

The variable effects of dynamic capability by firm size: the interaction of innovation and marketing capabilities in competitive industries

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Abstract Although investments in marketing and innovation capabilities theoretically help firms to compete in dynamic markets and enhance performance, company size has a strong influence on whether this is the case. In a test of a proposed conceptual model, this study of 692 small, medium, and large enterprises found that large firms prospered from building dynamic capabilities under conditions of high industry competitiveness, while investments in innovation and marketing individually diminished small firms' performance. The effect was mixed for medium-size firms. In small enterprises, however, dynamic capability proved to be crucial in order to withstand competition. Therefore, taking into account these firms' limited resources, managerial efforts should be focused on the integration of marketing and innovation capabilities, because each capability alone does not have a significant positive impact on performance. In medium-sized enterprises, the support of marketing capability is required to raise profitability under conditions of high industry competitiveness; otherwise, innovation would not lead to actual profits. For large enterprises, industry competitiveness was found to be a less serious threat to performance, and instead is a catalyst to the development of capabilities, suggesting that managers of such firms should focus on building long-term strategic advantages.

Keywords Dynamic capability · Innovation capability · Marketing capability · Firm size · Resource-advantage theory · Industry competitiveness

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Introduction

Studies of the contribution of organizational capabilities (Slater et al. 2006) to firm performance (Morgan et al. 2009) suggest that a firm's ability to deploy resources through its organizational capabilities may be more important than the amount of resources itself in driving performance (Vorhies et al. 2009). Studies in this area also have enhanced the understanding of how some firms with high-level capabilities overcome resources deficiencies and perform better than those with similar resources (DeSarbo et al. 2007; Krasnikov and Jayachandran 2008; Morgan et al. 2009). Ketchen et al. (2007) argued that resources only have value when firms develop capabilities to use these resources for superior firm performance. However, the resource-based view has not fully discovered what kinds of actions are critical and how they create the value of the resources that are available (Ngo and O'Cass 2012).

In order to address this gap, we examined the integration of innovation and marketing capabilities by looking at the direct effects of each capability alone on performance. Interaction between capabilities (i.e., capability-capability interaction) is known as a dynamic capability (Teece and Pisano 1994), and the allocation of resources related to such essential firm functions as innovation and marketing plays a key role in the implementation of strategy (Christensen and Bower 1996). Since the competitive environment is in continual flux, the ability of firms to integrate, build, and reconfigure their abilities can help build a strong foundation for the development of dynamic capabilities (Teece et al. 1997). However, investing resources solely in innovation may lead to the capability-rigidity paradox, when the development of an existing product innovation capability prevents the exploration of new ones (Atuahene-Gima 2005). We argue that the complementary effect of innovation and marketing is synergistic, and thus will have stronger impact on firm performance than the direct effect of each capability alone.

Although integration of firm resources and capabilities has long been recognized as beneficial to a firm's competitiveness, it is still unclear how this type of synergy actually affects profitability. Moreover, such interactions tend to have ambiguous effects on firm performance due to different environmental variables, such as industry turbulence (Song et al. 2005; Pavlou and El Sawy 2011) or market orientation (Ngo and O'Cass 2012; Bettiol et al. 2012). In addition, the separate effects of innovation and marketing capabilities have been shown to have different outcomes due to competitive pressure (Ahn 2002; Cetindamar et al. 2009; Helfat 2007). Therefore, the most important issue is that firms upgrade and reconstruct their core capabilities in response to their environments (Wang and Ahmed 2007; Audia et al. 2000), especially in today's economy, when managers face challenges associated with frequent major and discrete environmental shifts in competitive, technological, social, and regulatory domains (Barreto 2010). Firms also must respond to the diminishing lifespan of competitive advantages (Wiggins and Ruefli 2005). Resource allocation to the development of sustainable competitive advantages in such "hypercompetitive environments" (Wiggins and Ruefli) is a serious issue for firms of different size.

