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The mediating roles of differentiation strategy and learning orientation in the relationship between entrepreneurial orientation and firm performance
創業導向與績效關係之研究—學習導向與策略導向之中介效果

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Abstract: Differentiation strategy and learning orientation are both important for entrepreneurial firms, but differ in their paths to improve entrepreneurial performance. Nonetheless, to the best of our knowledge, the differentiation strategy that mediates the relationship between entrepreneurial orientation and firm performance has not been thoroughly investigated in the literature. In addition, the mediating effect of learning orientation on the entrepreneurial orientation-performance relationship remains unclear. Therefore, this study constructs a multiple mediating model to comprehensively examine how entrepreneurial performance influences multiple firm performance measures (growth performance and profitability performance) through the mediating variables of differentiation strategy and learning orientation. This study focuses on firms in a component supply network in the automotive industry. Structural equation modelling (SEM) analysis and tests on multiple mediating effects indicate that, through the mediating effect of differentiation strategy, entrepreneurial performance increases growth performance. Moreover, through the mediating effect of learning orientation, entrepreneurial performance

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enhances profitability performance. The research results reveal that, in terms of the mediating effect, differentiation strategy and learning orientation can complement each other in order to raise growth performance and profitability performance, respectively.

Keywords: Entrepreneurial orientation, Differentiation strategy, Learning orientation, Firm performance, A multiple mediating model.

1. Introduction

The entrepreneurship literature has strongly recognized the importance of entrepreneurial orientation to firm performance (*e.g*., Lumpkin and Dess, 1996, 2001; Rauch *et al*., 2009; Su, Xie, and Li, 2011; Covin and Wales, 2012; Boso, Story, and Cadogan, 2013). In the theoretical frameworks proposed by Covin and Slevin (1991) and Lumpkin and Dess (1996), many organizational and environmental variables moderate the relationship between entrepreneurial orientation and firm performance. A large volume of empirical entrepreneurial orientation research has examined the effect of different moderating variables on the entrepreneurial orientation-performance relationship (*e.g*., Dess, Lumpkin, and Covin, 1997; Lumpkin and Dess, 2001; Wiklund and Shepherd, 2005; Covin, Green, and Slevin, 2006; Stam and Elfring, 2008; Rauch *et al*., 2009; Covin and Wales, 2012). In terms of scientific validation, however, if one only investigates the variables that moderate the entrepreneurial orientation-performance nexus while failing to establish whether there are any positive relationships between entrepreneurial orientation and moderating variables, then one may misidentify the mediating effects as the moderating effects, thus leading to biased conclusions. Additionally, from a practical standpoint, aside from the direct effect of entrepreneurial orientation on performance, entrepreneurial orientation may also influence performance through some indirect approaches. Accordingly, a few studies have begun to investigate the role of a single mediating variable in the entrepreneurial orientation-performance relationship (*e.g*., Wang, 2008; Li, Huang, and Tsai, 2009), but, in general, establishing the presence and effect of the mediating variables in the entrepreneurial orientation-performance relationship warrants further in-depth research.

Porter (1980) argued that the "entrepreneurship problem" should be viewed as a product of how a firm creates value (*i.e.*, differentiation or cost leadership strategy) and how it defines its market coverage scope (*i.e.*, focused or market-wide scope) (Slater and Olson, 2000). In addition, in the Miles and Snow's (1978) framework, the strategic type of "prospector" was proposed for dealing with the "entrepreneurial problem." "Prospector" firms continuously seek to locate and exploit new products and market opportunities (Slater and Olson, 2000); therefore, they often challenge their existing routines, managerial processes, and products/markets, thus promoting organizational change in order to increase competitiveness (Miles and Snow, 1978; Zahra, Kuratko, and Jennings, 1999). By integrating the strategy frameworks of Porter (1980) and Miles and Snow (1978), Walker and Rueker (1987) argued that "prospector" firms could incorporate a differentiation strategy for approaching their product-market domains (the entrepreneurship problem) so as to achieve success in those domains. Therefore, the characteristics of "differentiator" firms (*i.e.*, firms that implement a differentiation strategy) are rather similar to those of Miles and Snow's (1978) "prospector" firms, as argued by Dess, Lumpkin and Covin (1997). Many studies have demonstrated that a differentiation strategy can generate a competitive edge, thus enhancing firm performance (*e.g.*, Miller and Friesen, 1986, 2001; Slater and Olson, 2006). Miller (1986, 1988) further identified two differentiation strategy types, innovative differentiation and marketing differentiation, to expand Porter's framework. According to Covin and Slevin (1991), Knight (2000), and Zhou, Yim, and Tse (2005), entrepreneurial orientation influences a firm's adoption of specific strategic variables. These strategic variables resemble innovative differentiation and marketing differentiation strategies, as outlined by Durand and Coeurderoy (2001) and Dess, Lumpkin, and Covin (1997). Thus, entrepreneurial firms endeavor to implement differentiation strategies to improve their firm performance (Dess, Lumpkin, and Covin, 1997). Drawing on these studies of the entrepreneurial orientation-differentiation strategy relationship and the differentiation strategy-performance relationship, one could infer that entrepreneurial orientation influences firm performance through the mediating variable of differentiation strategy. Nevertheless, to our knowledge, the relationship of entrepreneurial orientation-differentiation strategy-performance has not been thoroughly investigated in the

literature. Accordingly, the first research question is as follows: Does a firm's differentiation strategy mediate the entrepreneurial orientation-performance relationship?

Harrison and Leitch (2005) overall argued that entrepreneurship is a process of learning, and that each aspect of organizational learning has relevance either directly or indirectly for entrepreneurial management. Liu, Luo and Shi (2002) and Wang (2008) empirically showed that entrepreneurial orientation positively affects learning orientation. Additionally, many researchers have argued that learning orientation influences the degree to which firms are likely to promote high-order generative learning, which is an important organizational competence, as it reflects the overall organizational capacity to implement change by unlearning obsolete perspectives, systems, and norms and proactively replacing them with new methods that ensure sustainable competitive advantage (Baker and Sinkula, 1999), thereby improving firm performance (Baker and Sinkula, 1999; Calantone, Cavusgil, and Zhao, 2002). Integrating these findings regarding entrepreneurial orientation-learning orientation and learning orientation-performance relationships, the influence of entrepreneurial orientation on firm performance is likely mediated by learning orientation. Accordingly, the mediating effect of learning orientation is integrated into the research concept model. The second research question thus is: Does a firm's learning orientation mediate the entrepreneurial orientation-performance relationship?

The above analysis shows that differentiation strategy and learning orientation are both closely related to the characteristics of "prospector" firms. Such firms often preemptively adopt new methods that promote continuous improvement and change in order to generate a sustainable competitive advantage, attempting to become leaders in their fields (Miles and Snow, 1978; Walker and Rueker, 1987; Baker and Sinkula, 1999). Additionally, differentiation strategy and learning orientation are both important in helping firms approach an "entrepreneurial problem," but the two differ in their paths to achieve improved entrepreneurial performance, as differentiation strategy is related to business strategies, while learning orientation is associated with overall organizational learning. Accordingly, the two can be complementary in strengthening the competitiveness and entrepreneurial performance of a firm. Lumpkin and Dess (1996) argued that firm performance has multiple dimensions, but follow-up

empirical studies involving the application of subsequent structural equation modelling (SEM) on the entrepreneurial orientation-performance nexus generally view firm performance as a unified construct that includes multiple firm dimensions (*e.g*., Keh, Nguyen, and Ng, 2007; Wang, 2008; Li, Huang, and Tsai, 2009). As these studies did not explore the multiple dimensions of firm performance, the present study constructs an integrated conceptual framework, a multiple mediating model, to explore how entrepreneurial orientation influences multiple indices of firm performance through the mediating variables of differentiation strategy and learning orientation. This integrated framework helps fill the gap in the existing literature as well as opens up a new direction for entrepreneurial orientation research. Accordingly, the third research question is: How does a firm's entrepreneurial orientation affect its multiple dimensions of firm performance via differentiation strategy and learning orientation as mediating variables?

