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**Resource Orchestration for Innovation:
Structuring and Bundling Resources in Growth- and Maturity-Stage Firms**

Abstract

Innovation is an important outcome for firms across all life-cycle stages, though challenges to this goal vary by a firm's stage of development. In this study, we integrate resource orchestration with contingency theory to theorize how managers differentially orchestrate their firm's resource portfolio and capabilities to develop innovation based on the firm's life-cycle stage. Empirical tests using primary data collected from 189 managers of U.S. and Italian firms based on the policy capturing method provide support for our hypotheses. Overall, this research contributes to our understanding of how firms manage their resources to create innovation over the firm's life-cycle.

Keywords: Resource Orchestration, Innovation, Firm Life-Cycle, Contingency Theory

Resource Orchestration for Innovation: Structuring and Bundling

Resources in Growth and Maturity-Stage Firms

Growth is a common goal of most organizations, especially for-profit businesses, regardless of their age or position in the market. And many firms have found that organic growth (by internal means) leads to higher returns over time than external growth (acquisitions) (Hitt et al., 2006; Hess, 2007). Organic growth can be achieved by innovation and expansion of the customer base in current or new markets, often simultaneously. Thus, it is important to understand how firms manage their resources to create innovation. Developing innovation requires specific capabilities derived from the integration of resources acquired and developed by the firm (Sirmon et al., 2007). Although we know much about the innovation process and recently have learned how firms generally orchestrate their resources (Sirmon et al., 2011), more research is needed to understand how firms orchestrate their resources to create innovation. In particular, research could help us understand how firms pursue growth through innovation in different contexts.

Prior research has largely focused on the amount of resources needed to develop innovation or on the effect of specific resources on innovation; but how managers actually orchestrate those resources is also critical to innovation. Yet, how firms manage resources is contingent on certain boundary conditions (Sirmon et al., 2007). Contingency theory has become important in understanding how firms innovate by demonstrating that many of innovation's determinants are dependent on multiple firm attributes or environmental contexts (Ahuja et al., 2008; Damanpour, 1991). Based on contingency theory, we expect firm life-cycle stage to affect the way firms orchestrate their resources to facilitate innovation (Miller and Friesen, 1984; Sirmon et al., 2011; Van de Ven, 1986). For example, firms in the growth stage tend to be

younger, smaller, and simultaneously experience more opportunities and more competition in their markets. To exploit opportunities, stay ahead of and/or respond to competition, these firms must create new capabilities and find less crowded market niches, which requires them to access new resources (acquired or through external alliances – King et al., 2003) and develop them to use in the creation of new capabilities. Alternatively, firms in the mature stage of their life-cycle are often older, are more established with formal structures and routines, and have slack resources. Likewise, there are fewer new major opportunities in their market(s), but they still must continue to improve their capabilities to stay ahead of rivals. Thus, managers in these two life-cycle stages engage in different resource management actions to create innovation and gain or sustain an advantage over competitors. Integrating theoretical arguments based on resource orchestration (RO) (Sirmon et al., 2007, 2011) and contingency theory (Boyd et al., 2012; Hitt et al., 2004a), we theoretically explain and hypothesize these relationships. As such, the research question for this study is how do firms manage their resources to be innovative at different stages of their life-cycle. We empirically test our hypotheses using primary data collected from 189 managers of U.S. and Italian firms using policy capturing methodology.

This research offers several contributions. First, we extend the theory underlying RO by integrating contingency theory. Contingency theory provides a framework which helps us understand how firms adapt to changing contexts (Hitt et al., 2004a). By integrating contingency theory to explain boundary conditions that affect how resources are managed to create innovation, we are able to provide more theoretical precision and thus refine and extend our understanding of RO (Edwards, 2010; Boyd et al., 2012).

Second, we provide a strong and unique empirical test of RO theory. To our knowledge, this is the first empirical test to examine the link between orchestrating resources and innovation.

Additionally, while previous studies of RO examined one or two managerial actions (e.g., one or two structuring or bundling actions) in isolation, this study examines all of them simultaneously, providing a more complete understanding of how resources are comprehensively managed.

Therefore, this research empirically demonstrates the value of RO actions for innovation.

Third, the findings of this research have greater generalizability because data were obtained on firms from two different countries. Previous research has been criticized for being too U.S.-centric, hence its generalizability to other country contexts has been questioned.

However, the value of understanding the link between RO and innovation is not confined to the U.S. context. Thus, we collected data on firms from two countries with developed economies and well established formal institutions. Yet, these two countries are located in different global regions and have different but partially overlapping cultural milieus.

This work proceeds first by specifying the theoretical arguments linking RO actions to innovation in firms' different life-cycle stages and presenting hypotheses for the specific relationships explained. We then explain the methods in which we describe the sample, approach used for data collection and the variables measured. Following the method section, we present the results of the analyses used to test each of the hypotheses. We conclude with a discussion of the results explaining the specific theoretical and empirical contributions of the findings and their implications.

THEORY AND HYPOTHESIS DEVELOPMENT

Innovation is essential for the survival, success, and renewal of organizations (Brown and Eisenhardt, 1995; Danneels, 2002). Prominent scholars have argued that innovation is critical to a firm's ability to grow (Hitt et al., 2006; Hess, 2007) and thus be competitive (Schumpeter, 1934) in the long term. It reflects a firm's propensity to engage in and support creativity and

experimentation, which leads to the creation of new products or the modification of existing ones (Lumpkin and Dess, 2001). Given its importance for long term growth and performance, innovation has been intensely studied by management scholars over many decades and its continued importance is evidenced by a multitude of recent review articles (e.g., Ahuja et al., 2008; Anderson et al., 2014; Bogers et al., 2010; Garud et al., 2013).

Recent work has suggested that resources must be managed effectively in order to produce innovation (Helfat et al., 2007; Sirmon et al., 2011). For example, scholars have proposed that “the ultimate source of novelty” (Fleming, 2001: 118) comes through the recombination of existing conceptual and physical materials (Nelson and Winter, 1982). Similarly, Schumpeter (1934) observed that innovation lies in combining components in a valuable way or in developing new combinations. In other words, controlling valuable, heterogeneous resources is necessary, but insufficient; these resources must be recombined, bundled, or otherwise managed in order to produce innovation. This logic suggests that the combinative process necessary for innovation occurs through managers’ decisions and actions designed to orchestrate the firm’s resources and capabilities – or simply “RO” (Sirmon et al., 2007, 2011). Specifically, the actions of structuring (i.e., *acquiring* external resources, *accumulating* resources internally, and *divesting* unproductive resources) and bundling (i.e., *stabilizing* to make incremental improvements to existing capabilities, *enriching* to extend current capabilities, and *pioneering* to create new capabilities) are employed to generate a resource portfolio and develop the firm’s capabilities that can facilitate innovation.