Because they are likely to be important for the development of both competitive advantage and superior performance (Ngo and O'Cass 2012), this study of capability-capability interactions follows those of Menguc and Auh (2006), Moorman and Slotegraaf (1999), Morgan et al. (2009), and Song et al. (2005). We also fill a gap in

the literature by explicitly investigating the relation between the type of firm and the development of dynamic capabilities. Although it was originally stated that dynamic capabilities are particularly relevant to multinational enterprises operating in global markets (Teece 2007), we have seen no evidence on whether firm size influences the likelihood that a firm will benefit from dynamic capabilities (Barreto 2010). Therefore, the current work also investigates the significance of dynamic capabilities among small, medium, and large enterprises, and the impact of those capabilities on firm performance.

Given the limited amount of resources available for investment in innovation and marketing, the development of these two capabilities requires careful managerial consideration in order to allocate resources in a way that is most beneficial for the firm. The challenge is thus how to invest resources to create more value and obtain sustainable competitive advantages in a competitive market. In summary, this research aims to contribute to the literature in the following three ways: (i) in addition to the direct effect of internal (i.e., innovation) and external (i.e., marketing) capabilities, we examine the interaction effects of both on performance; (ii) this study also considers how industry competitiveness shapes the market and moderates the capabilities-performance relationship for different size firms; (iii) finally, it examines how firms of different sizes develop organizational capabilities and deal with competition.

Literature review

Theoretical background

In our conceptual framework, the relationships among capabilities and performance under conditions of high industry competitiveness are drawn from the resource-advantage (R-A) theory and dynamic capabilities perspectives. Connecting the R-A and dynamic capabilities theories explains the nature of resources in firms of different size, and how these resources can be utilized under competitive pressure. At the same time, dynamic capability theory clarifies how firms compete based on their resource base and build organizational capabilities out of existing resources.

Innovation is viewed as a firm's capacity to find and create new resources and produce products and services that are superior to those offered by competitors (Hunt and Morgan 1995), while marketing is seen as a firm's capacity to assemble and apply all its consumer-facing resources in a way that improves performance. Therefore, innovation, marketing, and the interaction of both, can be considered as organizational capabilities, because they represent the act of deploying resources with a new ability to create value (Day 1994; Yang et al. 2009).

Linking the theories of R-A and dynamic capabilities can enhance our understanding of the conceptual framework presented in this work, because: (i) it explains the sources of enterprise-level competitive advantage over time (Teece 2007), represented by innovation, marketing, and dynamic capabilities; (ii) it considers the adaptation, integration, and reconfiguration of internal and external organizational skills, resources, and functional competencies towards a changing environment (Teece 2007; Teece et al. 1997), thus explaining the integration of firm resources and capabilities, which leads to the development of dynamic capabilities; and (iii) it considers not merely technological

innovation, but rather the capability to generate new products, services, or processes that can be used to enhance long-term performance (Rush et al. 2007; Cáceres et al. 2011), and thus considers the multidimensional nature of innovation.

Innovation capability and firm performance

According to R-A theory, the search for competitive advantages will motivate firms to use their existing resources more efficiently, as well as to create or obtain new resources. Innovation capability contributes to firm's ability to find and create these new resources, and to efficiently produce products and services that are superior to those offered by competitors. While innovation should have a positive effect on performance, the magnitude of this effect may vary. Major innovations in processes and products, for example, should provide the innovator with significant competitive advantages that can often be sustained for a long period, while small innovations would have a cumulative effect on resource advantage (Hunt and Morgan 1995).

From a dynamic capability perspective, innovation enables firms to deploy existing capabilities and create new ones in a more effective manner, both of which support long-run performance (Teece 2007). Greater innovation capabilities result in higher innovative outputs and lead to higher sales growth (Yuming and Desheng 2010), and firms with strong innovation capabilities are more likely to expand, modify, and innovate their products or services than those without such capability. Innovations in this regard can involve operations or products. By modifying production and operations, a firm can increase its efficiency, by expanding the features of the products or services it offers, a firm can increase demand among existing customers, and by introducing new offerings, a firm can attract new customers (Fosfuri and Giarratana 2009).

Overall, innovation has been shown to be a critical determinant of performance, because it enables firms to achieve a competitive edge and respond to rapidly changing markets (Helfat and Peteraf 2003; Hult et al. 2004; Teece 2007; Yuming and Desheng 2010). Based on this, the first hypothesis is as follows:

H1 Innovation capability is positively related to firm performance.