Many organizations have recognized that improving efficiency within an organization is insufficient to ensure firm advantages; the whole supply chain network must be made competitive (Li *et al*., 2005). Most entrepreneurial orientation empirical studies have investigated a wide range of unspecified firms (*e.g*., Lumpkin and Dess, 2001; Wang, 2008; Rauch *et al*., 2009), normally including firms in the B2B market and firms in the B2C market. However, to our knowledge, entrepreneurial orientation research on firms in supply chain networks (*i.e.*, firms in B2B market) is rare. Since firm-specific attributes or industry types may influence the relationship between entrepreneurial orientation and firm performance (Rauch *et al.,* 2009), previous research results on a wide variety of industry types may not be applied directly to firms in supply chain networks. Supply chain networks exist in all industries, and the supply chain network created by component suppliers in the automotive industry is representative of supply chain networks in general (Quesada, Syamil, and Doll, 2006; Binder, Gust, and Clegg, 2008). Thus, this study focuses on firms in the automotive industry's component supply chain network to investigate the effects of entrepreneurial orientation on firm performance through the mediating variables of learning orientation and differentiation strategy.

2. Theoretical framework and hypotheses

2.1 Entrepreneurial orientation and firm performance

Entrepreneurial orientation has recently emerged as an important concept in the entrepreneurship literature and has received substantial theoretical and empirical attention (Rauch *et al.*, 2009; Covin and Wales, 2012). Lumpkin and Dess (1996) distinguished between entrepreneurial orientation and entrepreneurship by asserting that entrepreneurial orientation represents key entrepreneurial processes that answer the principal question of how new ventures are undertaken, whereas the term entrepreneurship refers to the content of entrepreneurial decisions by addressing what is undertaken. Using concepts from the strategy-making process literature (Covin and Slevin, 1991), entrepreneurial orientation shall be viewed as the key entrepreneurial strategy-making processes that mean "the methods, practices, and decision-making styles managers use to act entrepreneurially" (Lumpkin and Dess, 1996); these entrepreneurial processes exist in a firm that "engages in product market innovation, undertakes somewhat risky ventures and is the first to come up with 'proactive' innovations, beating competitors to the punch" (Miller, 1983). In short, entrepreneurial orientation represents the processes and practices that provide organizations with a basis for entrepreneurial decisions and actions, leading to new ventures (Lumpkin and Dess, 1996; Rauch *et al.*, 2009).

In the literature on entrepreneurship, many studies have recognized that entrepreneurial orientation is important to firm performance (Rauch *et al.*, 2009). Although a number of different performance indicators were used, they are commonly divided into financial performance and non-financial performance measures (Rauch *et al.*, 2009; Chang and Fu, 2011). Most empirical studies regarding the entrepreneurial orientation-firm performance nexus have focused exclusively on financial performance (Lumpkin and Dess, 2001; Covin, Green, and Slevin, 2006; Wang, 2008), because firms with a strong entrepreneurial orientation effectively differentiate their products in premium market segments, set appropriate prices, and grab market opportunities ahead of their competitors, thereby improving profitability and accelerating growth (Zahra and Covin, 1995). Conversely, the impact of entrepreneurial orientation on non-financial

performance is less straightforward than that of entrepreneurial orientation on financial performance, because factors that influence non-financial performance are rather complex (Rauch *et al*., 2009). Accordingly, this study focuses on financial performance and distinguishes between two independent dimensions of financial performance, including growth performance and profitability performance, as proposed by Covin and Slevin (1991).

Based on Miller's conceptualization (Miller, 1983), three entrepreneurial orientation dimensions have been identified and used consistently in the literature (Rauch *et al*., 2009): innovativeness, proactiveness, and risk-taking. Innovativeness reflects a firm's willingness to engage in and support experimentation, creativity, novelty, technological leadership, and R&D when introducing new products, services, and processes (Lumpkin and Dess, 1996, 2001). Innovative firms typically have a broad technical and knowledge base through which they can develop innovative products or processes and renew their operations in the marketplace, hence improving profitability (Lumpkin and Dess, 1996; Zahra and Gavis, 2000). Risk-taking means a tendency to take bold actions, such as venturing into new markets and committing substantial resources to ventures in uncertain environments (Lumpkin and Dess, 2001). A risk-taking orientation can help firms seize market opportunities to obtain higher earnings (Lumpkin and Dess, 1996). Proactiveness is an opportunity-seeking and forward-looking perspective, which is characterized by introducing new products and services ahead of the competition (Lumpkin and Dess, 1996, 2001). Proactiveness allows firms to anticipate future market/customer demands and create change in advance, thus attaining a superior performance (Lumpkin and Dess, 2001; Wiklund and Shepherd, 2005). A positive relationship does exist between proactiveness and sales growth (Lumpkin and Dess, 2001). Thus, hypotheses **H1a** and **H1b** are proposed.

H1a: Entrepreneurial orientation is positively related to the profitability performance of a firm.

H1b: Entrepreneurial orientation is positively related to the growth performance of a firm.

This study shall distinguish between growth performance and profitability performance (Covin and Slevin, 1991). Rauch *et al*. (2009) pointed out that growth performance and profitability performance are strongly correlated.

Combs, Crook, and Shook (2005) empirically showed that sales growth and market share are significantly and positively related to certain accounting profit indicators (*e.g.*, return on assets (ROA) and return on investment (ROI)). Additionally, the ultimate purpose of growth performance is to increase profitability performance. Accordingly, hypothesis **H2** is proposed.

H2: Growth performance is positively related to the profitability performance of a firm.

2.2 Entrepreneurial orientation, differentiation strategy, and firm performance.

Porter's (1980) business strategy framework, including cost leadership strategy and differentiation strategy, has been widely used in the strategic management literature. Many studies have pointed out that adopting a differentiation or cost leadership strategy can improve firm performance (*e.g.*, Miller and Friesen, 1986; Slater and Olson, 2006). Miller (1986, 1988) further identified two differentiation strategy types - innovative differentiation and marketing differentiation - to expand on Porter's framework.

Based on studies by Miller (1986, 1988), the concept of differentiation strategy in this present study comprises marketing differentiation and innovative differentiation, which are explained in detail as follows. First, innovative differentiation features pioneering firms (Miller, 1992). These firms generally use an innovative differentiation to attract customers and thereby achieve and maintain competitive advantage (Dess, Lumpkin, and Covin, 1997; Durand and Coeurderoy, 2001). Durand and Coeurderoy (2001) argued that innovative differentiation implies the inimitability of a firm's products and processes and its capability to differentiate itself through its main technologies. Dess, Lumpkin, and Covin (1997) asserted that innovative differentiation is characterized by creativity in product development, the original application of new technology, and up-to-date innovation. Second, in terms of marketing differentiation, Durand and Coeurderoy (2001) proposed that marketing differentiation refers to the propensity of a firm to develop originality, quality, and innovation in its product policy, flexibility in providing differentiated products that meet customer demands, and the influence of the firm's supply on customer sales. Durand and Coeurderoy (2001) presented that firms that implement a marketing

differentiation use marketing capabilities, marketing strategies, and additional innovative features to differentiate their products in an attempt to earn customer loyalty and develop competitive advantage. Dess, Lumpkin, and Covin (1997) suggested that marketing differentiation is characterized by extensive marketing campaigns, intensive marketing campaigns (*e.g.*, offering attractive product features, convenience, and service guarantees), and image management.

Covin and Slevin (1991) asserted that entrepreneurial orientation affects business-level strategies, which are the mechanisms that allow entrepreneurial firms to develop market potential. Covin and Slevin (1991) further pointed out that firms with a strong entrepreneurial orientation tend to adopt some specific strategy-related priorities, such as predicting industry and market trends, marketing efforts, product quality, product pricing, and valuing technical personnel. Covin (1991) empirically examined differences in strategic patterns between entrepreneurial and conservative firms, with findings showing that high-performance entrepreneurial firms focus on a number of specific strategic variables, including advertising, product pricing, product quality, industry awareness (especially predicting future customer and industry trends), customer service and support, product warranties, innovative marketing, patents and copyrights, long-term financial orientation, and external financial support. Additionally, empirical results obtained by Knight (2000) show that entrepreneurial orientation influences a firm's tendency to implement marketing leadership strategy, quality leadership strategy, and product specialization strategy, resulting in financial performance improvement. Marketing leadership strategy strengthens marketing capabilities, quality leadership strategy is reflected in quality products that obtain customer loyalty, and product specialization strategy refers to the provision of unique and differentiated products for specified market segments. Zhou, Yim, and Tse (2005) showed that specific entrepreneurial orientation characteristics can influence a firm's use of technology-breakthrough and market-breakthrough innovations. In sum, these studies present that firms driven by entrepreneurial orientation typically adopt a number of specific strategies to expand their market share and improve their performance.