Yet, combining resources in a valuable way is not always a smooth process, especially when existing activities and routines are deeply ingrained in, and supported by, the organizational structure (Morrow et al., 2007). To further complicate this, the effectiveness of

these combinative resource activities – termed RO actions here – is likely contingent on other factors (Boyd et al., 2012). One important contingency factor is firm life-cycle stage. Overall, life-cycle stage has been found to have an indirect effect on firm innovation (Koberg et al., 1996; Van de Ven, 1986; Walsh and Dewar, 1987; Westerman et al., 2006). Furthermore, the life-cycle contingency encompasses several characteristics that have been found to influence innovation, such as uncertainty (Semadeni and Anderson, 2010), size (King et al., 2003), age (Kotha et al., 2011), and experience (Godart et al., 2015).

As such, at different life-cycle stages, firms face unique advantages and challenges, and thus managers need to orchestrate their firm's internal resource and capability portfolios differently to sustain innovation over time (Cameron and Whetten, 1981; Hanks et al., 1994; Miller and Friesen, 1984; Sirmon et al., 2011). Specifically, differences in resource endowments, goals, market strategy, and other characteristics may change the relative importance of each RO action for firms in various life-cycle stages. Thus, in line with RO, we expect that managers will regard all RO actions to be relevant for innovation across all firm's life-cycle stages. However, by integrating RO with contingency theory, we argue that managers emphasize different RO actions to support innovation efforts depending on their life-cycle stage.

Life-Cycle Contingency in Resource Orchestration and Innovation

Firms evolve through various stages of a life-cycle and undergo transformations in their competitive strategies, market position, and organizational structure (Agarwal et al., 2002; Greiner, 1972; Hanks et al., 1994; Miller and Friesen, 1984; Sirmon et al., 2011). Most of the research suggests that firms evolve in a consistent and predictable manner which can be broken down into various life-cycle stages (e.g. Hanks et al., 1994; Miller and Friesen, 1984; Quinn and Cameron, 1983; Sirmon et al., 2011). However, empirical evidence suggests that the main

divergence is between early and later stages, as opposed to four or five stage models (Kazanjian, 1988). Thus, we focus on a general two-stage life-cycle contingency in our theoretical framework (e.g., Koberg et al., 1996): growth-stage (early stage) and maturity-stage (later stage) firms.

Growth-stage firms refer to relatively small, young firms with informal reporting relationships and flexible organizational structures. These firms seek growth as their primary goal and innovation is a means to achieve this goal. Growth-stage firms face challenges and threats to their survival, such as the need to establish legitimacy in the eyes of various stakeholders including investors (Navis and Glynn, 2011), customers (Sirmon et al., 2011), and those charged with implementing formal institutions (e.g. regulatory and economic entities) (Webb et al., 2009). Further, growth-stage firms typically experience resource constraints and need to obtain organizational capabilities either from external sources (e.g. through alliances or acquisitions) or by developing them internally through trial and error processes (i.e. internal R&D investments). Yet, for all these challenges, these firms are rarely encumbered with bureaucracy and strong path-dependent routines, which gives them advantages in leveraging market opportunities quickly. Thus, if growth-stage firms can overcome their challenges, they can become quite agile and innovative over time (Hitt et al., 1994).

On the other hand, maturity-stage firms are generally larger and older firms with a more complex, bureaucratic, and rigid organizational structure that generally slows the implementation of strategic decisions by top executives (Miller and Friesen, 1984). Indeed, the systematic increase in formalization is so standardized across all firms that it is a common defining life-cycle characteristic employed by scholars to divide growth- and maturity-stage firms (Miller and Friesen, 1984; Kazanjian, 1988; Walsh and Dewar, 1987). A typical maturity-stage firm has

more stable revenues and growth rates. Thus, its primary goal is to protect and maintain its current advantages and returns with risk-adverse actions (Shimizu, 2007), such as investing in a new market after a dominant design has been selected (King et al., 2003). However, though mature firms may have become established through success in the market, they face challenges to their continued survival. For example, with a more highly formalized organizational structure, they often have difficulty in being agile enough to quickly respond to rivals' challenges (Agarwal et al., 2002; Lester et al., 2008). Also, mature firms may face difficulty in branching out in new areas because of past competitive moves that protect the firm from rivals, but also insulates it from exploring new opportunities (e.g. the creosote bush conundrum – Burgelman and Grove, 2007). Finally, within established firms, the decision-making process is more formalized and may exhibit forms of path dependency (Ahuja and Lampert, 2001; Jawahar and McLaughlin, 2001). For these reasons, innovation often slows down in maturity-stage firms. However, benefits of scale and continuity of a research program along with routinization of decisions may support continuous innovations and organic growth within mature firms (Dobrev et al., 2003; Hitt et al., 1990).

Structuring the resource portfolio

Developing and extending a firm's resource portfolio has the potential to stimulate innovations (Helfat et al., 2007; Makri et al., 2010). Structuring actions enrich a firm's endowment by adding to existing resources and developing new ones while eliminating inefficient ones. In fact, gaining access to the external resources that a firm lacks (Ahuja and Katila, 2001; Makri et al., 2010), developing resources internally (Thomke and Kuemmerle, 2002), and (sometimes) shedding unproductive resources (Morrow et al., 2007) are important actions regardless of the firm's stage of development. Because firms have finite resources, it is

critical that managers actively orchestrate their resource portfolio to foster innovation outputs (Sirmon and Hitt, 2003). However, unique characteristics associated with each life-cycle stage may influence managers to differentially emphasize structuring actions to facilitate innovation.

Because growth-stage firms commonly encounter greater resource constraints than maturity-stage firms, the organizational abilities to gain access to external resources, learn from external partners, and develop resources internally (e.g., through talented employees) are critical for success in growth-stage firms (Agarwal et al., 2002; Fosfuri and Giarratana, 2007; Sardana and Scott-Kemmis, 2010). For example, small firms lacking in resources can often increase their intangible resources and knowledge by entering into alliances with larger, more established firms (King et al., 2003; Rothaermel and Deeds, 2004). Gilbert et al. (2006), Lumpkin and Dess (2001), and Sirmon and colleagues (2011) all highlight the importance of using external expertise and developing enhanced skills internally to help develop these firms' innovations and spur further growth.

Growth-stage firms, whether in new or established markets, commonly seek to identify gaps or niches not yet satisfied, and try to exploit them through innovations (Miller and Friesen, 1984). Accordingly, these firms typically target specific customers and commercialize specialized products to build customer loyalty to overcome the disadvantages of a smaller resource portfolio and of a narrower reputation with the consumers. Of course, to continue growing, growth-stage firms must satisfy their current customer base and seek new unfulfilled market niches and/or possibly create new markets. For example, product and geographic diversification and entry into new markets that may yet be untapped by current larger competitors present opportunities for firms to both grow and further their explorative ability (Fuentelsaz et al., 2002; March, 1991). Thus, for managers of these firms, emphasizing acquiring

and accumulating actions may be essential (Agarwal et al., 2002; Fosfuri and Giarratana, 2007; Sardana and Scott-Kemmis, 2010) in order to support their firms' strategy to engender organic growth (Miller and Friesen, 1984), establish and maintain legitimacy, and gain a competitive advantage in the market (Gupta et al., 2006; Katila and Ahuja, 2002).