Marketing capability and firm performance

Marketing capability reflects a firm's ability to increase the value of its products and services, and differentiate them from those of its competitors. Marketing activities and new branding campaigns may attract new customers or poach them from competitors, and studies have found that advertising has a positive impact on a firm's market value (Fosfuri and Giarratana 2009; Nath et al. 2010).

In that regard, many empirical studies have shown that advertising investments are positively associated with various indicators of firm performance, such as market value, cash flow, financial performance, market share, and profits (Chauvin and Hirschey 1993; Joshi and Hanssens 2006; Kotabe et al. 2002; Mithas et al. 2012; Szymanski et al. 1993). Marketing capability builds links between a firm and its customers, and enables the firm to compete better by predicting changes in customer preferences (Day 1994). Investments in advertising and promotion can also expand the demand for a

firm's products and services (Bass et al. 2010), and increase sales by expanding product categories (Kotabe et al. 2002). Based on these arguments, the second hypothesis is as follows:

H2 Marketing capability is positively related to firm performance.

Dynamic capability and firm performance

As we discussed above, the literature suggests that a strong innovation capability, as reflected in intensive R&D activities, generally has positive effects on firm performance by improving efficiency and lowering production costs (Gu and Tang 2004; Kotabe et al. 2002). Efficient firms are in a better position to support their marketing activities by providing more valuable, high quality products. In addition, firms with high innovation capability are able to introduce more product modifications or create new products (Fosfuri and Giarratana 2009; Kotabe et al. 2002). In this way, innovation capability can strengthen a firm's marketing capability by increasing the value of the products and services offered, as well as introducing these to the market in a more effective manner.

The literature also suggests that marketing capabilities may influence a firm's innovation intensity and sustained competitive. While not every innovation can be monetized and bring real returns on investments, the support provided by marketing capabilities can contribute to the commercial success of new products and services (Day 1994; O'Driscoll et al. 2000; Ruiz-Ortega and García-Villaverde 2008; Weerawardena 2003). Strong marketing capabilities can also be used to build a brand out of innovative offerings, and open the way to premium pricing, thus increasing both sales and profits (Fosfuri and Giarratana 2009; Kotabe et al. 2002; Srinivasan et al. 2009). Therefore, marketing capability can strengthen innovation capability by commercializing innovations, thereby increasing sales. Practically speaking, firms can use their innovation capabilities to better utilize their internal resources and their marketing capabilities to take advantage of opportunities in the market. Given that the interaction of these capabilities can be complementary, the third hypothesis is as follows:

H3 Dynamic capability is positively related to firm performance.

Industry Competitiveness as a Moderator

At higher levels of concentration, the structure of an industry theoretically approaches that of an oligopoly, where relatively few competitors each control a large portion of overall market share (Scherer and Ross 1990). Under such conditions of high concentration, competition tends to be more stable and predictable, because the large scale and relative balance of the existing firms discourages competitive disruption (Miller and Chen 1996). On the other hand, when there is low concentration an industry is more similar to a fragmented market with perfect competition. In this situation, the existence of many smaller firms will make conditions more competitive (Palmer and Wiseman 1999).

With a high level of industry competitiveness, incumbent firms will face many new entrants that will drive changes in the market and create new challenges for innovation

and diversification (Cetindamar et al. 2009). In this scenario, it is expected that firms in such competitive industries would face great pressure to innovate and improve their capabilities simply to survive (Ahn 2002). At the same time, this situation also requires significant resource expenditures in order to build capabilities, gain competitive advantages, and maintain performance (Aghion et al. 1999; Helfat 2007; Hunt and Morgan 1996).

To sustain competitive advantage in competitive markets, a firm needs to invest in the development of innovation capabilities, marketing capabilities, and the related dynamic capability. This implies that in a highly competitive industry, the development of a firm's marketing, innovation, and dynamic capabilities could decrease, thus leading to worse performance (decreasing profits). Based on this, we present the following hypotheses:

H4 High industry competitiveness has a negative moderating effect on the relationship between innovation capability and firm performance.

H5 High industry competitiveness has a negative moderating effect on the relationship between marketing capability and firm performance.

H6 High industry competitiveness has a negative moderating effect on the relationship between dynamic capability and firm performance.

