

Marketing as an Investment in Shareholder Value

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ABSTRACT

We present resource-based and capability-based arguments of marketing investment intensity to offer a strategic view of marketing as an investment in shareholder value. We find that marketing investment intensity has a U-shaped quadratic effect on shareholder value creation (Tobin's q) that calls for marketing investment to be protected and increased, not surrendered. We show how marketing investments interact with investments in R&D, human capital and operations to reveal how strategic co-investments can alter the shareholder value of marketing. Finally, we show how competitive intensity and failings in the firm's investment productivity (its ability to convert investment expenditure into sales) point to malaise in the firm's own strategic architecture as fault for perceived poor returns from marketing investments. Our findings suggest that marketing investment should not be scapegoated when its contributions to shareholder value are not as expected. When invested in strategically and in combination with other investments, marketing can unlock exciting improvements in shareholder value.

KEYWORDS

Marketing investment, marketing, R&D, human capital, operations, capabilities, shareholder value, investment intensity, productivity.

INTRODUCTION

Senior managers and investors are concerned about the impact of marketing investment on shareholder value (Edeling and Fischer, 2016; Hanssens and Pauwels, 2016). Verhoef and Leeflang (2009) lamented that marketing is not seen as an investment among senior managers. This has been matched by marketing departments' loss of influence in the last decade, despite encouraging evidence that marketing departments make the greatest contributions to firm performance (Homburg et al., 2015). Other studies also find support for a financial benefit *to the firm* from investing in marketing (e.g., Feng et al., 2017; Homburg et al., 2015; Luo, 2008; Mishra and Modi, 2016). However, evidence of myopic investment decisions where marketing budgets are cut to inflate current-term earnings (Mizik and Jacobson, 2007) suggest that senior managers have little confidence in what marketing investments have to offer shareholders. We argue that marketing scholars and marketing managers have failed to demonstrate the longer-term *shareholder* value of investing in marketing and communicating that in a vocabulary that appreciates the accountability pressures on senior management. Evidence for this is building (Hanssens and Pauwels, 2016; Homburg et al., 2015; Verhoef and Leeflang, 2009), and calls have followed for a much deeper understanding of the system of effects marketing investment has and its relationship with shareholder value (Edeling and Fischer, 2016; Germann et al., 2015; Kumar et al., 2016). We address these urgent calls.

Senior managers are driven by an accountability agenda (Rust et al., 2004) and are sensitive to investing only in those activities that demonstrably generate value for shareholders (Homburg et al., 2015; Kumar and Shah, 2009). Senior management scepticism about marketing investment is directly related to this agenda. We see three dimensions to this problem. First, past research has concentrated largely on financial performance instead of shareholder value creation. Shareholder value creation is focused on the long-term financial wellbeing, competitiveness and sustainability of the firm, distinct from its current or short-

term financial performance. While evidence of revenue and profit growth offer marketing a “seat at the top table” (Feng et al., 2017, p.77), evidence of its contribution to shareholder value is limited. This is important because the current debate is treating only part of the problem: concerns over marketing as an investment stem from a lack of evidence on the dimensions senior managers and investors care for beyond revenue¹. Second, studies compare marketing investments against other competing investments senior managers make (e.g., R&D and operations investments) (Krasnikov and Jayachandran, 2008). But the moderating effects of these other investments on the contributions of marketing investment are missed. This is important because it risks an incomplete and potentially inaccurate understanding of the interrelatedness of marketing investment with other investments taking hold. Investments *in combination* can create unique capabilities that further establish the importance of marketing investment in ways that have received little treatment to date. Third, absent from current debate are external and strategic-level moderators of the effects of marketing investment on shareholder value (Edeling and Fischer, 2016). The contribution of marketing to shareholder value will depend on external and internal boundary conditions in the firm’s strategic architecture beyond the control of marketing managers. For instance, the investment productivity of the firm is a strategic-level factor pointing to its ability to convert any one dollar of current spending into revenues that fuel future investments needs consideration, while the competition intensity faced by the firm is another important overlooked contingency.

¹ An illustration can be found in the automobile industry. In 2017, Tesla had a larger market capitalization than Ford and General Motors, valued at \$55bn USD despite 7 straight years of losses since its IPO. In contrast, in 2017, Ford fired CEO Mark Fields after 3 years and under pressure from Wall Street investors, despite achieving record revenue and profits, having its most profitable year in 2015 with \$11bn USD profit, yet had seen its share price slide by 40%. This is an illustration of how a focus on current financial performance, while not wholly independent (because it gives the financial resources needed to invest into the future), is not a measure of shareholder value and is not solely what investors prioritise. Tesla has a higher marketing investment intensity according to 2016 data as well. Moreover, Uber at one point had a market capitalisation of nearly \$70bn USD in 2017 despite never having made a profit. Ford then considered entering the ride-hailing market. The primary argument for Fields’ dismissal was a failure to orient the business towards the future and invest aggressively to please investors to that end.

This discussion raises three important research questions: (1) To what extent does marketing investment contribute to shareholder value? (2) Do R&D, human capital and operations investments moderate the relationship between marketing investment and shareholder value creation? (3) Does the contribution of marketing investment to shareholder value depend on the firm's investment productivity and the intensity of competition?

Drawing on a model of capital investment (Maritan, 2001), the resource-based view (RBV) of organisational capabilities (Helfat and Peteraf, 2003; Wernerfelt, 1984) and resource combinations (Sirmon et al., 2011), we argue that the *intensity* of financial capital investment into specific activities is an act of investing in organisational capabilities (Baldwin and Clark, 1992; Maritan, 2001). We theorise that the contribution of marketing investment intensity to shareholder value is amplified by its interactions with other simultaneous investments made by senior managers, the productivity of the firm at converting its investments into revenue and competitive intensity.

This study offers two contributions. First, it draws on theories of capital investment, the RBV and resource combination to develop predictions about how marketing investment in conjunction with concurrent investments interact to generate longer-term shareholder value. This is important because treating combinations of investments under the concept of investing in capability building demonstrates how marketing investments can generate shareholder value in ways that cannot necessarily be foreseen by senior management due to causal ambiguity. This contribution extends current works that have yet to consider these interactions or have only examined their effects on short-term financial performance and not shareholder value (e.g., Feng et al., 2017; Homburg et al., 2015; Katsikeas et al., 2016; Luo and de Jong, 2012; Verhoef and Leeflang 2009).

Second, this study identifies the investment productivity of the firm and competitive intensity as new boundary conditions that affect the marketing investment–shareholder value

relationship. The value of marketing investment depends on marketplace conditions (Feng et al., 2017; Morgan, 2012), but absent has been any treatment of internal organisational conditions (Edeling and Fischer, 2016; Homburg et al., 2015) and competitive intensity. Our findings show that marketing investment can be inadequate in creating shareholder value if we do not simultaneously account for the productivity of the firm at maximising sales out of its expenditures. This investment productivity is a proxy for the firm's talent at using its capabilities to generate revenue needed to fund future investments. By demonstrating the importance of the firm's own investment productivity in creating shareholder value from its investments, we show how any dismay with marketing may stem from greater strategic problems within the firm itself.

THEORETICAL FOUNDATION

Investments are made to build capabilities (Dierickx and Cool, 1989; Maritan, 2001). Dedicating funds to specific activities commits resources such as people, expertise and know-how in anticipation of future expected returns exceeding the opportunity cost of the original investment (Baldwin and Clark, 1992; Maritan, 2001). We examine *investment intensity* by dividing investment with sales turnover because a firm cannot spend more than it budgets to receive in sales revenue on any one activity. As a firm invests more intensely in an activity, it can form a capability that over time becomes more complex and difficult to erode (Helfat and Peteraf, 2003). These investments can then enable competitive advantages that contribute to shareholder value.

We examine four important investments a firm can make, and which compete with each other for finance: marketing investment, R&D investment, operations investment and human capital productivity. *Marketing investment intensity* concerns expenditure to use available resources to perform direct and indirect marketing tasks of selling, advertising,

marketing and delivery of products (Dutta et al., 1999; Mizik and Jacobson, 2007). *R&D investment intensity* concerns expenditure to use available resources to create technological knowledge and advancements for product and process innovations (Dutta et al., 1999). *Operations investment intensity* concerns expenditure to perform organisational activities efficiently and flexibly with minimum resource wastage (Krasnikov and Jayachandran, 2008). Each can explain interfirm differences in performance (Dutta et al., 1999). We add *human capital productivity* (Becker, 1975) because improvements in employee productivity are driven by improvements in the intellectual assets of the firm (the skills and accumulated knowledge of its people) brought on by investments in human capital (Pfeffer, 1994).