Alternatively, maturity-stage firms have a more established resource portfolio and often possess more slack resources. They may engage in market transactions to access external resources, but often the intention is to replace existing firm resources (i.e., outsourcing) to enhance efficiency. Their managers' emphasis is on making incremental adjustments to their portfolios. Furthermore, larger, maturity-stage organizations often have greater difficulty in managing the organizational climate as firm size increases, which can lead to inertia and resultant declines in creativity (Gong et al., 2013). Thus, we expect managers of growth-stage firms to place more importance on resource acquisition and accumulation for innovation than do managers of maturity-stage firms.

***Hypothesis 1:** Managers of growth-stage firms emphasize resource acquisition and accumulation more than managers of maturity-stage firms for innovation.*

RO involves regular and active management of the firm's resource portfolio, which at times will likely include divesting some resources. Sirmon and colleagues (2010) suggest that a firm's capability weaknesses may undermine the benefits provided by capability strengths. Thus, divesting resources that no longer help to create competitive advantages may be important to facilitate innovation in maturity-stage firms (Chang, 1996; Morrow et al., 2007). Proceeds from divesting unproductive resources can be reinvested to develop innovations. For example, Borisova and Brown (2013) found evidence of firms

using divestments to raise proceeds for future R&D investments. Similarly, by divesting inefficient resources (absorbed slack) and transforming them into flexible cash resources (unabsorbed slack), maturity-stage firms might be able to reduce some of the bureaucracy in their organizational structure, allowing them to increase their level of flexibility, which can enhance innovation outcomes (Chen and Miller, 2007).

Overall, maturity-stage firms often become rigid and inflexible, especially when faced with change (Delacroix and Swaminathan, 1991; Hannan and Freeman, 1989; Haveman, 1993). Multiple business units, products, teams, and activities existing within a firm may require significant bureaucracy to manage and coordinate them, increasing the complexity of managing any single activity efficiently (Palich et al., 2000) and the level of formalization that such coordination requires (Walsh and Dewar, 1987). Also, as firms grow into the maturity-stage, they may have some business units (e.g. resulting from previous diversifications) or resources that require managerial competencies absent in the current managerial team, providing greater impetus for divestment (Hoskisson and Hitt, 1994). Maturity-stage firms can often reduce their organizational complexity, inertia, and capability weaknesses through emphasizing divestment actions and generate flexible cash resources, thereby enhancing innovation potential.

Compared to growth-stage firms, maturity-stage firms often excel at exploitation, relative to exploration (March, 1991). Path-dependent behavior and organizational routines resulting from formalization can limit a firm's search processes and cause them to become less explorative over time. In fact, in the pursuit of continuous innovation and growth, mature firms with the ability to maintain both exploration and exploitation (i.e. organizational ambidexterity) can achieve higher long term outcomes (Hitt et al., 2011;

O'Reilly and Tushman, 2013). Thus, managers of maturity-stage firms that emphasize divestment actions may enable greater innovation over time by shedding past explorative attempts that no longer contribute to current performance and continue to exploit other more promising areas. Yet, they are likely prone to exploit currently successful products which in turn enhances short-term success.

As such, compared to managers of growth-stage firms, managers of maturity-stage firms likely emphasize divesting actions to make efficiency-enhancing, incremental changes in their firm's resource portfolio (Miller and Friesen, 1984; Quinn and Cameron, 1983), rather than amassing more resources to support innovation.

***Hypothesis 2:** Managers of maturity-stage firms emphasize resource divestment more than managers of growth-stage firms for innovation.*

Bundling resources for capabilities

As a firm builds its resource portfolio, it must bundle different sets of resources to create capabilities to perform the required tasks necessary to achieve its strategic goals (Rothaermel and Hess, 2007). Regardless of their stage of development, firms need to continuously make minor incremental improvements (stabilizing), extend current capabilities (enriching) and, at times, build completely new capabilities (pioneering) to grow organically through innovation (Sirmon et al., 2007). While each bundling action may benefit innovation outcomes, the specific action's impact likely changes depending on the context of the firm's life-cycle stage.

Growth-stage firms' capabilities often differ from those of large, maturity-stage firms. In fact, growth-stage firms may often use business models that are entirely different from those of maturity-stage firms (Zott and Amit, 2015). Specifically, the benefits of having a small size and

informal structure allow growth-stage firms to exploit market opportunities more easily and quickly than larger firms can (Dean et al., 1998). In other words, growth-stage firms are more agile. What enables this agility is an ability to quickly modify and develop capabilities to match arising market opportunities. The transformation of capabilities, or development of new ones, come from enriching and pioneering actions.

The lower structural distance between R&D employees and executive decision-makers (flatter structure) in growth-stage firms (Dougherty and Hardy, 1996) can enable greater flexibility for identifying, assessing, and exploiting attractive market niches. Similarly, the communication and coordination within growth-stage firms is often easier than in maturity-stage firms, thereby enabling growth-stage firms to execute a larger number of competitive attacks in the marketplace and allowing them to respond more quickly to rivals' attacks (Chen and Hambrick, 1995). The need to develop new (or substantially change) internal capabilities to engage in new and different competitive attacks supports firm managers' emphasis on enriching and pioneering actions to facilitate innovation in the growth stage.

Although firms in the maturity stage may have diverse capabilities, they may struggle to enrich current ones or pioneer new capabilities due to liabilities of largeness (i.e., bureaucracy, complexity, inertia, and inflexibility – Josefy et al., 2015). Indeed, in maturity-stage firms, well-established routines leading to myopic path-dependent practices often penalize attempts to create innovation; thus conservatism may become the norm (Agarwal et al., 2002; Miller and Friesen, 1984) as opposed to the entrepreneurial, explorative focus of growth-stage firms (Hitt et al., 2011). Maturity-stage firms are likely to concentrate more on maintaining their current market position rather than on developing new long-term strategies. Thus, managers of maturity-stage firms may perceive both enriching existing capabilities and pioneering new ones as expensive,

risky, and ultimately unnecessary. Hence, we expect that managers of growth-stage firms will emphasize the actions of enriching and pioneering capabilities for innovation more strongly than those of maturity-stage firms.

***Hypothesis 3:** Managers of growth-stage firms emphasize capability enriching and pioneering more than managers of maturity-stage firms for innovation.*

Frequently, maturity-stage firms possess a large quantity of resources, often embedded in both their social and human capital; but, because of the challenges associated with strong routines developed over time and a complex bureaucratic structure, they may not be able to efficiently use all of their resources and capabilities (Miller and Friesen, 1984; Quinn and Cameron, 1983). Accordingly, stabilizing actions which balance efficiency and innovation in current capabilities through minor incremental improvements are often an important goal for managers of maturity-stage firms (Quinn and Cameron, 1983).

As firms grow, they implement more elaborate and complex structures to control employee decision-making and to produce more standardized responses (Baker and Cullen, 1993; Kimberly, 1976). An emphasis on stabilizing actions may help to reduce the innovation costs resulting from increased formalization and complexity of maturity-stage firms. Often, increased size creates disagreement and conflict among senior executives due to problems of communication, coordination, interpretation, and integration (Iaquinto and Frerickson, 1997). These disagreements can slow and delay the implementation of strategic decisions. Greater coordination among different teams and business units in maturity-stage organizations could produce more locally cohesive networks which in turn benefits firm

innovation (Guler and Nerkar, 2012). Thus, a focus on stabilizing actions may reduce coordination problems in a complex firm and thereby facilitate innovation.