The conceptual model representing the hypothesized relationships is depicted in Fig. 1.

The impact of firm size

The connection between firm size and innovation is far from settled. Some researchers (Ettlie 1983; Freel 2000; Praveen et al. 1993) have suggested that smaller firms are more innovative, while others (Barreyre 1978; Bourgeois 1980) have argued that innovation is more likely to be associated with large firms. Although Morgan et al.

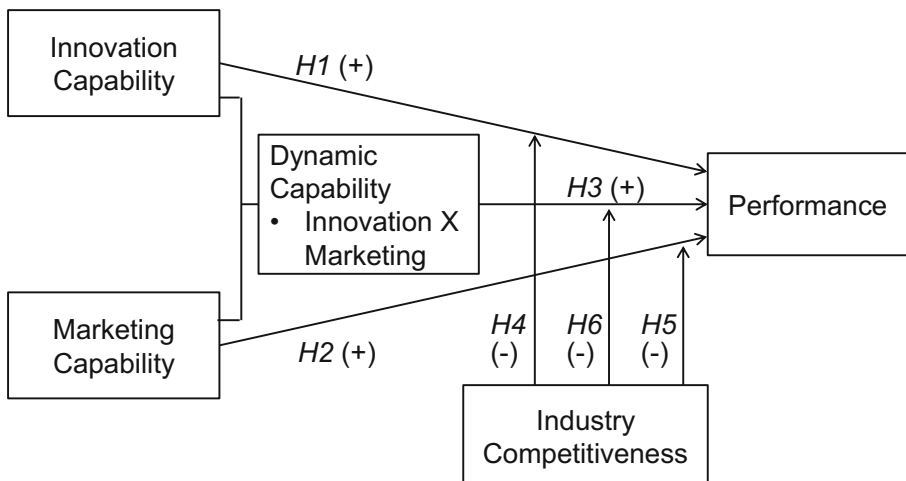


Fig. 1 Conceptual model

(2009) suggested that marketing capabilities, accompanied with market orientation, are contributing to superior firm performance, the relationship between firm size, innovation capability, and marketing capability towards firm performance remains open to investigation.

Methodology

To address these hypotheses, we conduct an empirical investigation using archival data. We drew time series data on R&D expenditures, advertising expenditures, net income, total revenue, and number of employees for the period from 2002 to 2011 for 692 firms from the Standard and Poor's Compustat database, which provides data on United States and Canadian publicly held companies. .

In order to measure innovation capability, we examined the level of resources that firms apply to support innovation activities (Muller et al. 2005; Tang and Le 2007), as measured by investment in R&D, which is the most frequently used indicator of a firm's innovation activity in the literature (Artz et al. 2010; Bobillo et al. 2006). Following previous studies, marketing capability is measured in terms of investments in advertising (Fosfuri and Giarratana 2009; Kotabe et al. 2002; McAlister et al. 2007; Srinivasan et al. 2009).

We determine industry competitiveness by measuring the industry concentration ratio as an inverse proxy (Melville et al. 2007; Porter and Sakakibara 2004). Industry concentration represents the percentage of output accounted for by the largest firms in a given industry (Botosan and Stanford 2005; DeFond and Park 1999; Engel et al. 2003; Harris 1998; Hornyk and Schwartz 2009; Verrecchia and Weber 2006). To avoid the limitation mentioned in Ali et al. (2009) with regard to using the Compustat database to calculate industry concentration, we drew data from the U.S. Census Bureau, utilizing 50-firm industry concentration ratios calculated for five years each, for the periods 2002–2006 and 2007–2011.

Only companies that reported the required data for R&D and advertising expenses were examined in this analysis. Most of the firms did not have information of this type for ten consecutive years, and we dropped those with less than four years of available data from the analysis. We also removed firms that lacked information for any of the major research constructs. Attributes of the sample after these filtering processes are presented in Table 1.

Dependent and independent variables were standardized by the number of employees in a particular firm (Mithas et al. 2012). So, for example, the indicator for innovation capability was R&D expenses divided by the number of employees, and other variables were standardized in the same fashion. We divided the sample into small, medium, and large enterprises, according to number of employees in each firm (Elfenbein et al. 2010; Rogers 2004). Hierarchical regression analysis was conducted separately on each of the three sub-samples to determine the variation of beta coefficients across firms of different size (Rogers 2004).

