Strategic Intent, Capabilities and Financial Performance:
A Study of the Pharmaceutical Industry

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Strategic intent represents an organization's vision and its aspired direction of growth. Organizations that lack a serious strategic intent suffer from "scarcity of ambition" that inhibits them from compiling the resource stocks that may lead to future success. Despite being almost three decades old, there has been a dearth of empirical papers testing strategic intent theory and, therefore, there is little precedent in operationalizing this construct. This study empirically tested two separate theories prevalent in the management field. First tested was strategic intent theory, something that has only been done once (Doving and Gooderham 2008) in the decades since its founding. Secondly, the paper tested capabilities theory to provide additional empirical evidence for the relationship between capabilities and financial performance. In both cases, the results of the study not only add to the empirical evidence in the literature but also contribute to current theory.

INTRODUCTION

Organizational leadership is the focus of a large body of literature, encompassing multiple disciplines including management, economics, and psychology. In studies related to strategic management, leadership and decision-making have become nearly synonymous. This is premised on the notion that those in leadership positions set corporate policy as well as delegate the actions needed to implement said policy (Yunlu and Murphy 2012). This logic has been integrated into the construct of strategic intent (Hamel and Prahalad 1989), which is the process of aggressive goal-setting that induces additional marginal commitment from management. One of the central tenets of strategic intent theory is that of optimal misalignment. Optimal misalignment is defined as "…the misfit between resources and ambitions (Hamel and Prahalad 1989, page 67)" whereby firms stretch their future goals in the face of limited current resources. As such, the result of strategic intent is primarily to build a firm's arsenal of resources and capabilities in order to effectively compete with rivals. Corporate action is the culmination of a process preceded by strategic intent. Intentions are formulated after the TMT scans the environment to determine how best to match the firm's strategy within the current competitive context. While strategic intent is, therefore, very important in the study of competitive dynamics, it has not received appropriate attention in the literature to date.

Resource-based scholarship (Barney 1991) argues that strategic assets and capabilities lead to superior advantage; however, the process by which firms choose resources and establish capabilities has not clearly been defined to date. In this paper, I will attempt to better define strategic intent in a number of different ways. First, I offer a process model that addresses the links between strategic intent and capability attainment. Secondly, I propose a novel operationalization of strategic intent at the firm level. One major issue in the literature on strategic intent is that there has been little attempt to operationalize and empirically test the construct (one exception is Doving and Gooderham 2008). Finally, I empirically

test the relationship between strategic intent and capability levels in a sample of pharmaceutical firms over the years 1993 to 2003. I find that strategic intent, as theory predicts, is associated with increased levels of capabilities in the sample of pharmaceutical firms after for controlling for a number of factors.

Following the analysis on strategic intent, I then model the association of a firm's capability levels on its financial performance. While the majority of research predicts that higher levels of capabilities will be associated with greater performance, some scholars have argued for, and found evidence that, capability levels may decrease firm performance through a number of mechanisms (Drnevich and Kriauciunas 2011), which will be discussed in the next section. Melding the strategic intent-capabilities relationship with the capabilities-performance relationship is a unique contribution to the business literature that fills a current gap. In order to do this, I have collected panel data on the pharmaceutical industry so that both the levels of strategic intent and the levels of capabilities can be effectively measured over time.

The paper is organized as follows. Section two contains the theory and hypotheses. Section three is the methods section and incorporates the data collection, sample selection, empirical estimation technique and the variables employed. Section four describes the results of the estimation. Finally, section five is a discussion about the results and how these results fit with current theory.

THEORY AND HYPOTHESIS DEVELOPMENT

As noted by seminal works in the strategic intent literature (Hamel and Prahalad 1989, 1993), firms must stretch their current position in order to effectively battle rivals in the future. As such, the use of stretch goals (Sitkin, See, Miller, Lawless, and Carton 2011) is important as a foundation for the competitive dynamics that firms utilize during competition.   Stretch entails the integration of new resources and capabilities in subsequent time periods that allow managers to effectively change strategy to meet new challenges encountered in the environment. These challenges are most likely to come from rivals but also other entities such as suppliers, regulators and the like. Firms that do not adapt through the acquisition of new resources, capabilities and strategies are less able to survive in an ever changing environment.