While growth-stage firms operate in niches or even new markets not yet dominated by others, Miller and Friesen (1984: 1171) suggest that maturity-stage firms tend "... to follow the competition...; to wait for competitors to lead the way in innovating and, then, to imitate the innovations if they prove to be necessary." For example, in new technology-based markets, larger, mature firms often follow the investments of younger firms in new innovations, increasing their chances of earning higher returns by investing in less unsure innovation projects (King et al., 2003). Similarly, in a multiple case study analysis, Westerman et al. (2006) found that a mature firm in an established industry successfully adapted by waiting for rivals to act first, then transforming after uncertainty had decreased. Thus, maturity-stage firms often greatly benefit by investing in capabilities to be fast second movers in the market. They do so by quickly reengineering new products introduced to the market and improving those products to better meet customer needs and thereby gain market share (Economist, 2012), taking advantage of their exploitative strengths. Thus, managers of maturity-stage firms may emphasize the refinement and incremental changes associated with actions designed to stabilize their current capabilities to best support innovation for an imitation market strategy.

Finally, in addition to reducing coordination costs of increased formalization and complexity, some types of organizational controls can actually facilitate innovation in mature firms. For example, Cardinal (2001) found that different combinations of organization-wide controls enhanced innovation in established pharmaceutical firms. Further, benefits of emphasizing stabilizing actions in mature firms include creating

organizational routines for continuous innovation (Dobrev et al., 2003) and benefiting from scale and continuity of their research programs (Hitt et al., 1990).

Hypothesis 4: Managers of maturity-stage firms emphasize capability stabilizing more than managers of growth-stage firms for innovation.

METHODS

Sample

Our study explores the varying emphasis managers place on different RO actions to facilitate innovation in different firm life-cycle stages. As such, it is important to collect data that accurately capture managers' decisions and perceptions regarding the varying importance of different RO actions for firm innovation. To achieve this, data were collected through a specially designed survey instrument to capture top managers' evaluation of the relative importance of different RO actions in achieving innovation. A top executive of a firm (the CEO or a member of the top management team) completed each instrument (Hitt et al., 2000; Hitt et al., 2004b).

To enhance the generalizability of the results, we collected data from firms based in two different countries, U.S. and Italy. While the firms in these countries operate in somewhat different cultural milieus (see the Global Leadership and Organizational Behavior Effectiveness (GLOBE) study – Gupta and Hanges, 2004), both countries represent developed economies with highly developed formal institutions. The sampling frame for the U.S. was a list of firms identified by a major entrepreneurship center of a large research university located in the southwestern U.S.. From this list, we randomly selected 600 firms and tried to directly contact each firm's top executive via telephone, successfully reaching 256 of them. Upon obtaining each executive's consent to participate, we sent an online link to the instrument. We received complete data from 120 firms yielding a participation rate of 46.87%. We conducted some tests to ensure the representativeness of our sample where secondary information was available (i.e.,

firm's age, size, and industry); we found no statistically significant difference between participating and non-participating firms. The data were collected over a seven-month period in 2011.

To acquire Italian data, 500 private Italian firms were randomly selected from the Amadeus dataset provided by Bureau Van Dijk (AIDA). The instrument was translated from English into Italian and then back-translated by two university scholars fluent in both languages; then, it was sent to each firm's top executive following the same procedure used for the U.S. data collection. The final Italian sample consisted of 111 firms, for a response rate of 22.2%. As with the U.S. data, we found no statistically significant difference in age, size, and industry between participating and non-participating firms. The data were collected over a nine-month period spanning 2011 and 2012.

In the combined sample (U.S. and Italian firms), the median firm age is 13 years with the median firm age for growth-stage firms at 7 years and the median firm age for maturity-stage firms at 25 years. The median firm size is 14 employees with a range from 1 to 300,000. Private firms make up the majority of the sample at 90%, with public firms comprising the rest. Also, 38.5% of our sample consists of family businesses. The average executive that completed the instrument has been with his/her current firm for 10+ years, and in the industry for more than 17 years. On average, if the respondent was not the CEO (45% of our sample), s/he was a member of the firm's top management team, one position removed from the CEO. The U.S. and Italian samples were compared with regard to multiple variables (e.g. firm's age, life-cycle stages, importance of RO actions and strategies, and synchronization), and no statistically significant differences were detected.

Growth-stage firms represent 42.86% of the sample with 99 firms, while maturity-stage firms represent 45.89% with 106 firms. The remaining 11.26% of the sample comprised 26 decline-stage firms. These were eliminated from the analyses because they do not fit the theoretical arguments and hypotheses. There were also 16 firms for which there was incomplete firm demographic information and thus they were also excluded from the analyses. Our final combined sample consisted of top managers from 189 firms.

The Instrument

The policy capturing method was originally designed, and has been validated by previous management research, to accurately capture the judgment policies of decision makers (Hitt et al., 2000; Stumpf and London, 1981). As such, it is particularly helpful in determining the drivers of managerial decisions when faced with a variety of potentially relevant criteria that can vary across situations (Connelly et al., 2012). This method has gained recent attention in strategic management research examining managerial decisions such as alliance partners (Hitt et al., 2004b), interorganizational contracts (Connelly et al., 2012), and international joint ventures (Reuer et al., 2013).

Following the policy capturing method, we asked participants to assess the innovation potential of 30 hypothetical scenarios with varying levels of emphasis on 10 different RO actions and strategies. Each scenario was presented to the participants on a single page and they were asked to rate the innovation potential of each. The set of decision criteria (the 10 RO actions and strategies) did not change across the 30 scenarios, but the level of emphasis on each RO actions and strategies was experimentally manipulated randomly from “low” to “high” on a 5-point scale. This variation across the 30 scenarios was necessary to capture which of the actions managers emphasize to drive innovation. In the development of the scenarios, we randomly

assigned the levels of each action/strategy using a random number generator to prevent multicollinearity. We ensured that the variance of each of the actions and strategies was balanced; this was required to make certain that each action/strategy had an equal probability of influencing the decisions (Reuer et al., 2013). A pilot test was conducted with managers of 13 firms not in our final sample to determine the efficacy of the instrument.

Standard surveys often are in danger of retrospective bias and common method bias. However, the policy capturing method overcomes these issues through its design. Specifically, because the decision criteria – in our case RO actions and strategies – remain identical across all scenarios but their levels are randomly manipulated, the respondent only provides the dependent variable, eliminating the possibility of common method bias between independent and dependent variables. Furthermore, because the respondent is asked to evaluate not current or past experiences but hypothetical scenarios, no retrospective bias arises. However, the policy capturing method requires a high level of mental and cognitive effort from respondents. To help the managers complete the instrument, we included detailed instructions and a list of definitions for each of the 10 decision criteria (RO actions and strategies).

