.01, *p<.05, .[a] service=0, manufacture = 1, producer = 0, fishery = 0, livestock = 0 [b] service = 0, manufacture = 0, producer = 1, fishery = 0, livestock = 0. [c] service = 0, manufacture = 0, producer = 0, fishery = 0, livestock = 0. [d]service = 0, manufacture = 0, producer = 0, fishery = 0, livestock = 1. [e]proprietor = 1, partnership = 0, private limited company = 0, limited company = 0. [f] proprietor = 0, partnership = 1, private limited company = 0, limited company = 0. [g] proprietor = 0, partnership = 0, private limited company = 1, limited company = 0. [h] employee < 20 = 1, employee > 20 = 0. [i]cycle (1 day) = 0, cycle (1 month) = 1, cycle (3 months) = 0. [i]cycle (1 day) = 0, cycle (1 month) = 0, cycle (3 months) = 1. [k] agriculture dependence = 1, agriculture non-dependence = 0

and H_{2f}.

Tacit knowledge shown in Table 8 was explained by three control variables, the producers type of business, partnership form and three month business cycles at p<0.05. On the other hand, proactive risk taking, competitive aggressiveness and product innovativeness explained tacit knowledge. Thus, H_{3a}, H_{3c} and H_{3d} were supported. Only strategic change moderator explained tacit knowledge directly.

Strategic alliance shown in Table 9 as a network strategy proved firm size, both in 1 and 3 months cycles, to be significant predictors at p<0.05. Three EOs' autonomy, competitive aggressiveness and proactiveness explained strategic alliance. With that H_{4b}, H_{4c} and H_{4f} were supported. In case of the moderator, technology development is a significant predictor.

The social network variable shown in Table 10 was explained by livestock farming type of SMAEs at p<0.05. On the other hand, EOs' autonomy, competitive aggressiveness, innovativeness and product innovativeness were the direct predictors of social network. The result showed support for H_{5b}, H_{5c} and H_{5d}. The moderators, that is, technology development and strategic resources were found to be predicted as social network.

Moderating effect of technology and strategy on EO-knowledge-network relationships

Technology was found to be moderated on the relationship between competitive aggressiveness (p<0.01), product innovativeness (p<0.05), proactiveness (p<0.01) and human capital development. The results provide support for H_{6c}, H_{6e} and H_{6f}. In explaining tacit knowledge, proactive risk taking and autonomy were found to be significant predictors in the presence of technology at p<0.01. Therefore, H_{7a} and H_{7b} were supported.

Impact of technology was found to be significant on the relationship between autonomy (p<0.01), proactiveness (p<0.01) and strategic alliance, substantiating H_{8bi} and H_{8fi}. Technology was moderated significantly on the relationship between product innovativeness (p<0.01) and social network, thereby substantiating H_{9ei}. On the other hand, strategic capability was moderated on the relationship between competitive aggressiveness (p<0.05), innovativeness (p<0.05), proactiveness (p<0.01) and human capital development. Thus, H_{10ci}, H_{10di} and H_{10fi} were substantiated. All EO dimensions: proactive risk taking (p<0.01), autonomy (p<0.05), significant predictors for tacit knowledge with moderation of strategic capability except product innovativeness. Therefore, H_{13ai}, H_{13bi}, H_{13ci}, H_{13ei} and H_{13fi} were supported.

In explaining strategic alliance, autonomy (p<0.01) and innovativeness (p<0.05) were found as the significant predictors in the presence of strategic capability. Therefore, H_{16bi} and H_{16di} were supported. Not a single relationship was moderated with the presence of strategic capability between any EO dimensions and social network; thus H_{19ai}-H_{19fi} were not supported.

Strategic resources were found to be moderated on proactive risk taking (p<0.01) and innovativeness (p<0.01) in human capital development relationships. The results showed support for H_{11aii} and H_{11dii}. In explaining tacit knowledge, strategic resources were moderated on proactive risk taking, autonomy, competitive aggressiveness and proactiveness of all at p<0.01. Therefore, H_{14aii}, H_{14bii}, H_{14cii} and H_{14fii} were substantiated.

In explaining strategic alliance, strategic resources were found to be moderated significantly on innovativeness at p<0.05 substantiating H_{17dii}. Autonomy (p<0.05), product innovativeness (p<0.01) and proactiveness (p<0.01), and social network relationship were moderated by strategic resources, whereby H_{20bii}, H_{20eii} and H_{20fii} were supported.

Strategic change was moderated on the relationship between risk taking, innovativeness, product innovativeness and proactiveness, and human capital development for all that were significant at p<0.01. Thus H_{12aiii}, H_{12diii} and H_{12fiii} were supported. Strategic change was moderated on the relationship between autonomy and innovativeness at p<0.01 and proactiveness at p<0.05, and tacit knowledge. Therefore, H_{15biii}, H_{15diii} and H_{15fiii} were substantiated.