Industry and revenue were included in this study as control variables. The industry dummy was specified based on the primary Standard Industry Classification code of each firm (Feeny and Rogers 2003). To control the revenue, we used the annual revenues of each firm, standardized by taking the logarithmic values (Datta et al. 2005).

Table 1 Attributes of Firms

Firm Size	Number of Employees	Number of Firms	Number of Observations
Small	≤10	602	3,779
Medium	11–100	71	626
Large	>100	19	141
Total		692	4,547

Results

Table 2 presents the results of a Pearson correlation analysis.

The results for medium and large enterprises (Figs. 3 and 4) show that firms with strong innovation capabilities have better performance. By investing in R&D to develop innovation capability these mid-size and large firms experienced enhanced performance, as measured by increasing profitability. However, small firms did not experience this effect (Fig. 2). Instead, small firms' expenditures on innovation activities have a significant and negative effect on performance.

As proposed by hypothesis 4, greater industry competitiveness decreased the performance of small and medium firms (Figs. 2 and 3). This supports the argument that low industry concentration and a large number of rivals makes competition fiercer. However, industry competitiveness appeared to have a significant and positive impact on large enterprises (Fig. 4).

The results relating to marketing capability with regard to industry competitiveness also vary according to whether an enterprise is small, medium, or large. For small enterprises, the relationship between marketing capability and performance is negative (Fig. 2), while for medium-sized enterprises (Fig. 3), investing in marketing does not have any significant impact on performance. Only in large enterprises is marketing capability associated with significantly improved firm performance (Fig. 4). The results show that greater industry competitiveness has a negative effect for the small firms, although this impact is minuscule and insignificant (Fig. 2). Unexpectedly, industry

Table 2 Pearson Correlation for Overall Sample

Variables	1	2	3	4	5	6	7	
1	Marketing Capability	1						
2	Innovation Capability	0.097**	1					
3	Dynamic Capability	0.726**	0.292**	1				
4	Competitiveness	0.200**	0.154**	0.266**	1			
5	Performance	-0.093**	-0.313**	-0.161**	-0.245**	1		
6	Industry	-0.069**	-0.063**	-0.053**	-0.068**	-0.005	1	
7	Revenue	0.002	-0.114**	-0.036*	-0.403**	0.252**	-0.192**	1

** correlation is significant at the 0.01 level (2-tailed)

* correlation is significant at the 0.05 level (2-tailed)

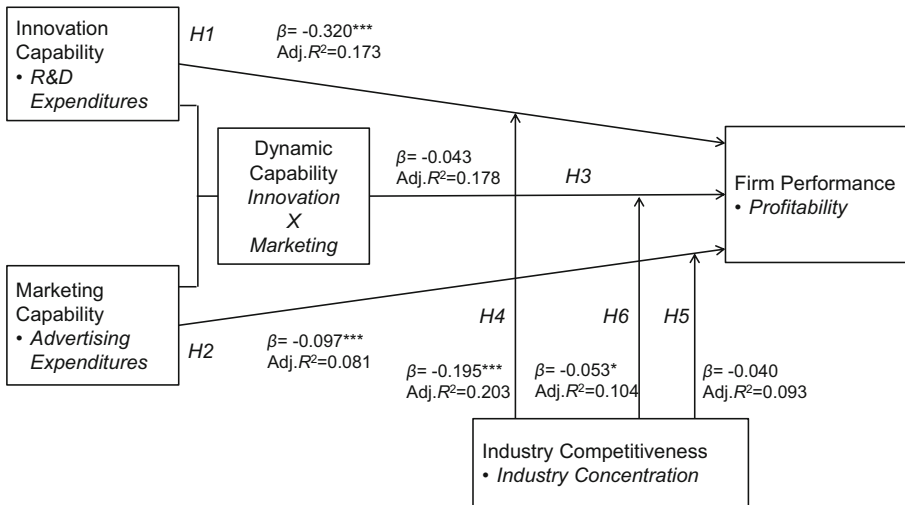


Fig. 2 Regression result for small firms. *** significant at $p < 0.001$, ** significant at $p < 0.01$, * significant at $p < 0.05$

competitiveness has a positive moderating effect on medium-sized enterprises (Fig. 3), while for large enterprises the effect is insignificant (Fig. 4).