Strategic intent represents an organization's vision and its aspired direction of growth. As such, intent plays a pivotal role in shaping organizational resource allocation and capability development (Hamel and Prahalad 1993; Hamilton, Eskin and Michaels 1998). Organizations that lack a serious strategic intent suffer from "scarcity of ambition" that inhibits them from compiling the resource stocks that may lead to future success. In order for a firm to position itself for competition in its relevant product markets, the top management team (TMT) must be able to effectively scan its environment so that the firm's strategy fits appropriately with the market. Fit entails that the firm can proactively separate itself from rivals, yet offer products and services that conform to the general needs of customers in those markets (Mantere and Sillince 2007).

Before a firm can effectively build its resource and capability repertoire, it must formulate plans to attain these resources in an effective manner. Strategic intent theory (Hamel and Prahalad 1989, 1993; Hamilton et al. 1998) predicts that firms that are aggressive in planning for future rivalry will be the most successful at building capabilities that effectively aid planning to give them adequate time to "ramp up" their stocks of strategic assets. Strategic assets include both tangible and intangible resources as well as the mechanisms to deploy resources (i.e. capabilities).

A process model of the actions necessary for goal attainment is included in Figure 1. The firm must first scan the external environment and its internal capabilities to assess the dynamics of the competitive market. After assessing these two realms, input from management incorporates this information into decision-making vectors. From these vectors, management initiates its intent through a rational process of resource allocation based off of its information and its bounded rationality (March and Simon 1958). After intent is formulated, the firm must calibrate its options. Calibration is defined here as the ramp-up period after the firm's intent is accepted but before action has commenced. It is during this period that the firm begins to shift resource allocation in preparation of the final goal (i.e. the strategic action). Important to note is that the calibration that occurs as a result of strategic action is not the competitive action itself; instead, this calibration consists of the build-up necessary to accomplish the appropriate competitive

action in the future. For example, if entering the Indian market is the final competitive action, the calibration period may accumulate resources in order to make this possible. This may include hiring personnel, contracting suppliers geographically closer to India and the like. It is this calibration period that is crucial into turning strategic intent into a competitive action. This last statement is crucial in understanding the difference between this study, which focuses on strategic intent and calibration, and competitive dynamics research (Chen 1996; Chen, Su and Tsai 2007).

FIGURE 1
Process Model of Strategic Intent-Capabilities-Performance Relationship
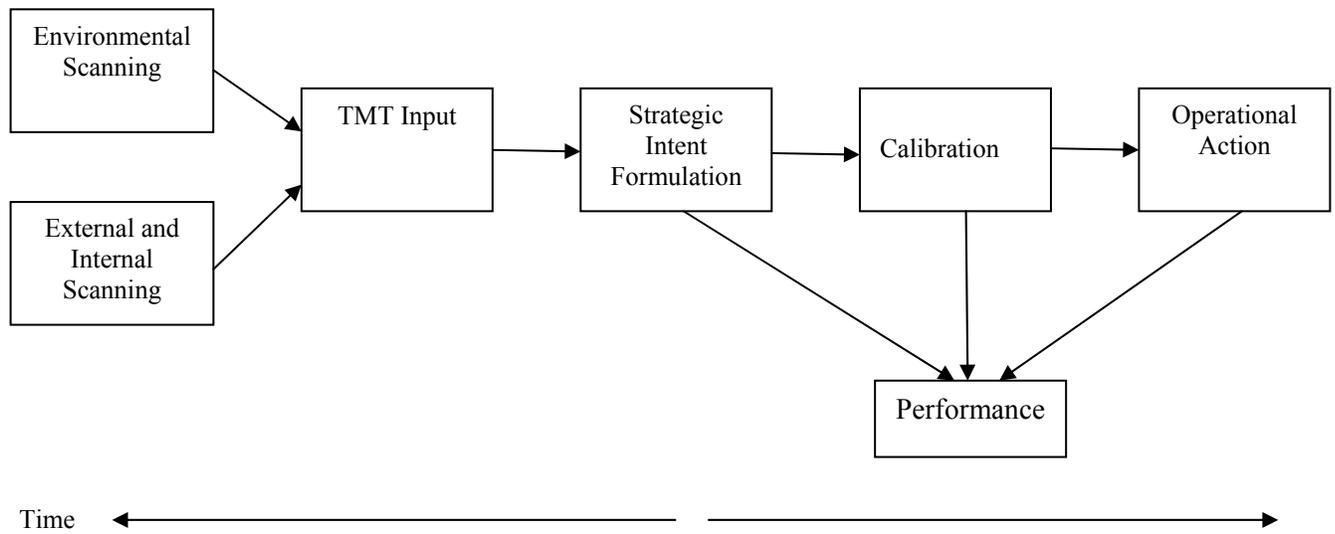
Strategic Intent and Capabilities