Strategic change was moderated on the relationship between proactive risk taking (p<0.05), autonomy (p<0.05), innovativeness (p<0.01) and strategic alliance substantiating H_{18aiii}, H_{18biii} and H_{18diii}. Not a single relationship between any EO dimensions and social network was found to be significant in the presence of strategic change, whereby none of the H_{21aiii}-H_{21fiii} were supported.

To ascertain the existence of the interaction of the moderators on the relationships, all significant relationships were plotted on 2×2 curves in simple slope graphs verifying either the higher or steeper as compared to the lower curve to show the presence of interaction (Aiken and West, 1991; Cohen et al., 2003).

DISCUSSION

The study ascertains that EO dimensions were multidimensional verifying the claim in Lumpkin and Dess (1996); however, the study's results differ in number and nature of dimensions extracted from the analysis. Competitive aggressiveness (p<0.01), innovativeness (p<0.01) and proactiveness (p<0.01), were found as

An excerpt in Covin et al. (2006), in which an argument was done on the multidimensional contruct of EO, was again justified in this study which supported the argument of Lumpkin and Dess (1996). Nonetheless, the argument of labeling firms that are more entrepreneurial is beyond this research. It is just sufficient to contend that those firms exhibiting 'some' of those dimensions were already 'behaving in an entrepreneurial' manner (Covin et al., 2006).

Some control variables proved their importance in explaining knowledge and network of SMAEs as verified in Covin et al. (2006) and Wilklund and Shepherd (2003). We contend that cyclical nature, type of business and form of business among SMAEs played some roles in explaining knowledge and networking capabilities in agro-based entrepreneurship. Future research should not ignore the impact of these demographics that may influence results of the study.

EO, technology and strategy predicted that SMAEs knowledge and network justifies the fact that strategic and entrepreneurship resources are always important in smaller firms to a certain extent. Thus, some claims in

Table 6. Restatement of hypothesis.

Original hypothesis	Restated hypothesis
H_{2a}-H_{2e}: The more SMAEs engage in each EO dimension [(a) autonomy, (b) innovativeness, (c) proactiveness, (d) risk taking and (e) competitive aggressiveness], the more positive the relationship with knowledge capability	H_{2a}-H_{2f}: The more SMAEs engage in each EO dimension [(a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness, (f) proactiveness], the more positive the relationship with human capital knowledge capability. H_{3a}-H_{3f}: The more SMAEs engage in each EO dimensions [(a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness, (f) proactiveness], the more positive the relationship with tacit knowledge capability.
H_{3a}-H_{3e}: The more SMAEs engage in each EO dimension [(a) autonomy, (b) innovativeness, (c) proactiveness, (d) risk taking, (e) competitive aggressiveness], the more positive the relationship with network capability	H_{4a}-H_{4f}: The more SMAEs engage in each EO dimension [(a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness, (f) proactiveness], the more positive the relationship with strategic alliance. H_{5a}-H_{5f}: The more SMAEs engage in each EO dimension [(a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness, (f) proactiveness], the more positive the relationship with social network.
H_{4a}-H_{4e}: The more SMAEs utilize technology, the more positive the relationship between the EO of (a) Innovativeness, (b) autonomy, (c) proactiveness, (d) risk taking and (e) competitive aggressiveness, and knowledge capability. H_{5a}-H_{5e}: The more SMAEs utilize technology, the more positive the relationship between the EO of (a) innovativeness, (b) autonomy, (c) proactiveness, (d) risk taking and (e) competitive aggressiveness, and network capability.	H_{6a}-H_{6f}: The more SMAEs utilize technology, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and human capital. H_{7a}-H_{7f}: The more SMAEs utilize technology, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and tacit knowledge. H_{8a}-H_{8f}: The more SMAEs utilize technology, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and strategic alliance. H_{9a}-H_{9f}: The more SMAEs utilize technology, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and social network.
H_{6a}-H_{6e}: The more SMAEs utilize strategic capability, the more positive the relationship between the EO of (a) innovativeness, (b) autonomy, (c) proactiveness, (d) risk taking and (e) competitive aggressiveness, and knowledge capability. H_{7a}-H_{7e}: The more SMAEs utilize strategic capability, the more positive the relationship between the EO of (a) innovativeness, (b) autonomy, (c) proactiveness, (d) risk taking and (e) competitive aggressiveness, and network capability.	H_{10ai}-H_{10fi}: The more SMAEs utilize strategic capability, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and human capital. H_{11aii}-H_{11fii}: The more SMAEs utilize strategic resources, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and human capital. H_{12aiii}-H_{12fiii}: The more SMAEs utilize strategic change, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and human capital. H_{13ai}-H_{13fi}: The more SMAEs utilize strategic capability, the more positive the relationship between the EO (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and tacit knowledge.