Small firms are also left behind in terms of dynamic capability. It was expected that marketing and innovation capabilities will strengthen each other and have a synergistic effect on firms' performance. Based on the results, dynamic capability has significant effects in medium (Fig. 3) and large (Fig. 4) enterprises. In contrast, dynamic capability does not have a positive effect on the performance of small firms (Fig. 2). However, considering that, when examined separately, both innovation and marketing capability

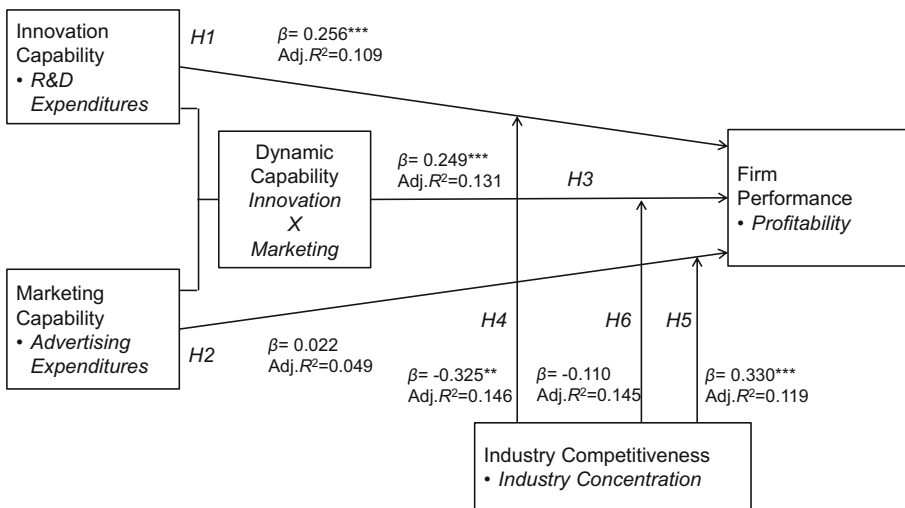


Fig. 3 Regression result for medium firms. *** significant at $p < 0.001$, ** significant at $p < 0.01$, * significant at $p < 0.05$

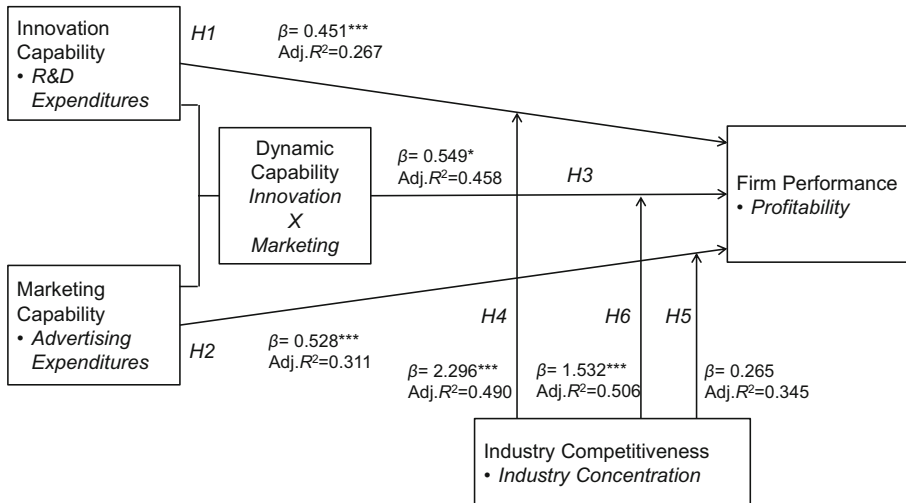


Fig. 4 Regression result for large firms. *** significant at $p < 0.001$, ** significant at $p < 0.01$, * significant at $p < 0.05$

have significantly negative impacts on firm performance, the dynamic capability has a much less negative effect.