Comparing the innovative differentiation, as outlined by Durand and Coeurderoy (2001) and Dess, Lumpkin, and Covin (1997), with the content of

the business strategies preferred by entrepreneurial orientation firms (*e.g.*, a focus on predicting industrial trends, technological development, patent/copyright (Covin and Slevin, 1991; Covin, 1991), technology breakthrough (Zhou, Yim, and Tse, 2005), and product specialization (Knight, 2000) reveals that the business strategies preferred by entrepreneurial orientation firms do in fact resemble the innovation differentiation described by Durand and Coeurderoy (2001) and Dess, Lumpkin, and Covin (1997). Accordingly, entrepreneurial orientation firms tend to adopt an innovation differentiation to improve their firm performance. Furthermore, comparing the marketing differentiation, as outlined by Durand and Coeurderoy (2001) and Dess, Lumpkin, and Covin (1997), with the content of the business strategies preferred by entrepreneurial orientation firms (*e.g.*, a focus on marketing, product quality, product warranty/service, advertising, innovative marketing, and product differentiation (Covin and Slevin, 1991; Covin, 1991; Zhou, Yim, and Tse, 2005; Knight, 2000)) indicates that the business strategies preferred by entrepreneurial orientation firms are similar to those strategies that feature in the marketing differentiation as described by Durand and Coeurderoy (2001) and Dess, Lumpkin, and Covin (1997). This reveals that entrepreneurial orientation firms generally apply a marketing differentiation to improve their firm performance. Overall, differentiation strategies, including marketing differentiation and innovative differentiation, fit well into the entrepreneurial orientation context - that is, entrepreneurial firms endeavor to implement differentiation strategies to improve firm performance. Thus, hypotheses **H3a** and **H3b** are proposed.

H3a: Differentiation strategy mediates the relationship between entrepreneurial orientation and the profitability performance of a firm.

H3b: Differentiation strategy mediates the relationship between entrepreneurial orientation and the growth performance of a firm.

2.3 Entrepreneurial orientation, learning orientation, and firm performance

Sinkula, Baker, and Noordewier (1997) conceptualized learning orientation as a set of organizational values that influence a firm's ability and tendency to create, disseminate, and use knowledge. Important organizational values that are associated with organizational learning capabilities include commitment to

learning, open-mindedness, and shared vision. These values have been described as the three salient dimensions of learning orientation (Sinkula, Baker, and Noordewier, 1997; Baker and Sinkula, 1999). Commitment to learning refers to the value that a firm places on learning, requiring a firm to regard learning activities as an axiomatic value (Sinkula, Baker, and Noordewier, 1997). Baker and Sinkula (1999) further pointed out that commitment to learning is related to the development of thinking and reasoning abilities; when firms value understanding the causes and effects of different actions, they are able to constantly monitor and revise any theory in use. Open-mindedness can be linked to the notion of "unlearning," referring to the extent to which a firm proactively questions long-held practices, assumptions, and beliefs (Baker and Sinkula, 1999). "Unlearning" is at the core of organizational change, while open-mindedness is an organizational value that influences an organization's mental model and helps it unlearn obsolete perspectives and systems (Sinkula, Baker, and Noordewier, 1997). Similar to the concept of "goal convergence," shared vision is an organizational value that influences the extent to which a firm develops and holds a common goal (Baker and Sinkula, 1999). Therefore, the critical aspect of shared vision is that it is universally known and understood in a manner that provides the organization's members with a sense of common purpose and direction (Baker and Sinkula, 1999), as well as organizational expectations and anticipated outcomes (Sinkula, Baker, and Noordewier, 1997).

In summary, Sinkula, Baker, and Noordewier (1997) did not propose learning orientation as the organizational learning model; instead, they proposed that learning orientation is a set of core values associated with learning. The quality and efficiency of organizational learning are a function of these core values (Wang 2009). Based on these learning orientation values, some studies argued that learning orientation influences the degree to which firms are likely to promote high-order learning (*i.e.*, double loop and generative learning) (Baker and Sinkula, 1999; Calantone, Cavusgil, and Zhao, 2002; Liu, Luo, and Shi, 2002). High-order learning reflects a firm's overall organizational capacity to implement change by unlearning obsolete perspectives, systems, and norms and proactively replacing them with new methods that ensure sustainable competitive advantage and superior long-term performance (Baker and Sinkula, 1999; Calantone, Cavusgil, and Zhao, 2002).

Harrison and Leitch (2005) argued that entrepreneurship is a learning process. Slater and Narver (1995) indicated that entrepreneurial cultures are generally characterized by such traits as tolerance for risk, proactiveness, and receptivity to innovation. These traits allow organizations to acquire knowledge from exploration and challenge existing practices, thereby creating generative learning. In a firm that has a tendency to take risks and innovate, managers typically encourage new ways of thinking, tolerate mistakes, and reward new ideas that foster innovation or improvement (Miller and Friesen, 1983). Individuals in environments characterized by an entrepreneurial culture and structure are motivated to learn (Harrison and Leitch, 2005) and are often highly committed to learning. Such environments can also foster open-mindedness, because individuals are encouraged to "think outside the box" (Baker and Sinkula, 1999) and are unconcerned with punishment for making mistakes.

Creating an entrepreneurial performance effect involves linking organizational learning efforts (*e.g.*, acquisition, shared understanding, and the use of information) with achieving common organizational goals (Slater and Narver, 1995). Therefore, to direct individuals toward common organizational goals, an entrepreneurial vision must be communicated to each organizational level. Although entrepreneurial challenges encourage people to pursue a vision (Harrison and Leitch, 2005), when firms reach a certain size and have a very comprehensive management system, developing a common entrepreneurial vision is often challenging (Harrison and Leitch, 2005). A firm's emphasis on risk-taking and innovation can help eliminate the adverse effects of authoritarian structures and organizational hierarchies and promote communication within an organization, thereby aiding the development of a shared vision (Wang, 2009). Commitment to learning and open-mindedness increase learning intensity and learning scope (Sinkula, Baker, and Noordewier, 1997), while shared vision emphasizes the common direction of learning, thus favoring the attainment of the convergent effect of learning (Sinkula, Baker, and Noordewier, 1997; Wang, 2009).

In conclusion, as a firm's degree of entrepreneurial orientation increases, the degree of learning orientation also increases, emphasizing the creation of core

organizational values: commitment to learning, open-mindedness, and shared vision. These organizational values positively impact the quality and efficiency of organizational learning and further promote double-loop and generative learning, thereby strengthening competitiveness and raising firm performance. Accordingly, hypothesis **H4a** and **H4b** are proposed.

H4a: Learning orientation mediates the relationship between entrepreneurial orientation and the profitability performance of a firm.

H4b: Learning orientation mediates the relationship between entrepreneurial orientation and the growth performance of a firm.

Figure 1 presents an integrated concept model.