Table 6. Contd

	H_{14aii}-H_{14fii}: The more SMAEs utilize strategic resources, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness of (f) proactiveness, and tacit knowledge.
	H_{15aiii}-H_{15fiii}: The more SMAEs utilize strategic change, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and tacit knowledge.
	H_{16ai}-H_{16fi}: The more SMAEs utilize strategic capability, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and strategic alliance.
	H_{17aii}-H_{17fii}: The more SMAEs utilize strategic resources, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and strategic alliance.
	$H1_{8aiii}$-H_{18fiii}: The more SMAEs utilize strategic change, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and strategic alliance.
	H_{19ai}-H_{19fi}: The more SMAEs utilize strategic capability, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and social network.
	H_{20aii}-H_{20fii}: The more SMAEs utilize strategic resources, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and social network.
	H_{21aiii}-H_{21fiii}: The more SMAEs utilize strategic change, the more positive the relationship between the EO of (a) proactive risk taking, (b) autonomy, (c) competitive aggressiveness, (d) innovativeness, (e) product innovativeness and (f) proactiveness, and social network.

Table 7. Multiple hierarchical regression analysis (moderating impact of technology and strategy on EO-human capital development relationship)

Variable	Model 1	Model 2	Model 3	Model 4
Mfg/Processor	0.109	0.024	0.032	-0.026
Producers	0.059	-0.043	-0.040	-0.084
Fishery	-0.038	-0.040	-0.033	-0.020
Livestock	0.143	0.064	0.059	0.054
Proprietor	0.072	0.017	0.077	0.049
Partnership	0.134	0.066	0.113	0.086
Private Ltd Co.	0.132	0.059	0.098	0.075
Firm size (micro)	0.006	0.036	0.038	0.034
Sales cycle (1 month)	0.238**	0.109	0.117	0.109
Sales cycle (3 months)	0.308**	0.099	0.097	0.099
Agro dependence	0.000	0.041	0.037	0.010
Proactive risk taking (RT)		0.421**	0.397	0.425

Table 7. Contd.

Autonomy (AUT)		0.054	0.053	0.029
Competitive aggressiveness (CA)		0.091	0.071	0.076
Innovativeness (INN)		0.397**	0.390	0.376
Product innovativeness (PM)		0.086**	0.068	0.031
Proactiveness (PRO)		0.149**	0.146	0.170
Technology development (TD)			0.059	0.060
Strategic capability (SC)			0.029	0.011
Strategic resources (SR)			0.060	0.041
Strategic change (SCH)			0.020	0.060
RT × TD				-0.054
AUT × TD				0.058
CA × TD				-0.181**
INN × TD				-0.008
PM × TD				-0.065*
PRO × TD				0.153**
RT × SC				0.075
AUT × SC				-0.023
CA × SC				0.067*
INN × SC				0.069*
PM × SC				0.013
PRO × SC				-0.174**
RT × SR				0.186**
AUT × SR				0.016
CA × SR				0.038
INN × SR				-0.083**
PM × SR				0.044
PRO × SR				0.021
RT × SCH				-0.133**
AUT × SCH				-0.051
CA × SCH				0.023
INN × SCH				-0.143**
PM × SCH				-0.076**
PRO × SCH				0.173**
Change R^2	0.107	0.606	0.014	0.113
F Change	4.260**	135.429**	4.875**	10.462**
Adjusted R^2	0.082	0.701	0.712	0.802
Durbin-Watson = 1.917				

n = 402, *p<0.05, **p<0.01.

Table 8. Multiple hierarchical regression analysis (moderating impact of technology and strategy on EO-tacit knowledge relationship).

Variable	Model 1	Model 2	Model 3	Model 4
Mfg/Processor	0.103	0.109	0.071	0.132
Producers	0.241*	0.217	0.170	0.263
Fishery	-0.042	-0.006	0.013	0.048
Livestock	0.019	-0.007	-0.041	0.031
Proprietor	0.494	0.494	0.505	0.707
Partnership	0.451*	0.426	0.442	0.667
Private Ltd Co.	0.282	0.266	0.293	0.400