By combining respondents' evaluation of scenarios and the characteristics of their firms, we can capture what criteria top managers particularly emphasize to evaluate the innovation potential under different contexts. The 10 decision criteria were developed based on the theory and research to encompass the specific actions of structuring and bundling (*acquiring, accumulating, divesting, stabilizing, enriching, and pioneering*) along with other RO actions and strategies (*synchronization, and resource advantage, market opportunity, and entrepreneurial leveraging strategies*) that may influence innovation (Sirmon et al., 2007, 2011). See Appendix A for definitions and terms provided to the respondents.

Variables

Independent variables. Our research question focused on the relative emphasis top managers place on structuring and bundling actions for firm innovation depending on firm life-cycle stage. Thus, the levels of *acquiring*, *accumulating*, and *divesting* structuring actions, and the *stabilizing*, *enriching*, and *pioneering* bundling actions were the independent variables in the study. In accordance with the policy capturing technique, they were varied randomly across 30 scenarios for the respondents to use in forming judgments about the level of innovation each scenario was likely to achieve.

We were interested in how the importance of these predictors for innovation varied across growth- and maturity-stage firms. We provided respondents with a description of the firm stages of development and, following the work of Koberg and colleagues (1996), asked them to assess if their firm was in the *growth-stage* (start-up or expansion) or the *maturity-stage* (consolidation or revitalization).

Dependent variable. The dependent variable was a two-item scale on the expected level of innovation ($\alpha=0.91$) based on the hypothetical configuration proposed in each scenario. Respondents rated each of the 30 cases on a 5-point Likert-type scale on (1) the probability of recommending their firm to adopt the given configuration to facilitate innovation and (2) the potential for the given process configuration to contribute to a firm's level of innovation. The responses to these two items were then averaged to produce the dependent variable: *innovation*.

Control variables. First, we controlled for levels of leveraging strategies to ensure that the identified effects of structuring and bundling actions on top managers' evaluation of innovation were in addition to the effects of these strategies (Sirmon et al., 2007). Therefore, we included as controls the three strategies of *leveraging capabilities* as well as the *synchronization* of RO

actions and strategies; they were varied on a 5-point scale across the scenarios. Second, we included several firm-level attributes that could potentially confound our results. *Firm size* may influence the availability of slack resources (Zahra and Nielson, 2002) or the existence of market power (Josefy et al., 2015). Size was measured as the log of the total number of employees in a given firm. *Family firms* may differ in their use of RO actions from non-family firms for innovation outcomes (Carnes and Ireland, 2013). Thus, this attribute, identified as having two or more family members involved in the ownership and management of the business, was controlled for in our analyses. *Firm R&D intensity* has also been found to be closely related to a firm's degree of innovation (Cohen and Levinthal, 1990). This variable was provided by the respondent through a question regarding the percentage of key employee time and other valuable firm resources that were invested in developing new ideas, products, or services (e.g., for industrial firms, R&D expenditure as a percentage of sales). Additionally, to capture industry effects on innovation (Makri et al., 2010), we controlled for broad industry classifications using four categorical variables. The industry to which each firm belongs was provided by the respondent, and we grouped them into 5 broad NAICS categories: (1) Mineral and Construction, (2) Manufacturing, (3) Financial, Services, and Communication, (4) Wholesale, Retail, and Transportation, and (5) Public Administration and Other. The reference industry for measurement was Wholesale, Retail, and Transportation, because it had the smallest number of firms in our sample. Finally, because we collected data from the U.S. and Italy, we controlled for country (1 for U.S. and 0 for Italian respondents).

RESULTS

Table 1 shows the descriptive statistics and correlations of the dependent variable and the randomized policy criteria, which are the specific RO actions and strategies in our instrument.

Table 2 shows the descriptive statistics and correlations of the dependent variable and all of the control variables. To test our hypotheses, we developed subgroup models for each of the life-cycle stages using multilevel modeling (see Table 2). Multilevel modeling is particularly appropriate for policy capturing analyses (Connelly et al., 2012; Hitt et al., 2000, 2004) because of our instrument design of 30 scenarios per respondent, which results in a nested data structure that violates the ordinary least squares (OLS) regression assumption of independence. Multilevel modeling controls for the two nested data levels by accounting for within- and between-respondent variance (Hofmann, 1997). Interpretation of the coefficients produced by multilevel analysis is similar to that of OLS regression (Bryk and Raudenbush, 1992) and, due to the relatively equal variances of the predictors in our instrument design, the coefficients proxy standardized coefficients allowing for the relative weights to be interpreted (Hitt et al., 2000, 2004). With 30 observations per respondent, the growth-stage and maturity-stage groups had 2,760 and 2,910 observations respectively (for a total of 5,670 observations), addressing concerns for type-2 error and making the subgroup analysis design more efficacious. We used STATA 12.0 for all the analyses.

Insert Tables 1 and 2 about here

In order to test our hypotheses, we examined different emphases on structuring and bundling actions between growth- and maturity-stage firms' top managers. To do this, we compared the coefficients obtained through our multilevel analyses based on the technique outlined in Hitt and colleagues (2004: 181) and in Cohen and Cohen (1983: 111). First, the adjusted standard error of each coefficient was obtained and the difference between the coefficients from the two subgroups was divided by the difference of their adjusted standard errors. The result of this comparison is a normally distributed z -test statistic. Table 3 shows the

results for both the growth-stage subsample (Model 2) and the maturity-stage subsample (Model 3). Table 4 shows the results of the comparisons.

Hypothesis 1 asserts that managers of growth-stage firms emphasize the acquiring and accumulating actions more strongly than managers of maturity-stage firms to achieve innovation. The results presented in Table 4 show positive and statistically significant z-scores for acquiring and accumulating, thus supporting hypothesis 1.

Hypothesis 2 states that managers of maturity-stage firms emphasize divesting more strongly than managers of growth-stage firms to achieve innovation. Results in Table 4 provide no support for hypothesis 2; the z-score coefficient is not statistically significant. Models 2 and 3 in Table 3 show that managers of both growth- and maturity-stage firms equally emphasize divesting (although marginally statistically significant) for innovation.

Hypothesis 3 posits that managers of growth-stage firms emphasize the enriching and pioneering actions more strongly than managers of maturity-stage firms to achieve innovation. The results in Table 4 show positive and statistically significant z-scores for enriching and pioneering. Therefore, hypothesis 3 receives support.

Hypothesis 4 states that managers of maturity-stage firms emphasize the stabilizing activity more strongly than managers of growth-stage firms for innovation. Table 4 shows a negative and statistically significant z-score for stabilizing, thus providing support for hypothesis 4.

Insert Tables 3 and 4 about here

Some self-reporting bias is possible in the managers' identification of their firm's life-cycle stage. As a robustness check for this measure, we used a median split of firm age as a proxy for growth- and maturity-stage firms and re-ran the analyses to test Hypotheses 1-4. The results are essentially similar alleviating concerns, with the only notable difference that we found

marginal support for hypothesis 2 in these analyses (-1.36; $p=0.087$), which did not receive support in the main analysis¹.