The results show that industry competitiveness has an insignificant and negative moderating effect for medium-sized firms (Fig. 3). Industry competitiveness has a negative moderating effect in small firms (Fig. 2), while in large enterprises, industry competitiveness leads to the development of a strong dynamic capability, which then boosts firm performance. That could be why we observe a significantly positive moderating effect of industry competitiveness (Fig. 4). Another explanation for the positive moderating effect of industry competitiveness on large firms could be the indicator we used to measure competitiveness. Given that industry competitiveness was measured by industry concentration, we can suppose that at high industry concentration levels, that is, when an oligopoly exists, the surviving firms will be large enterprises that have advantages with regard to greater access to resources (Hou and Robinson 2006; Karuna 2007). By this logic, greater industry concentration contributes to the competitive advantage of large enterprises.

Conclusion

Discussion

This empirical study found that innovation capability is positively associated with performance in medium and large enterprises, but not in small firms. As a consequence, investments related to innovation capability enable medium-size and large enterprises to modify, extend, or introduce new products and services which contribute to greater profitability. This mechanism does not work for small firms, where innovation capability has a negative effect on firm performance. Consequently, R&D expenditures by small enterprises would significantly reduce their overall profitability. We acknowledge the possibility that the small firms' innovation

efforts simply were not yet reflected in the profitability data used in this study. The chronology factor is important, because the benefits of innovation are not reflected in short-term profitability, but instead become visible only as time goes on. Depending on the conditions that prevail in each specific industry, firms may have to wait a considerable amount of time before innovative products can be successfully monetized, thus improving firm performance. It also may be the case that small firms' R&D efforts were not substantial enough to lead to a competitive advantage. Innovative small firms simply may not be able to sustain their competitive advantages due to a limited resource base. The impact that an innovation has on performance depends on the magnitude of the effect which it has on a firm's competitive advantage compared to its competitors (Hunt and Morgan 1996). It is likely that the products or services that are invented by small firms are less likely to create significant competitive advantage (Otero-Neira et al. 2009), because they are easily imitated by competitors with greater access to resources.

As expected, a high level of industry competitiveness reduces the performance of small and medium enterprises. Under competitive pressure, small and medium firms are not able to monetize their innovative efforts. As a result, the cost of developing innovation capability means decreased performance, because severe competition exhausts the resources that are available. On the other hand, a large number of smaller competitors are not a serious threat for large firms with a stable resource base, and thus innovation capability enables such companies to sustain their advantages in competitive markets.

The study's findings point to the importance of innovation in competitive industries. In contrast to hypothesis 4, the results show that industry competitiveness serves as catalyst of innovative activity, at least for large firms. This can be explained by drawing on the industry organization literature, which contains two contradictory theoretical predictions about the effect of competition on innovativeness. According to on traditional view, competition is detrimental for innovation and technological progress. The contrasting view is that competition forces firms to innovate, and can thus lead to better product innovation, performance, and productivity growth (Ahn 2002). Thus, the dialectic effect of creative destruction is more likely to take place in competitive industries, according to Hou and Robinson (2006), where high risk is associated with higher returns. The results presented in this work demonstrate that industry competitiveness is beneficial for the development of innovation capability, which leads to higher profits. Once again, however, competition is conducive only for large enterprises that can utilize more resources, build stronger innovation capability, overcome competitors, and thus gain high profitability.

Large companies also benefit from the role of marketing capability in generating profitability, while this capability was also unprofitable for small firms, and insignificant for medium-sized ones. Innovation capability also had a differential effect, as the results show that marketing capability is beneficial only for firms with strong innovation capability. Even though, medium-size and large enterprises are both able to monetize innovations, marketing capability has no significant effects for mid-size firms. This suggests that in order to improve firm performance, market-based knowledge resources should be involved in developing marketing and innovation capabilities (Ngo and O'Cass 2012).

Therefore, in medium-size enterprises, innovation activities should be driven by strong market research and be closely related to satisfying customers' needs. Such actions are better able to support marketing capability, and thus make it more likely that positive outcomes will arise from innovative activities.

We can only speculate on the reasons that expenditures on marketing tend to decrease small enterprises' overall performance. This outcome may be because advertising is less efficient for small firms, given that their limited resources do not enable them to create a critical level of market awareness. In that situation, expenditures on advertising may weaken small companies' resource base, which would otherwise be available for innovation activities. Similar results were found by Qian and Li (2003) for small and medium-sized enterprises in high-tech industries. This finding suggests that small enterprises should carefully allocate their resources on marketing activities.

