

Marketing's Role in Capturing Value from Innovation: Knowledge Resources, Strategic Emphasis, and Firm Value

Judy Ma¹, Byungchul Choi², Gina O'Connor³

¹Department of Marketing & Entrepreneurship, California State University, East Bay, USA

²Department of International Business and Management, Nottingham University Business School (NUBS) China, China

³Lally School of Management, Rensselaer Polytechnic Institute (RPI), USA

Abstract—Investing in and integrating R&D and marketing efforts are critical activities for achieving innovation and new product success. A persistent question is how firms should allocate resources in favor of one or the other. In this research, we examine how the bottom-line impact of the balance between R&D and marketing is dependent on the firm's knowledge resources. We propose that, depending on the technological novelty and potential of a firm's knowledge resources, investing more in marketing may have a positive impact on firm value. We find that this positive impact is only present when a firm's knowledge resources have low technological novelty and/or potential. In such cases, the complementary role of marketing helps a firm increase its value when it is in an inferior technological position relative to competitors in its industry. Our study answers recent calls to demonstrate marketing's contribution to the firm's bottom-line. Our findings evidence that managers should consider their current stock of knowledge resources when making decisions concerning balancing R&D and marketing priorities.

I. INTRODUCTION

Marketing capability, a critical organizational asset that enables firms to adapt to market conditions, has received much attention not only in the field of Marketing [1] [2] [3] but also in Strategy [4] [5]. Especially, in the context of innovation, a common theme across the literatures discussing marketing capability is the importance of integrating marketing capability with R&D capability in achieving successful innovation and sustainable competitive advantage. Marketing scholars have used the concept of strategic emphasis to describe the balance between a firm's R&D (i.e., value creation) and marketing (i.e., value appropriation) efforts [6] [7]. Strategic emphasis, which derives from the resource-based view of the firm (RBV) [8] [4] is operationally defined as the ratio of a firm's resource allocation between marketing and R&D.

While findings reported in the literature show a positive impact from investing more in marketing (relative to R&D) on firm value, there are aspects of strategic emphasis that call for further investigation. Namely, the impact of strategic emphasis on stock market returns may be contingent upon various firm-specific characteristics [6]. The Resource Based View of the firm emphasizes that firm performance is an outcome of both the heterogeneity in a firm's resources and how the firm controls these resources. Therefore, to get a full understanding of the innovation process, we need to link the nature of a firm's resources to the capabilities that a firm uses to manage them. Although the strategic emphasis framework

conceptualizes a relationship between a firm's resources and strategic emphasis, the specific impacts of heterogeneous firm resources have not been tested empirically.

In this research, we aim to extend existing literature on strategic emphasis by focusing on the contingency associated with the strength and nature of technological knowledge resources of firms. Given (1) the importance of both R&D and marketing capabilities in sustaining competitive advantage and (2) the heterogeneity in firms' knowledge resources, our research objective is to understand how the strategic emphasis—firm value relationship is different for firms with different types of knowledge resources. First, as a baseline hypothesis, we propose that a shift in strategic emphasis toward marketing (i.e., value appropriation) has a positive impact on firm value.

Next, we theorize beyond the tension between R&D and marketing at the resource allocation level. Marketing capabilities have been shown to complement or enhance a given set of technological knowledge resources created from R&D efforts [9]. In other words, the optimal allocation of resources across these two capabilities may be contingent upon the set of technological knowledge resources possessed by a firm. Therefore, we argue that the impact of strategic emphasis may vary with the strength of a firm's technological knowledge resources relative to its competitors. While Mizik and Jacobson [6] investigate industry-level technological characteristics (e.g., high-tech industries, low-tech industries), we focus on a firm's relative technological position within its industry. We do this because a firm's strategic intention may be more sensitive to its direct rival groups rather than indirect rivals across other industries. In particular, we examine two characteristics of a firm's technological knowledge resources that may impact the strategic emphasis—firm value relationship: technological novelty and technological potential. (Put the importance of originality and impact).