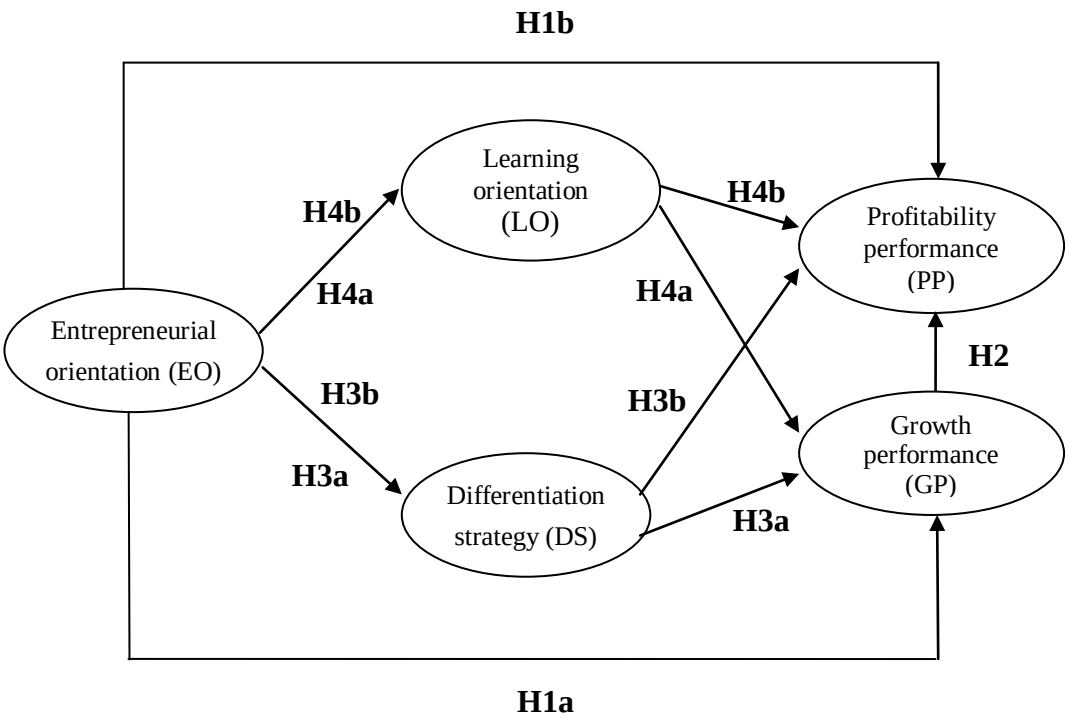

Figure 1
Conceptual model

3. Research methods

3.1 Sample

This study selected the components supply network of a vehicle manufacturer as its research subject, with data gathered by mailing out questionnaires. With the assistance of the purchasing department of this vehicle manufacturer, this study located 150 important component supply firms and a list of contacts responsible for these firms or representative high-level managers of the firms. Generally, these firms are part of the automotive component supplier network in Taiwan, not only providing components to the vehicle manufacturer in this study, but also supplying other vehicle manufacturers in Taiwan.

The selection of this vehicle manufacturer's component supplier network as the sampling population was based on three factors. First, many automotive component suppliers have been established by entrepreneurs and have operated and grown over many years, and so the entrepreneurial experience of these firms is relevant to the topic of entrepreneurial orientation. Second, questionnaires could be addressed and sent directly to the named contacts. Data gathered from questionnaires completed by these named individuals are more representative than data gathered from questionnaires where the recipient is only denoted by a firm's name rather than the personal name of a representative contact. Third, this study examined a vehicle manufacturer's component supplier network. While not necessarily applicable to supply network firms in other industries, this study's results are directly applicable to firms in the automotive component supply network. Therefore, the results can be used to identify which strategies and actions will help increase the operating performance and competitiveness of the supplier network.

The questionnaires were distributed to 150 contacts; 113 responses were returned and 8 of them were incomplete. The remaining 105 questionnaires were valid and completed for the quantitative analysis, representing a usable response rate of 70.0%. Preliminary analysis was conducted to provide basic information about the characteristics of sample firms in Table 1, including firms' operation type, firm age, amount of capital, and number of employees. According to the basic information from the respondents, 69.5% of firms are operated by the

Table 1
Characteristics of sample firms

Item		Frequency	Percentage (%)	Accumulated percentage (%)
Firm age	Less than 10 years	21	20.0	20.0
	10-30 years	44	41.9	61.9
	More than 30 years	40	38.1	100.0
Employees	Less than 100	20	19.1	19.1
	100-200	61	58.1	77.1
	More than 200	24	22.9	100.0
Firms' operating type	Operated by the founders	73	69.5	69.5
	Operated by the second generation of the founders	15	14.3	83.8
	Internal corporate venture	17	16.2	100.0
Capital (NT$)	Less than 20 million	21	20.4	20.4
	20-80 million	54	50.5	70.9
	More than 80 million	30	29.1	100.0

company founders, 14.3% are operated by the second generation of the founders, and 16.2% self-reported as being an internal corporate venture. These analytic results seem to be in accordance with the prediction that many automotive component suppliers are directly operated by entrepreneurs and that the entrepreneurial experience of these firms is relevant to entrepreneurial orientation. Given that all measures were collected from the same source, we use the Harman's one-factor test to examine the potential problem of common method variance. Common method variance is not observed, as a principal component factor analysis on the 32 questionnaire measurement items leads to eight factors explaining 75.71% of the total variance and the first factor explains 34.54% of the variance.

3.2 Dimension measures

The Milller/Covin and Slevin Scale (Rauch *et al*., 2009; Covin and Wales, 2012), the most commonly used scale, is employed to measure entrepreneurial orientation along the three dimensions of innovation, proactiveness, and risk-taking. This study uses the scale devised by Durand and Coeurderoy (2001) to measure the two dimensions of differentiation strategy, including marketing

differentiation and innovative differentiation. Based on the works of Sinkula, Baker, and Noordewier (1997) and Baker and Sinkula (1999), the three dimensions of learning orientation (*i.e.*, commitment to learning, open-mindedness, and shared vision) are measured with the scale. For each entrepreneurial orientation, differentiation strategy, and learning orientation dimension, all items are interval scale variables and are measured on a seven-point Likert scale, ranging from 1 for "strongly disagree" to 7 for "strongly agree." Each dimension and questionnaire item are shown in the Appendix.

Firm performance can be measured by means of the dimensions of growth and profitability performance (Covin and Slevin, 1991). In addition, based on methods used in much of the entrepreneurial orientation literature, subjective measures of performance in comparison with competitors have also been made (Dess, Lumpkin, and Covin, 1997; Covin, Green, and Slevin, 2006; Wang, 2008). Therefore, the respondents evaluated their firms' performance on each indicator over the previous three years in comparison to that of their competitors. Although this is a subjective measure, research has shown that subjective measures can capture objective measures (Dess, Lumpkin, and Covin, 1997). Indicators of growth performance include rate of sales growth and market share (Lumpkin and Dess, 1996; Keh, Nguyen, and Ng, 2007), while profitability indicators include operating profit margin, ROA, and ROI (Dess, Lumpkin, and Covin, 1997; Lumpkin and Dess, 2001; Wang, 2008; Rauch *et al*., 2009). All responses to items are measured on a seven-point Likert scale, ranging from 1 for "lowest level of performance" to 7 for "highest level of performance." Each dimension and questionnaire item are shown in the Appendix.

3.3 Normality test

This study applies SEM analysis to test the model's fit and each estimated parameter by using AMOS software. The estimation method is selected based on data distribution. When the data show a multivariate normal distribution, the maximum likelihood method is applied. Multivariate normality is generally tested in the literature using two steps. The first step involves testing the univariate normality for each observed variable. If a variable's absolute value of skewness and kurtosis is < 2, then the data distribution of this observed variable

is normal (Bollen and Long, 1993). The second step involves testing for multivariate normality of the combined set of observed variables using Mardia's coefficient of multivariate kurtosis. According to the example provided in Mardia's study (1970), when the critical ratio of Mardia's coefficient is < 1.96, the sample data are considered to have multivariate normality. However, setting the critical ratio at 1.96 as a criterion to test multivariate normality seems both unnecessarily strict and difficult to attain when applying SEM analysis. Therefore, based on the robustness of the maximum likelihood method, Byrne (2001) and Newsom (2005) suggested that variable data could be regarded as having multivariate normality when Mardia's coefficient is < 30. In the measurement model, the absolute value of skewness and kurtosis of each observed variable is < 2, indicating that the data have a univariate normal distribution. Furthermore, Mardia's coefficient of the combined set of observed variables in the sample data is 26.37, which is < 30, complying with Byrne (2001) and Newsom's (2005) view of multivariate normality. Accordingly, the measurement variable data used in this study could be regarded as having multivariate normality and is therefore suitable for application of the maximum likelihood method in SEM analysis.

3.4 Assessment of the fit of the measurement model

This study applies confirmatory factor analysis (CFA) to measure various indices of the measurement model fit. These fit indices include the chi-square probability level (p value), normed chi-square (χ^2/df), goodness of fit index (GFI), normed fit index (NFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). The following normal academic guidelines for these model fit indices are used: $p > 0.05$; $\chi^2/df < 3$; GFI, NFI, and CFI > 0.9; RMSEA< 0.08 (Hair *et al*., 1998).

