

A Case Analyses of the Origin of Organizational Capability: Amgen Corporation's Innovation Capabilities

Chris Adalikwu* • Paul Adalikwu** • William Undie***

Abstract

To strategy scholars and managers, the origin of organizational capabilities is elusive. A scholar wonders “where [do] capabilities come from [and] what kinds of investment in money, time, and managerial efforts is required in building them” Ethiraj, et al. (2005, Strategic Management Journal, 26, 25-45). This study traced the trajectory of strategic asset deployment by Amgen’s top echelon to capture the origin of Amgen’s drug innovation capabilities. Sequentially, Amgen’s top echelon strategically acquired star scientists, who in turn, developed Amgen’s drug innovation capabilities. This finding is consistent with the upper-echelon and resource-based theories about the strategic roles of top managers in developing organizational capabilities. We hope, managers should learn from this insightful case.

I. Background

A copious literature is emerging that

non-imitable and non-substitutable organizational capabilities are the bedrock of inter-firm performance differences (see, e.g., Barney, 1991; Wernerfelt, 1984; Rumelt, 1984; Dosi, Nelson and Winter, 2000). In contrast, however, the literature is scanty about a legion of empirical questions pertaining to organizational capabilities. For example :

- where and when did organizational

* Professor of Management College of Business Administration Hankuk University of Foreign Studies
** Permanent Secretary Ministry of Finance Government of Cross River State
*** Director, Continuing Education and Coordinator, Management Program Emory University School of Medicine Medical Imaging Program

- capabilities start in the organization?
- are top managers indispensable in developing organizational capabilities?
- is investors' valuation of a young organization's initial public offering (IPO) critical in financing the initial development of organizational capabilities?
- is external ties and network capabilities of top managers critical to the initial development of organizational capabilities?

These are a few of the gaps in scholarly knowledge of organizational capabilities. These gaps are important chiefly because the development of theories that managers can apply is among the major objectives of the strategic management discipline (Hofer and Schendel, 1978; Chandler, 1990; Leonard-Barton, 1995), and scholars agree that theories about the origins of organizational competitive advantage in capabilities, is critical (Cockburn, Henderson and Stern, 2000). In concurring with this view, Mahoney and Sanchez (2004 : 34) cautioned that "theory building in strategic management should also recognize that inquiry from the inside [of the firm] is vital in developing integrative capabilities and more integrated strategy

theory." They also argued that "researchers interested in developing useful strategy theory" should gain rich insights from the managerial actions of practitioners in the real business world. Consistent with this notion, landmark works in strategic management grounded on practical insights of practitioners, have emerged. These works include Penrose (1959), Leonard-Barton (1995), Chandler (1990), Argyres (1996), and Williamson (1975). These authors agreed that history matters, and called for more research for theory development in strategy grounded on the practical experience of managers in strategic management and organizational economics.

In this study, we follow the recommendations the authors just cited, to draw practical illustrations from the strategic managerial actions reported in Amgen Corp. to discuss the theory of the origin of organizational capabilities. In this framework, the four research gaps on organizational capabilities as articulated above -are addressed. As a prelude to that, we first present a discussion of how organizational capabilities are linked to inter-firm performance difference which is the epicenter of research in strategic management (Rumelt et al., 1994; Rumelt, 1984).

II. Organizational Capabilities Linked to Inter-organizational Performance Differences

There is a growing consensus among strategy scholars that resources and capabilities are critical determinants of organizational innovations and performance (Penrose, 1959; Barney, 1991; Rumelt, 1984; Wernerfelt, 1984). In particular, superior leadership as an intangible resource forms the basis of organizational strategies (Barney, 1991) as well as the implementation of strategies (Schoenecker and Cooper, 1998). Even though conceptual definitions of resources and capabilities may differ among scholars (Makadok, 2001; Priem and Butler, 2001; Amit and Shoemaker, 1993), there is a consensus that inter-firm differences in intangible managerial capabilities constitute the inimitable and non-substitutable organizational capabilities instrumental to inter-firm differences in performance (Dierickx and Cool, 1989). Consistent with this line of reasoning, the relationship between leadership and innovation variables has become the focus of empirical research (Halbesleben et al., 2003; Sharma and Rai, 2003; West et al., 2003;

Elenkov, Judge and Wright, 2005).