Table 8. Contd

Firm size (micro)	0.018	0.032	0.031	-0.019
Sales cycle (1 month)	0.012	-0.043	-0.033	-0.019
Sales cycle (3 months)	0.133*	0.074	0.096	0.078
Agro dependence	0.067	0.077	0.078	0.017
Proactive risk taking (RT)		0.163**	0.157	0.067
Autonomy (AUT)		0.087	0.077	0.055
Competitive aggressiveness (CA)		0.147**	0.150	0.120
Innovativeness (INN)		0.238**	0.252	0.204
Product innovativeness (PM)		0.035	0.025	0.035
Proactiveness (PRO)		-0.034	-0.031	0.039
Technology development (TD)			-0.157	-0.125
Strategic capability (SC)			0.032	0.154
Strategic resources (SR)			0.078	-0.026
Strategic change (SCH)			0.199**	0.104
RT × TD				-0.410**
AUT × TD				0.115**
CA × TD				0.004
INN × TD				-0.034
PM × TD				0.002
PRO × TD				0.049
RT × SC				-0.287**
AUT × SC				-0.109*
CA × SC				-0.157**
INN × SC				0.140**
PM× SC				0.052
PRO × SC				0.346**
RT × SR				0.342**
AUT × SR				0.137**
CA × SR				0.283**
INN × SR				-0.056
PM× SR				-0.045
PRO × SR				**-0.281****
RT × SCH				0.040
AUT × SCH				**-0.174****
CA × SCH				0.016
INN × SCH				**-0.308****
PM × SCH				0.048
PRO × SCH				**0.094***
Change R^2	0.083	0.154	0.048	0.365
F Change	3.343**	13.450**	6.590**	16.129**
Adjusted R^2	0.058	0.205	0.247	0.608
Durbin-Watson = 1.843				

n = 417, *p<0.05, **p<0.01.

Covin and Slevin (1991), Lumpkin and Dess (1996), Ireland et al. (2001) and Hitt et al. (2001) set a benchmark for entrepreneurship variables' role as the antecedent of knowledge and networking capabilities in the firm. In a similar vein, technology and strategy also prove themselves as important determinants. Firm internal capabilities comprised entrepreneurial resources, as well as strategic resources, which help to enrich firms' knowledge and network. Firms with higher EO possess more capabilities in acquiring valuable resources and economic opportunities through their social network and finally contribute more value for their stakeholders and

Table 9. Multiple hierarchical regression analysis (moderating impact of technology and strategy on EO-strategic alliance relationship).

Variable	Model 1	Model 2	Model 3	Model 4
Mfg/Processor	-0.112	-0.132	0.036	0.004
Producers	0.035	0.013	0.121	0.080
Fishery	0.023	0.034	0.056	0.050
Horticulture	0.044	-0.002	0.042	0.016
Proprietor	-0.610	-0.496	-0.217	-0.189
Partnership	-0.435	-0.381	-0.188	-0.153
Private Ltd Co.	-0.060	-0.026	0.062	0.063
Firm size (micro)	0.122*	0.142	0.171	0.172
Sales cycle (1 month)	0.119*	0.060	0.020	0.010
Sales cycle (3 months)	0.124*	0.049	0.053	0.050
Agro dependence	-0.014	-0.019	-0.036	-0.026
Proactive risk taking (RT)		0.013	-0.091	-0.084
Autonomy (AUT)		0.137**	0.096	0.069
Competitive aggressiveness (CA)		0.092*	0.058	0.068
Innovativeness (INN)		0.005	-0.064	-0.052
Product innovativeness (PM)		0.057	0.015	0.005
Proactiveness (PRO)		0.295**	0.291	0.343
Technology development (TD)			0.713**	0.732
Strategic capability (SC)			-0.101	-0.185
Strategic resources (SR)			0.003	0.049
Strategic change (SCH)			-0.079	-0.091
RT × TD				-0.016
AUT× TD				0.111**
CA × TD				-0.041
INN× TD				-0.013
PM × TD				-0.014
PRO × TD				0.167**
RT× SC				-0.030
AUT × SC				-0.114**
CA × SC				0.020
INN × SC				0.082*
PM × SC				0.058
PRO × SC				-0.011
RT × SR				-0.046
AUT × SR				-0.020
CA × SR				0.057
INN × SR				-0.082*
PM × SR				0.002
PRO × SR				0.231
RT × SCH				-0.070*
AUT × SCH				0.071*
CA× SCH				0.017
INN× SCH				-0.103**
PM× SCH				-0.019
PRO × VY				-0.038
Change R^2	0.204	0.161	0.345	0.103
F Change	8.927**	15.934**	111.270**	8.068**
Adjusted R^2	0.182	0.337	0.695	0.790
Durbin-Watson = 1.977				

n = 394, *p<0.05, **p<0.01.

Table 10. Multiple hierarchical regression analysis (moderating impact of technology and strategy on EO-social network relationship).