Our results show that the complementarity of innovation and marketing capabilities is the best determinant of firm performance for medium-size and large enterprises. Small firms again cannot take this approach, because their limited resources prevent them from overcoming their competitors in this way. Even if small firms develop this dynamic capability they do not gain competitive advantages, nor do they enjoy greater profits. However, comparing the separate impacts of innovation and marketing capabilities, the results show that this dynamic capability is able to contribute more to performance among small firms, perhaps as a protective strategy, since it does not boost their actual profitability. Moreover, the results show that the correct integration of resources can enable firms of all sizes to avoid resource wastage, and thus improve overall performance.

Although the performance of medium-sized enterprises was not significantly affected by industry competitiveness in this study, we found that the impact of competition was less harmful for medium-sized firms that had a well-developed dynamic capability, compared to those that had a good innovative capability, but lacked the support of effective marketing. In addition, the results show that the entrance of new competitors does not damage performance of medium-size enterprises that are able to turn innovations into recognizable brands.

For large enterprises, greater competitive pressure results in increased performance, and the entry of new competitors merely motivates such companies to invest more in innovation and marketing activities. In a changing market, this dynamic capability is an essential factor which enables firms to build competitive advantage and increase profitability. Majumdar (2010) reported that the entry of more competitors into the U.S. telecommunications industry, for example, actually increased the efficiency of incumbent firms. Our results show that despite greater competition, the dynamic capabilities of large firms enable them to improve their level of innovation and also to better commercialize the resulting products or services, thus increasing profitability.

In short, firms of all sizes should work to develop their dynamic capabilities in order to make better use of their resources. In rapidly changing markets, the ability to integrate resources and capabilities can enable firms of all sizes to create competitive advantages and improve profitability, as well as to sustain existing advantages by utilizing resources more efficiently (Maritan and Peteraf 2007).

Implications

Our findings show that building a dynamic capability is a good investment of resources for small, medium, and large enterprises. Due to their limited resources, small firms should concentrate their resources, capabilities, and managerial efforts on creating the right integration of marketing and innovation capabilities, because the resulting dynamic capability is critical in order to withstand competition. On the other hand, if resources are not managed properly, then innovation and marketing efforts can dilute smaller companies' focus and waste resources. In addition, the results showed that each capability in isolation did not have significant impacts on performance for small firms.

For medium-size enterprises, solid marketing capability is required to raise profitability in a highly competitive industry, and if this is not achieved then an innovation is unlikely to lead to profits. Managers should thus use market-based knowledge resources when building this dynamic capability, and focus innovative efforts on market needs (Ngo and O'Cass 2012). For medium-size enterprises operating under the constraint of limited financial resources, innovation activities should be driven by strong market research and be closely related to satisfying customer needs. In this way such efforts can support marketing capability, and enable a firm to promote the output of its innovative activities more successfully.

We found that due to their strong innovation and marketing capabilities, large enterprises are better able to increase performance and generate profits, even in conditions of high industry competitiveness. Managers of such companies should thus focus on building long-term competitive advantages, because competition itself is not a serious threat. Using their advantage of a significant, stable resource base, large enterprises should focus on process innovation, which requires long term resource investments that are difficult for competitors to imitate.

Limitations and further research

As with every study, the current research has some limitations related to the research design and data availability. First, this study uses time series data for publicly traded firms from the U.S. and Canada, which limits the generalizability of our findings. It is also possible that the interactions of marketing capability and innovation capability may not fully explain dynamic capability, while marketing and R&D expenditures cannot fully represent these two capabilities, and firm performance is not only determined by profitability (important though that is). Therefore, there is a need for further studies to verify generalizability of the findings in other contexts. Second, the factor of industry competitiveness was observed based on industry concentration, and thus it reflects only a few dimensions of competition, such as product substitutability, market size, and entry barriers. Therefore, future studies should address this issue and use a more complex measure of competition.

This empirical study confirmed that good firm performance can be the result of efficient integration of existing resources. Thus, future study may further investigate on how firms can better utilize their capabilities in competitive markets and extensively examine the interactions among firm capabilities empirically and theoretically.

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