The shareholder value of marketing investment intensity may interact with the intensity of investments made into the other organisational activities (Srivastava et al., 1998). Financial capital investment is made in an effort to maintain or add to existing capabilities (Baldwin and Clark, 1992), increase their strength relative to competitors (Maritan, 2001), or reverse their deterioration (Dierickx and Cool, 1989). Firms investing in combinations of activities can add further competitive advantage (Sirmon et al., 2011). We see this as a product of a firm making simultaneous investments capable of forming new or unexpected capabilities (Baldwin and Clark, 1992). As investments payoffs are uncertain, it should not be assumed that combinations of investments are inherently superior to individual ones. While more complex capabilities might emerge, their emergence may be causally ambiguous, cause capabilities to compete, or fail. For example, combining marketing and R&D investments might shape a product development capability (Dutta et al., 1999); it might also waste resources as the firm competes between the tensions of servicing its existing markets and finding new ones.

Firms differ in their ability to maximise revenue from their investments (e.g., Kumar and Peterson, 2004; Luo and Donthu, 2006). While earning revenue (short-term financial

performance) is distinct to shareholder value creation, they are not wholly separate. When more revenue accrues to one firm compared to another from similar expenditure, we theorise that such a firm has *investment productivity*. Investment productivity captures how productive a firm is at converting its expenditure into sales revenue. A firm high in investment productivity exhibits a better ability to get the most dollars out of the investments it makes, can generate extra financial capital to invest in further developing its capabilities, and can enter projects in pursuit of long-term shareholder value. The failure of marketing investment intensity to contribute to shareholder value might, therefore, be a function of a very different strategic problem: the inability of the firm to convert investment into the revenue that fuels future investments. The failure of marketing investment would then be a scapegoat for this problem. We see investment productivity as a missing link in the relationship between marketing investment intensity and shareholder value creation. Finally, studies suggest the importance of external contingencies on the value of marketing (Feng et al., 2017; Morgan, 2012). We include competitive intensity as this boundary condition. Figure 1 illustrates our theoretical model.

[Insert Figure 1 here]

HYPOTHESES

We predict that marketing investment intensity has a nonlinear relationship with shareholder value. At low levels of marketing investment intensity, we anticipate a negative effect on shareholder value but as marketing investment increases, we expect a positive effect to emerge. We also expect that the effects of any investment (individually or in combination) on shareholder value are lagged. Thus, we treat an investment as taking place in time $t-1$ and shareholder value at time t . Table 1 provides an overview of studies that link marketing to financial outcomes.

[Insert Table 1 here]

Marketing activities must satisfy customer requirements without ignoring the costs incurred in achieving the firm's financial objectives. Cash flows distributed to investors determine shareholder value (Rappaport, 1986). However, most initial marketing investments will not pay out and do not generate first-year profits or positive first-year cash flows (Blattberg and Deighton, 1991). Instead, 'lean' marketing and advertising expenditures can lead to backlash that create unproductive outcomes that hinder customer equity efforts (Luo and Donthu, 2006). As such, low levels of marketing investment intensity can result in objectives such as planned levels of customer awareness, corporate exposure and new product innovations being missed (Dutta et al., 1999; Szymanski et al., 1993), diminishing future returns. Thus, at low-to-medium levels of marketing investment, the associated costs will outweigh its associated benefits. Notions of "critical mass" explain this relationship because some minimum amount of investment is necessary before any impact or output can be realized (Terpstra, 1983).

As marketing investments continue to increase, we expect the associated benefits to outweigh the associated costs and positively affect shareholder value. Beyond a mid-range point of marketing investment intensity, the paybacks will be more beneficial because gains in performance through continued investment in understanding customers' needs will be incrementally positive. Significant investments in marketing activities allow the firm to build brand equity, increase market share and sales (Boulding et al., 1994) and enhance customer loyalty (Russell and Kamakura, 1994), positively impacting shareholder value. Significant marketing investments can also act as a signal of financial well-being and competitive viability thereby increasing shareholder value (Joshi and Hanssens, 2010). Thus, we

hypothesise that marketing investment intensity has a U-shape influence on shareholder value²:

H1: Marketing investment intensity has a U-shape influence on shareholder value.

R&D expenditures can drive the market value of the firm (Sridhar et al., 2014). R&D investments are expected to reduce the negative effects of low marketing investment intensity and increase the positive effect of high levels of marketing investment intensity on shareholder value. For instance, low marketing investment has a detrimental effect on customer loyalty (Huang, 2015). R&D investments can mitigate this negative effect. Investments in R&D are a primary source of product innovations and new products are often perceived by customers to offer superior quality and benefits (Stock and Zacharias, 2013), which generate customer loyalty (e.g. Frank et al., 2014; Fornell et al., 1996). Consequently, R&D investments support an innovation capability to enjoy superior customer loyalty (Givon et al., 1995) thereby reducing the negative effect of low levels of marketing investment. Similarly, as low marketing investment negatively affects brand equity and thereby shareholder value (Madden et al., 2006; Srinivasan et al., 2009), R&D investment can reduce this negative impact through its own positive influence on brand equity (Torres and Tribó, 2011). R&D investments can also heighten the positive effect high levels of marketing investments have on shareholder value. For instance, together they lead to the development of new products capable of better meeting customer needs. This is consistent with evidence regarding R&D-induced growth providing better returns than growth in general (Chauvin and Hirschey, 1993) and a focus on innovation through R&D as a way of stimulating longer-term sales growth (Kelm et al., 1995). Thus:

² Luo and Donthu (2006) propose an inverted-U shape relationship between ‘marketing communications productivity’ and shareholder value. This is an efficiency measure of marketing input to output. Nevertheless, their arguments support the deleterious effects of ‘lean’ marketing and advertising expenditures and the view that a sufficient investment in marketing is needed to create shareholder value. We thank an anonymous reviewer for encouraging us to explain this alternate position.

H2: R&D investment intensity positively moderates the curvilinear relationship between marketing investment intensity and shareholder value. Increasing levels of R&D investment intensity reduces the negative effects of low levels of marketing investment intensity and increases the positive effect of high levels marketing investment intensity.

Moorman and Day (2016) see human capital as a key force in achieving excellence from marketing investment, and Riley et al. (2017) found that human capital investments are more impactful when combined with advertising investments. Assuring that people add value to firm processes through their human capital offers competitive advantage (Wright et al., 1994). Firms investing in human capital can mitigate the negative effects of low intensity investments in marketing and accentuate the benefits of high marketing investment. The hallmarks of human capital are bright and skilled employees with expertise in their roles and functions. They are a key source of new ideas (Snell and Dean, 1992). Firms investing in human capital increase their intellectual capital base and increase their capacity to absorb and deploy knowledge (Subramaniam and Youndt, 2005), becoming more productive in their tasks (Dess and Shaw, 2006) and more capable of filtering information to arrive at better decisions (Kang and Snell, 2009). Firms then become more efficient in using the market knowledge they acquire (Ling and Jaw, 2006). We further expect such human capital productivity to strengthen the positive portion of marketing investment's contribution to shareholder value. As human capital productivity grows, employees are in a better position to leverage the firm's resources to take advantage of market opportunities (Offstein et al., 2005) with new ideas and techniques. Thus:

H3: Human capital productivity positively moderates the curvilinear relationship between marketing investment intensity and shareholder value. Increasing levels

of human capital productivity reduces the negative effects of low levels of marketing investment intensity and increases the positive effect of high levels marketing investment intensity.

Marketing and operations are functional areas that create and add value to customers. Intimately connecting the two can increase firm performance (Ho and Tang, 2004; Malhotra and Sharma, 2002). A firm increases operations investment to perform organisational activities more efficiently and effectively (Krasnikov and Jayachandran, 2008). In doing so, it reduces cost and increases flexibility in the delivery process to achieve competitive advantage (Day, 1994), offsetting the initial negative effect of low-to-medium marketing investment intensity. As different customer needs can often require different operations capabilities in a plant, investment in operations can help the firm to differentiate its products from their competitors, thereby positively impacting firm's sales (Berry et al., 1991). This can help mitigate the negative effects of low levels of marketing investments. Thereafter, investment in operations enables infrastructure development that supports high-quality product design processes that create customer value (Tan et al., 2004) and loyalty. Operations investments can then enhance the positive effects of high marketing investments. Thus:

H4: Operations investment intensity positively moderates the curvilinear relationship between marketing investment intensity and shareholder value. Increasing levels of operations investment intensity reduces the negative effects of low levels of marketing investment intensity and increases the positive effect of high levels marketing investment intensity.