Variable	Model 1	Model 2	Model 3	Model 4
Mfg/Processor	0.025	-0.042	-0.011	-0.009
Producers	0.134	0.071	0.092	0.103
Fishery	0.079	0.051	0.082	0.102
Livestock	0.167*	0.102	0.080	0.089
Proprietor	-0.239	-0.191	0.068	0.115
Partnership	-0.185	-0.140	0.045	0.080
Private Ltd Co.	-0.008	-0.008	0.108	0.151
Firm size (micro)	0.019	0.045	0.062	0.066
Sales cycle (1 month)	0.062	-0.019	-0.001	0.004
Sales cycle (3 months)	0.031	-0.047	-0.033	-0.034
Agro dependence	-0.069	-0.064	-0.081	-0.075
Proactive risk taking (RT)		0.023	-0.097	-0.096
Autonomy (AUT)		0.004	-0.042	-0.058
Competitive aggressiveness (CA)		0.187**	0.133	0.132
Innovativeness (INN)		0.173**	0.153	0.174
Product innovativeness (PM)		0.084*	0.007	-0.002
Proactiveness (PRO)		0.204*	0.209	0.211
Technology development (TD)			0.472**	0.481
Strategic capability (SC)			0.031	-0.002
Strategic resources (SR)			0.116**	0.116
Strategic change (SCH)			-0.001	0.020
RT × TD				-0.004
AUT × TD				0.060
CA × TD				-0.011
INN × TD				-0.029
PM × TD				0.135**
PRO × TD				-0.009
RT × SC				-0.025
AUT × SC				-0.022
CA × SC				0.083
INN × SC				0.042
PM × SC				-0.002
PRO × SC				0.088
RT × SR				0.048
AUT × SR				0.095*
CA × SR				0.019
INN × SR				0.067
PM × SR				-0.138**
PRO × SR				-0.122**
RT × SCH				-0.008
AUT × SCH				-0.045
CA × SCH				-0.059
INN × SCH				-0.012
PM × SCH				-0.056
PRO × SCH				0.015
Change R^2	0.071	0.195	0.261	0.043
F Change	3.500**	21.827**	67.404**	1.950**
Adjusted R^2	0.051	0.241	0.506	0.528
Durbin-Watson = 1.841				

n = 512, *p<0.05, **p<0.01.

customers (Lee et al., 2001; Chen et al., 2007).

Firms that showed higher strategic change interacted with higher proactive risk taking and human capital development relationship. The finding suggested that in order to improve human capital development in the firm, proactive risk taking orientation was most appropriate when firms' strategy was focused more on high strategic change than when it was low. Furthermore, firms' strategic change consisted of short term planning and changes in their vision strategy, with the ability to enhance human capital development when members of the firm exercise proactive risk taking posture.

Interaction of high strategic capability explained positive relationship between autonomy, innovativeness, proactiveness orientation and tacit knowledge. These phenomena suggested that to enhance tacit knowledge in an entrepreneurial firm, most appropriate EO dimensions were exercised by firms' members (autonomy, innovativeness and proactiveness) when firms proved to exhibit high strategic capability than when it was low. High strategic capability of the firms require them to achieve specific level of competitiveness in quality supplies, long term planning, clearer vision, and possess the ability to comprehend changes in their industrial environment. Tacit knowledge has been an invaluable resource owned by firms, where other firms were unable to duplicate those (Barney, 1991) represented by firms' experience and skilled members. Malaysian SMAEs entrepreneurs singled out tacit knowledge as a significant factor. When firms' members exercise autonomy, innovative and proactive postures, it is possible for the relationship to be enhanced in the presence of the strategic capability.

Firms that possess more strategic resources appreciate more tacit knowledge when firms employed proactive risk taking, competitive aggressiveness and autonomy orientations. The relationships justified that to enhance tacit knowledge in entrepreneurial firms, the most appropriate EO dimensions exhibited proactive risk taking, competitive aggressiveness and autonomy when firms possess more strategic resources than when it was less. The strategic resources comprise those capabilities such as firms' competitiveness in facing changes on the energy source price and competencies such as the competitiveness in utilization of human resources beyond their normal capability and when there are more new opportunities. Firms reacting to strategic change that may affect their organizations require more proactiveness in order to improve tacit knowledge capability. The interaction proved that firms with proactive orientation are capable to boost tacit knowledge when firms employed more short term planning and clearer vision. These strategic capabilities help to flourish experiential and skilled development knowledge when members of the firms take their proactive posture.

The interaction of technological development in the firm help to boost strategic alliances when firms employ proactiveness and autonomy. The relationship proved that proactive and autonomy orientation explain higher strategic alliances when technological development was high than when it was low. The technological development here upholds that the extent of firm competitiveness is influenced by production technology, new agricultural technology, functional management, marketing and information technology besides combination of technologies. Influence of technological development toward firms' strategic alliance requires firms with proactive and autonomous members.