As described in the previous section, and in Figure 1, the link between strategic intent and capabilities is most common in firms with an aggressive posture (i.e. high strategic intent). Strategic intent theory predicts that firms with high intent will absorb the most appropriate resources and capabilities in order to take strategic action (Hamel and Prahalad 1993). As such, theory predicts that there is a positive association between intent and capabilities as intended strategy is needed to effectively compile strategic resources (Makadok 2001). Therefore, I posit:

> *Hypothesis 1: There will be a positive association between a firm's strategic intent and its subsequent level of capability attainment.*

Capabilities and Firm Performance

While there seems to be a presumption that capabilities are positively associated with firm performance, this has been shown to not always be the case (Drnevich and Kriauciunas 2011). Evidence that capabilities are positively related to firm performance is abundant.[1] While capabilities seem intuitively positive by definition, there is contrary evidence. Lenonard-Barton (1992) proposed the concept of "core rigidity" which reflects a successful firm's myopia that may encompass managerial abilities. While capabilities are needed to thrive in a turbulent environment (Beck and Wiersma 2013),

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[1] These specific capabilities include marketing (Fahy, Hooley, Cox, Beracs, Fonfara, and Snoj 2000; Ritter 2006; Golfetto and Gibbert 2006), R&D (DeCarolis 2003), technological and innovation (Prencipe 1997; Argyres and Silverman 2004; Cho and Puckik 2005; Sampson 2005; Dutta, Narasimhan, and Rajiv2005; Kotha, Zheng and George 2011; Yam, Lo, Tang and Lau 2011), forecasting (Makadok and Walker 2000), alliance building (Combs and Ketchen 1999; Rothaermel and Deeds 2004; Nooteboom, Van Haverbeke, Duysters, Gilsing, and van den Oord2007) and human capital (Fiol 1991; De Saa Perez, Falcon and Manuel 2004).

too much success derived from capabilities can blind management to alternative views (Park 2000; Henningsen, Henningsen, Eden and Cruz 2006). This myopic consensus can foster inertia at the expense of opportunity exploration. The literatures on managerial myopia (Miller 2002), escalation of commitment (Sleesman, Conlon, McNamara and Miles 2012) and strategic persistence (Audia, Locke and Smith 2000) give credence to a capabilities view that can result in negative performance for firms that do not effectively utilize once-needed resources. More specifically, Drnevich and Kriauciunas (2011) and Schilke (2013) find that capabilities can result in negative performance under certain conditions, including those including asymmetrical information problems (Brown 2014).

In mature industries, firms may overinvest in the capabilities that once were the backbone of corporate success in a manner similar to the Red Queen Effect (Derfus, Magitti, Grimm and Smith 2008). Other scholars have shown that the appropriation of rents within the firm may not flow to shareholders, but instead, may be captured by other stakeholders in the firm (Coff 1999). Since empirical evidence points to opposite effects, I propose the following dueling hypotheses (Brockman, Rui and Zou 2013):

Hypothesis 2a: The build-up of capabilities is positively related to firm performance.

Hypothesis 2b: The build-up of capabilities is negatively related to firm performance.