By analyzing patent and financial data of publically traded manufacturing firms in the U.S., we find that the positive impact of a shift in strategic emphasis toward marketing on firm value is only present when a firm's knowledge resources are limited in terms of technological novelty and potential. In such cases, the complementary role of marketing helps a firm increase its value when it is in an inferior technological position relative to competitors in its industry. (This imply that complementary also depends on the contingency, not generality)

With this study, we contribute to the understanding of how and when firms can capture value from their investments in marketing. (This is important because general complementary lead firm to waste their resource and lead firm to deviate from the optimal balance between R&D resources and marketing resources) We focus on the dynamics among strategic emphasis, technological resources, and firm value. We propose that managers should consider their current stock of knowledge resources when making decisions regarding strategic emphasis. Our results reveal specific insight regarding how firms can maximize their returns from marketing and R&D efforts.

II. THEORY AND HYPOTHESES

A. The Resource-Based View and the Dynamics of Strategic Emphasis

A capability is a firm's proficiency in creating and capturing value from its resources [10]. The Resource Based View (RBV) posits that a firm can utilize its heterogeneous resources and unique capabilities to achieve competitive advantage [11]. Two key capabilities of a firm that are fundamental in achieving sustained competitive advantage are R&D and marketing [2] [12] [13]. R&D capability refers to the firm's ability to create value for society through technological innovation. Marketing capability, or value appropriation, can be defined as the firm's ability to compete in the marketplace and extract profits from their value creation activities through commercializing the innovation. Value appropriation is critical because without it, the potential value a firm creates through innovation may be lost (e.g., if consumers do not adopt the creation, if the firm cannot maintain an advantage over competitors). The balance between a firm's value appropriation and value creation efforts is known as strategic emphasis. A proper strategic emphasis influences a firm's sustainable competitive advantage and, consequently, superior financial performance [6] [7].

Understanding the factors that drive the appropriate balance is therefore critical to strategy scholars. Strategic emphasis changes over time as the firm changes its strategy and addresses a dynamic competitive environment. While strategic emphasis itself is important, it is in fact the change in strategic emphasis from one point in time to another (which is often unanticipated) that provides informational cues to the market about a firm's competitive posture in a dynamic competitive environment, and is therefore more critical in determining firm market value at any point in time. Mizik and Jacobson (2003) show, for example, that firms experience increased stock returns when they shift their strategic emphasis toward value appropriation. The change in stock return reflects the investors' valuation of the "unanticipated strategic emphasis" or the change in a firm's strategic emphasis from the previous year (Somewhere, we need to explain change mean moving toward investing in marketing). These findings are consistent with prior studies

that show marketing capability has a stronger impact on firm performance than R&D capability (see Krasnikov and Jayachandran, 2008 [3] for a meta-analysis). Based on these findings, we first hypothesize:

Hypothesis 1: *Unanticipated strategic emphasis toward value appropriation will have a positive impact on firm market value.*

B. Conditional Strategic Emphasis

The extant research on strategic emphasis provides some evidence to managers who question whether investing in marketing (i.e., value appropriation) contributes to firm value [14] [15]. However, an unanswered question is: *Under what conditions* would a firm benefit from a strategic emphasis toward value appropriation? This question challenges the notion that there is a one-size-fits-all relationship between strategic emphasis and firm value.

To answer such a question, we must consider the heterogeneity in a firm's resources. From the RBV perspective, firms are essentially bundles of resources; more specifically, knowledge resources [16], and those bundles of resources vary across firms. Organizational knowledge is viewed as a critical category of resource that provides a valuable source of competitive advantage is organizational knowledge [17] [18]. Firms managing superior and heterogeneous knowledge resources can enjoy sustainable competitive advantage.

Knowledge resources can be classified in various ways. Technological novelty and technological potential of these resources are two important aspects recognized in prior literature, and are of particular interest in any examination of technology intensive firms. Technological novelty is defined as the inimitability of a technology [19]. By this we mean, how difficult it is for a competitor to copy the resource due to the complexity of the resource. The second classification, technological potential, is the range of possible applications of a technology [20]. By this we mean, how much value may be derived from the resource with the appropriate capabilities. These characteristics of technological knowledge resources can be considered strategic levers that create cross-firm heterogeneity, particularly in technology-intensive firms, and may contribute to financial performance [21].