The fit indices of the measurement model for the three dimensions of entrepreneurial orientation exhibit a good fit for the data: $\chi^2(24)= 35.124$, $p= 0.067$, $\chi^2/ df= 1.463$, GFI= 0.939, NFI= 0.915, CFI= 0.970, and RMSEA= 0.067. The measurement model for the two dimensions of differentiation strategy result in a good fit: $\chi^2(8)= 14.087$, $p= 0.08$, $df/\chi^2= 1.761$, GFI= 0.955, NFI= 0.958, CFI= 0.981, and RMSEA= 0.081. For the three dimensions of learning orientation, the model fit indices indicate an adequate fit:

$\chi^2(51)= 60.169$, $p= 0.178$, $\chi^2/df= 1.180$, GFI= 0.914, NFI= 0.938, CFI= 0.990, and RMSEA= 0.042. For the growth and profitability dimensions of firm performance, the model fit indices show a good fit: $\chi^2(4)= 6.844$, $p= 0.144$, $\chi^2/df= 1.711$, GFI= 0.975, NFI= 0.987, CFI= 0.994, and RMSEA= 0.083.

3.5 Analysis of scale reliability and validity

The reliability of each dimension is estimated using Cronbach's alpha (α) and composite reliability. Both α and composite reliability should exceed the recommended level of 0.6 (Bagozzi and Yi, 1988). The α and composite reliability values for entrepreneurial orientation, learning orientation, differentiation strategy, and firm performance dimensions are greater than 0.7, indicating that all assessed reliability indicators are above the acceptance level (Table 2).

According to Anderson and Gerbing (1988), convergent validity of the measurement model can be assessed by examining whether standardized path coefficients from each dimension to its corresponding items reach significance on the t-value test, indicating whether these items converge on the respective dimension to be measured. Additionally, Bagozzi and Yi (1988) suggested that the average variance extracted (AVE) for each measured dimension should be at least 0.5 for good convergent validity. Analytical results show that the standardized factor loadings of corresponding items for each dimension are statistically significant (t-value > 2.0) and that the AVE of each dimension is > 0.5 (Table 2). Thus, all measured dimensions exhibit convergent validity. Discriminant validity is assessed by comparing the AVE of each dimension with shared variances of this dimension with any other dimension of study constructs (Fornell and Larcker 1981). All AVEs are higher than all shared variances, indicating that all dimensions exhibit discriminant validity (Table 2).

4. Data analysis and results

4.1 SEM analysis and result

The SEM analysis of the conceptual model (Figure 1) results in the following indices of model fit: $\chi^2(56)= 69.565$, $p= 0.105$, $\chi^2/df = 1.242$,

Table 2
Descriptive statistics, correlation coefficient, reliabilities, and validities (n= 105)

Construct	Dimension	IN	PR	RIS	SV	OM	CL	ID	MD	GP	PP
Entrepreneurial orientation (EO)	Innovativeness	1.00	.413‡	.102	.111	.075	.125	.151	.161	.053	.071
	Proactiveness	.643†	1.00	.146	.332	.205	.215	.169	.261	.079	.073
	Risk-taking	.319	.382	1.00	.165	.105	.099	.066	.067	.000	.018
Learning orientation (LO)	Shared vision	.333	.576	.406	1.00	.400	.515	.089	.125	.036	.158
	Open-mindedness	.273	.453	.323	.632	1.00	.435	.024	.102	.005	.069
	Commitment to learning	.353	.464	.314	.718	.659	1.00	.049	.129	.017	.139
Differentiation strategy (DS)	Innovative differentiation	.389	.411	.257	.299	.155	.221	1.00	.243	.180	.040
	Marketing differentiation	.401	.511	.259	.354	.319	.359	.493	1.00	.087	.035
Firm performance	Growth performance	.230	.281	.000	.189	.074	.129	.425	.296	1.00	.284
	Profitability performance	.266	.271	.134	.397	.263	.373	.201	.188	.533	1.00
	Mean	5.244	5.216	4.31	5.500	5.321	5.567	4.762	5.310	4.310	4.432
	Standard deviation	1.002	0.942	0.836	0.933	0.992	0.889	0.984	0.882	1.302	0.984
	Cronbach alpha	.812	.834	.754	.902	.875	.903	.791	.884	.948	.942
	Overall Cronbach alpha		.851			.936			.842		.891
	Composite reliability (CR)	.821	.836	.755	.904	.879	.929	.795	.898	.949	.942
	AVE	.604	.630	.507	.703	.647	.713	.569	.743	.903	.845

† Correlation coefficients are reported in the lower diagonal half of the matrix. Correlations with an absolute value greater than 0.257 are significant at $p< 0.01$, those greater than 0.201 are significant at $p< 0.05$, and those greater than 0.188 are close to significance at $p< 0.10$ (two-tailed test).

‡ Shared variances are reported in the upper diagonal half of the matrix.

GFI= 0.912, NFI= 0.926, CFI= 0.984, and RMSEA= 0.048. These analytical results demonstrate a good fit between the data and the conceptual model. Furthermore, this study tests the existence of a causal path relationship between each construct. Entrepreneurial orientation, learning orientation, differentiation strategy, growth performance, and profitability performance are represented by EO, LO, DS, GP, and PP, respectively, when identifying paths in SEM analysis (Figure 2). The SEM analysis results are explained below.

(1) An analysis of the EO→PP and EO→GP paths show no significant positive relationship between entrepreneurial orientation and either growth performance or profitability performance (EO→GP: $\gamma 31= -0.142$, $p= 0.599$, n.s.; EO→PP: $\gamma 41= 0.082$, $p= 0.719$, n.s.).

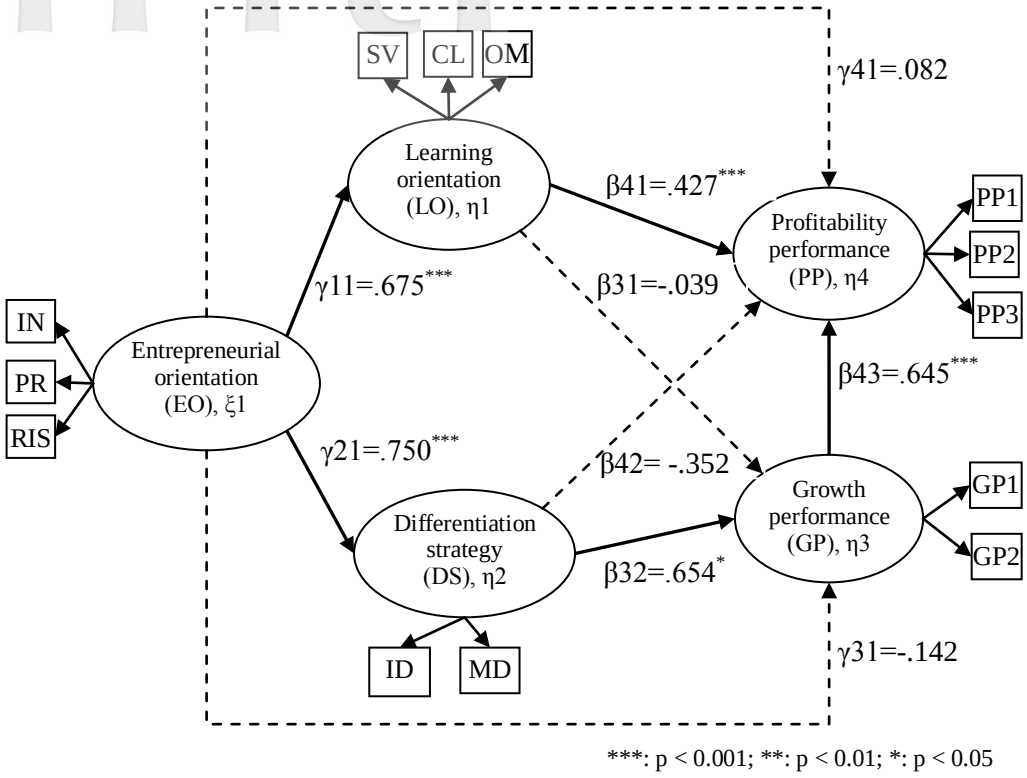

Figure 2
The results of SEM analysis of the concept model

(2) This study explores the cause-and-effect relationships associated with learning orientation. Path analysis results show a significantly positive relationship between entrepreneurial orientation and learning orientation (EO→LO: $\gamma 11 = 0.675$, $p < 0.001$) and also a significantly positive relationship between learning orientation and profitability performance (LO→PP: $\beta 41 = 0.427$, $p < 0.001$). However, learning orientation does not significantly impact growth performance (LO→GP: $\beta 31 = -0.039$, n.s.).