METHODS

Sample

Firm-level data was compiled on the pharmaceutical industry for the years 1993 through 2003. I used pharmaceutical data due to the industry's reliance on intellectual property protection. This was important for the study because capability-building around intellectual property is a central theme in research based on this industry (Henderson and Cockburn 1994; Yeoh and Roth 1999; DeCarolis 2003). I used a single setting to control for industry effects and I define pharmaceutical firms as those that are involved in the research, development and innovation of new drugs (IBIS World Industry Report). Using industry codes issued by the Occupational Safety and Health Administration (OSHA), the pharmaceutical industry is identified under the two digit SIC Code 28 (Chemicals and Allied Products). More specifically, I identified three four digit SIC Codes: (i) Pharmaceutical Preparations (SIC 2834), (ii) In Vitro and In Vivo Diagnostic Substances (SIC 2835) and (iii) Biological Products Except Diagnostic Products (SIC 2836).

Three sources were used to compile the firm-level data: (i) financial data was compiled using Compustat Fundamentals Annual; (ii) patent data was compiled using the National Bureau of Economic Research's patent database, which is an open and publicly available data set. NBER contains patent data on over 32 million utility patents from 1976 through 2006; and (iii) additional patent data was compiled from the United States Patent and Trademark Office (USPTO). The USPTO data set served two purposes. First, it was used to corroborate data compiled from the NBER. Secondly, in certain instances, it was not possible to aggregate patent information to the firm level using only the NBER. In these cases, the USPTO was the only other information source.

After searching several databases, including IBIS World Industry Report and Lexis-Nexis Corporate Database, I compiled a list of publicly traded firms with primary four-digit SIC codes of 2834, 2835, and 2836. Next, I checked for evidence of acquisitions during our sample period in order to separate the count of patent applications for firms that were merged together presently yet were not integrated from 1993-2003.

Since I have data that is both cross-sectional and time-series in nature, I integrated the data into a final data set where the unit of observation is the firm-year. The final panel dataset contains 225 firm-year observations from 1993 to 2003. There are a total of 28 firms included in the sample, which accounted for over 90 percent of industry sales (Basdeo *et al.* 2006). While many companies had a full 10 years of data, some firms that were either founded within that time period or that were acquired during that time period had less than 10 years of data. The justification for this time frame lies in the constraints of the sample and the data needed to conduct the estimations.

Dependent Variables

Dependent Variable: Capabilities

A firm's capabilities are measured using patent data following other studies of similar industries (Henderson and Cockburn 1994; Hall, Jaffe and Trajtenberg 2001; DeCarolis 2003; Lin and Chen 2005; Kotha et al. 2011). Since the pharmaceutical industry depends heavily on intellectual property protection, technological capabilities (Ortega 2010) are the most appropriate to use. Following these studies, I measure a firm's capabilities as the number of patents applied for by the firm in a given year. Additionally, since the number of patent applications will be at least partially dependent upon the size of the firm, I normalize the patent count by the revenues of the firm. Both the patent application count and the revenues are lagged by one year with respect to the dependent variable. Specifically, I measure capabilities as follows[2]:

$$\text{Capabilities}_{i(t-1)} = \text{Number of Patent Applications}_{i(t-1)}/\text{Total Revenues}_{i(t-1)} \quad \text{Eq.1}$$

Dependent Variable: Firm Performance

In hypothesis 2a and 2b, the dependent variable employed is firm level performance. Following other empirical management studies (Lin and Wu 2014; Santos, Basso, Kimura and Kayo 2014), I use two return measures for firm performance--return on assets (ROA) and return on invested capital (ROIC). ROA is calculated as a firm's earnings before interest and taxes (EBIT) divided by its total assets in the same year. ROIC is calculated as a firm's earnings before interest and taxes (EBIT) divided by its total invested capital in the same year.

Independent Variables

Firm-level Capabilities

I operationalize firm level capabilities as an independent variable for hypotheses 2a and 2b as is done in Equation 1 above. Since the industry studied here is pharmaceuticals, firm-level capabilities are appropriately measured using the firm's patent applications since patent applications incorporate the processes and personnel needed to effectively compete in this specific industry (Henderson and Cockburn 1994; DeCarolis 2003). Patent applications proxy managerial decision-making regarding exploitation of current resource stocks as well as exploration of new markets and drug combinations (Keller and Wiebler 2014).