Based upon this logic, we reconsider the impact of strategic emphasis on firm performance, and argue that the relationship is contingent upon the nature of technological resources that firms possess. The central idea of our argument is that the effect of investing in marketing capability can vary in accordance with a firm's relative strength embedded in their technological resources. In fact, previous studies [5] have recognized that benefits from investing in marketing capability are contingent upon various situational factors such as market characteristics (e.g., high-turbulence vs. low turbulence) or market share. For example, firms with higher market share are more likely to invest more in marketing – more specifically, advertising- whereas firms that are not

performing as well are more likely to invest more in R&D [13].

Likewise, we argue that the impact of the R&D-Marketing interface is likely to vary in accordance with the nature of a firm’s technological resources which provide the basis for current or future products. In spite of inevitable tension in the allocation of resources between R&D and marketing, prior empirical studies have found evidence that R&D and marketing capabilities are complementary [22] [23] [24]. What this means is that these capabilities enhance the positive benefits of each other so that, when both capabilities are present, there is a greater positive impact on organizational performance. For example, marketing investments tend to guard and protect the firm’s competitive position established by new technologies [25] [26] and defend against new entrants with new inventions [27].

We argue that the complementary benefits of marketing helps firms send positive signals to investors, especially when a firm suffers from relatively low technological capability. Considering that shareholders are sensitive to the value or potential of technological resources, a firm maintaining a technologically strong position within the industry may be able to enjoy a high stock price even without spending resources on marketing. However, when a firm possesses inferior technologies, at least in the short term, increasing marketing investments can serve as an instrument to boost the brand’s perceived market value in two ways. First, an increase in marketing (e.g., advertising) serves as a positive signal to investors of the quality of its current products [28] [29] [3]. While using marketing as a quality signal may be beneficial for all firms, we propose that this positive signal to investors may be especially valuable for firms that are objectively lacking in technological resources. Second, additional investment in marketing sends the signal that a firm will more focus on value appropriation, which can boost the sales of current products.

From all the discussions thus far, we argue that firms with inferior technological knowledge resources will benefit from a shift in strategic emphasis toward marketing. We examine this argument with respect to two classifications of a firm’s resources that we previously discussed: technological novelty and technological potential. We hypothesize:

Hypothesis 2: *Unanticipated strategic emphasis toward value appropriation will have a positive impact on firm market value when a firm has a lower degree of technological novelty than the industry average.*

Hypothesis 3: *Unanticipated strategic emphasis toward value appropriation will have a positive impact on firm market value when a firm has a lower degree of technological potential than the industry average.*

Our conceptual framework (Figure 1) depicts how knowledge resources determine how the balance between value creation and value appropriation impact firm value.

III. METHODOLOGY

A. Data and Sample

To test our hypotheses, we use data from Standard and Poor’s COMPUSTAT database and The National Bureau of Economic Research (NBER) patent database. COMPUSTAT provides annual accounting measures (e.g., R&D expenditures and advertising expenditures) as well as stock market figures (e.g., stock price and shares outstanding). The NBER patent database provides detailed information on all patents granted in the United States between 1976 and 2006. To construct our sample, we matched all publically traded manufacturing firms (Standard Industrial Classification [SIC] codes 2000-3999) with complete information in both datasets (Mention that most of patents are actually from tech-intensive industries). The final dataset used in our analysis contains 2,063 firm-year observations from 598 firms in the period between 1992 and 2004.