(3) This study investigates the cause-and-effect relationships associated with a differentiation strategy. Path analysis results show a significant positive relationship between entrepreneurial orientation and differentiation strategy (EO→DS: $\gamma 21 = 0.750$, $p < 0.001$) and also a significantly positive relationship between differentiation strategy and growth performance (DS→GP: $\beta 32 = 0.654$,

p= 0.016). However, differentiation strategy does not directly influence profitability performance (DS→PP: β42= -0.352, n.s.). Additionally, increased growth performance leads to an increase in profitability performance (GP→PP: β43= 0.645, p< 0.001); thus, hypothesis **H2** is supported. Although differentiation strategy does not affect profitability performance directly, the analysis of the DS→GP→FF path shows that this strategy can indirectly increase profitability performance via the path of increased growth performance (DS→GP: β32= 0.654, p= 0.016; GR→PP: β43= 0.645, p< 0.001).

4.2 Tests on multiple mediating effects

This study uses a bootstrapping approach, as suggested by Kristopher and Hayes (2008), to test multiple mediating effects.

(1) First, the total effect of entrepreneurial orientation on profitability performance and growth performance is found to be significant at 0.378 (p= 0.003) and 0.392 (p= 0.022), respectively. If one tests for the total effect, hypotheses **H1a** and **H1b** are supported. However, when the mediating variables of learning orientation and differentiation strategy are input into a multiple mediating model, the direct effect of entrepreneurial orientation on profitability performance weakens and is insignificant at 0.092 (p= 0.568, n.s.). The total indirect effect of the mediating variables on profitability performance is 0.286 (z-value = 2.750, Table 3), revealing the existence of a significant mediating effect on profitability performance. The relationship between the three effects is as follows: total effects (0.378) = direct effect (0.092) + total indirect effect (0.286). This shows that the effect of entrepreneurial orientation on profitability performance is partially mediated. Moreover, when the mediating variables are input into a multiple mediating model, then the direct effect of entrepreneurial orientation on growth performance weakens to almost zero, showing that the effect of entrepreneurial orientation on growth performance is almost fully mediated. Additionally, the SEM analysis results (Figure 2) show that, when the effects of mediating variables are accounted for, entrepreneurial orientation does not have a significant direct effect on either growth performance or profitability performance. However, this does not mean that no positive relationship exists between entrepreneurial orientation and firm performance, but rather gives us strong evidence that entrepreneurial orientation affects firm performance through

mediating variables.

(2) Second, this study further examines the multiple mediating effects of learning orientation and differentiation strategy on profitability performance. The specific indirect effect of learning orientation is 0.237 (z-value =2.469), and the 95% confidence intervals derived from the three bootstrapping methods do not include zero (Table 3). The test result indicates that the specific indirect effect of learning orientation is significant (Kristopher and Hayes 2008). Additionally, checking the SEM analysis result for the path EO→LO→PP (Figure 2) reveals that learning orientation has a significant mediating effect on the relationship between entrepreneurial orientation and profitability performance (EO→LO: $\gamma 11 = 0.675$, $p < 0.001$; LO→PP: $\beta 41 = 0.427$, $p < 0.001$). Therefore, hypothesis **H4a** is supported, meaning that entrepreneurial orientation has a positive influence on learning orientation, which in turn has a positive influence on profitability performance. However, the specific indirect effect of differentiation strategy on profitability performance is 0.049 (z-value= 0.636, n.s.), indicating that the mediating effect of this strategy is insignificant. Additionally, SEM analysis results for the EO→DS→PP path (Figure 2) show that differentiation strategy does not have a significant mediating effect on the relationship between entrepreneurial orientation and profitability performance (EO→DS: $\gamma 21 = 0.750$, $p < 0.001$; DS→PP: $\beta 42 = -0.352$, n.s). Thus, hypothesis **H3a** is not supported.

(3) This study next analyzes the multiple mediating effects of learning orientation and differentiation strategy on growth performance. The specific indirect effect of differentiation strategy is 0.406 (z-value= 3.248), and the 95% confidence intervals derived from the three bootstrapping methods do not include zero (Table 4). The test result suggests a significant mediating effect from this strategy. Additionally, the SEM analysis result for the EO→DS→GP path (Figure 2) also shows that differentiation strategy has a significant mediating effect on the relationship between entrepreneurial orientation and growth performance (EO→DS: $\gamma 21 = 0.750$, $p < 0.001$; DS→GP: $\beta 32 = 0.654$, $p = 0.016$). Therefore, hypothesis **H3b** is supported, meaning that entrepreneurial orientation has a positive influence on the tendency to adopt a differentiation strategy, which in turn has a positive influence on growth performance. However, the specific indirect effect of learning orientation is -0.007 (z-value= 0.064, n.s.), demonstrating that the mediating effect of learning orientation is insignificant.

Additionally, the SEM analysis results for the EO→LO→GP path (Figure 2) also show that learning orientation has an insignificant mediating effect on the relationship between entrepreneurial orientation and growth performance (EO→LO: $\gamma 11 = 0.675$, $p < 0.001$; LO→GP: $\beta 31 = -0.039$, n.s.). Thus, hypothesis **H4b** is not supported.

5. Conclusions and discussion

5.1 Results and discussion

In the constructed conceptual model of this study (Figure 1), firm performance is decomposed into growth performance and profitability performance constructs. The SEM analysis results (Figure 2) show that, driven by firm entrepreneurial orientation, learning orientation and differentiation strategy are both important mediating factors raising firm performance. On the one hand, entrepreneurial orientation positively influences learning orientation, which, in turn, has a positive effect on profitability performance, but learning orientation does not have a positive effect on growth performance. On the other hand, entrepreneurial orientation positively affects differentiation strategy, which in turn positively affects growth performance, but differentiation strategy does not positively affect profitability performance. The analysis results reveal that, in terms of the mediating effect, learning orientation and differentiation strategy can complement each other in raising firm performance, learning orientation mediates the relationship between entrepreneurial orientation and the profitability performance of a firm, and differentiation strategy mediates the relationship between entrepreneurial orientation and the growth performance of a firm.

In prior SEM studies of the entrepreneurial orientation-performance nexus, firm performance is generally viewed as a unified construct that overall includes multiple firm dimensions (*e.g.*, Keh, Nguyen, and Ng, 2007; Wang, 2008; Li, Huang, and Tsai, 2009). If the method that previous SEM studies generally adopt is followed, then both the growth performance construct and profitability performance construct in the original concept model shown in Figure 1 should be integrated into a unified firm performance construct. By adopting this unified

performance construct, the constructed conceptual model adapted from the original conceptual model can be designated as a "unified firm performance model." The SEM analysis results for the EO→DS→PP path in this "unified firm performance model" show that there is a positive relationship between entrepreneurial orientation and learning orientation (EO→LO: $\gamma 11 = 0.677$, $p<0.001$), but learning orientation does not significantly impact unified firm performance (LO→FP: $\beta 31 = 0.389$, n.s). The analysis results for the EO→DS→FP path in this model show that there is a positive relationship between entrepreneurial orientation and differentiation strategy (EO→DS: $\gamma 21 = 0.749$, $p<0.001$), but the latter does not significantly impact unified firm performance (DS→FP: $\beta 32 = 0.166$, n.s). Thus, SEM analysis results for the "unified firm performance model" cannot establish the mediating effect of learning orientation and differentiation strategy on the entrepreneurial orientation-performance relationship. Comparing the SEM analysis results of the conceptual model (Figure 2) with those of the "unified firm performance model" shows that the constructed conceptual model in this study (Figure 1 and Figure 2), which decomposes firm performance into two constructs, can generate a deeper understanding of the relationship between entrepreneurial orientation, mediating variables, and firm performance.