Given our international sample, we performed an additional robustness test to examine if there were systematic differences between the U.S. and Italian samples. We found the same general pattern of relationships across the two models as in the combined model. In general, the results of these tests support the theoretical arguments presented being generalizable beyond a single country's context and suggest that our analyses are robust to different operationalizations of growth- and maturity-stage firms.

DISCUSSION

Innovation is a challenging yet necessary activity for firms throughout their life-cycle to maintain growth over time (Hitt et al., 2006; Hess, 2007). However, the specific innovation issues faced by firms differ depending on their context. By integrating the theoretical perspective of RO with contingency theory, we explore how a firm's life-cycle stage affects the need to differentially emphasize internal resource and capability development actions to facilitate innovation. We demonstrate that firms' growth stages affect the way managers orchestrate resources for innovation.

We find that growth-stage firms' managers emphasize resource acquisition and accumulation actions to overcome resource constraints, accessing new markets, and quickly transform or develop new capabilities that help produce innovation. On the contrary, maturity-stage firms often have established resource portfolios, which can potentially inhibit innovation due to resources being tied up in inflexible investments limiting the firm's ability to explore new growth opportunities distant to its core business(es). We expected managers of maturity-stage

¹ Results are available from authors upon request.

firms to deal with these issues by emphasizing divestment actions. Yet, given our results, perhaps maturity-stage firms did not use divestment of resources to enhance innovation. Rather they likely only divested resources to increase efficiency. In sum, growth-oriented firms engage in RO actions that allow them to grow and expand over time, whereas maturity-stage firms engage in RO actions to increase their efficiencies.

As noted above, the analyses did not provide evidence that managers of maturity-stage firms emphasize divesting actions more strongly than managers of growth-stage firms for increasing innovation. Yet, in the robustness test with the median split of firm age, we found that managers of older firms (likely, mature firms) emphasized divesting resources to develop innovation more than managers of younger firms did (typically firms focused on growth). Our results may reflect the difficulty managers have in divesting resources (Shimizu, 2007) until the firm is older and pressured to do so in order to restart its growth. According to Shimizu and Hitt (2005), managers are reticent to divest assets that they have acquired, often investing more in vain to show the efficacy of their original decision to acquire those resources.

There are also additional potential explanations for the findings noted above. When a firm tries to free up resources and achieve some new slack regardless of the firm's life-cycle stage, restructuring strategies, such as downscoping, can be costly (thus reacquiring use of the increased slack). However, downscoping can enhance innovation; thus, growth-stage firms' pursuit of innovation may benefit from divesting resources as well. Indeed, as we previously stated, growth-stage firms are less likely to divest resources because they often have fewer slack resources (especially inefficient ones) and do not face the costs and complexities associated with large size. However, when growth-stage firms follow multiple technological trajectories, they may become over-diversified in their pursuit of new opportunities. These firms might realize that

some of these trajectories, though promising at the beginning, would be better divested now in view of the core business(es) to reinvest the resulting cash in more relevant, successful, and/or promising innovations. Therefore, managers of growth-stage firms as well as maturity-stage firms might benefit from divestment to free up resources that can be re-directed to other (and more profitable) innovation projects. That is, all firms may benefit from divesting resources to re-focus on their core business, suggesting that life-cycle stage may not differentiate firms engaging in this activity. Furthermore, firms across all life cycles may face the risk of diversification due to managerial reasons, such as diversifying employment risk, instead of firm strategic reasons. This suggests that corporate governance mechanisms need to limit these types of actions across all firm life cycles, instead of just in mature, large, public firms where such corporate governance mechanisms are commonly studied (Dalton et al., 2007).

Our integration of RO with contingency theory allowed us to explore the simultaneous benefits and challenges of orchestrating resources to support innovation in firms across life-cycle stages. We theoretically proposed and empirically found that emphasis on the types of RO actions to develop capabilities for innovation differs across life-cycle stages. While growth-stage firms build their resource portfolio so that they can enrich their current capabilities and continue to create new ones, maturity-stage firms attempt to stabilize their capabilities with incremental improvements. Specifically, managers of growth-stage firms focus on developing new capabilities to adapt quickly to partners and rivals alike trying to gain an advantage, whereas managers of maturity-stage firms focus on sustaining current advantages through stabilizing actions that facilitate continuous innovation programs and protect from temporary environmental pressures that can divert resources.

Contributions

Our study makes three primary contributions. First, we extend theoretical arguments in RO by illuminating an important contingency factor for RO actions: firm life-cycle stage. Specifically, we integrate RO and contingency theory to explore how managers differentially emphasize RO actions for innovation across life-cycle stages. Prior research exploring various resources and capabilities to produce innovation has provided sparse and inconsistent results. This is perhaps at least partially due to a missing link in these studies, as they have not examined how those resources have been managed and have not considered the contingency of life-cycle stages. Our research sheds light on these missing links by examining how managers of firms in different life-cycle stages orchestrate resources differently to develop innovation. The integration of RO and contingency theories extends the RO theoretical perspective by explaining an important boundary condition and links it to innovation.

Second, our work offers important additional empirical support to the RO framework. To the best of our knowledge, this is the first effort to empirically apply RO to the study of innovation and firms' life-cycle stages across national borders using primary data. Furthermore, our empirical contribution is important to the literature given that most prior work on RO has either been conceptual (e.g., Sirmon et al., 2007, 2011), or has focused on only one or two actions (e.g., Sirmon and Hitt, 2009). Our simultaneous treatment of all the structuring and bundling actions, while controlling for market leveraging strategies and synchronization, is unique and valuable. While not hypothesized herein, the results for the full sample analysis (Model 1 in Table 3) show that structuring and bundling resources are important actions for all firms regardless of their life-cycle stage, providing empirical support for the importance of orchestrating firms' resources to facilitate innovation.

The third contribution is our use of primary data collected through a field-experiment technique across multiple countries. In so doing, we enhance the generalizability of the results as they are not U.S.-centric. Our results suggest that managing resources to produce innovation is broadly applicable, especially in economically developed countries with well developed formal institutions and across cultures. This study is the first of its kind within the RO literature and provides support to the generalizability of this theoretical perspective.

Limitations and Future Research

The results outlined earlier and the following limitations suggest several issues that future research may explore. First, we recognize that, in general, maturity-stage firms might also find it difficult to divest resources because of top executives' escalation of commitment (Shimizu, 2007). However, such divestment may become more plausible when a new CEO is hired or another change in the leadership occurs (Shimizu and Hitt, 2005). For instance, Salvato and colleagues (2010) documented how the recent appointment of a new CEO in the Falck Group – an European company established in 1906 – helped the firm to shed its unproductive resources related to the steel business and fostered its entrepreneurial regeneration into the renewable energy business. Future research should consider the effect of top management changes on how resources are managed, including not only changes in the resource portfolio, but also in the capabilities created and the strategies used to exploit them.