We expect increasing levels of investment productivity to reduce the negative effects of low marketing investments and amplify the positive effect of high levels of marketing

investment intensity on shareholder value. Investment productivity captures how well a firm is able to transform its expenditure into revenue. Greater investment productivity is indicative of the firm's ability to get the best use of, and the most value from, its capabilities. In the case of low levels of marketing investment, it is important for firms to be investment productive in order to make the most of their limited resources. A firm is considered productive if it is able to maximise its value given its resource constraints (Nath et al, 2010). Investment productivity supports a firm to better leverage its resources to enhance shareholder value in the case of low levels of marketing investments.

As significant investments in marketing activities should increase shareholder value, this positive impact is further enhanced by increased investment productivity. With high levels of marketing investments and increasing levels of investment productivity, firms gain a greater ability to derive financial reward from any dollar investment, and gain a greater future ability to invest in further market growth. Such combination will benefit shareholder value because of the firm's superior position to garner longer-term performance and its superior projected future health (Mittal et al., 2005). Thus:

H5: Investment productivity positively moderates the curvilinear relationship between marketing investment intensity and shareholder value. Investment productivity reduces the negative effects of low levels of marketing investment intensity and increases the positive effect of high levels marketing investment intensity.

Competitive intensity is beneficial because it forces the firm to be more efficient and effective in using its resources, to react quickly to competitors' moves, and to intensify its efforts to differentiate itself from the competition (Powell, 1996; Ramaswamy, 2001). This 'competition leads to competence' approach (Barnett et al., 1994; Levinthal and Myatt, 1994) suggests that the more competitive the market, the better firms are in using their resources

and capabilities to overcome these competitive challenges. Firms tend to undertake greater learning in highly competitive markets, challenging their current practices and exploring innovative ways of satisfying customer needs (O’Cass and Weerawardena, 2010). Competing in intense markets also requires the firm to actively monitor and respond to customer and environmental changes. Consequently, firms operating in competitively intense markets are more likely to innovate (Abebe and Angriawan 2014) and be more effective and efficient in using their existing resources to meet changing customer needs (Sousa and Lengler, 2011). As competitions increases, firms are forced to find novel means to differentiate themselves and develop new offerings that provide superior customer value (Heirati et al., 2016) thereby generating customer loyalty that supports shareholder value. Taken together, firms competing in highly intense markets should be in a better position to simultaneously minimize the negative and enhance the positive effects of marketing investments on shareholder value.

Thus:

H6: Competitive intensity positively moderates the curvilinear relationship between marketing investment intensity and shareholder value. Increasing levels of competitive intensity reduces the negative effects of low levels of marketing investment intensity and increases the positive effect of high levels marketing investment intensity.

DATA AND MEASUREMENT

Data

A detailed panel dataset was generated from COMPUSTAT for 2004-2014, for US firms only. The firm-year is our unit of analysis. We have not filtered the sample by size or revenue to avoid sample selection bias, but we include relevant industry and firm level variables to control the size effect. We did not limit industry, but our choice of theoretical variables gears

us towards those firms making marketing, R&D, operations and human capital investments. To account for a time-lag effect, all independent variables, moderators and control variables were lagged to the dependent variable by one year. This generated 8469 data points after missing values, in which observation numbers are 1085 (observations in 2004 are excluded in the final observation numbers due to taking the time lag effect into account), 210, 1070, 1060, 1053, 1031, 990, 937, 908, 925 and 285 across 2004-2014 respectively.

Measurement

Measures are reported in Table 2, and their descriptive properties in Table 3. The dependent variable, *shareholder value*, is measured using Tobin's q. Tobin's q is comparable across firms and industries and is a numeric value based on each firm and year unit. We calculate Tobin's q following prior studies (Luo and Donthu, 2006; Rao et al., 2004).

[Insert Tables 2 and 3 here]

We measure all investment intensity variables by taking their comparative values for each firm-year unit. *Marketing investment intensity* is calculated as marketing expenditure divided by total annual sales. Consistent with extant works (see Table 2), selling, general and administrative expenses (SG&A) is used as a proxy for marketing expenditure because it is made up of direct and indirect costs associated with marketing. SG&A is better than a single marketing expenditure item (e.g., advertising) because it includes more items associated with marketing investment (e.g., advertising spend, promotional spend, sales force costs) (Dutta et al., 1999; Mizik and Jacobson, 2007). To prevent double-counting, R&D expenses were subtracted as the SG&A value in COMPUSTAT includes this (Mizik and Jacobson, 2007). *R&D investment intensity* is the ratio of R&D expenditure to total annual sales (Anderson et al., 2004). *Operation investment intensity* is measured as a ratio of net property, plant and equipment (PPE) to gross PPE. *Human capital productivity* is calculated as the ratio of total

annual turnover to number of employees. Higher values imply that the firm has made better investments in its employees, enabling them to achieve higher levels of financial output per employee (Datta et al., 2005). *Investment productivity* measures how well a firm functions, calculated as the ratio of total annual sales to the sum of SG&A and cost of goods sold. By having high investment productivity, the relative saved investment per dollar (by having superior ‘output’ from any dollar investment) can be invested in other projects (Anderson et al., 1997; Mittal et al., 2005; Ofek and Sarvary, 2003). *Competitive intensity* measures the level of competition in each industry by the number of firms existing in a 4-digit SIC.

We include firm-level and industry-level control variables. We control for *firm size* as larger firms may hold larger resource stocks that influence shareholder value. The natural logarithm of the number of employees³ measures firm size. *Return on assets* (ROA) indicates how efficiently senior managers use the firm’s assets to generate earnings. Studies report that ROA impacts Tobin’s q (Luo and Donthu, 2006). We measured ROA with the ratio of net income to assets and controlled for its influence at time $t - 1$ when computing Tobin’s q at time t . *Acquisitions value* was measured as the costs of acquisitions made. *S&P quality index* was measured according to Standard & Poor’s seven ratings categories. *Financial crisis* was measured as a dummy variable (1 if year is 2007, 2008 or 2009; 0 otherwise). We include 4-digit SIC and year dummies to control *industry-* and *year-*level variance.

ANALYTICAL MODELS

Baseline Model

We start with a baseline model (Model 1) in which all impact of unobservable variables on the relationships between the dependent variable and independent variables is completely ignored. No interaction terms are included. We specify the baseline model as:

³ We tested the raw number of employees as an alternative measure. Our findings were robust to the alternative operationalization.

$$\begin{aligned}
TobinQ_{it} = & m + \beta_1 \text{MI}_{it-1} + \beta_2 \text{RDI}_{it-1} + \beta_3 \text{OI}_{it-1} \\
& + \beta_4 \text{HCI}_{it-1} + \beta_5 \text{IP}_{it-1} + \beta_6 \text{COMP}_{it-1} + \sum \beta_{ctrl} \text{Controls}_{it-1} + e_{it}
\end{aligned} \tag{1}$$

where

$$E(e_{it}e_{i't'}) = \begin{cases} \hat{\sigma}^2 & \text{if } i = i', t = t' \\ \hat{0} & \text{else} \end{cases}$$

Controlling for Firm-Level and Time-Level Unobserved Heterogeneity

Since we hypothesise a U-shaped relationship between marketing investment intensity and Tobin's q, and we are focused on the moderating effects of RDI, OI, HCI, IP and COMP on this relationship. We add the squared term of marketing investment intensity to compose Model 2. Then we add the interaction terms between marketing investment intensity and the other strategic variables as well as the interaction terms between the squared term of marketing investment intensity and the other strategic variables, respectively, into Model 2 to compose Model 3. All independent and moderating variables are operationalised following Aiken and West (1991) to avoid multicollinearity. To compute the time-lagged effect, we set Tobin's q at time t and set all regressors at time $t - 1$. We test endogeneity and disturbances potentially caused by multicollinearity and heteroscedasticity. VIF values (Table 3) range from 1.06 to 1.81, suggesting that multicollinearity is not a concern. However, Breusch-Pagan tests confirm that heteroscedasticity is present in our data; therefore, we correct the estimate by calculating robust standard errors in the computation process⁴. We control for unobserved heterogeneity in firm-level factors and time-level factors due to the unobserved

⁴ We also computed the Driscoll-Kraay standard errors and found they are consistent with standard error estimates obtained from the covariance matrix estimators in our results.