Since the total mediating effect of learning orientation on profitability performance is significant (Table 3), this study furthermore examines the relative indirect effect of three factors related to learning orientation - commitment to learning, open-mindedness, and shared vision - on profitability performance. The multiple mediating test results show that entrepreneurial orientation affects commitment to learning, open-mindedness, and shared vision; however, when comparing the specific indirect effects of these three factors related to learning orientation on profitability performance, the results show that the specific indirect effect of shared vision is strongest (indirect effect: 0.1736), followed by that of commitment to learning (indirect effect: 0.1236), while the specific indirect effect of open-mindedness is almost negligible (indirect effect: -0.0286). These multiple mediating test results demonstrate that entrepreneurial orientation promotes a commitment to learning and an open-minded environment within firms, thereby broadening learning scope and enhancing learning intensity (Sinkula, Baker, and Noordewier, 1997). However, to improve profitability

Table 3
The indirect effect of entrepreneurial orientation on profitability through learning orientation and differentiation strategy

	Product of coefficients			Bootstrapping, 95% confidence interval					
				Percentile		BC†		BCa†	
	Estimate	SE	Z	Upper	Lower	Upper	Lower	Upper	Lower
Learning orientation	0.237	0.096	2.469	0.462	0.054	0.475	0.058	0.463	0.054
Differentiation strategy	0.049	0.077	0.636	0.223	-0.089	0.224	-0.089	0.217	-0.094
Total	0.286	0.104	2.750	0.501	0.078	0.509	0.086	0.513	0.089

† BC: bias corrected; BCa: bias corrected and accelerated; 1,000 bootstrap samples.

effectively, the organizational learning process must be directed toward the achievement of common organizational goals (Slater and Narver, 1995). Therefore, a shared vision is essential to the link between entrepreneurial orientation and profitability performance.

Since the total mediating effect of differentiation strategy on growth performance is significant (Table 4), this study next examines the relative indirect effect of the two factors related to differentiation strategy (*i.e.*, innovative differentiation and marketing differentiation) on growth performance. The multiple mediating test results show that entrepreneurial orientation affects innovative differentiation and marketing differentiation. When comparing the specific indirect effects of innovative differentiation and marketing differentiation on profitability performance, however, the result shows that the specific indirect effect of innovative differentiation (indirect effect: 0.2979) is stronger than that of marketing differentiation (indirect effect: 0.1014). These multiple mediating test results demonstrate that entrepreneurial orientation affects a firm's commitment to using the strategy variables related to innovative differentiation and marketing differentiation to establish a competitive advantage, ultimately affecting the firm's long-term growth (*e.g.*, Covin and Adler, 1989; Covin, 1991; Dess, Lumpkin, and Covin, 1997; Zhou, Yim, and Tse, 2005). However, in terms of the effectiveness of raising growth performance, innovative differentiation is the most important factor for the linkage between entrepreneurial orientation and growth performance, and marketing differentiation is the second most important.

Table 4
The indirect effect of entrepreneurial orientation on growth through learning orientation and differentiation strategy

	Product of coefficients			Bootstrapping, 95% confidence interval					
				Percentile		BC		BCa	
	Estimate	SE	Z	Upper	Lower	Upper	Lower	Upper	Lower
Learning orientation	-0.007	0.109	0.064	0.239	-0.199	0.230	-0.204	0.230	-0.205
Differentiation strategy	0.406	0.125	3.248	0.499	0.098	0.566	0.136	0.552	0.134
Total	0.399	0.153	2.608	0.686	0.101	0.718	0.127	0.715	0.127

5.2 Theoretical implications

This study notes the theoretical implications and contributions to entrepreneurial orientation theory as follows.

Prior empirical research on the connection between entrepreneurial orientation and business strategy did not examine the important mediating effect of business strategy on the entrepreneurial orientation-performance relationship (*e.g.*, Dess, Lumpkin, and Covin, 1997; Knight, 2000; Zhou, Yim, and Tse, 2005, Covin, Green, and Slevin, 2006). Specifically, Dess, Lumpkin, and Covin (1997) explored the moderating effect of three business strategy variables (*i.e.*, innovative differentiation, marketing differentiation, and cost leadership) and environmental variables on the entrepreneurial orientation-performance relationship, but their study showed that the moderating effects of innovative differentiation and marketing differentiation are insignificant. However, in terms of scientific validation, if one only investigates the business strategy variables that moderate the entrepreneurial orientation-performance nexus while failing to establish whether there are any positive relationships between entrepreneurial orientation and the moderating variables (entrepreneurial orientation-business strategy) and also fails to further establish whether entrepreneurial orientation affects firm performance through strategy variables (entrepreneurial orientation-business strategy-performance), then one may misidentify the mediating effects of business strategy variables as the moderating effects, thus leading to biased conclusions. Empirical results in this study confirm the existence of the mediating effect of differentiation strategy in the relationship

between entrepreneurial orientation and growth performance, showing that entrepreneurial orientation increases growth performance through the mediating variable of differentiation strategy (*i.e.*, innovative differentiation and marketing differentiation)(Figure 3, Table 4). This research finding regarding differentiation strategy as a mediating variable in the entrepreneurial orientation-performance relationship helps fill the gap in the current literature on the connection between entrepreneurial orientation and business strategy.

If one applies the "Causal Steps Approach" to test the effect of a single mediating variable (Kristopher and Hayes, 2008), then one must examine both the direct effect and the indirect effect of the independent variable (entrepreneurial orientation) through the mediating variable (learning orientation) on the dependent variable (firm performance). Wang's (2008) research framework was used to examine only the indirect effect of entrepreneurial orientation on firm performance through learning orientation (entrepreneurial orientation-learning orientation-performance), ignoring the direct effect of entrepreneurial orientation on firm performance (entrepreneurial orientation-performance). Therefore, Wang's work does not clearly demonstrate the mediating effect of learning orientation. Consequently, this study employs rigorous analytical methods and steps to demonstrate that learning orientation has a significant mediating effect on the relationship between entrepreneurial orientation and profitability performance (Figure 3, Table 3). This research finding improves the understanding of the mechanism linking entrepreneurial orientation to firm performance via learning orientation.

Many empirical studies of entrepreneurial orientation have focused on the influence of moderating variables on the entrepreneurial orientation-performance relationship (*e.g.*, Dess, Lumpkin, and Covin, 1997; Lumpkin and Dess, 2001; Wiklund and Shepherd, 2005; Covin, Green, and Slevin, 2006; Stam and Elfring, 2008; Rauch *et al*., 2009; Covin and Wales, 2012), while few have investigated the role of a single mediating variable in the entrepreneurial orientation-performance relationship (*e.g.*, Wang, 2008; Li, Huang, and Tsai, 2009). However, Wang (2008) and Li, Huang, and Tsai (2009) adopted a single mediator model that does not account for interactions between multiple variables. By accounting for multiple dimensions of enterprise operations and the competitive environment in which firms operate, firms driven by entrepreneurial

orientation may apply many different strategies and actions to improve firm performance. Accordingly, a multiple mediating model is more appropriate than a simple mediator model for identifying variables that mediate the entrepreneurial orientation-firm performance relationship.

This study, which first adopts a multiple mediating model, finds that when the mediating variables of learning orientation and differentiation strategy are input into the model, the direct effect of entrepreneurial orientation on either profitability performance or growth performance becomes weak and insignificant, but improved profitability performance is observed through the mediating effect of learning orientation and improved growth performance through the mediating effect of differentiation strategy. This research finding reveals that the mediating role of learning orientation and the mediating role of differentiation strategy can complement each other in raising both growth performance and profitability performance. Another important finding of this study is the multiple dimensions of firm performance. The SEM analysis results show that overall firm performance must be divided into growth performance and profitability performance to gain a deep understanding of the association between entrepreneurial orientation, multiple mediating variables (learning orientation and differentiation strategy), and multiple dimensions of firm performance (growth performance and profitability performance). Lumpkin and Dess (1996) contended that firm performance has multiple dimensions. Consequently, entrepreneurial orientation may positively affect one performance dimension, yet may not positively affect another performance dimension. However, subsequent empirical SEM studies on the entrepreneurial orientation-performance relationship generally viewed firm performance as a unified construct (*e.g.*, Keh, Nguyen, and Ng 2007; Wang 2008; Li, Huang, and Tsai 2009). These studies did not explore the multiple dimensions of performance. Based on research findings using a multiple mediating model and multiple dimensions for firm performance, we assert that it is possible to launch a new direction for research that examines how entrepreneurial orientation influences multiple indices of firm performance through multiple mediating variables.

5.3 Managerial implications and recommendations

Our research shows that, driven by entrepreneurial orientation, both learning

orientation and differentiation strategy are two important mediating factors that increase firm performance. The managerial implications are that, for firms in the vehicle component supply network, two main challenges must be addressed to achieve improved firm performance from entrepreneurial efforts.

(1) For overall organization management, the three core values associated with learning orientation - commitment to learning, open-mindedness, and shared vision - must be strengthened.