Second, we do not consider the differences in types of innovation created between the life-cycle stages. Previous research has found that while growth-stage firms are focused on novel, discontinuous innovations, maturity-stage firms often produce a greater number of innovations that are largely incremental improvements in existing products (Cohen, 1995; Sorescu et al., 2003). Furthermore, maturity- and growth-stage firms may orchestrate their resources differently

to support product versus process innovations. Future research should examine how managers orchestrate resources to develop different types and amounts of innovations across the life-cycle stages. Future research should also study how different leveraging strategies (i.e. resource advantage strategy, market opportunity strategy, and entrepreneurial strategy) are used to exploit capabilities to develop different forms of innovation in each life-cycle stage.

Third, our data were collected in the U.S. and Italy, which adds confidence to the generalizability of the results. However, future studies across a greater number and variety of countries could explore whether cultural norms or formal institutions influence the relative types of structuring and bundling actions used for innovation. For example, research using emerging economy countries with less developed formal institutions could be the focus for a sample. Alternatively, the sample could be composed of some firms/managers with a home based in developed countries and other firms/managers based in emerging economies. This would allow research with a contingency based on differences in formal institutions.

Also, our research was cross-sectional. Cross-sectional studies are limited in that they are unable to capture the historical context or changes in the environment and how they are associated with the growth of individual firms over time. Longitudinal studies of the organizational life-cycle that trace changing structuring and bundling actions over time are thus needed. Furthermore, there is a need for qualitative studies capturing the nuances of change within individual organizations. Such studies may provide additional insights into the choice of appropriate RO configurations over time.

In addition to the opportunities provided by the limitations in our study, our integration of RO and contingency theory highlights a number of promising avenues for future research. First, while we focus on the activities surrounding the development of resource and capability

portfolios, we do not consider how life-cycle stages might differentially affect the use of certain capabilities for innovation. For example, absorptive capacity is often stronger in maturity-stage firms than in growth-stage firms due to the greater experiences and network connections of the more established firms. However, the inflexibility due to bureaucracy may make it more difficult for maturity-stage firms to use the absorptive capacity. In contrast, growth-stage firms may have more opportunities to exploit their weaker, but growing absorptive capacity.

Second, while we focus on the resource portfolio's development activity of acquiring, referring to the acquisition of resources from the strategic factor market (Barney, 1986), it would be valuable to explore the differences in emphasizing the capability development bundling actions (stabilizing, enriching, and pioneering) if a firm acquires an entirely new resource portfolio through the purchase of another firm, as opposed to purchasing specific resources externally, or developing them internally. While meta-analyses have shown that performance outcomes of acquisitions are often poor (King et al., 2004), successful deals are often focused on creating innovations (e.g., Makri et al., 2010). In these cases, would managers need to emphasize the enriching and pioneering actions to build new capabilities around the newly combined resource portfolios, or would the stabilization activity become critical to standardize decisions in the merger's integration process and create a successful and long-term R&D program? Also, some firms (often maturity-stage firms) seek to supplement their internal innovation development process by acquiring firms with robust new innovations (i.e. acquiring innovation through market transactions) (Hitt et al., 1996). In this way, they may be able to sustain their competitive advantage or create a new one. Future studies on RO could more explicitly consider these issues to better understand the development of firms' innovation.

Implications for Practice

Our findings also provide important insights for managers. An understanding of the most influential RO actions in the different stages of development can be helpful to managers responsible for planning, guiding, and fostering organic organizational growth, or enabling the transition from one stage to another. Specifically, managers need to transform their firm's resources and capabilities as their firm grows and develops; otherwise, its long-term success might be at risk. Managers also need to identify and acquire the most suitable resources and develop the most effective capabilities to produce the amount and type of innovation needed to achieve and maintain competitive advantages. Our work provides a useful roadmap for managers to anticipate the challenges and better allocate resources to ensure the firm's long-run survival, viability, and growth. Moreover, managers could use our research to anticipate the RO actions in which their firm's competitors are likely engaging and design appropriate countermoves. Finally, our findings suggest that divesting is an important action to enhance innovation across all life-cycle stages, instead of primarily in the mature phase as commonly assumed.

CONCLUSION

In conclusion, we explored how firms orchestrate resources in an attempt to achieve and maintain organic growth. We found support for the contention that managers focus on different RO actions to achieve innovation and growth across the firm's stages of development. RO actions are important to all firms, yet growth- and maturity-stage firms differentially emphasize specific RO actions to achieve their competitive goals. Our study provides a promising building block for understanding the link between the RO actions, firm life-cycle stages, and innovation.

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Table 1: Descriptive Statistics and Correlations for the dependent variables and the randomized policy criteria^a

Variable	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Innovation	2.67	0.95	1.00									
(2) Acquiring	3.27	1.39	0.11	1.00								
(3) Accumulating	2.87	1.41	0.12	-0.10	1.00							
(4) Divesting	2.50	1.34	0.01	-0.04	0.12	1.00						
(5) Stabilizing	3.17	1.34	0.03	0.12	-0.32	0.23	1.00					
(6) Enriching	3.09	1.47	0.07	-0.08	0.04	0.13	0.23	1.00				
(7) Pioneering	2.75	1.33	0.08	0.22	-0.04	-0.02	0.19	-0.03	1.00			
(8) Resource Advantage Strategy	2.77	1.45	0.06	0.10	-0.28	-0.21	0.00	-0.19	-0.05	1.00		
(9) Market Opportunity Strategy	2.96	1.50	0.09	-0.16	-0.31	-0.24	-0.28	0.20	-0.23	0.19	1.00	
(10) Entrepreneurial Strategy	2.77	1.41	0.14	-0.04	-0.15	-0.15	-0.01	-0.27	-0.01	0.01	0.21	1.00
(11) Synchronization	2.87	1.41	0.12	0.00	0.26	0.20	0.12	-0.04	-0.11	-0.23	-0.21	-0.10

^aCorrelations greater than |0.03| are significant at $p < 0.05$

Table 2: Descriptive Statistics and Correlations the dependent variable and the control variables^a

Variable	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Innovation	2.67	5.00	1.00							
(2) Firm Size	3.48	12.61	-0.02	1.00						
(3) Family Business	0.36	1.00	-0.02	-0.22	1.00					
(4) R&D Intensity	20.06	100.00	-0.02	-0.13	-0.04	1.00				
(5) Mineral & Construction	0.13	1.00	0.01	-0.02	0.02	-0.18	1.00			
(6) Manufacturing	0.11	1.00	-0.03	0.17	0.14	0.03	-0.13	1.00		
(7) Financial, Services, Communic.	0.53	1.00	-0.02	0.04	-0.19	0.03	-0.40	-0.37	1.00	
(8) Public Admin & Other	0.07	1.00	-0.02	-0.00	-0.20	0.33	-0.10	-0.09	-0.29	1.00
(9) US Dummy	0.57	1.00	-0.11	0.36	-0.17	0.13	0.04	-0.01	0.14	0.16