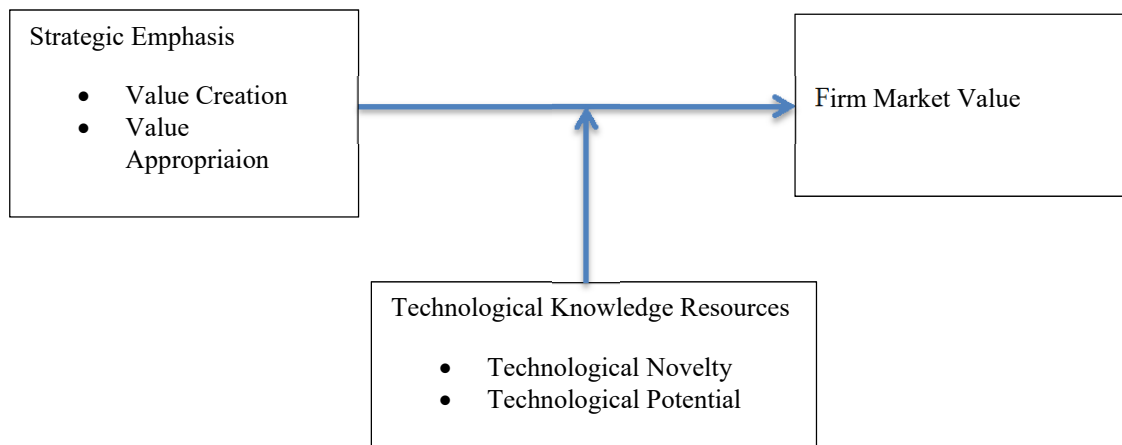


Figure 1. Conceptual Model

B. Variable Descriptions

Dependent variable. Consistent with previous literature (e.g., Mizik and Jacobson [6]), we measure *stock return* as:

$$\text{Stock return}_{i,t} = \frac{(\text{market value}_{i,t} + \text{dividends}_{i,t}) - \text{market value}_{i,t-1}}{\text{market value}_{i,t-1}}$$

where market value is equal to the number of shares outstanding multiplied by stock price and dividends is the sum of common and preferred cash dividends. The *Unanticipated stock return* is defined as:

$$\text{Unanticipated stock return}_{i,t} = \text{Stock return}_{i,t} - \text{Stock return}_{i,t-1}$$

to represent the change in stock returns or unexpected part of stock return, following Mizik and Jacobson [6].

Independent variables. *Strategic emphasis* refers to the relative importance of value appropriation to value creation. Following Mizik and Jacobson [6] and Swaminathan, Murshed and Hulland [7], we measure *Strategic emphasis* as:

$$\text{Strategic emphasis}_{i,t} = \frac{\text{advertising expenditures}_{i,t} - \text{R\&D expenditures}_{i,t}}{\text{assets}_{i,t}}$$

Variables for heterogeneity in knowledge resources. *Technological novelty* represents the broadness or diversity in the fields of science that are synthesized to create an original resource [19]. If patents are established by integrating knowledge in various technological classes, they are more likely to be inimitable and have unique value. Based on previous studies [19] [31] [31], we operationalize *Technological novelty* as:

$$\text{Technological novelty} = 1 - \sum_j^{N_i} O_{ij}^2$$

where O_{ij} represents the fraction of citations made by patent i that belong to patent class j , out of N_i patent classes so that the value O_{ij} will be close to zero when a patent i is based on a less diverse technological class. Then, we calculate the average novelty of all patents that each firm applied (eventually granted) for in each year. *Technological potential* represents the potential applications of a patent [20] and is measured by the average number of claims per patent, which is an indicator of the actual contribution made by the invention [33].

Control Variables. We account for firm-level heterogeneity with three control variables. First, we control for the change in *Return on assets (ROA)* to control for the change in overall firm performance from year to year, which should impact firm value. The change in ROA is computed as the change in the ratio of operating income before depreciation to the book value of assets [6]. Second, we use *Capital intensity*, measured as the ratio of the total property, plant, and equipment to the total book value of assets, to control for the influence of a firm’s investment on innovation [34]. Finally, we control for *Firm size*, which is measured as the logarithm of total sales [35].