Consequently, since attempts to explain inter-firm differences in performance is among the central missions of the strategic management discipline (Rumelt et al, 1994), there is a renewed interest in understanding the extent inter-firm differences in capabilities are instrumental to explaining inter-firm variances in firm performance (Zott, 2003). The logic of the argument runs as follows (e.g., Ethiraj et al, 2005 : 37): observed inter-firm differences in production functions do not stem from differences in factors of production since all firms face the same factor market and factor prices. Instead, inter-firm differences in production function leading to inter-firm differences in productivities stem from inter-firm differences in capabilities and, within the firm, temporal differences in productivities can be attributed to temporal differences in capabilities. In this framework, the role that top-most organizational leaders play towards organizational innovation capabilities, has attracted research attention (Halbesleben et al., 2003; Elenkov, Judge and Wright, 2005), and the persistent empirical question remains: where and when do organizational capabilities as a competitive advan-

tage, originate in the organization (Cockburn, Henderson and Stern, 2000).

III. Upper-Echelon Theory: The Beginning of the Origin of Organizational Capabilities

We argue and then illustrate with examples, that the beginning of any meaningful attempt at tracing the origin of organizational capabilities should begin with the strategic roles played by the organization's topmost executive-the CEO. Importantly, the CEO is the best informed person about the mission of the organization or the essence of the organization's existence (Hambrick and Mason, 1984). Consequently, in pursuit of the organization's missions, the CEO steers the strategic choice of the organization in ways that maximize the realization of organizational mission. Along this line, research evidence suggests that organizations reflect the actions of their top executives (Hambrick and Mason, 1984; Cyert and March, 1963), and hence, any meaningful analyses of the origin of organizational capabilities should begin at the level of

topmost executive-the CEO. We now turn to Amgen Corp. for a practical illustration in these theoretical analyses.

Amgen was organized as a company in April 1980 when *four venture capitalists* legally registered it as a corporate entity and hired Dr. George B. Rathmann to be President and CEO of Amgen. As can be seen, the recruitment of Dr. Rathmann by the four venture capitalists marks the beginning of the "the kinds of investment in money, time and managerial efforts required in building [capabilities]" (Ethiraj et al., 2005). And this is question repeatedly raised by many scholars of strategy. It is noteworthy that, these four venture capitalists gave Dr. Rathmann the executive power to operate Amgen profitably. One of the first things the President (Dr. Rathmann) did was to craft a business strategy for Amgen. Keeping in mind that : "Strategy is a firm's theory [assumption] of how it can gain superior performance in the markets within which it operates" (Drucker, 1994), Amgen's business strategy at the time of its incorporation was unambiguously stated as follows :

Product development based on own advanced biotechnology [underlining is mine].

In fact, this corporate strategy is a three-

part strategy subsumed in one: (a) develop biotechnology products, (b) the products must be developed using Amgen's own proprietary technology, and (c) the technology must be advanced technology. Here are the critical linkages: to acquire *advanced technology* demands the possession of hi-tech human resource (firstclass research scientists) which is the most competitive asset of the firm (Grant, 1996). This notion is in line with studies in strategic leadership which eloquently prescribe a menu of strategic actions that Dr. Rathmann must follow to acquire first class biotech scientists. In turn, these first class scientists who will then invent the all-important *advanced technology* necessary to develop the biotech products that would make Amgen the leader of the biotech industry. Yet, in this fascinating menu of sequential events, the network capabilities of the CEO of Amgen, was equally critical in developing the advanced technological innovation. Next, we discuss this factor.