Strategic capability was interacted significantly on proactiveness and social network relationship. The finding suggested that firms with proactiveness orientation were capable of enhancing the social network of the firm when strategic capability was more than when it was less. More strategic capability means more concern on quality supplies, long term planning, clearer vision and possessing the ability to comprehend changes in their industrial environment.

In the same vein, strategic resources were interacted significantly on proactiveness and social network relationship. The finding justified the firms' proactiveness which explained higher social network when firms employed high strategic resources than when it was low. Strategic resources comprise competitive human effort, energy price level and new opportunities which influence vibrant social networking of the proactive firms.

The study concludes that EO among the SMAEs are multidimensional with distinctive identity among them; as such, EO dimensions are the direct predictors of knowledge and network strategy. However, the direct associations did not totally explain the phenomena, and so, the relationships are even stronger when both internal and external capabilities inherent within technological and strategic variables act as the moderators. Thus, the higher order MRA modifies the relationship substantiated in the lower order MRA.

Limitations of this study are as a result of various factors. First, disproportionate number of respondents in each state, respondents characteristics and self reported survey design, which might interfere in the generalizability of the findings, therefore warrants some careful handling. Secondly, the research design utilizes cross sectional data collection that might fail to measure certain variables precisely; hence longitudinal approach shall suggest an alternative design in future research.

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REFERENCES

Abernethy MA, Brownell P (1997). Management control systems in research and development organizations: The role of accounting, behavior and personnel controls. Account. Organ. Soc., 22(3-4): 233-248.

Ahuja G, Lambert CM (2001). Entrepreneurship in large corporations: a longitudinal study of how established firms create breakthrough inventions. Strateg. Manage. J., 22: 521-543.

Aldrich H, Zimmer C. (1986). Entrepreneurship through social networks. In: Sexton, D Smilor R (eds). The Art and Science of Entrepreneurship. Ballinger, Cambridge, MA. pp. 3-23.

Aldrich H, Birley S, Dubini P, Greve A, Johannisson B, Reese, PR, Sakano T (1991). The generic entrepreneur? Insights from a multinational research project. Paper presented at the Babson Conference on Entrepreneurship.

Amabile TM (1988). A model of creativity and innovation in organizations. In: Staw BM, Cummings LL (eds) Research in organizational behavior, I0. JAI, Greenwich, CT. pp. 123-168.

Ban SS, Seo S, Lee H, Lee YS, Cha MS (2009). An empirical study on the relationship between entrepreneurial orientation, market environment and performances of entrepreneurial networks. ICSB World Conference, Seoul.

Barney JB (1991). Firm resources and the theory of competitive advantage. J. Manage., 17: 99-120.

Becker GS (1964). Human capital. Columbia University Press, New York.

Bharadwaj AS (2000). A resource-based perspective on information technology capability and firm performance: An empirical investigation. MIS. Q., 24: 169-196.

Burt RS (1992). Structural Holes: The Social Structure of Competition. Harvard University Press, Cambridge, MA.

Chandler GN Hanks SH (1994). Market attractiveness, resource-based capabilities, venture strategies and venture performance. J. Bus. Ventur., 9: 331-349.

Chen CN, Tzeng LC, Ou WM, Chang KT (2007). The relationship among social capital, entrepreneurial orientation, organizational resources and entrepreneurial performance for new ventures. Contemp. Manage. Res., 3(3): 213-232.

Cohen J, Cohen P, West SG, Aiken LS (2003). Applied Multiple Regression/Correlation Analysis for the Behavioral Science (3rd ed.). Lawrence Erlbaum Associates, Publishers, Mahwah, NJ.

Cohen W, Levinthal D (1990). Absorptive Capacity: A new perspective on learning and innovation. Adm. Sci. Q., 35: 128-152.

Cooper AC, Folta TB, Woo C (1995). Entrepreneurial information search. J. Bus. Ventur., 10(2): 107-120.

Covin JG, Slevin DP (1989). Empirical relationship among strategic posture environmental context variables, and new venture performance, Frontiers Entrepreneurship Research. Babson College, Wellesley, MA. pp. 124-133.

Covin JG, Slevin DP (1991). A conceptual model of entrepreneurship as firm behavior. Entrep. Theory Pract., Fall: pp. 7-25.

Covin JG, Green KM, Slevin DP (2006). Strategic process effects on the entrepreneurial orientation-sales growth rate relationship. Entrep.. Theo. Pract., 30: 57-81.

Dean CC (1993). Corporate entrepreneurship: Strategic and structural correlates and impact on the global presence of United States firms. Unpublished doctoral dissertation, University of North Texas, Denton.