C. Empirical Methodology

In our longitudinal data set, unobserved firm-specific characteristics may be correlated across time. To account for this, we use firm fixed effects and year fixed effects in our analyses.

$$\begin{aligned} \text{Stock return}_{i,t+1} = & a_{0i} + \lambda_t + a_1 \text{Unanticipated strategic emphasis}_{i,t} \\ & + a_2 \Delta ROA_{i,t} \\ & + a_3 \Delta ROA_{i,t} \times a_1 \text{Unanticipated strategic} \\ & \text{emphasis}_{i,t} \\ & + a_4 \text{strategic emphasis}_{i,t-1} \times \\ & a_1 \text{Unanticipated strategic emphasis}_{i,t} + a_5 \\ & \text{Firm size}_{i,t} + a_6 \text{Capital intensity} + e_{i,t} \end{aligned}$$

where a_{0i} and λ_t represent firm fixed effects and year fixed effects respectively. *Unanticipated strategic emphasis_{i,t}* is the shift or change in strategic emphasis since the previous year and ΔROA_i is the change in accounting business performance since the previous year. The interaction between ΔROA_i and *Unanticipated strategic emphasis_{i,t}* represents how the relationship between unanticipated strategic emphasis and stock return is moderated by the change in ROA while the interaction between *strategic emphasis_{i,t-1}* and *Unanticipated strategic emphasis_{i,t}* represents how the relationship is moderated by the firm’s past strategic emphasis.

IV. RESULTS

The descriptive statistics and correlation matrix of our main variables are shown in Table 1 and Table 2, respectively.

TABLE 1. DESCRIPTIVE STATISTICS

Variables	N	Mean	S.D.	Min	Max
(1) Stock return	2063	0.206	0.681	-0.727	2.733
(2) Strategic emphasis	2063	-0.046	0.097	-0.380	0.160
(3) ROA	2063	0.083	0.216	-1.898	0.396
(4) Firm size	2063	6.572	2.441	-2.333	10.718
(5) Capital intensity	2063	0.222	0.132	0.000	0.722
(6) Technological novelty	2063	0.449	0.174	0.000	0.843
(7) Technological potential	2063	20.104	9.646	1.000	62.333

TABLE 2. CORRELATION MATRIX

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Stock return									
(2) Strategic emphasis	-0.014								
(3) ROA	0.062	0.482							
(4) Unanticipated strategic emphasis	0.151	0.246	0.133						
(5) Unanticipated ROA	0.230	0.019	0.209	0.348					
(6) Firm size	-0.050	0.457	0.550	0.047	-0.026				
(7) Capital intensity	-0.088	0.224	0.212	-0.051	-0.025	0.301			
(8) Technological novelty	0.013	-0.104	-0.134	-0.013	-0.003	-0.139	-0.092		
(9) Technological potential	0.018	-0.095	-0.100	0.017	0.012	-0.182	-0.032	0.184	

TABLE 3. FIXED-EFFECT REGRESSION OF UNANTICIPATED STRATEGIC EMPHASIS ON STOCK RETURN

Independent variables _{<i>t</i>}	Dependent variable						
	Stock return _{<i>t</i>}						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
	Total sample	High Technological novelty	Low Technological novelty	High Technological potential	Low Technological potential	High Tech novelty High Tech potential	Low Tech novelty Low Tech potential
Unanticipated strategic emphasis	0.748* (0.409)	0.714 (0.486)	2.981*** (1.081)	0.174 (1.307)	1.297*** (0.490)	-1.719 (1.567)	3.011** (1.383)
Δ ROA	0.701*** (0.161)	1.070*** (0.227)	0.514* (0.309)	0.808** (0.362)	0.261 (0.217)	1.280*** (0.476)	0.962** (0.481)
Δ ROA x Unanticipated strategic emphasis	-0.227 (0.866)	-3.048 (1.901)	0.840 (1.094)	-3.465 (2.489)	-0.031 (1.193)	-4.278 (3.373)	4.158* (2.480)
Strategic emphasis _{<i>t-1</i>} x Unanticipated strategic emphasis	-0.542 (1.844)	-0.853 (2.778)	7.425* (3.893)	-6.688 (6.039)	-0.704 (2.266)	-12.663 (8.578)	6.393 (5.131)
Firm size	0.140** (0.063)	0.036 (0.087)	0.268*** (0.102)	0.176 (0.137)	0.217** (0.096)	-0.051 (0.166)	0.210* (0.125)
Capital intensity	-2.150*** (0.393)	-1.415** (0.562)	-3.127*** (0.660)	-1.569** (0.750)	-2.658*** (0.557)	-0.567 (0.851)	-2.426*** (0.847)
N	2,063	1,031	1,032	823	1,240	486	695
R²	0.153	0.227	0.183	0.186	0.167	0.204	0.197

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parenthesis. Year dummies are included, but not reported.