heterogeneity resulting in large variance for cross-sectional time-series data. We specify two-way fixed effects models (Model 2 and Model 3) with Tobin's q as dependent variable⁵:

$$\begin{aligned} \text{Tobin}Q_{it} = & (\alpha + \mu_i + \gamma_t) + \beta_1 \times MI_{it-1} + \beta_2 \times RDI_{it-1} + \beta_3 \times OI_{it-1} \\ & + \beta_4 \times HCI_{it-1} + \beta_5 \times IP_{it-1} + \beta_6 \times COMP_{it-1} + \beta_7 \times MIS_{it-1} + \sum \beta_{ctrl} \times \text{Controls}_{it-1} + \varepsilon_{it} \end{aligned} \quad (2)$$

$$\begin{aligned} \text{Tobin}Q_{it} = & (a + m_i + g_t) + b_1 \cdot MI_{it-1} + b_2 \cdot RDI_{it-1} + b_3 \cdot OI_{it-1} \\ & + b_4 \cdot HCI_{it-1} + b_5 \cdot IP_{it-1} + b_6 \cdot COMP_{it-1} + b_7 \cdot MIS_{it-1} + \hat{a} b_8 \cdot MI_{it-1} \cdot \text{Interactions}_{it-1} + \hat{a} b_9 \cdot MIS_{it-1} \cdot \text{Interactions}_{it-1} \\ & + \hat{a} b_{ctrl} \cdot \text{Controls}_{it-1} + e_{it} \end{aligned} \quad (3)$$

where

α	= Intercept;
μ_i	= Firm-specific effect on intercept;
γ_t	= Time-specific effect on intercept;
MI	= Marketing Investment Intensity;
RDI	= R&D Investment Intensity;
OI	= Operations Investment Intensity;
HCI	= Human Capital Productivity;
IP	= Investment Productivity;
COMP	= Competitive Intensity;
MIS	= Square term of marketing investment intensity;
MI×Int.	= Interaction terms among RDI, OI, HCI, IP, COMP and linear term of marketing investment intensity;
MIS×Int.	= Interaction terms among RDI, OI, HCI, IP, COMP and square term of marketing investment intensity;
Controls	= Control variables including firm size, ROA, S&P quality index, acquisitions, financial crisis, 4-digit SIC, and year dummies
ε_{it}	= Error term, following normal distribution with constant variance σ^2 .

Robustness Tests

Panel data are associated with cross-sectional and/or time-series effects. If an individual firm or time has different intercept in the regression equation, then a fixed effects model is preferred. However, if an individual firm or time has different disturbance, a random effects

⁵ We computed the cubic term of marketing investment intensity, but it is insignificant. We also computed the regression that corrects the first-order correlation errors. The results are consistent with those reported in Table 5. Moreover, we tested the model by adding lagged Tobin's q as a control variable. The results are highly comparable to those of Model 3. Thus, serial correlation of Tobin's q does not bias our results.

model is suitable. To select the correct estimation model, we specify and examine a fixed group and time-effect model (two-way fixed effects model) and a random group and time-effect model (two-way random effects model). First, we set a pooled OLS model as a benchmark. Second, we employ Pagan and Hall's (1983) test to compare a random effects model with the pooled OLS model. In a random effects model, error variances are assumed to be varying across groups and/or times. We have a general function form of random effects model as $y_{it} = \alpha + X'_{it}\beta + (u_i + v_{it})$. The null hypothesis is that cross-sectional variance components are zero, $H_0 : \sigma_u^2 = 0$. As shown in Table 4, the Pagan-Hall test statistic is significant ($\chi^2(302)_{TobinQ} = 908.14, p < .01$), and a random effects model is preferred to pooled OLS.

[Insert Table 4 here]

We use an incremental F-test to detect the existence of fixed effects. Given the general function form of fixed effects model, $y_{it} = (\alpha + u_i) + X'_{it}\beta + v_{it}$, the null hypothesis is that intercepts are constant across groups and/or times. $H_0 : u_1 = u_2 = \dots = u_{n-1} = 0$. Based on loss of goodness-of-fit, the F-statistic rejects the null hypothesis. Hence, a fixed effects model is preferred to the pooled OLS model. We use Hausman's (1978) test to compare the random effects model with the fixed effects models (one-way fixed vs. random effects; two-way fixed vs. random effects). The test results indicate that the coefficients estimated by the relatively consistent fixed effects model are significantly different from those estimated by the relatively efficient random effects ($p < 0.01$ in both cases). Thus, the fixed effects model is better than the random effects model⁶.

Moreover, we replaced the dependent variable Tobin's q with *Dividends* (a firm's total dividends value) as an alternate conceptualisation of shareholder value. We composed

⁶ Results of a Mundlak test (1978) are consistent with the Hausman results and favour the fixed effects model.

Models 4, 5 and 6 using *Dividends* as dependent variable and used the same group of explanatory variables as Models 1, 2 and 3, respectively. We report results of Models 1-3 in Table 5 and Models 4-6 in Table 6. The results are comparable.

[Insert Tables 5 and 6 here]

RESULTS

Effects of Marketing Investment Intensity on Tobin's q

Reflecting on Table 5, the magnitude, sign and significance of coefficients are consistent between the models. For the control variables, Model 3 shows that firm size and the financial crisis period have negative impacts on shareholder value; ROA and S&P quality index have positive impacts; and acquisition costs have no significant impact. In Model 3 on Tobin's q, marketing investment intensity has a linear term (MI) and a quadratic term (MIS). The linear term defines the rate of change of Tobin's q when marketing investment intensity is equal to zero; while the quadratic term determines both the direction and steepness of the curvature. As marketing investment intensity equal to zero does not provide meaningful findings, we standardise independent variables and moderators from each value before running regressions.

We use the full model (Model 3) to interpret the results⁷. In Model 3, we observed a positive and significant coefficient for marketing investment intensity (Marketing Investment Intensity_{TobinQ}: $\beta=1.490$, $t=11.82$, $p<0.001$) and the quadratic term of marketing investment intensity (MIS_{TobinQ}: $\beta=1.495$, $t=2.89$, $p<0.01$). The positive quadratic term shows that the curvature is convex, suggesting a U-shaped relationship between marketing investment intensity and Tobin's q. Continued increases in marketing investment intensity will lead to greater increases in Tobin's q at accelerating speed.

⁷ According to Dawson (2014), results interpretation should rely on the full model instead of other mis-specified ones, because "if the interaction term is significant, then it does not make sense to interpret versions of the model that do not include it, as those models will be mis-specified and therefore violating an assumption of regression analysis" (p.13).

Following Aiken and West (1991), we plot the curvilinear relationship between Tobin's q and marketing investment intensity in Figure 2 across scenarios when marketing investment intensity moves from low to high (± 1 standard deviation). Increasing marketing investment intensity will not increase Tobin's q if the proportion of marketing investment is low (because the slope of MIS at -1 SD is not significant, $p > 0.1$). Conversely, as marketing investment intensity increases, the positive quadratic effect will strengthen the linear effect. Moreover, the steepness of the curvilinear line increases as marketing investment intensity increases in Figure 2. This suggests that the speed of increase in Tobin's q will become larger with higher marketing investment intensity. Therefore, H₁ is supported.

[Insert Figure 2 here]

Non-linear Moderating Effects

The results of Model 3 show that the interaction term between MI and RDI and one between MIS and RDI are significant at the 0.05 level; the interaction term between MIS and IP is significant at the 0.01 level; and the interaction term between MI and COMP is significant at the 0.01 level and the interaction term between MIS and COMP is significant at 0.001 level.. Thus, by looking at the coefficients alone, H₂ (R&D), H₅ (investment productivity) and H₆ (competitive intensity) are supported. In contrast, neither the respective linear nor quadratic interaction terms between MI/MIS and HCI/OI are significant. Therefore, H₃ (human capital) and H₄ (operations investment) are not supported.

To fully understand the support for H₂, H₅ and H₆, we follow Aiken and West (1991) to visualise the non-linear moderating effects of our significant moderator variables (RDI, IP, and COMP) and the curvilinear curves themselves (plotted in Figure 3). We also test where each pair of curves in Figure 3 are significantly different from each other. We plot 95% confidence intervals of each set of two curves in Figures 3a-c (where CIH refers to the higher-bound confidence interval and CIL refers to the lower-bound confidence interval)

(Wales et al., 2013). These plots can be interpreted as follows: the X-axis indicates how a one-unit increase in MI and a one-unit increase in RDI (or IP, COMP) affect marginal performance on the Y-axis. A U-shaped relationship indicates that the joint effects decrease down to a certain point and incline afterwards. As Figure 3 shows, the zone of significance starts from the dashed vertical line and continues to the left. At lower and medium values of the unitary increase in MI, the moderating effects of RDI/IP/COMP are significant. However, as MI increases to a high level, the moderating effects of RDI/IP/COMP lose significance because the lines are converging together and there are no significant differences between those lines.