Deeds DL, DeCarolis D, Coombs J (1999). Dynamic capabilities and new product development in high technology ventures: An empirical analysis of new biotechnology firms. J. Bus. Ventur., 15(3): 211-229.

Dess GG, Lumpkin GT, Covin JG (1997). Entrepreneurial strategy making and firm performance: Tests of contingency and configurational models. Strateg. Manage. J., 18(9): 677-695.

Dodgson M (1993). Organizational learning: A review of some literatures. Dodgson Organization Studies, pp. 375–394.

Eisenhardt KM, Santos FM (2002). Knowledge-based view: A new theory of strategy? In: Pettigrew A, Thomas H, Whittington R (eds) Handbook of Strategy and Management. Sage Publications, Thousand Oaks, CA.

Gabbay SM, Leenders R Th. AJ (1999). CSC: The structure of advantage and disadvantage. In: Th AJ Leenders R, Gabbay SM (eds), Corporate Social Capital and Liability. Kluwer Academic Press, Boston. pp. 1-14.

Granovetter MS (1973). The strength of weak ties. Amer. J. Socio., 78: 1360-1380.

Gupta AK, Govindarajan V. (2000). Knowledge management's social dimension: Lesson from Nucor Steel. Sloan Manage. Rev., 42(1): 71-80.

Hair J, Black W, Babin B, Anderson R, Tatham R (2006). Multivariate Data Analysis, (6th ed.). Upper Saddle River, New Jersey: Pearson Prentice-Hall.

Hall R (1993). A framework linking intangible resources and capabilities to sustainable competitive advantage. Strategic Manage. J., 14: 607-618.

Hansen EL 1995. Entrepreneurial network and new organization growth. Entrepreneurship: Theory Pract., 19(4): 7-19.

Harabi N (1995). Appropriability of technical innovations – an empirical analysis. Res. Policy, 24(6): 981-992.

Hinkin TR (1995). A review of scale development practices in the study of organizations. J. Manage., 21(5): 967-988.

Hitt MA, Ireland RD, Camp SM, Sexton DL (2001). Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. Strateg. Manage. J., 22(6): 479-492.

Hultink EJ, Atuahene-Gima K, Lebbink I (2000). Determinants of new product selling performance: An empirical examination in the Netherlands. Eur. J. Innov. Manage., 3: 27-34.

Ireland RD, Hitt MA, Camp SM, Sexton DL (2001). Integrating entrepreneurship and strategic management actions to create firm wealth. Acad. Manage. Exec., 15(1): 1.

Jarillo JC (1989). Entrepreneurship and growth: The strategic use of external resources. J. Bus. Ventur., 4: 133-147.

Khandwalla PN (1977). The Design of organizations. Harcourt Brace Jovanovich, New York.

Klevorick AK, Levin RC, Nelson RR, Winter SG (1995). On the sources and significance of interindustry differences in technological opportunities. Res. Policy, 24: 185-205.

Krackhardt D (1992). The strength of strong ties: The importance of *philos* in organizations. In: Nohria N, Eccles RG (eds), Networks and Organizations: Structure, Form, and Action. Harvard University Press, Boston, MA. pp. 216-239.

Kreiser P, Marino L, Weaver KM (2002). Assessing the relationship between entrepreneurial orientation, the external environment, and firm performance. Frontiers of Entrepreneurship Research [Online], 9 p. Available: http://www.babson.edu/entrep/fer/Babson2002/X/X_P3/P3.htm [2003, March 25].

Kogut B, Zander U (1996). What Firms Do? Coordination, Identity and Learning. Org. Sci., 7: 502-518.

Lee C, Lee K, Pennings JM (2001). Internal capabilities, external networks, and performance: a study on technology-based ventures. Strateg. Manage. J., 22: 615-640.

Lee LS, Sukoco BM (2007). The effects of entrepreneurial orientation and knowledge management capability on organizational effectiveness in Taiwan: The moderating role of social capital. Int. J. Manage., 24(3): 549-572.

Lerner M, Almor T (2002). Relationships among strategic capabilities and the performance of women-owned small ventures. J. Small Bus. Manage., 40: 109-125.

Li LY, Ogunmokun G (2001). Effect of export financing resources and supply –chain skills on export competitive advantages: Implications for superior export performance. J. World Bus., 36: 260-279.

Lin N (1999). Building a network theory of social capital. Connections, 22(1): 28-51.

Low MB, MacMillan IC (1988). Entrepreneurship: Past research and future challenges. J. Manage., 14: 139-161.

Lumpkin G, Dess G (1996). Clarifying the Entrepreneurial Orientation Construct and linking it to Performance. Acad. Manage. Rev., 21(1): 135-172.