Table 3 illustrates the results of our analyses. Hypothesis 1 predicts a positive relationship between unanticipated strategic emphasis and stock market return of the firms. The positive coefficients of strategic emphasis ($\beta = 0.748$, $p < 0.1$) in Model 1 provide support for Hypothesis 1, implying consistency with the findings of Mizik and Jacobson (2003). That is, firms that increase their emphasis toward value appropriation relative to value creation enjoy an increase in market value in the given time period.

Hypothesis 2 states that unanticipated strategic emphasis toward value appropriation will have a positive impact on stock return when a firm engages in a lower degree of technological novelty than the industry average. In Model 2, the impact of unanticipated strategic emphasis toward value appropriation on stock return for the High technology novelty group is not statistically significant. This implies that when a firm already manages a high degree of technological novelty, a shift toward value appropriation does not positively impact stock returns. However, the positive and significant coefficient in Model 3 ($\beta = 2.981$, $p < 0.01$) suggests that

firms with lower degrees of technological novelty can benefit from increasing emphasis on value appropriation relative to value creation. Together, these two results show support for Hypothesis 2.

In Hypothesis 3, we propose that unanticipated strategic emphasis toward value appropriation will have a positive impact on stock return when a firm's patent portfolio indicates a lower degree of technological potential than the industry average. The coefficient on unanticipated strategic emphasis toward value appropriation is not statistically significant in Model 4, which implies that value appropriation does not meaningfully impact stock return when a firm already manages a high degree of technological potential. The positive and significant coefficient in Model 5 ($\beta = 1.297$, $p < 0.01$) suggests that the stock return of a firm with a low degree of technological potential increases with a shift toward value appropriation. Therefore, we have support for Hypothesis 3.

As a robustness check, we tested the models on firms with lower degrees of both technological novelty and

technological potential than the industry average versus those with higher degrees of both characteristics. The results of this analysis, shown in the last two columns (Model 6 and Model 7) of Table 3, are consistent with our previous results in showing that a strategic emphasis shift toward value appropriation adds value only when the firm has an inferior set of technological knowledge resources.

V. CONCLUSION AND DISCUSSION

This research examines the impact of strategic emphasis on firm market value, contingent upon the characteristics of the firm's technological knowledge resources. More specifically, we study the value of a firm's strategy that focusses on either R&D or marketing by examining how stock market returns change in response to shifts in strategic emphasis for firms with different types of knowledge resources.

Our empirical analysis reveals that a shift in strategic emphasis toward value appropriation or marketing has a positive impact on stock market returns for firms with resources that have low technological novelty and/or low technological potential, compared with other firms in their industry. However, for firms whose assets have higher than average technological novelty and/or technological potential, shifts in strategic emphasis toward value appropriation via investments in marketing do not add value.

Our study extends the work of Mizik and Jacobson (2003) by showing how the value of a shift in strategic emphasis toward value appropriation matters for some firms but not others. Our empirical results suggest that investing more in marketing is especially valuable for firms with inferior knowledge resources. Although we find that some firms do not benefit from investing more in marketing, these findings do not challenge the overall complementarity between marketing and R&D, which has been widely shown in prior literature. Rather, they support the notion of complementarity by showing how investing in such discretionary expenditures can indeed increase firm value in the face of weaknesses in technological knowledge assets.