[Insert Figure 3 here]

Therefore, H₂, H₅ and H₆ are supported when MI is at a low-to-medium level. Moreover, to generate inference from these findings, we further observe the position of lines. According to the position of lines in Figure 3, the values of Tobin's q are higher when RDI/IP/COMP are high than when they are low when MI is at a low-to-medium level. That is, the lines of the moderators when they are high are above the lines of the moderators when they are low. Shareholder value is better when RDI/IP/COMP are high than when they are low when MI is at a low-to-medium level.

DISCUSSION

Given marketing's struggle against the accountability agenda, we sought to evidence the shareholder value of making marketing investments. We developed and tested a theoretical framework predicting the quadratic effects of marketing investment on shareholder value, its effects in combination with other investments, and whether its value is contingent on the firm's investment productivity and the competitive intensity it faces. Our results support a U-shaped relationship between marketing investment intensity and shareholder value,

moderated by the firm's R&D investments, its investment productivity and competitive intensity when MI is at a low-to-medium level. We conclude that: (1) the shareholder value of marketing investment depends on whether the investment is sufficient and above a threshold before which its effects are negative; (2) marketing investment should be assessed concurrently with R&D investment; and (3) boundary conditions to marketing investment's relationship with shareholder value include competitive intensity and the firm's productivity at converting investments into sales. Without these considerations, marketing may be scapegoated for failings to do with insufficient investment, co-investment elsewhere in the firm and the firm's own malaise in failing to deliver shareholder value.

Implications for Research and Theory

We extend the corpus of literature that has sought to substantiate marketing's value to senior management. The quadratic U-shaped effects we reveal contribute much-needed theoretical insight from capital investment theory and the RBV of the firm. Past research has focused largely on firm financial performance, which treats only one problem relevant to senior managers for whom shareholder value carries considerable importance. By visualising marketing investment as capability-building efforts, we contribute to the literature by conceptualising and empirically demonstrating quadratic effects that have previously been viewed as linear. Our findings extend those of Dutta et al. (1999), Feng et al. (2017), Homburg et al. (2015), Luo and de Jong (2012), Luo and Donthu (2006), Mishra and Modi (2016), and Verhoef and Leeflang (2009) by connecting marketing investments to shareholder value.

We show that the effect of marketing investment intensity on shareholder value depends on understanding the interaction it has with other investments that senior managers can make. The effect of marketing investment intensity is U-shaped, and its interaction with

other investments can increase shareholder value across low-to-medium levels of marketing investment intensity, but less so when marketing investment intensity is sufficiently high. For example, R&D investment intensity interacts positively with the marketing investment intensity quadratic term to amplify shareholder value. High investment in marketing and R&D could lead a firm to form more complex innovation capabilities, where it becomes effective at developing and commercialising new product ideas and technologies. Such combinations reveal the power of marketing investment. Marketing investment intensity did not interact significantly with operations investment intensity or human capital productivity for shareholder value. While unexpected, our robustness test indicated that the coefficients for operations (positively) and human capital (negatively) do moderate the relationship with dividends (as an alternative measure of shareholder value). This reveals the sensitivity of marketing investments to alternative dependent variables.

This discussion yields our first contribution. By drawing on theories of capital investment, the RBV and resource combination, we provide new knowledge about the system of effects marketing investment has with the most-important concurrent investments senior managers can make in generating longer-term shareholder value. We evidence how marketing investments can generate shareholder value in ways that cannot necessarily be foreseen by senior management due to causal ambiguity. This contribution extends current works that have yet to consider these interactions or when doing so have only examined their effects on short-term financial performance and not shareholder value creation (e.g., Feng et al., 2017; Germann et al., 2015; Homburg et al., 2015; Katsikeas et al., 2016; Luo, 2008; Luo and de Jong, 2012; Verhoef and Leeflang 2009). The impact of marketing investments can be better understood by considering its interactions with other concurrent investments made by the firm.

Our findings highlight the moderating role of investment productivity and competitive intensity. Investment productivity captures a firm's ability to convert expenditure into sales and is indicative of its effectiveness at using the capabilities it invests in to generate greater value. Investment productivity explains how an injection of financial capital into a particular activity may otherwise create outcomes of varying quality. When marketing investment intensity is low-to-medium, investment productivity has a large positive effect on the association between marketing investment intensity and shareholder value, albeit increases in shareholder value associated with increases in investment productivity decelerate as marketing investment intensity increases. The same is seen with competitive intensity. These findings are important because concerns held about the shareholder value of investing in marketing may be misplaced or superficial if investment productivity and competitive intensity are not taken into account neglects far greater ailments in the firm.

This yields our second contribution. Investment productivity and competitive intensity are boundary conditions that affect shareholder value created from marketing investment. Investment productivity represents the firm's talent at using its capabilities to generate revenue and yields new information on why differences in shareholder value exist and persist among firms investing in marketing. The ability of the firm to convert expenditure into revenue can be at fault for marketing investment delivering little shareholder value. This draws attention to the firm itself for the first time.

Implications for Managers

Senior managers should avoid myopic assessments of the contribution of marketing investment intensity to shareholder value, and account for contingencies acting on this contribution. Senior managers should *protect* and *increase* marketing investment intensity because once over the threshold of its quadratic relationship, the effects of marketing

investment intensity on shareholder value are positive and accelerating. Marketing managers can use this evidence to push for larger budgets but with a narrative that speaks directly to the accountability agenda facing senior managers.

Senior managers under pressure to “make the year” often cut marketing investment and/or investments in related business activities. This is potentially destructive. Senior managers should align marketing and R&D because of the latter’s positive moderating effect. Operations investments could also be prioritised. Despite no significant moderating effect on the relationship between marketing investment intensity and shareholder value, it exhibited a positive moderation effect on dividends in our robustness test. Marketing managers should locate allies in these functions to work together for a greater co-share of financial budgets. When invested in strategically and in combination with other investments, marketing can generate improvements in shareholder value.

The moderating effect of investment productivity is important for marketing managers and senior managers. When a firm is unable to maximise revenue given its resource constraints, far greater problems exist in the *firm* than in any one functional area. Failings in the firm’s investment productivity point to problems in the firm’s strategic architecture. Pessimism about marketing as an investment might mask these problems.

Limitations and Future Research

Our work offers important directions for future research. First, we studied US firms only. Data from other regions would help broaden generalisability. Second, investments are accurate proxies for capability-building efforts (Maritan, 2001), but we did not test whether our firms actually created capabilities or what form those capabilities took. Stochastic frontier estimation (SFE) can be used to measure singular capabilities (Dutta et al., 2005). Recent meta-analyses of capabilities and performance have called for objective measurement to

offset larger effect sizes reported for perceptual data (Karna et al., 2016). Our measures, converted into SFE, offer a way forward. Third, we do not conceptualise shareholder value to include share price. COMPUSTAT only offers quarterly share price information. Fourth, some organizations use zero-based marketing budgets (Ad Age, 2016) and blur the boundaries between marketing and other functions (Joshi and Giménez, 2014). These resist objective measurement but represent important future research directions. Marketing as a function has changed as organisational configurations have altered (Whitler and Morgan, 2017). The diffusion of Agile principles with Guilds, Chapters and Squads along with SCRUM-based project management often clouds how clearly marketing investments are aligned with hitherto traditional marketing activities. Scholars should look to capture the evolution of marketing within organisations, through qualitative work and simulations, to further understand its role in value creation. Fifth, SG&A as a measure of marketing investment has limitations. For example, the CMO of Visa, Antonio Lucio, was recently invited to also lead Human Resources in an effort to better align the firm's strategy with how Visa employees are recruited, developed, retained and rewarded. Such events create opportunities for marketing but also management challenges and measurement difficulties⁸. Sixth, we could not capture firms' marketing strategy. Using a carefully-generated list of terms, computer-aided text analysis of company documents (e.g., letters to shareholders or 10-K filings) could be used to objectively measure marketing strategy in future studies. Seventh, investments and their configuration may perform differently across stages of the technology life cycle. Concurrently, investment decisions are not made in a vacuum and may be subject to external shocks and variability due to competitor actions or seasonal changes. Our data captures the *actual* amount spent at the end of a given year and not the amount spent per month or budgeted per year. Such variance is potentially important. Quarterly earnings

⁸ We thank an anonymous reviewer for the valuable recommendations detailed in the fourth and fifth limitations.

reports offer some information about income and investments compared to annual statements but do not contain data on all variables in our model. Eighth, investment productivity should equally moderate the effects of other investments on shareholder value. Finally, we could not control for CME and CEO turnover with our dataset. New incoming officers may change the pattern and allocation of investment, potentially disrupting the effects of marketing investment.