1. External Linkages and Network Capabilities

Jointly, the agency and upper echelon research streams suggest that the capabilities of the CEO in formulating and im-

plementing strategic actions that capitalize on environmental opportunities, are critical to organizational success (e.g., Getzkanycz and Hambrick, 1997; Hambrick and Mason, 1984). In this regard, the CEO's past and present experience in external ties which allow the CEO to capitalize on available network capitals, is equally critical for implementation of strategic actions crucial for organizational success. That is, within the purview of the boundary spanning activities of the CEO, the quality of the social and political ties available to the CEO is directly related to the degree the young organization will successfully draw legitimacy and identification from established organizations (D'Aveni and Kesner, 1993). Consistent with these previous research results, our archival research found that, between April and May, 1983, president Rathmann-who also was a former Vice President of R&D, Diagnostics Division of Abbott Labs-signed a *collaborative agreement* with Abbott Labs for a five-year \$19 million R&D partnership deal. Accordingly, these deliberate conducts (strategy implementations) suggest the following proposition.

Proposition 1 :

External collaborative partnership for

R&D is the critical first strategic investment by a biotech organization to acquire drug innovation capabilities leadership.

2. Importance of the collaborative agreement

Because primary focus of our case study is on practical managerial application, the study must therefore underline the following encouraging observations about the importance of the *Collaborative Agreement* discussed above, so that managers will maximally benefit from the study. First, industry observers said that the collaborative agreement would have been impossible without the prior experience of Amgen's President (Dr. Rathmann) with Abbot Labs where he (Dr. Rathmann) served prior to joining Amgen. Hence, Rathmann's networking capability was instrumental in getting Abbott Labs and Amgen to sign this all-important collaborative R&D agreement. Stated another way, absent Rathmann's networking capabilities that tied him to Abbott Lab, the collaborative agreement would not have taken occurred in the first place. Therefore, it is noteworthy that, the networking capabilities of Amgen's CEO is, per se an important leadership capability which

cannot be ignored in Amgen's success history in the same sense that forecasting capability in the mutual funds industry (Makadok and Walker, 2000) is a source of competitive advantage. Another parallel support comes from previous research which corroborates the notion that a CEO with previous R&D management experience "is clearly beneficial to a biotechnology firm's productivity," (Deeds et al., 1999 : 225). Hence, superior leadership is indispensable for organizational innovation and its origin. Hence, we propose as follows.

Proposition 2 :

Superior leadership is indispensable for a theory of the origin of organization innovation capabilities, especially in the biotech industry.

3. Star Scientists Linked to the Collaborative Agreement

Importantly, a lion share of the \$19 million collaborative agreement was deployed as monetary compensations to attract the best research scientists in the biotech industry to work for Amgen, these best scientists were called "star scientists" (Zucker et al., 1998). To see that this is

a classic illustration of strategy implementation, it was these star scientists that developed or invented “the advanced technology” as stated in Amgen strategic vision discussed above. Stated another way, strategic acquisition of the star scientists was a necessary precursor to building “the advanced technology” required to acquire the proprietary drug innovation capabilities envisioned in Amgen’s business strategy. We believe that these practical chronologies of strategic events are practically informative to the practical manager grappling with similar practical strategic issues. The word *practical* is underscored because implementation is the most important aspect of strategy (Hofer and Schendel, 1978; Chandler, 1990). Finally, consistent with the question about *kinds of investment in money, time, and managerial efforts required in building them* [capabilities] (Ethiraj et al., 2005), we now discuss further how this strategy translates into organizational innovation capabilities.

In a short time (May to December, 1983) the strategy behind the \$19 million R&D collaboration with Abbott Labs started to payoff. How? One of the “star scientists” hired under that agreement led a team that discovered *New Molecular Entities* called Epoetin alfa which later was commercia-

lized as a product called EPOGEN. The team leader was Fu-Kuen Lin. Therefore, this discussion allows us to propose as follows :

Proposition 3 :

The origin of organizational innovation capabilities begins with the team of scientists who discover the first new Molecular Entities resulting in a commercialized product.

This is the landmark event that launched Amgen as the biotech industry leader, as we know it to-day. Infact, a confidential informant close to Amgen said that no one can challenge the fact that the discovery of EPOGEN by Lin’s team launched Amgen’s fame and fortune as a biopharmaceutical industry leader. Thus, the hypotheses about the *kinds of investment in money, time, and managerial efforts required in building them* [capabilities] (Ethiraj et al., 2005), begins to be addressed in this study. This inference is supported by previous research finding suggesting that human capital is a critical first resource for the implementation of a firm’s strategy (Lee and Miller, 1999). That is, human resource (Penrose, 1959; Barney, 1991) is needed to build innovation ca-

pabilities. This is in line with previous research in the biotechnology industry indicating that the quality of research teams is the backbone of new product innovation capabilities (Deeds et al., 1999). Specifically, following Makadok (2001) theory of embeddedness of capabilities, innovation capabilities are embedded in the teams of research scientist working in unity for a common purpose-innovation. Hence, the following proposition is suggested :

Proposition 4 :

Drug innovation capabilities are embedded in teams of scientists.