Broadly, our study underscores the importance of marketing in the firm value equation. More specifically, our findings suggest that firms may use marketing as competitive tool when it cannot compete solely on the basis of technological innovation. Anecdotally, there are many examples of how a lack of marketing efforts has led to failure. For example, the launch of Google Glass flopped in 2014 not because of a lack of technological innovation, but because the firm was not able to communicate to consumers what need the product fulfilled. On the other side of the coin, there is also anecdotal evidence of market successes due to strong marketing by firms with relatively inferior technology. Despite Apple's late-entry into the wearable technology market, the Apple Watch quickly became the highest selling smart watch through a strong brand image, sleek product design, and effective advertising.

Our study provides theoretical explanation and empirical evidence in line with such market outcomes. Marketing creates value through appropriately linking internal firm activities to the needs and demands of the current external market. Without understanding its intended customers, the firm may struggle to translate technological knowledge assets—whether weak or strong—into valuable market offerings that contribute to firm value.

A limitation of our empirical study is that we only examine one aspect of marketing; advertising. There is great opportunity for future research that examine how other dimensions of marketing (e.g., word-of-mouth valence and volume, pricing strategies, and distribution intensity) may compliment knowledge assets in creating firm value. In addition, future research is needed to understand the effects of changes in strategic emphasis relative to competitor actions as well as the long-term effects of strategic emphasis dynamics.

REFERENCES

- [1] G. S. Day, "Closing the marketing capabilities gap," *J Marketing*, vol. 75, pp. 183-195, 2011
- [2] A. Griffin and J. R. Hauser, "Integrating R&D and marketing: A review and analysis of the literature," *J Prod Innovat manag.*, vol. 13, pp. 191-215, 1996.
- [3] A. Krasnikov and S. Jayachandran, "The Relative Impact of Marketing, Research-and Development, and Operations Capabilities on Firm Performance," *J Marketing*, vol. 72, no. 4, pp. 1-11, 2008.
- [4] R. W. Ruekert and O.C. Walker, "Interactions between marketing and R&D departments in implementing different business strategies," *Strategic Manage J.*, vol. 8, no. 3, pp. 233-248, 1987.
- [5] M. Song, C. Droge, S. Hanvanich and R. Calantone, "Marketing and technology resource complementarity: An analysis of their interaction effect in two environmental contexts," *Strategic Manage J.*, vol. 26, no.3, pp. 259-276, 2005.
- [6] N. Mizik and R. Jacobson, "Trading off between value creation and value appropriation: The financial implications of shifts in strategic emphasis," *J Marketing*, vol. 67, no. 1, pp. 63-76, 2003.
- [7] V. Swaminathan, F. Murshed, and J. Hulland, "Value creation following merger and acquisition announcements: The role of strategic emphasis alignment," *J Marketing Res.*, vol. 45, no. 1, pp. 33-47, 2008.
- [8] J. B.Barney, "Firm resources and sustained competitive advantage," *J Manage.*, vol. 17, pp. 99-120, 1991.
- [9] D. J. Teece, "Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy," *Res Policy.*, vol. 15, no. 6, pp. 285-305, 1986.
- [10] M. Javidan, "Core competence: What does it mean in practice?," *Long Range Plann.*, vol 31, no. 1, pp. 60-71, 1998.
- [11] B. Wernerfelt, "A resource-based view of the firm," *Strategic Manage J.*, vol. 5, pp. 171-80, 1984.
- [12] A. K. Gupta and D. Wilemon, "Improving R&D/Marketing relations: R&D's Perspective," *R&D Manage.*, vol 20, no. 4, pp. 277-290, 1990.
- [13] E. Ofek and M. Sarvary, "R&D, marketing, and the success of next-generation products," *Marketing Sci.*, vol. 22, no. 3, pp. 355-370, 2003.
- [14] D. M. Hanssens, R. T. Rust, and R. K. Srivastava, "Marketing strategy and wall street: Nailing down marketing's impact," *J Marketing*, vol. 73, no. 6, pp.115-118, 2009.
- [15] S. Srinivasan and D. M. Hanssens, "Marketing and firm value: Metrics, methods, findings, and future directions," *J Marketing Res.*, vol. 73, pp. 293-312, 2009.
- [16] H. Tsoukas, "The firm as a distributed knowledge system: a constructionist approach," *Strategic Manage J.*, vol. 17, pp. 11-25, 1996.