Strategic Intent

Despite being almost three decades old, there has been a dearth of empirical papers testing strategic intent theory and, therefore, there is little precedent in operationalizing this construct. Hamilton et al. (1998) proposed specific measures for future empirical papers. They suggested future researchers use accounting measures to approximate corporate intent. Specifically, they proposed the use of capital expenditures, R&D intensity and marketing intensity to discern corporations that were intent on entering new markets or introducing new products (amongst other actions). Additionally, Nair and Selover (2012), in a competitive dynamics study of the beverage industry, used accounting measures to operationalize competitive action. Specifically, they used sales intensity, capital expenditures and capital intensity to model corporate action. Therefore, I propose using a similar logic integrating the arguments from Hamilton *et al.* (1998) and Nair and Selover (2012).

I posit that by studying a firm's expenditures in certain categories, the data will portray firms that have spent finite resources in specific areas previously defined. To capture the velocity and direction of intent, I take the difference in these measures from one year to the next. The operationalization details are explained in the following subsections.

Strategic Intent (Continuous)

First, I measure three intensity constructs: (i) Δ R&D intensity, (ii) Δ marketing intensity, and (iii)

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[2] The result of this equation was then multiplied by 100.

Δ fixed capital intensity as follows:

ΔR&D Intensity $_{i(t-2 \to t-1)}$ **= ΔR&D Expenditures** $_{i(t-2 \to t-1)}$ **/ΔTotal Revenues** $_{i(t-2 \to t-1)}$

ΔMarketing Intensity $_{i(t-2 \to t-1)}$ **= ΔSG&A Expenses** $_{i(t-2 \to t-1)}$ **/ΔTotal Revenues** $_{i(t-2 \to t-1)}$

ΔFixed Capital Intensity $_{i(t-2 \to t-1)}$ **= ΔPP&E Assets** $_{i(t-2 \to t-1)}$ **/ΔTotal Revenues** $_{i(t-2 \to t-1)}$

Next, I aggregate these three measures to calculate the strategic intent variable:

Strategic Intent $_{i(t-2 \to t-1)}$ **= Σ (ΔR&D Intensity, ΔMarketing Intensity,**

$$\textbf{ΔFixed Asset Intensity})_{i(t-2 \to t-1)} \qquad \text{Eq.2}$$

Strategic Intent (Categorical)

The second measure of strategic intent includes a categorical operationalization that accounts for both the willingness and ability that firms may have. In other words, firms can signal their level of intent through both measures of willingness (i.e. the previous measurements of strategic intent in this paper) and ability (i.e. the current resources that the firm possesses). Ability is measured as the slack resources that firms possess and are available to allocate. Attempts at incorporating ability into the first operationalization were not possible because of the misalignment between the sign of the resultant equation and its interpretation. For example, we could measure strategic intent as follows if we were to include the firm's ability to Equation 2:

Σ (ΔR&D Intensity, ΔMarketing Intensity, ΔFixed Asset Intensity) $_{i(t-2 \to t-1)}$**/**

$$\textbf{ΔCurrent Ratio}_{i(t-2 \to t-1)} \qquad \text{Eq. 3}$$

where firm i's current ratio is calculated as the difference between its current ratio from year t-2 to year t-1. The current ratio is a measure of a firm's current assets divided by its current liabilities. By dividing the original strategic intent variable by the firm's slack, we can control for both the willingness (numerator) and ability (denominator) with respect to the intentions of the firm. However, we encounter an issue from the fact that both the numerator and denominator can take both positive and negative values, which becomes problematic for interpretation.

Figure 2 provides a matrix of such outcomes derived from the equation with the categories of the firms in parentheses. As portrayed, the result is positive in both the top left and bottom right quadrants. This is not necessarily problematic because as willingness is increased or decreased and ability follows in the same direction, there is consistency in the overall interpretation of the firm's strategic intent. The problem lies in the top right and bottom left quadrants where the result of Equation 3 is negative. Obviously, the two ways in which the product can be negative is either if the willingness (numerator) is positive and the ability (denominator) is negative or vice-versa. In the former case, increased resource allocations in the face of reduced slack is a signal of strong strategic intent. In the latter case, the opposite conclusion may be offered since, as firms' ability to invest are increased yet they hold back on their willingness to invest, these firms may be classified as having low or weak strategic intent. I attempt to detect these differences by operationalizing the strategic intent variable into three categories based on the different outcomes from Figure 2. Specifically, I categorized strategic intent as 0 if the firm has a negative value for willingness and a positive value for ability (Figure 2, bottom left), 1 if the firm has an increase or decrease in both willingness and ability (Figure 2, top left or bottom right) and 2 if the firm has positive willingness but negative ability (Figure 2, top right). The estimation results will use the lowest measure of strategic intent (coded as 0) as the reference category.