IV. Innovation Capabilities and Investors' Perception of Value in the Firm

Being an intangible strategic asset (Amit and Schoemaker, 1993), an organization's drug innovation capabilities should positively impact the overall economic performance of the organization, according to strategic assets theory (Barney, 1986). Consistent with this notion, previous research suggests that as much as 70 per cent of the market value of Fortune 500 companies is based on investors' assess-

ment of the intangible assets of these companies (Srivastava et al., 1998, a, b), which includes superior leadership (Cho and Puck, 2005; Barney, 1991), corporate reputation for quality (Shapiro, 1983), corporate culture Barney (1991), forecasting capability (Makadok and Walker, 2000), and innovativeness (Cho and Puck, 2005).

In the specific case of a young biotech firm, what mechanism would be used to send signals of drug innovation capabilities to potential investors during the initial public offering (IPO) stage? In a nutshell, IPO shares are not sold directly to the public. Instead, institutional investors (investment bankers), broker the IPO deal between the issuing firm and the public by selling to the latter (Benveniste and Spindt, 1989). Here again, the network capabilities (external ties) of the issuing firm's CEO is directly linked to the quality of investment banker the CEO is able to attract to handles the IPO process. If that is well done, both the issuing firm's CEO and the investment banker must work closely together to provide information that will showcase the value potentials in the young firm, and then, a critical part of this information is the leadership capabilities of the CEO of young firm issuing the IPO. At this critical sta-

ge, the investment banker strives to overcome the “liability of market newness” (Certo, 2003) of the young firm.

To illustrate with Amgen, verifiable evidence clearly indicates that Amgen’s president and CEO (Dr. Rathmann) did a superb job during Amgen’s IPO stage. That is, investors perceived value in Amgen’s drug innovation and believed in the quality of Amgen’s leadership. Investors risk aversion reduced to the extent that they were willing to pay \$18 per share for Amgen’s IPO. Altogether, the IPO netted \$40 million for Amgen. Amgen’s management called this event the “Ticker Event.” that launched Amgen as biotech industry leader.

Two years later (1985) another team of star scientists led by Larry M. Souza discovered another New Molecular Entities called *Filgrastim* which was later produced and commercialized as a product called *NEUPOGEN*. These two products contribute more than a half of Amgen’s \$5 billion sales yearly. EPOGEN and NEUPOGEN received *Fortune Magazine’s product of the year awards* in 1989 and 1991, respectively. Currently, Amgen’s R&D financing is generated internally from sales revenue from EPOGEN and NEUPOGEN, which in turn has made Amgen a bio-

pharmaceutical company with global presence and industry leadership. We now turn to Amgen’s subsequent track records.

1. Amgen’s Subsequent Track Records of Scientific Achievement

Amgen’s archival data reveal that in December 1994, Amgen was awarded the *National Medal of Technology* (NMT) which is “the highest presidential tribute for extraordinary achievement in commercial application of technology and the equivalent of a Noble Prize.” In addition, Amgen received *Fortune Magazine’s Product of the Year Award* several times. Thus, R&D-driven radical innovation as a source of competitive advantage in the biotechnology industry (Dummett, 2003), leapfrogged Amgen to global industry leadership of the biotech industry. To the extent that R&D spending leverage a firm’s capability for radical innovation through organizational learning (cf: Cohen and Levinthal, 1990), Amgen records indicate that Amgen “invests heavily in research and development, having invested 22 per cent of total product sales in R&D in 2002.”