Entrepreneurial orientation is notably characterized by innovativeness, proactiveness, and risk-taking, which represent firm-level entrepreneurial practices (Lumpkin and Dess, 1996), as well as the beliefs that are expressed among a firm's top-level managers (Covin, Green, and Slevin, 2006). These practices and beliefs must be instilled at each level and in each department within an organization to develop a shared vision and foster environments of commitment to learning and open-mindedness. Commitment to learning and open-mindedness increase learning intensity and scope, while shared vision helps attain the convergent effect of learning. Without a clearly shared vision, entrepreneurial resources and efforts will diverge from each other, incurring a loss of organizational focus and sense of direction.

These three values of learning orientation further promote high-order generative learning within a firm, enabling it to continuously improve and take proactive measures in response to market changes. The outcome is increased organizational efficiency and efficacy, thereby lifting profitability performance and generating competitive advantage. Additionally, from the perspective of customer expectations, the crucial competition factors in vehicle products are quality, cost, innovation, and product variety (Takeishi, 2001; Binder, Gust, and Clegg, 2008). Based on customer expectations, component suppliers must plan with vehicle manufacturers to continuously improve and change in order to increase overall competitiveness. This is therefore an important challenge for overall organizational management. Consequently, the three core values of learning orientation function as the mediating roles through which a firm's entrepreneurial orientation can enhance its profitability performance and competitiveness.

(2) For business unit management, differentiation strategies must be promoted, including innovative differentiation and marketing differentiation.

These entrepreneurial orientation practices and beliefs (*i.e.*, innovativeness, proactiveness, and risk-taking) must be instilled in each business unit in an organization to ensure that the entire business works toward a differentiation strategy. Business units that implement a differentiation strategy aim to provide differentiated products and services to customers so as to acquire customer loyalty, thereby promoting business growth and generating a competitive advantage. Particularly, the practice of innovative differentiation, which implies inimitability of a firm's products and processes and its capability to differentiate using its main technologies (Durand and Coeurderoy, 2001), is the most important factor linked to increased growth performance. Thus, we offer two practical recommendations to firms in the automotive component supply network. 1) Manufacturing capability differentiation: Manufacturing processes, production facilities, and manufacturing management require continued diligence. Enhancing these manufacturing capabilities to achieve an innovative differentiation will help manufacturers control cost and quality, as well as comply with joint production planning requests from the vehicle manufacturer, enabling reductions in inventory and shortening lead-time (Doran, 2003). Strengthening manufacturing capabilities protects the market share of a firm, by ensuring that existing production products are not replaced by those of competitors, and helps acquire new opportunities to manufacture new products, ultimately increasing sales growth. 2) Technological capability differentiation: When a vehicle manufacturer develops a new product, it must work with component suppliers for joint product development (Quesada, Syamil, and Doll, 2006; Binder, Gust, and Clegg, 2008) in order to meet high product complexity and ever-increasing customer expectations (Takeishi, 2001). Therefore, vehicle manufacturers should request that the component suppliers build up strong technological capabilities for developing new products. These technological capabilities must be strengthened continuously to deliver an innovative differentiation. Component suppliers can gain opportunities to develop new products through joint product development with the vehicle manufacturer by strengthening their technological capabilities, thereby increasing sales growth and market share.

5.4 Suggestions for future research

(1) Entrepreneurial orientation research on firms in supply networks or the B2B market is seldom addressed in the literature. This study has focused on firms in the automotive component supply network. A survey of supply network firms in different industries may obtain different results since industry type can possibly influence the entrepreneurial orientation-performance relationship (Rauch *et al*., 2009). Therefore, comparative studies of supply networks in different industries in the future would prove worthwhile in achieving generalizability of research results. Additionally, it would also be worthwhile to initiate comparative studies between firms in supply networks (*i.e.*, the B2B market) and firms in B2C market.

(2) The analysis result of this study demonstrates that the two mediating variables of learning orientation and differentiation strategy are complementary in strengthening the competitive advantage and performance of a firm. Future research can investigate some other potential mediating variables. Based on the resource-based approach (Barney, 1991), some empirical works reveal that internal strategic resources are the key to a firm's competitive advantage, thereby determining firm performance (*e.g.*, Han, Chao, and Chuang, 2012; Shyu, 2014). Internal strategic resources may thus be the promising variables that affect the entrepreneurial orientation-firm performance nexus and worth further investigating. In addition, according to research findings of Chen, Chu and Huang (2012), the business model adopted by a firm can influence performance during its innovation process. Therefore, we suggest that the business model could be a potential variable that affects the entrepreneurial orientation-performance relationship. Furthermore, integrating research results for mediating variables with previous findings for moderating variables may produce a model that combines moderating and mediating variables. This combined approach may help in the development of a more comprehensive theoretical entrepreneurial orientation model.

(3) Based on the discovery of multiple dimensions of a firm's financial performance (in terms of profitability and growth performance), future research can enter financial and non-financial dimensions of performance into the model in order to understand the relationships among entrepreneurial orientation,

mediating variables, financial performance, and non-financial performance. Specifically, Chang and Fu (2011) pointed out that financial performance measures generally reflect past performance and cannot completely reflect the expected future consequences of current actions in a timely manner, while non-financial performance measures can provide information about management actions that lead to future long-term performance. Therefore, non-financial performance measures may be regarded as the leading indicators of future financial performance. Some variables measuring non-financial performance - such as overall firm performance measured against firm goals and objectives (Lumpkin and Dess, 1996), customer satisfaction and speed in developing new products (Stam and Elfring, 2008), product quality, innovation productivity and operation efficiency (Chang and Fu, 2011), reputation, product competitiveness, and customer loyalty (Han, Chao, and Chuang, 2012), and enhanced opportunities that are especially important for service firms (Yang, Wang, and Ruan, 2013) - are possible performance measures that can be examined.

Appendix
Dimension and measurement items

Construct	Dimension		Item (code and statement)
Entrepreneurial orientation (EO)	Innovativeness (IN)	IN1	Our firm introduced many new lines of products or services in the past 3 years.
		IN2	Changes in product or service lines in our firm have usually been quite dramatic.
		IN3	In our firm, there exists a very strong emphasis on R&D, technological leadership, and innovations.
	Proactiveness (PR)	PR1	In dealing with competitors, our firm usually initiates actions that competitors then respond to.
		PR2	In general, the top managers of our firm have a strong tendency to be ahead of others in introducing novel ideas or products.
		PR3	In dealing with competitors, our firm is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.
	Risk-taking (RIS)	RIS1	When confronted with decisions involving uncertainty, our firm typically adopts a bold posture in order to maximize the probability of exploiting opportunities.
		RIS2	The top managers of our firm believe that, owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives.
		RIS3	Our firm usually has a strong proclivity for supporting high-risk projects (with chances of very high returns).
Learning orientation (LO)	Shared vision (SV)	SV1	There is a total agreement on our unit vision across all levels, functions, and divisions.
		SV2	Employees view themselves as partners in charting the direction of the organization.
		SV3	All employees are committed to the goals of the organization.
		SV4	Top leadership believes in sharing its vision for the organization with the lower levels.
	Open-mindedness (OM)	OM1	Managers encourage employees to "think outside of the box."
		OM2	Our organization places a high value on open-mindedness.
		OM3	An emphasis on constant innovation is not a part of our corporate culture. †
		OM4	Managers in our organization do not want their "view of the world" to be questioned. †
	Commitment to learning (CL)	CL1	Managers basically agree that our organization's ability to learn is the key to our competitive advantage.
		CL2	The basic values of the organization include learning as the key to improvement.
		CL3	The sense around here is that employee learning is an investment, not an expense.
		CL4	Learning in our organization is seen as a key commodity necessary to guarantee organizational survival.

Dimension and measurement items (continued)

Construct	Dimension		Item (code and statement)
Differentiation strategy (DS)	Innovative differentiation (ID)	ID1	It is difficult for competitors to imitate our firm's manufacturing processes.
		ID2	In comparison to our main competitors, our firm can easily develop differentiation using our own technologies.
		ID3	It is difficult for competitors to imitate our firm's products.
	Marketing differentiation (MD)	MD1	Our firm's products (services) are important for our customers' differentiation. strategy.
		MD2	Differentiation is important in our customers' decision making.
		MD3	Our firm's product policy emphasizes (1) originality, (2) quality, and (3) innovation.
Firm performance (FP)	Growth performance (GP)	GP1	Our firm's market share.
		GP2	Our firm's sales growth.
	Profitability performance (PP)	PP1	Our firm's operating profit margin.
		PP2	Our firm's return on assets.
		PP3	Our firm's return on investment.

† Reverse coded items.

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