FIGURE 2
Ability-Willingness Matrix

Ability

	+	-
+	+(1)	-(2)
-	-(0)	+(1)

Willingness

Control Variables

Prior Performance

I control for the firm's prior performance by including the lagged dependent variable in the models that test hypotheses 2a and 2b.

Geographic Location

I control for the location of the firm's headquarters by including a dummy variable that is equal to 1 if the firm is headquartered in the United States and 0 otherwise.

SIC Code

I control for the primary market that the pharmaceutical firm operates in. While all firms in the study are pharmaceutical companies, some operate primarily in SIC Code 2834 (Pharmaceutical Preparations) while others operate primarily in SIC Code 2836 (Biological Products Except Diagnostic Products).

Financial Slack

I control for the firm's financial slack by including the current ratio in year t-1. The current ratio is calculated by dividing the firm's current assets by its current liabilities.

Firm Size

Firm size is controlled for by including the natural logarithm of the firm's total assets in year t-1.

Year Dummies

In all models tested, I included year dummy variables as an additional control variable.

RESULTS

Table 1 contains the summary statistics and pairwise correlations for the variables in the study. Table 2 contains the results of the random-effects estimation for hypothesis 1. Table 3 contains the results of the random-effects estimation for hypotheses 2a and 2b.

In Table 2, Models 2 and 3 test hypothesis 1 while Model 1 is the control only model. Hypothesis 1 stated that firms with high levels of strategic intent will be associated with effective capability build-up, which is measured here by patent applications. In Model 2, the coefficient for strategic intent is both positive and significant thereby supporting hypothesis 1 (b=1.533, p=0.000). Model 3 tested this same hypothesis but with a categorical operationalization. Model 3 also adds credence to hypothesis 1 as the coefficient for category 2 (i.e. the highest intent category) is positive and significant (b=2.721, p= 0.059). While both models add support to hypothesis 1, Model 2 is superior as evidenced by its high r-squared value (r^2=0.358) and its high significance of the variable of interest.

Table 3 tests hypotheses 2a and 2b. In these four models, the dependent variable is firm performance, denoted by either ROA or ROIC. Models 1 and 3 in Table 3 are the control only models. Models 2 and 4 are the models of interest, and both supply evidence supporting hypothesis 2b. The coefficients for the variable "Capabilities" are negative and significant in both models (b= -0.020, p=0.000 in Model 2, b= -0.039, p=0.000).

Robustness Checks

Since the estimations include a lagged version of the dependent variable and this can lead to serial correlation and inflated errors, I also estimated a feasible generalized least squares (FGLS) model. Frain (2005) explains that in the face of such serial correlation, FGLS relaxes the assumptions made in the random effects models and may be superior to that of the random effects estimation. In all models, both the sign and the significance found in the models provided were identical in the FGLS models. These results are not incorporated here but are available upon request.

DISCUSSION

This study empirically tested two separate theories prevalent in the management field. First, I tested strategic intent theory, something that has only been done once (Doving and Gooderham 2008) in the decades since its founding. Secondly, I tested capabilities theory to provide additional empirical evidence for the relationship between capabilities and financial performance. In both cases, the results of the study not only add to the empirical evidence in the literature but also contribute to current theory.

Strategic intent theory (Hamel and Prahalad 1989) posits that firms with an aggressive stance have the ability to absorb appropriate capabilities in order to compete in the marketplace. I operationalize strategic intent as the difference in expenditures in key areas from one year to the next. While the operationalization of strategic intent lacks precedent, I argue that the two methods of calculating strategic intent included in this paper are contributions as they quantify a firm's efforts in calibrating its operations to effectively attain appropriate capabilities. As predicted by theory, I find evidence that firms with high levels of strategic intent do subsequently accumulate capabilities, in this case patent applications. Patent applications are an appropriate measure for capabilities in the pharmaceutical industry since patent applications incorporate firm specific embedded resources in unique combinations in order to secure monopoly rights over a specific compound sequence.