Lumpkin G, Dess G (1997). Proactiveness versus competitive aggressiveness: Teasing apart key dimensions of an entrepreneurial orientation. Frontiers of Entrepreneurship Research [0nline], 10 pages, retrieved June 21, 2001, from http://www.babson.edu/entrep/fer/papers97/lumpkin/lum1.htm.
Mahoney TA, Weitzel W (1976). Managerial models of organizational effectiveness. Adm. Sci. Q., 14: 357-365.
Miller D (1983). The correlates of entrepreneurship in three types of firms. Manage. Sci., 29: 770-791.
Miller D, Friesen P (1982). Innovation in conservative and entrepreneurial firms. Strateg. Manage. J., 3(1): 1-27.
Mintzberg H (1973). Strategy making in three modes. Cali. Manage. Rev., 16(2): 44-53.
Morris MH, Kuratko DF (2003). Corporate Entrepreneurship: Entrepreneurial Development within Organization. Fort Worth: Harcourt College Publishers.
Murphy GB, Trailer GW, Hill RC (1996). Measuring performance in entrepreneurship research. J. Bus. Res., 36: 15-23.
Nicolaou N, Birley S (2003). Academic networks in a trichotomous categorization of university spinouts. J. Bus. Ventur., 18(3): 333-359.
Penner-Hahn J, Shaver M (2005). Does international research and development increase patent output? An analysis of Japanese pharmaceutical firms. Strateg. Manage. J., 26: 121-140.
Podsakoff PM, Organ DW (1986). Self-reports in organizational research: Problems and prospects. J. Manage., 12(4): 531-543.
Scherer FM, Ross D (1990). Industrial Market Structure and Economic Performance. Boston: Houghton Mifflin Company.
Shane S, Venkataraman S (2000). The promise of entrepreneurship as a field of research. Acad. Manage. Rev., 25: 217-226.
Shang Lee LT, Sukoco BM (2007). The Effects of Entrepreneurial Orientation and Knowledge Management Capability on Organizational Effectiveness in Taiwan: The Moderating Role of Social Capital. Int. J. Manage., 24(3): 549.
Schriesheim CA, Powers KJ, Scandura TA, Gardiner CC, Lankau MJ (1993). Improving construct measurement in management research: Comments and a quantitative approach for assessing the theoretical content adequacy of paper-and-pencil survey-type instruments. J. Manage., 19: 385-417.
Stetz PE, Howell R, Stewart A, Blair JD, Fottler MD (2000). Multidimensionality of entrepreneurial firm-level processes: Do the dimensions covary? In: Reynolds PD, Autio E, Brush CG, Bygrave WD, Manigart S, Sapienza HJ, Sexton DL (eds), Frontiers of Entrepreneurship Research. Wellesley, MA: Babson College.
Tjosvold D, Weicker D (1993). Cooperative and competitive networking by entrepreneurs: A critical incident study. J. Small Bus. Manage., 31: 11-21.
Tushman M, Anderson P (1986). Technological discontinuities and organizational environments. Adm. Sci. Q., 31: 439-465.
Ursula G, Celeste PMW (1998). Predictors of organizational performance in small and medium-sized professional service firms. Int. J. Techno. Manage., 16: 23-36.
Vega-Jurado J, Gutierrez-Gracia A, Fernández-de-Lucio I, Manjarrés-Henríquez L (2008). The effect of external and internal factors on firms' product innovation. Res. Pol., 37: 616-632.
Venkataraman S (1997). The distinctive domain of entrepreneurship research. In: Katz JA (ed), Advances in entrepreneurship, firm emergence, and growth, Greenwich. CT: JAI, 119-138.
Wernerfelt B (1984). A resource-based view of the firm. Strateg. Manage. J., 5: 171-180.
Wilklund J (1998). Entrepreneurial Orientation as predictor of performance and entrepreneurial behavior in small firms – Longitudinal evidence. Frontiers of Entrepreneurship Research [Online], 13 p. Retrieved March 12, 1999 from http://www.babson.edu /entrep/fer/papers98/IX/IX_E/IX_E_text.htm.
Wilklund J, Shepherd D (2003) Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized business. Strateg. Manage. J., 24: 1307-1314.
Zahra SA, Bogner WC (1999). Technology strategy and software new ventures' performance: Exploring the moderating effect of the competitive environment. J. Bus. Ventur., 15(2): 135-174.
Zahra SA, Nielsen AP (2002). Sources of capabilities, integration and technology commercialization. Strateg. Manage. J., 23: 377-398.
Zhou L, Wu W-p, Luo X (2007). Internationalization and the performance of born-global SMEs: the mediating role of social networks. J. Int. Bus. Stud., 38: 673-69.