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Table 1. Summary Table of Empirical Studies of Marketing Actions on Financial Outcomes

Author(s)	Antecedent	Empirical findings
McKee, Varadarajan and Pride (1989)	Marketing effort	Marketing effort (used synonymously elsewhere in the paper with marketing tactics) differentially affect adaptive capability, which is then related to financial performance.
Zahra and Covin (1993)	Marketing intensity	Marketing intensity positively affects an aggressive technological posture and new product development and these technology policy choices differentially affect firm financial performance.
Kerin and Sethuraman (1998)	Brand value	A positive association between brand value and shareholder value.
Barth et al. (1998)	Brand value	A positive association between brand value and capital market valuation.
Aaker and Jacobson (2001)	Brand attitude	A positive association between brand attitude and firm value.
Kotabe, Srinivasan and Aulakh (2002)	Multinationality	Marketing capabilities moderate the impact of multinationality on financial and operational performance (short-term performance).
Anderson, Fornell and Mazvancheryl (2004)	Customer satisfaction	A positive association between customer satisfaction and shareholder value.
Rao, Agarwal and Dahlhoff (2004)	Branding strategies	Corporate branding strategy is associated with higher values of Tobin's q, and mixed branding strategy is associated with lower levels of Tobin's q.
Pauwels et al. (2004)	Sales promotion	Sales promotions diminish long-term firm value, even though they have positive effects on revenues and, in the short run, on profits.
Hooley et al. (2005)	Marketing resources	Resources impact on financial performance indirectly through creating customer satisfaction and loyalty and building superior market performance.
Gupta and Zeithaml (2006)	Customer metrics	Customer lifetime value and customer equity provide a good basis to assess the market value of a firm.
Luo and Donthu (2006)	Marketing communication productivity (MCP)	MCP has an inverted U-shaped influence on shareholder value.
Madden, Fehle and Fournier (2006)	Brand equity value	A positive association between brand equity value and shareholder value.
Fornell et al. (2006)	Customer satisfaction	A positive association between customer satisfaction and shareholder value.
Sorescu et al. (2007)	New product preannouncement	The more specific the content of a preannouncement, the higher are the stock returns in the short run. Furthermore, updating investors after the preannouncement leads to higher stock returns in the long run.
Mizik and Jacobson (2007)	Marketing expenditures	The long-term financial consequences to the firm of artificially inflating earnings by cutting marketing expenditures outweigh the short-term benefits.
O'Sullivan and Abela (2007)	Ability to measure marketing performance (or marketing effort in the job)	Ability to measure marketing performance has a significant impact on firm performance, profitability, stock returns, and marketing's stature within the firm.
Krasnikov and Jayachandran (2008)	Marketing capability	Marketing capability has a stronger positive impact on firm performance than research-and-development and operations capabilities.
Luo (2008)	Marketing expenditures	The higher the firms' pre-IPO marketing expenditures, the lower is the IPO under-pricing, and

Mizik and Jacobson (2008)	Brand attributes	the higher is IPO trading in financial markets. Analysis shows that perceived brand relevance and energy provide incremental information to accounting measures in explaining stock returns.
Kumar and Shah (2009)	Customer life time value (CLV)	A positive association between CLV and shareholder value.
Joshi and Hanssens (2009)	Advertising	Movies with above average prelaunch advertising have lower post-launch stock returns than films with below average advertising.
Wang et al. (2009)	Advertising	Negative persistence effects of advertising to firm intangible values.
Srinivasan et al. (2009)	Marketing investments	The stock-return impact of new-product introductions is higher when they are backed by substantial advertising investments. Promotional incentives do not increase firm-value effects of new product introductions, as they may signal an anticipated weakness in demand for the new product. The stock-return impact of new-product introductions is higher for innovations with higher levels of brand's perceived quality.
Verhoef and Leeflang (2009)	Marketing department's influence	There is no direct relationship between marketing influence and business performance
Vorhies et al. (2009)	Marketing capabilities	Architectural and specialized marketing capabilities, and their integration, positively mediate the product-market strategy and cash flow performance (short-term financial performance). (Controlled for marketing expenditure.)
Grewal et al. (2010)	Customer satisfaction heterogeneity	Shareholder value is shaped by the interplay of customer satisfaction level and heterogeneity, through their impact on retention sales, acquisition sales, and servicing costs.
Joshi and Hanssens (2010)	Advertising	Advertising spending has a positive, long-term impact on own firms' market capitalization
Torres and Tribó (2011)	Customer satisfaction	Customer satisfaction has a positive impact on shareholder value up to a certain level, beyond which the effect is negative
O'Sullivan and McCallig (2012)	Customer satisfaction	Customer satisfaction has a positive impact on firm value.
Luo and de Jong (2012)	Advertising	Advertising spending increases firm value in terms of both return and risk metrics and firm financial performance
Kurt and Hulland (2013)	Marketing expenditures	Aggressive marketing spending has a more pronounced impact on firm value during the two-year post-offering period than any other period.
Sridhar et al. (2014)	Advertising	Advertising spending has a positive impact on firm value.
Qiu (2014)	Product diversification	Product diversification positively affects the firm's market value (Tobin's q).
Malshe and Agarwal (2015)	Customer satisfaction	Customer satisfaction has a positive impact on Tobin's q.
Germann et al. (2015)	Chief Marketing Officer (CMO)	CMO presence has a positive impact on Tobin's q.
Feng et al. (2015)	Marketing department power	A powerful marketing department enhances firms' longer-term future total shareholder returns beyond its positive effect on firms' short-term return on assets (ROA)
Vomberg et al. (2015)	Brand equity	Positive effect of brand equity on firm value.
Homburg et al. (2015)	Marketing department's influence	Marketing department's influence has a positive impact on customer relationship performance and on the firm's financial performance
Lariviere et al. (2016)	Customer satisfaction	The influence of customer satisfaction and loyalty intentions on shareholder value varies by industry.

Mishra and Modi (2016)	Marketing capability	Marketing capability has a significant and positive effect on stock returns
Fornell et al. (2016)	Customer satisfaction	Stock returns on customer satisfaction are above the market
Edeling and Fischer (2016)	Marketing investments	Marketing-mix decisions such as advertising spending translate into financial results for firms that are appreciated by the stock market.
Feng, Morgan and Rego (2017)	Marketing capability	To enable future revenue and profit growth firms need to invest in building stronger marketing capabilities

Table 2. Data Measurements

Variables	Definition	Data Measurements	The source of the measure
Tobin's Q	Value of the firm—the ratio between a physical asset's market value and its replacement value	The result of ((Market value + liquidating value of preferred stock + short term liabilities - short term assets + book value of long term debt) / Book value of total assets) at time <i>t</i> and the following variables at time <i>t-1</i>	Haleblian, McNamara, Kolev and Dykes, 2012; Lee and Grewal, 2004; Luo and Donthu, 2006; Rao, Agarwal and Dahlhoff, 2004
Marketing Investment Intensity	The level of investment firms make in marketing	The result of (SG&A – R&D / Sales)	Denekamp 1995; Kotabe, Srinivasan and Aulakh, 2002; Toyne, 1976; Tsai and Eisingerich, 2010; see also Mizik and Jacobson (2007)
R&D Investment Intensity	The level of investment firms make in technology	The results of (R&D investment / Sales)	Baysinger and Hoskisson, 1989; Cohen and Klepper, 1992; Haleblian et al., 2012; Hundley, Jacobson and Park, 1996; Long and Ravenscraft, 1993; Tsai and Eisingerich, 2010; Zhang, Li, Hitt and Cui, 2007
Operation Investment Intensity	The level of investment firms make in operations	The result of (Net PPE / Gross PPE)	This study. Ratio of book value of investments in operational assets with the actual spent on operational assets.
Human Capital Productivity	Revenue per employee	The result of (Productivity = Sales/Employees)	Campbell, Ganco, Franco, and Agarwal, 2012; Datta, Guthrie and Wright, 2005; Koch and McGrath, 1996)
Investment Productivity	Revenue per cost of sales	The result of (Sales / (SG&A + cost of goods sold)	This study
Firm Size	Size of firms	The logarithm of number of employees	Luo and Donthu, 2006; Wales, Patel, Parida and Kreiser, 2013
Competitive Intensity	The level of competition concentration within an industry	The number of firms in the same 4-digit Standard Industrial Classification code for each firm-year observation	Luo and Donthu, 2006
ROA	Return of assets	The ratio of net income before extraordinary items to assets	COMPUSTAT
Acquisitions value	The effect of either a purchase and/or pooling of interest acquisition in the current year on a firm's sales	The costs relating to acquisition of a firm	COMPUSTAT
S&P Quality Index	S&P Dow Jones Indices	Standard & Poor's grades ratings into seven categories ranging from A1+ (the highest quality obligation, coded as 7) to D (the lowest quality obligation, coded as 1)	COMPUSTAT
Financial Crisis	US financial crisis	A dummy variable coded as 1 if year is 2007, 2008 or 2009; 0-others	Thakor, 2015
Time period		2004-2014	COMPUSTAT
Data source		COMPUSTAT	