2016 Proceedings of PICMET '16: Technology Management for Social Innovation

- [17] Y. Fang, M. Wade, A. Delios, and P. W. Beamish, "International diversification, subsidiary performance, and the mobility of knowledge resources," *Strategic Manage. J.*, vol. 28, no. 10, pp. 1053-1064, 2007.
- [18] W. Tsai, "Knowledge transfer in intra-organizational networks: effects of network position and absorptive capacity on business unit innovation and performance," *Acad. Manage. J.*, vol. 44, no. 5, pp. 996-1004, 2001.
- [19] M. Trajtenberg, R. Henderson, and A. Jaffe, "University versus corporate patents: A window on the basicness of invention," *Econ Innovat New Tech.*, vol 5, pp. 19-50, 1997.
- [20] J. O. Lanjouw and M. Schankerman, "Patent quality and research productivity: Measuring innovation with multiple indicators," *Econ J.*, vol.114, no. 495, pp. 441-465, 2004.
- [21] R. M. Grant, "The resource-based theory of competitive advantage: implications for strategy formulation" *Calif Manage Rev.*, vol.33, no. 3, pp. 114-135, 1991.
- [22] H. A. Krishnan, R. Tadepalli, and P. Daewoo, "R&D intensity, marketing intensity, and organizational performance," *J Managerial Issues.*, vol. 21, no. 2. pp. 232-244, 2009.
- [23] B.-W. Lin, Y. Lee, and S.-C. Hung, "R&D intensity and commercialization orientation effects on financial performance," *J Bus Res.*, vol. 59, no. 6, pp. 679-685, 2006.
- [24] P. Wright, M. Kroll, C. Peng, and K. Hamel, "Strategic profiles and performance: An empirical test of select key propositions," *J Acad Marketing Sci.*, vol. 19, no.3, pp. 245 -254, 1991.
- [25] F. T. Rothaermel, "Incumbent's advantage through exploiting complementary assets via interfirm cooperation," *Strategic Manage J.*, vol. 22, no. 6-7, pp. 687-699, 2001.
- [26] M. Tripsas, "Unraveling the process of creative destruction: Complementary assets and incumbent survival in the typesetter industry," *Strategic Manage J.*, vol. 18, pp. 119-142, 1997.
- [27] S. Shane, "Technology regimes and new firm formation" *Manage. Sci.*, vol. 47, no. 9, pp. 1173-1190, 2001.
- [28] A. Joshi and D. M. Hanssens, "The direct and indirect effects of advertising spending on firm value," *J Marketing.*, vol. 74, pp. 20-33, 2010.
- [29] R. E. Kihlstrom and M. H. Riordan, "Advertising as a signal," *J Polit Econ.*, vol. 92, pp. 427-450, 1984.
- [30] P. Milgrom and J. Roberts, "Price and advertising signals of product quality," *J Polit Econ.*, vol. 94, no. 4. pp. 796-821, 1986.
- [31] N. S. Argyres and B. S. Silverman, "R&D, organization structure, and the development of corporate technological knowledge," *Strategic Manage. J.*, vol. 25, pp. 929-958, 2004.
- [32] G. Valentini, "Measuring the effect of M&A on patenting quantity and quality," *Strategic Manage J.*, vol. 33, no. 3, pp. 336-346, 2012.
- [33] R. G. McGrath and A. Nerkar, "Real options reasoning and a new look at the R&D investment strategies of pharmaceutical firms." *Strategic Manage. J.*, vol. 25, no.1, pp. 1-21, 2004.
- [34] J. P. O'Brien and T. B. Folta, "A transaction cost perspective on why, how, and when cash impacts firm performance," *Manage Decis Econ.*, vol. 30, pp. 465-479, 2009.
- [35] H. Kim, H. Kim, and P. M. Lee, "Ownership structure and the relationship between financial slack and R&D investments: Evidence from Korean firms," *Org. Sci.*, vol.19, pp. 404-418, 2008.