^aCorrelations greater than |0.03| are significant at $p < 0.05$

Table 3: HLM Model Results

Innovation	Model 1 (Full Sample)	Model 2 (Growth-Stage Firms)	Model 3 (Maturity-Stage Firms)
<i>Controls</i>			
Resource Advantage Strategy	0.094; <i>p</i> :.000 (0.008)	0.091; <i>p</i> :.000 (0.012)	0.097; <i>p</i> :.000 (0.012)
Market Opportunity Strategy	0.119 <i>p</i> :.000 (0.010)	0.125; <i>p</i> :.000 (0.014)	0.114; <i>p</i> :.000 (0.014)
Entrepreneurial Strategy	0.129; <i>p</i> :.000 (0.009)	0.130; <i>p</i> :.000 (0.013)	0.129; <i>p</i> :.000 (0.012)
Synchronization	0.104; <i>p</i> :.000 (0.009)	0.114; <i>p</i> :.000 (0.012)	0.095; <i>p</i> :.000 (0.012)
Firm Size	0.018; <i>p</i> :.105 (0.011)	0.004; <i>p</i> :.874 (0.025)	0.011; <i>p</i> :.382 (0.012)
Family Business	-0.037; <i>p</i> :.513 (0.057)	-0.006; <i>p</i> :.945 (0.088)	-0.066; <i>p</i> :.363 (0.073)
R&D Intensity	0.001; <i>p</i> :.490 (0.001)	0.001; <i>p</i> :.479 (0.002)	0.002; <i>p</i> :.285 (0.002)
Mineral & Construction	0.077; <i>p</i> :.426 (0.097)	0.111; <i>p</i> :.473 (0.155)	0.059; <i>p</i> :.616 (0.118)
Manufacturing	-0.169; <i>p</i> :.089 (0.099)	-0.198; <i>p</i> :.222 (0.162)	-0.151; <i>p</i> :.211 (0.121)
Financial, Services, Communications	-0.056; <i>p</i> :.456 (0.075)	-0.084; <i>p</i> :.475 (0.117)	-0.021; <i>p</i> :.824 (0.093)
Public Admin & Other	-0.106; <i>p</i> :.413 (0.130)	-0.019; <i>p</i> :.932 (0.228)	-0.212; <i>p</i> :.165 (0.153)
US Dummy	-0.235; <i>p</i> :.000 (0.057)	-0.250; <i>p</i> :.004 (0.088)	-0.210; <i>p</i> :.004 (0.073)
<i>Independent Variables</i>			
Acquiring	0.079; <i>p</i> :.000 (0.008)	0.083; <i>p</i> :.000 (0.012)	0.076; <i>p</i> :.000 (0.011)
Accumulating	0.159; <i>p</i> :.000 (0.010)	0.178; <i>p</i> :.000 (0.015)	0.142; <i>p</i> :.000 (0.014)
Divesting	0.023; <i>p</i> :.009 (0.009)	0.023; <i>p</i> :.069 (0.013)	0.023; <i>p</i> :.061 (0.012)
Stabilizing	0.057; <i>p</i> :.000 (0.011)	0.053; <i>p</i> :.001 (0.016)	0.060; <i>p</i> :.000 (0.015)
Enriching	0.069; <i>p</i> :.000 (0.009)	0.081; <i>p</i> :.000 (0.013)	0.058; <i>p</i> :.000 (0.013)
Pioneering	0.089; <i>p</i> :.000 (0.009)	0.101; <i>p</i> :.000 (0.013)	0.077; <i>p</i> :.000 (0.012)
Log likelihood	-7108.70	-3482.46	-3614.93
Wald chi-Squared Test	1018.79; <i>p</i> :.000	561.82; <i>p</i> :.000	472.87; <i>p</i> :.000
N	5670	2760	2910

p-values in italics; Standard error in parentheses

Table 4: Pairwise z-scores (Growth- vs. Maturity-Stage Firms)^{2,a}

Resource Structuring and Bundling Actions	Pairwise z-scores
Acquiring	3.49***
Accumulating	12.86***
Divesting	0.09
Stabilizing	-2.35**
Enriching	9.39***
Pioneering	9.75***

^a one-tailed tests; + p<0.10, * p<0.05, **p<0.01; ***p<0.001

² These differences are interpreted as the first stage listed subtracted *from* the second listed. For example, the acquiring coefficient is positive and statistically significant suggesting that growth-stage firms emphasize acquiring significantly more than do maturity-stage firms. The p-values for the comparison tests are derived from standard z-score tables (see Hitt et al., 2004b).

Appendix A

Table A.1: Definitions of resource orchestration variables provided in the survey instrument

Independent Variables	
Acquiring	Acquiring external resources. Acquiring refers to purchasing tangible and intangible resources from strategic factor markets (e.g. equipment, intellectual capital, resources from mergers and acquisitions).
Accumulating	Developing resources internally. Developing refers to the internal development of tangible and intangible resources (e.g. equipment, facilities, knowledge, and learning form partnering with other firms).
Divesting	Divesting firm resources (in a way that is not harmful). Divesting refers to the shedding of firm-controlled resources (e.g. laying off employees whose skills do not add value to the firm, selling no valuable equipment and facilities, divesting underutilized resources, spinning-off peripheral businesses).
Stabilizing	Making minor incremental improvements in existing capabilities. It is needed to maintain a firm's current capabilities' level of proficiency. This is achieved by slightly altering a firm's mix of resources, making necessary investment in supporting and sustaining resources, restoring weakened resources (e.g. requiring employees to attend a specified number of training hours per year to keep their knowledge and skills up to date).
Enriching	Extending current capabilities. It is needed to improve a firm's current capabilities' level of proficiency. This is achieved by improving resources, adding better resources, replacing resources with incrementally higher quality ones, using existing resources more efficiently and/or more effectively (e.g. a pharmaceutical firm might use an alliance with or an acquisition of a biotechnology firm to capture knowledge that enhances its R&D capability).
Pioneering	Creating capabilities new to the firm. New capabilities are created by re-combining apparently unrelated resources in novel ways, bundling new, complementary resources together, uniquely combining new, valuable resources with existing ones (e.g. SmithKline acquired Beckman instruments to combine its own drug research with Beckman's capabilities in diagnostic technology, to create new capabilities in biomedical research).
Control Variables	
Resource Advantage Strategy	Leveraging internal capability configurations. It refers to the actions used to apply a firm's capabilities that produce a distinctive competence, developing a fit between the firm's competencies and the market where it has an advantage over its competitors (e.g. when Philip Morris acquired Miller Brewing company, it used its capabilities in marketing and distribution to gain an advantage over most competitors in the beer market).
Market Opportunity Strategy	Exploiting external market opportunities. It refers to the careful analysis of the external environment to identify those opportunities for which the firm has capabilities that can be configured to exploit them (e.g. expanding a current successful product into a new geographic or target market, or using marketing and R&D to develop a minor change to a product to fit new customer needs).
Entrepreneurial Strategy	Creating new entrepreneurial opportunities. It refers to the actions involved in developing capability configurations to create new products/services that require new markets (e.g. digital technology used in cameras created a number of new markets, such as retail cameras, security devices, and automotive imaging equipment).
Synchronization	Integration of all the actions. It refers to the integration to ensure harmony and efficiency. This requires top level managers to be simultaneously involved in all states of the resource management process while consistently scanning the external environment for important changes.