Table 3. Descriptive Statistics

	Variables	Mean	Sd.	Min	Max	1	2	3	4	5	6	7	8	9	10	11	VIF
1	Tobin's Q	1.77	3.44	-0.72	163.35	1											
2	Marketing Investment Intensity	0.38	0.58	0.00	16.52	0.17*	1										1.81
3	R&D Investment Intensity	0.09	0.29	0	16.75	0.05*	0.52*	1									1.40
4	Operation Investment Intensity	0.44	0.19	0	1.00	-0.01	0.05*	0.01	1								1.18
5	Human Capital Productivity	326.19	417.94	4.14	12303	0.01	-0.07*	-0.04*	0.03*	1							1.10
6	Investment Productivity	1.14	0.30	0.03	10.53	0.02*	-0.06*	-0.04*	0.01	0.01*	1						1.45
7	Competitive Intensity	137.41	172.37	1	488	0.03*	0.15*	0.19*	-0.09*	-0.01*	-0.01	1					1.36
8	Firm Size	0.15	2.30	-6.91	7.65	-0.05*	-0.26*	-0.14*	0.11*	-0.07*	-0.08*	-0.22*	1				1.71
9	ROA	0.02	0.03	-0.23	0.55	-0.01	-0.08*	-0.04*	-0.01*	-0.01	-0.02*	-0.15*	0.18*	1			1.27
10	Acquisition	86.84	701.37	0	43123	-0.01	-0.03*	-0.02*	0.05*	-0.01	-0.01	-0.02*	0.17*	0.02*	1		1.06
11	S&P Quality Index	2.63	1.91	0	8	-0.02*	-0.12*	-0.08*	-0.14*	-0.02*	-0.04*	-0.32*	0.29*	0.19*	0.04*	1	1.49
12	Financial Crisis	0.33	0.47	0	1	0.01	0.01	0.01	0.02*	-0.01	-0.01	-0.05*	-0.01	0.01*	0.01*	0.02*	1.06

Note: * p<.05

Table 4. Fixed Effects Model Specifications Results

Model Specification tests:	Test Statistics	p Value	Conclusion
Tobin's Q as dependent variable			
Random firm effects versus pooled OLS	$\chi^2(302)=908.14$	p<.01	One way random effects model is preferred.
Fixed firm effects versus pooled OLS	F(28, 6625)=16.75	p<.01	One way fixed effects model is preferred.
Random firm effects versus fixed firm effects	$\chi^2(25)=313.28$	p<.01	One way fixed effects model is preferred.
Fixed firm and time effects versus random firm and time effects	$\chi^2(20)=145.24$	p<.01	Two-way fixed effects model is supported.

Table 5. Marketing Investment Intensity and Shareholder Value

	Model 1		Model 2		Model 3	
DV: Tobin's Q	β	t	β	t	β	t
Control Variables						
Firm Size	-0.224***	-6.59	-0.163***	-6.93	-0.125***	-7.02
ROA	10.171***	5.75	10.275***	5.67	10.589***	6.20
Acquisition	0.000	1.62	0.000	0.90	0.000	0.22
S&P Quality Index	0.095***	4.50	0.091***	4.50	0.087***	4.44
Financial Crisis	-0.494**	-3.13	-0.473**	-3.07	-0.428**	-2.67
4-digit Standardized industry code	Included		Included		Included	
Year dummy	Included		Included		Included	
Main Effects						
Marketing Investment Intensity (MI)	0.742***	8.32	1.281***	8.30	1.490***	11.82
R&D Investment Intensity	-0.227***	-4.09	0.092	0.82	0.593***	3.57
Human Capital Productivity	-0.025	-0.46	0.023	0.42	0.149	0.99
Operation Investment Intensity	0.146***	4.57	0.143***	5.37	0.146***	6.14
Investment Productivity	0.137	0.90	0.213	1.16	0.292	1.93
Competitive Intensity	0.219***	5.32	0.135***	3.62	0.028	0.58
MIS			-0.045***	-3.89	1.495**	2.89
Interaction Terms						
MI \times R&D Investment Intensity					-0.044*	-2.09
MI \times Human Capital Productivity					0.359	1.48
MI \times Operation Investment Intensity					-0.046	-0.37
MI \times Investment productivity					0.349	1.38
MI \times Competitive Intensity					-0.338**	-2.76
MIS \times R&D Investment Intensity					0.001*	2.01
MIS \times Human Capital Productivity					0.052	0.43
MIS \times Operation Investment Intensity					0.003	0.44
MIS \times Investment productivity					0.419**	3.18
MIS \times Competitive Intensity					0.047***	3.89
Log likelihood	-19810.3		-19686.4		-19535.8	
Number of data points	8469		8469		8469	
Akaike's information criterion	39650.59		39404.74		39123.56	
Bayesian information criterion	39756.25		39517.44		39306.7	

Notes:

MIS= Marketing Investment Intensity Square term. All independent variables are at time $t-1$. Akaike's information criterion and Bayesian information criterion penalize the complexity for model misspecifications.

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 6. Marketing Investment Intensity and Dividends

	Model 4		Model 5		Model 6	
DV: Dividends	β	t	β	t	β	t
Control Variables						
Firm Size	0.458***	27.98	0.472***	27.25	0.522***	30.03
ROA	7.211***	11.43	7.004***	10.91	6.734***	13.84
Acquisition	0.000***	8.91	0.000***	8.93	0.000***	9.13
S&P Quality Index	0.080***	8.07	0.081***	8.13	0.078***	8.48
Financial Crisis	-0.220	-1.68	-0.213	-1.64	-0.201	-1.60
4-digit Standardized industry code	Included		Included		Included	
Year dummy	Included		Included		Included	
Main Effects						
Marketing Investment Intensity (MI)	0.079***	5.35	0.162***	6.34	0.821***	25.71
R&D Investment Intensity	-0.006***	-3.83	-0.007**	-2.95	0.023***	3.88
Human Capital Productivity	0.293***	17.67	0.301***	18.20	0.416***	15.65
Operation Investment Intensity	-0.207***	-25.66	-0.214***	-25.31	-0.221***	-27.53
Investment Productivity	0.077***	3.89	0.103***	4.02	0.208***	7.12
Competitive Intensity	0.033**	3.02	0.017	1.94	-0.039***	-4.52
MIS			-0.001**	-2.86	0.057**	2.93
Interaction Terms						
MI \times R&D Investment Intensity					-0.001***	-6.77
MI \times Human Capital Productivity					0.185***	7.33
MI \times Operation Investment Intensity					-0.001	-0.24
MI \times Investment productivity					0.146***	13.95
MI \times Competitive Intensity					-0.001	-0.15
MIS \times R&D Investment Intensity					0.001***	6.59
MIS \times Human Capital Productivity					-0.009***	-5.71
MIS \times Operation Investment Intensity					0.001*	2.11
MIS \times Investment productivity					0.018***	3.34
MIS \times Competitive Intensity					0.001	1.88
Log likelihood	-34033.6		-33961.2		-33761.8	
Number of data points	18337		18337		18337	
Akaike's information criterion	68097.26		67954.39		67575.62	
Bayesian information criterion	68214.51		68079.46		67778.86	

Notes:

MIS= Marketing Investment Intensity Square term. All independent variables are at time $t-1$. Akaike's information criterion and Bayesian information criterion penalize the complexity for model misspecifications.