TABLE 1
SUMMARY STATSTICS AND PAIRWISE CORRELATIONS

	Variable	Mean	Standard Deviation	1	2	3	4	5	6	7	8
1	Capabilities	79.568	520.753	1							
2	Strategic Intent	-0.121	3.778	0.3666*	1						
3	ROA	12.579	26.642	-0.6770*	0.2158*	1					
4	ROA (t-1)	12.101	27.334	-0.4890*	0.2435*	0.7679*	1				
5	ROIC	20.159	53.93	-0.5400*	0.4118*	0.9527*	0.6731*	1			
6	ROIC (t-1)	19.924	54.615	-0.3155*	0.2611*	0.5945*	0.9508*	0.5193*	1		
7	Firm Size (Ln Assets)	15.095	2.021	-0.3467*	0.0454	0.5048*	0.5182*	0.4626*	0.4616*	1	
8	Financial Slack	2.857	2.111	0.1638*	0.0906	-0.2297*	-0.2509*	-0.2020*	-0.2422*	-0.5345*	1

TABLE 2
RANDOM EFFECTS ESTIMATION RESULTS (DV=CAPABILITIES)

Variable	Dependent Variable: Capabilities (Patents)		
	(1)	(2)	(3)
Strategic Intent		1.533***	
Strategic Intent (Cat 1)			0.113
Strategic Intent (Cat 2)			2.721*
Firm Location	-0.351	-0.903	0.175
SIC	-0.913	-0.343	-1.097
Financial Slack	-0.364	-1.224***	-0.231
Firm Size	-1.268**	-2.718***	-1.139**
Constant	25.253***	48.742***	22.082***
Year Dummies	Yes	Yes	Yes
Wald Chi-Square	15.210	323.360***	19.620***
R-Squared (Overall)	0.050	0.358	0.069
	N=225	N=225	N=225
*** < 0.01 ** < 0.05 * < 0.10			

In the second hypothesis, I test for the relationship between capabilities and firm level performance. While it is often assumed that capabilities lead to competitive advantage and superior profits, there is another segment of capabilities theory that argues the opposite (Leonard-Barton 1992; Drnevich and Kriauciunas 2011). This opposite argument, the theory of core rigidities, posits that firms may overinvest in capabilities that, at one period of time, were profit inducing. This overinvestment is the result of myopic managerial decision making that flows from poor environmental scanning. As the overinvestment is realized, profitability suffers as firms are accumulating capabilities that are no longer most effective. While there is not as much research on the negative consequences of capability build-up, a few scholars (Leonard-Barton 1992; Drnevich and Kriauciunas 2011; Schilke 2013) have provided evidence that this may be the case.

The evidence in this study shows that pharmaceutical firms are overinvesting in patent capabilities as the returns (both ROA and ROIC) are negatively associated with these types of capabilities. More importantly, this evidence adds to capabilities/rigidities theory in that it provides evidence of such a negative relationship. As stated previously, the majority of empirical papers that employ a capabilities-performance relationship find that capabilities are positively associated with performance (See Newbert 2011).

TABLE 3
RANDOM EFFECTS ESTIMATION RESULTS (DV=PERFORMANCE)

Variable	Dependent Variable: ROA		Dependent Variable: ROIC	
	(1)	(2)	(3)	(4)
Capabilities (Patent Applications)		-0.020***		-0.039***
ROIC (t-1)			0.387***	0.306***
ROA (t-1)	0.676***	0.511***		
Firm Location	2.441	3.080	7.418	8.135
SIC	2.166	2.329	3.948	0.918
Financial Slack	0.357	0.310	1.367	1.250
Firm Size	2.138***	1.635**	8.625***	6.267***
Constant	-31.235**	-17.557*	-122.493***	-76.859**
Year Dummies	Yes	Yes	Yes	Yes
Wald Chi-Square	350.80***	567.69***	120.20***	195.22***
R-Square (Overall)	0.624	0.730	0.363	0.482
	N=225	N=225	N=225	N=225
*** < 0.01 ** < 0.05 * < 0.10				

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