Work by O’Brien (2003 : 419) concludes that “The R&D intensity [ratio of R&D to sales] of a firm, relative to its

industry rivals, indicates the strategic importance of innovation to a firm.” This is consistent with Amgen’s corporate strategy discussed above in which heavy investment in R&D is considered indispensable to achieve advanced proprietary technology for drug innovation leadership. Amgen realized this strategy because, to the extent that R&D spending reflects the level of importance a firm attaches to innovation (O’Brien, 2003; Hall and Bagchi-Sen, 2002), Amgen ranks first above all firms in the two industries: biotechnology and pharmaceutical industries. Finally, in a profile of the top ten biotech firms in the US and Europe, Amgen ranked first in the following indices: unit sales, total revenue, R&D expenditure, and operating income (Dummett, 2003). We can argue that, contemporary strategic management literature suggests Amgen’s managers must have been applying the principles of dynamic capabilities (Teece et al., 1997) which can explain such a track record of innovation capabilities over time. Dynamic capabilities are enshrined in Amgen’s organizational processes or what Nelson and Winter (1982) dubbed *routines*, these routines enable Amgen to new, innovative, coordinate, integrate, learn and reconfigure its technological and other assets in

a path-dependent manners in a hypercompetitive environments (D’Aveni, 1994) characterized by high velocity of rapid changes (Eisenhardt and Martin, 2000). Sadly, space constraint does not allow us to discuss this deeper, we stop it here.

V. Conclusion and Recommendations

This study was an attempt to respond to calls for research on the origins of organizational innovation capabilities, and to do so by drawing practical illustrations and insights from the strategic actions taken by top managers. In this way, the study drew practical illustrations from Amgen Corp. to buttress the theoretical discussion of the origin of organizational innovation capabilities. Consequently, after elaborate discussion of the theory of the origin of innovation capabilities buttressed by practical insights drawn from Amgen Corp., the following striking results emerged. We found that it was Dr. Rathmann who orchestrated and implemented an R&D collaborative agreement with Abbott Labs. Under this collaboration, Amgen was able to hire and finance the R&D drug innovation activi-

ties of its star scientists. In other words, absent the R&D collaborative agreement with Abbott Labs, Amgen's star scientists could not have been hired in the first place. And, we found that absent the leadership of Dr. Rathmann (Amgen's President and CEO), the R&D collaboration with Abbott Labs could not have taken place. Therefore, we found evidence that the role of Amgen's top leadership in supporting drug innovation activities resulted in the ability of the star scientists to innovate drug innovation capabilities technologies that leapfrogged Amgen to the biotech industry leadership position. So, leadership matters in the theory and practice of the origins of organizational innovation capabilities.

We also discussed theory of embeddedness of organizational capabilities. We found evidence in support of the theory in the case of Amgen Corp. In particular, we found evidence that drug innovation capabilities were embedded in the teams of star scientists working together. This finding is consistent with Makadok's (2001) notion of embeddedness of capabilities in organizations. Finally, we found that absent the four venture capitalists that incorporated Amgen in 1980 and hired Dr. Rathmann, Amgen could not have come into

existence at all. Hopefully, these findings will be insightful to entrepreneurs, to would-be entrepreneurs, and to academics grappling with the research questions addressed in this study especially the role of leadership in providing support to corporate innovation strategies, and the origin of capabilities.

Another unique contribution of the study is that, even though the upper-echelon theory enriched our knowledge of strategic leadership, it has the caveat that it failed to study actual leadership behavior (Cannella and Monroe, 1997). In fact, the extant strategic leadership research underpinned in upper-echelon theory enlisted demographic proxies of leaders to draw inference about their leadership behavior. In contrast, the present study used actual leadership strategic behaviors information which reflect a leader's deployment of organizational assets. Of course, the pattern of asset deployment of a firm is the x-ray of its corporate strategy and its implementation (Hofer, 1992; Hofer and Schendel, 1978). To sum up, the key roles played by Amgen's top echelon in the initiation and implementation of the collaborative R&D agreement without which the star scientists would not have been hired, is worthy of emulation by entrepreneurs and

would-be entrepreneurs who wish to build innovation capabilities for new or existing organizations. Intrusive research methods such as in the present study hold the key to finding the origin of organizational innovation capabilities, not quantitative methods as some scholars would insist.

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