* $p < .05$ ** $p < .01$ *** $p < .001$

Figure 1. Theoretical Model and Hypotheses

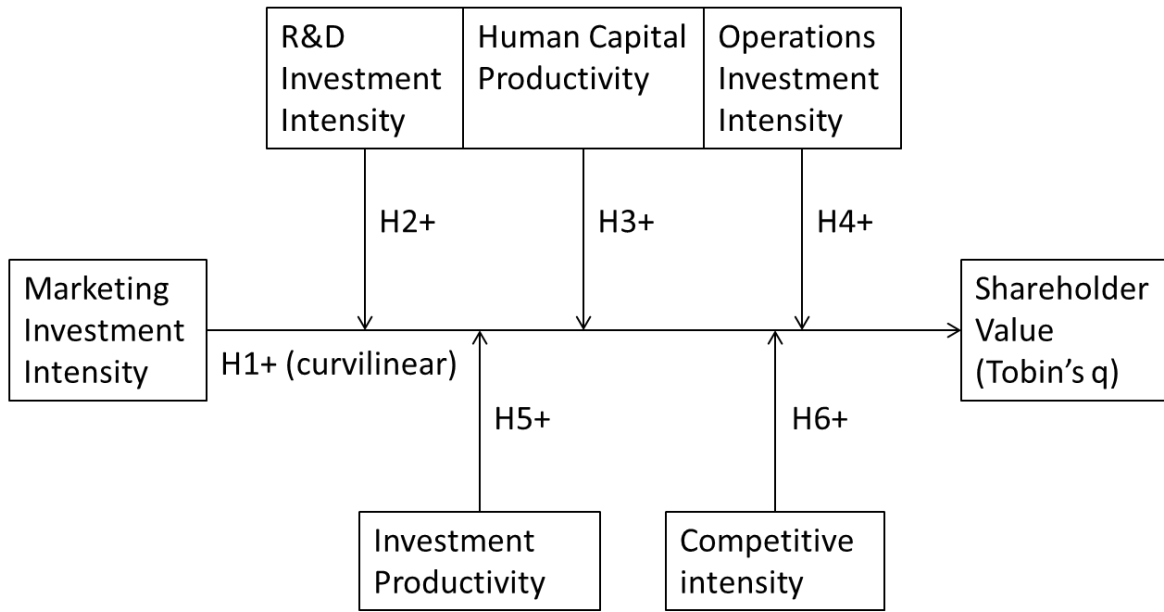


Figure 2. The Curvilinear Influences of Marketing Investment Intensity on Tobin's Q

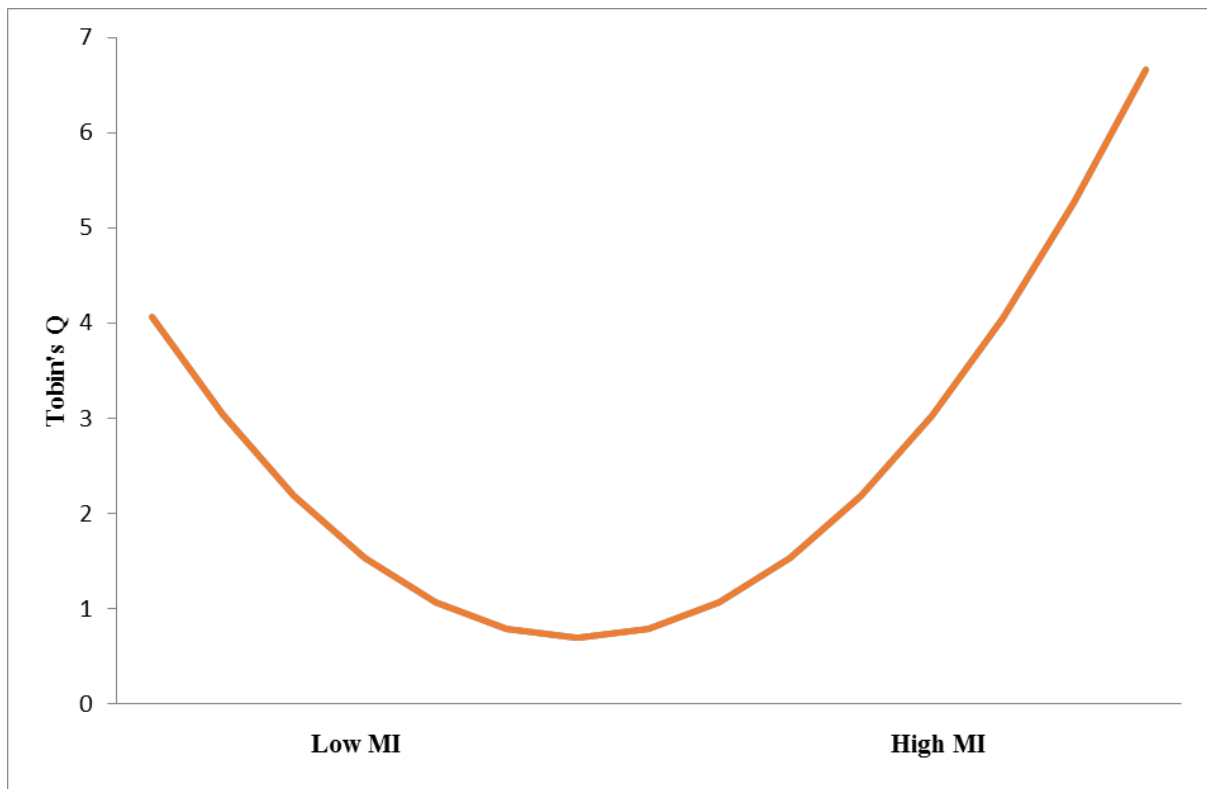


Figure 3. The Conditional Effects of Moderators

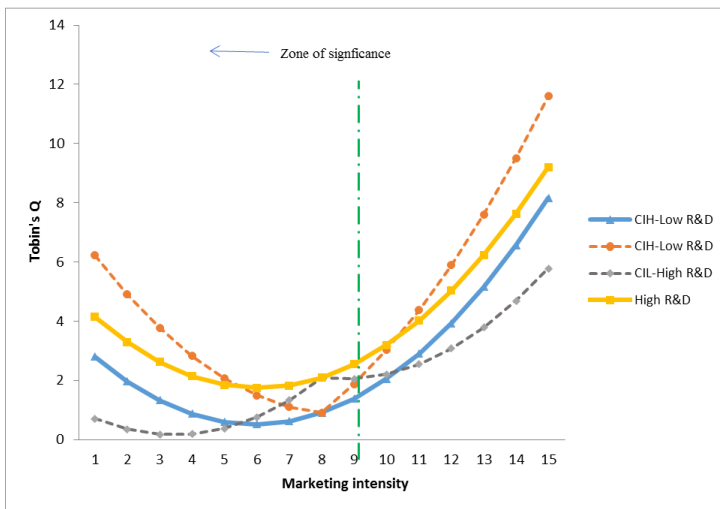


Figure 3a. Conditional Effects of R&D Investment Intensity

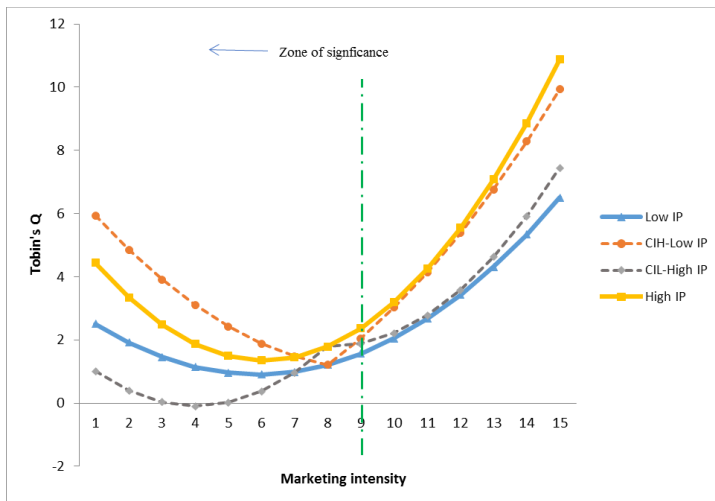


Figure 3b. Conditional Effects of Investment Productivity

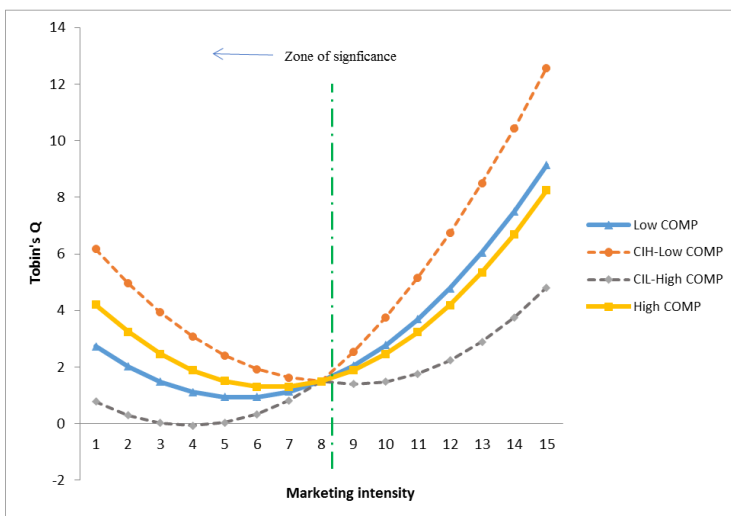


Figure 3c. Conditional Effects of Competitive Intensity